

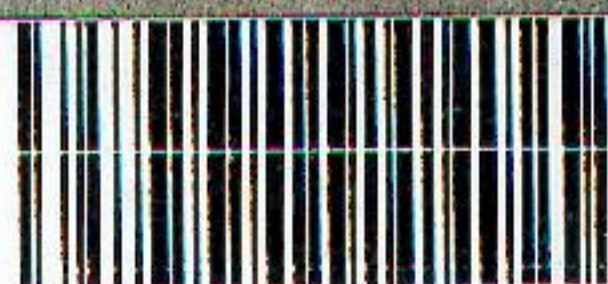
Report on

GEOTECHNICAL INVESTIGATIONS
MACKENZIE HIGHWAY
MILE 544 to MILE 635

Prepared for

DEPARTMENT OF PUBLIC WORKS OF CANADA

Volume 5



D001633

April 20, 1973



R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING





This report is in seven volumes. A Table of Contents is at the front of each volume.

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APPENDIX D

Explanation Sheets



EXPLANATION OF TERMS AND SYMBOLS

USED ON TEST HOLE LOG SHEETS

Depth

This column refers to the depth below the ground surface in feet.

Sample Number

Tube and core samples were numbered consecutively from the surface. Grab samples were not numbered.

Sample Type

This column indicates the depth interval and condition of each sample attempted. Undisturbed samples in this program were obtained with Shelby tubes of 18 inches length and 3 inches diameter, manufactured from 11 gauge steel, or by core drilling. Cores were of 2.85 inch diameter and up to 36 inches long.

Disturbed samples were obtained from the returned cuttings.

T indicates tube sample

C indicates core sample

☒ indicates large grab sample

Note: Grab samples taken for water content and visual examination are not indicated in this column.

Percent Recovery

This column shows the length of sample recovered as a percentage of the length attempted. 100% recovery is not indicated and may be assumed where no value is shown.



Penetration Resistance

No standard penetration tests were performed during this program.

Soil Symbol

The soil symbols used are explained in full on page 5 of this appendix.

Soil Description

Soils of different engineering classification are grouped generically for ease of reference. The system used is the Modified Unified Classification System for Soils.

Frozen Ground

The depth intervals over which frozen and unfrozen ground were encountered are indicated by F and UF respectively. No attempt was made to differentiate between seasonal frost and permafrost.

Ice Description

The ice content of permafrost soils has been classified according to the National Research Council System for describing permafrost. A brief review of the NRC System is contained on page 9 of this appendix. Where no entry is made, the type was not recorded in the field.

The amount of ice contained in a soil sample was estimated in the field laboratory by inspection. The value arrived at by the laboratory technician has been left unchanged.



Water Content

The natural water content of the soil at the time of drilling is plotted against depth on the chart at the right hand side of the log. The water content, which is indicated by a circle, is expressed as a percentage of the dry weight of the soil. It will be observed that water contents in excess of 100% are indicated in the column at the right of the chart by figures.

Volume of Ice

The total volume of ice in undisturbed samples is indicated on the same chart as water contents. The value is indicated by a triangle. This volume is the total volume of ice in an undisturbed sample and includes interstitial ice, as well as excess ice, and is expressed as a percentage of the total volume of the sample.

Grain Size Analysis

The proportions of clay, silt, sand and gravel in a sample are summarized. Grain size curves for each sample so analyzed are on separate sheets.

Wet Density

The wet in situ density of undisturbed samples is the total weight of the sample in pounds (including ice and water) divided by the volume of the sample in cubic feet.



Dry Density

The dry in situ density of undisturbed samples is the weight of dry soil divided by the volume of the sample in cubic feet.

Atterberg Limits

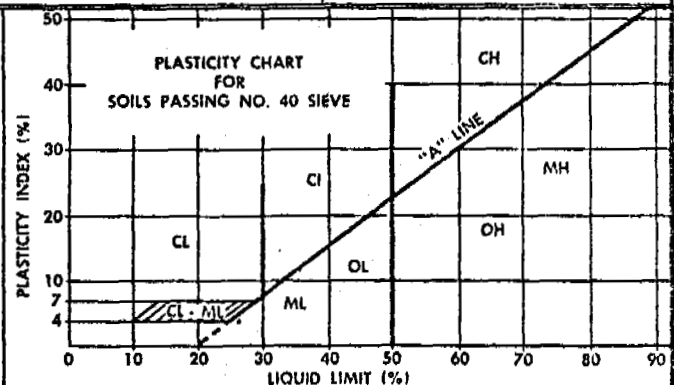
The plastic and liquid limits are shown on the water content chart by a horizontal bar. The Atterberg system is discussed in the following section.

NOTES ON ATTERBERG LIMITS

Soils which possess a significant fraction of clay can exist in liquid, plastic or solid states according to the water content. Where the water content is very high, so that the soil is in the form of a slurry, the soil behaves as a liquid. If the water content is reduced, for example through evaporation, the clay will enter into a plastic state. If the water content is reduced yet further, the clay will become a solid. The transition from one state to another occurs gradually over a range of water content. Atterberg, a Swedish agronomist, developed a method for delineating the boundaries between the three states. If his method is used, the water content which marks the dividing line between the plastic and liquid state is known as the Liquid Limit. These water contents are all expressed as percentages of the dry weight of soil. The range of water content between the plastic

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION			GROUP SYMBOL	GRAPH SYMBOL	COLOR CODE	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		RED	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
			GP		RED	POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY GRAVELS (WITH SOME FINES)	GM		YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTEBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			GC		YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-(SILT) CLAY MIXTURES		ATTEBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
	SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW		RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
			SP		RED	POORLY GRADED SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY SANDS (WITH SOME FINES)	SM		YELLOW	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTEBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			SC		YELLOW	CLAYEY SANDS, SAND-(SILT) CLAY MIXTURES		ATTEBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE NEGLECTIBLE ORGANIC CONTENT	$w_L < 50\%$	ML		GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (see below)	
		$w_L > 50\%$	MH		BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS		
	CLAYS ABOVE "A" LINE OR PLASTICITY CHART NEGLECTIBLE ORGANIC CONTENT	$w_L < 30\%$	CL		GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS		
		$30\% < w_L < 50\%$	CI		GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS		
		$w_L > 50\%$	CH		BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
	ORGANIC SILTS & CLAYS BELOW "A" LINE OR CHART	$w_L < 50\%$	OL		GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY	
		$w_L > 50\%$	OH		BLUE	ORGANIC CLAYS OF HIGH PLASTICITY		
	HIGHLY ORGANIC SOILS			PI		ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE



1. ALL SIEVE SIZES MENTIONED ON THIS CHART ARE U.S. STANDARD, A.S.T.M. E.11.
2. BOUNDARY CLASSIFICATIONS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN COMBINED GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL SAND MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%.



and liquid limit is known as the plastic range and the numerical difference between the liquid and plastic limits is called the Plasticity Index.

It will be appreciated that where the natural water content is in excess of the liquid limit, the soil mass will be most unstable and will readily flow into excavations or trenches. Such considerations will not apply where the soil mass is kept frozen. However, in cases where the frozen soil is allowed to thaw, the relationship between the natural water content and liquid limit becomes critical.

On page 5 there is a chart showing the relationship between the Plasticity Index, the Liquid Limit and the group symbols of the Unified Classification System. The Atterberg Limit system is extremely useful for identifying and classifying soils.

NOTES ON THE RADFORTH SYSTEM

FOR CLASSIFYING PEAT

The Radforth classification system for describing muskeg (organic terrain) is a method for classifying the three elements of vegetation, topography and organic surface cover using letter and figure symbols. Height and type of vegetation is described by using capital letters (A through I). Topography is described by using lower case letters (a through p) Organic cover type if described by using figures (1 through 16).



Table I outlines these figure symbols and the peat structure and type represented by them. A complete description of the Radforth system is contained in "Guide to a Field Description of Muskeg" published by National Research Council, Ottawa, from which has been copied Table I.



TABLE I
SUBSURFACE CONSTITUTION

Predominant Characteristic	Category	Name
	1.	Amorphous-granular peat
	2.	Non-woody, fine-fibrous peat
	3.	Amorphous-granular peat containing woody fine fibres
	4.	Amorphous-granular peat containing woody fine fibres
	5.	Peat, predominantly amorphous-granular, containing non-woody fine fibres, held in a woody, fine fibrous framework.
	6.	Peat, predominantly amorphous-granular containing woody fine fibres, held in a woody, coarse-fibrous framework.
	7.	Alternate layering of non-woody, fine fibrous peat and amorphous-granular peat containing non-woody fine fibres.
	8.	Non-woody, fine-fibrous peat containing a mound of coarse fibres.
	9.	Wood, fine fibrous peat held in a woody, coarse-fibrous framework.
	10.	Woody particles held in a non-woody, fine-fibrous peat.
	11.	Woody and non-woody particles held in fine-fibrous peat.
	12.	Woody, coarse-fibrous peat.
	13.	Coarse fibres criss-crossing fine- fibrous peat.
	14.	Non-woody and woody fine-fibrous peat held in a coarse-fibrous framework.
	15.	Woody mesh of fibres and particles enclosing amorphous-granular peat containing fine fibres.
	16.	Woody, coarse-fibrous peat containing scattered woody chunks.



NOTES ON THE NATIONAL RESEARCH COUNCIL
SYSTEM FOR DESCRIBING PERMAFROST

Ground ice occurs in three conditions. Non-visible, visible (but less than one inch in thickness) and clear ice. Non-visible ice is designated N with an added suffix of one or two lower case letters. Visible ice is designated V with an added suffix of one lower case letter. Clear ice is designated ICE with notes on ice type.

TABLE IV

<u>Symbol</u>	<u>Description</u>
Nf	Non-visible ice, frozen soil in friable condition.
Nbn	Non-visible ice, frozen soil well bonded, no excess ice.
Nbe	Non-visible ice, frozen soil well bonded, excess ice revealed on melting sample.
Vx	Visible ice crystals.
Vc	Ice coatings on soil particles.
Vr	Ice formations irregularly orientated.
Vs	Stratified ice lenses.
ICE	Clear ice over one inch in thickness.
ICE + soil	Ice over one inch thick with soil inclusions.

A complete description of this system is contained in "Guide to a Field Description of Permafrost" published by National Research Council, Ottawa.

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.			FIELD ENG: G.M.			DATE DRILLED: 29/1/75			AIRPHOTO NO: A-22933-17			CHAINAGE: 1358+62			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>111</i>			TECH: D.H.			RIG: FAIRBANKS 1000			SURFACE DRAINAGE: GOOD			VEGETATION: SCARIFIED 3' x 3' x 3'						MILE			B,C,S			NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										PLASTIC LIMIT		LIQUID LIMIT		CLAY	SILT	SAND	GRAVEL												
										20	40	60	80	100	100+	%	%	%	%										
2					GM	GRAVEL: PEBBLES TO 1/2" Ø BROWN	F	Nbn	2																				
4									4																				
6					CL	CLAY: SILTY LOW PLASTIC GREY BROWN			6							28	40	32											
8									8																				
10						SANDY	UF	OUT	10																				
12									12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				



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GRAIN SIZE CURVE

LAB ORDER NO. S-1065

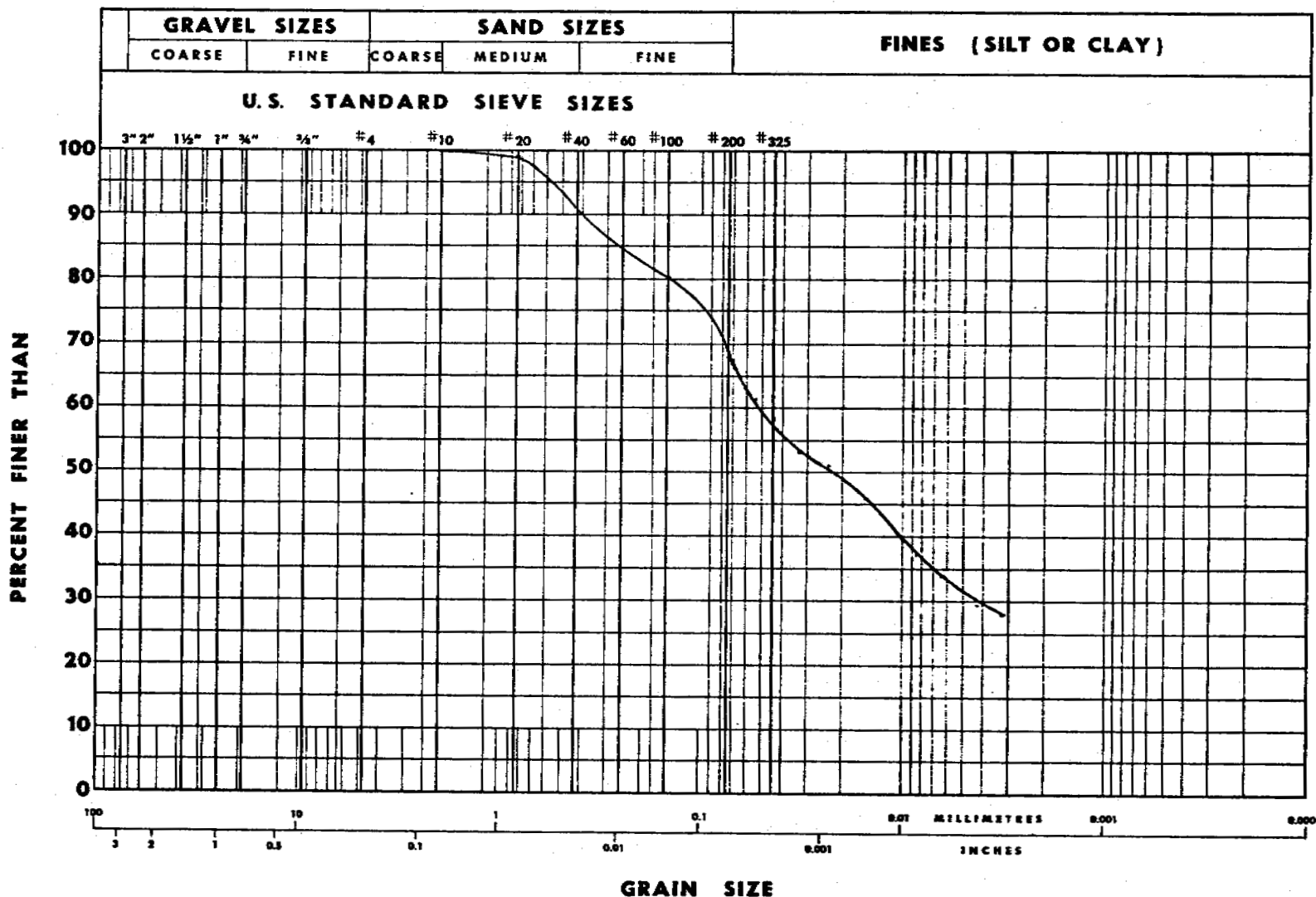
CLIENT E-2510

SAMPLE

SOURCE

HOLE 402 DEPTH 6' DATE REC'D.

TECHNICIAN J.G. DATE TESTED FEB 3 1973



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D ₁₀	_____	MM.
D ₃₀	_____	MM.
D ₆₀	_____	MM.
U	_____	
C	_____	

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 23/1/73		AIRPHOTO NO: A-22933.17		CHAINAGE: 1775+5.0		OFFSET:		ELEV:		TEST HOLE			
CKD: 1775		TECH: D.H.		RIG: FAIRING 1070		SURFACE DRAINAGE: GOOD		VEGETATION: SEE PLANT						MILE	B,C,S	NUMBER	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS					WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL				
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
										%	%	%	%				
0					OL	SILT: ORGANIC FINE FIBRY BLACK	F	NbO	0								SPRUCE & PINE TO 25'; 6" x 8" & 7' CED. PAPER
2									2								
4									4								
6					SM	SAND: SILTY FINE GRAINED NON PLASTIC GREY BROWN			6								
8					MH	SILT: CLAYEY TRACE OF SAND LOW PLASTIC SAT / HEAVY			8				35	60	5		
10									10								
12									12				16	62	22		
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								
						END OF HOLE			14								



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GRAIN SIZE CURVE

LAB ORDER NO. S-1065

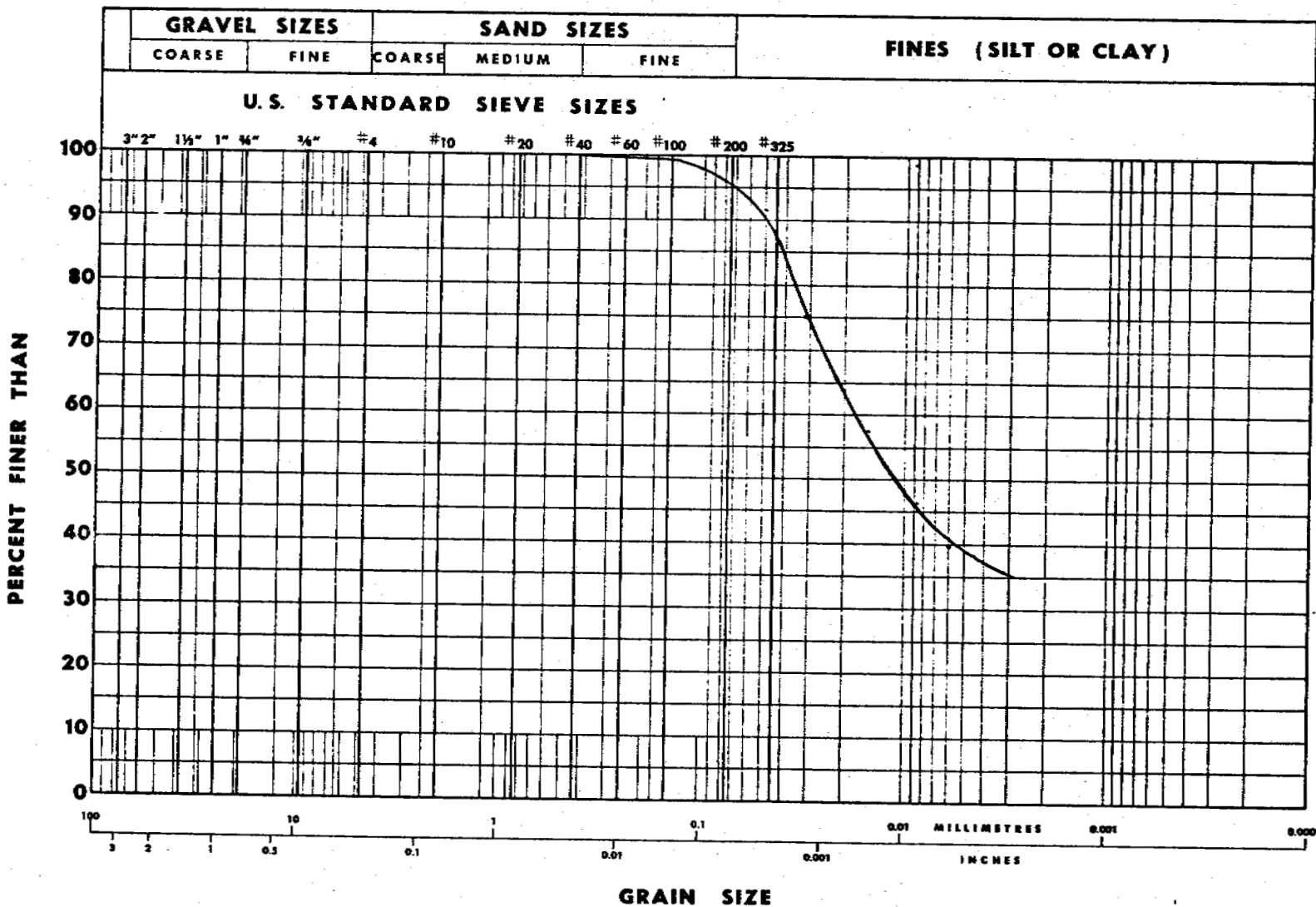
CLIENT E-2510

SAMPLE

SOURCE

HOLE 403 DEPTH 8' DATE REC'D.

TECHNICIAN LG DATE TESTED FEB 14/77



REMARKS:

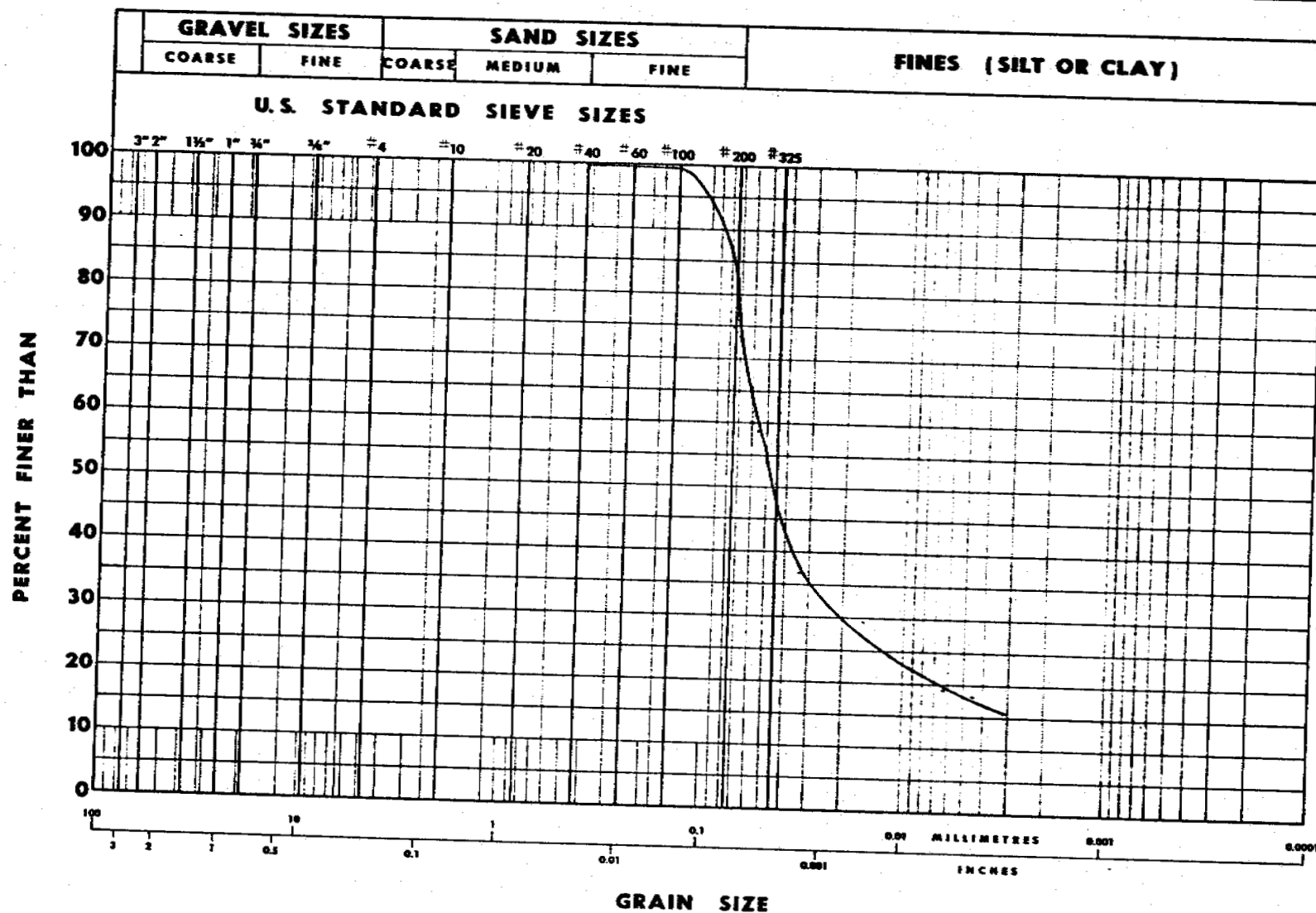
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D₁₀ = _____ MM.
D₃₀ = _____ MM.
D₆₀ = _____ MM.
C_u = _____
C_c = _____



MATERIALS TESTING LABORATORIES LTD.

GRAIN SIZE CURVE



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

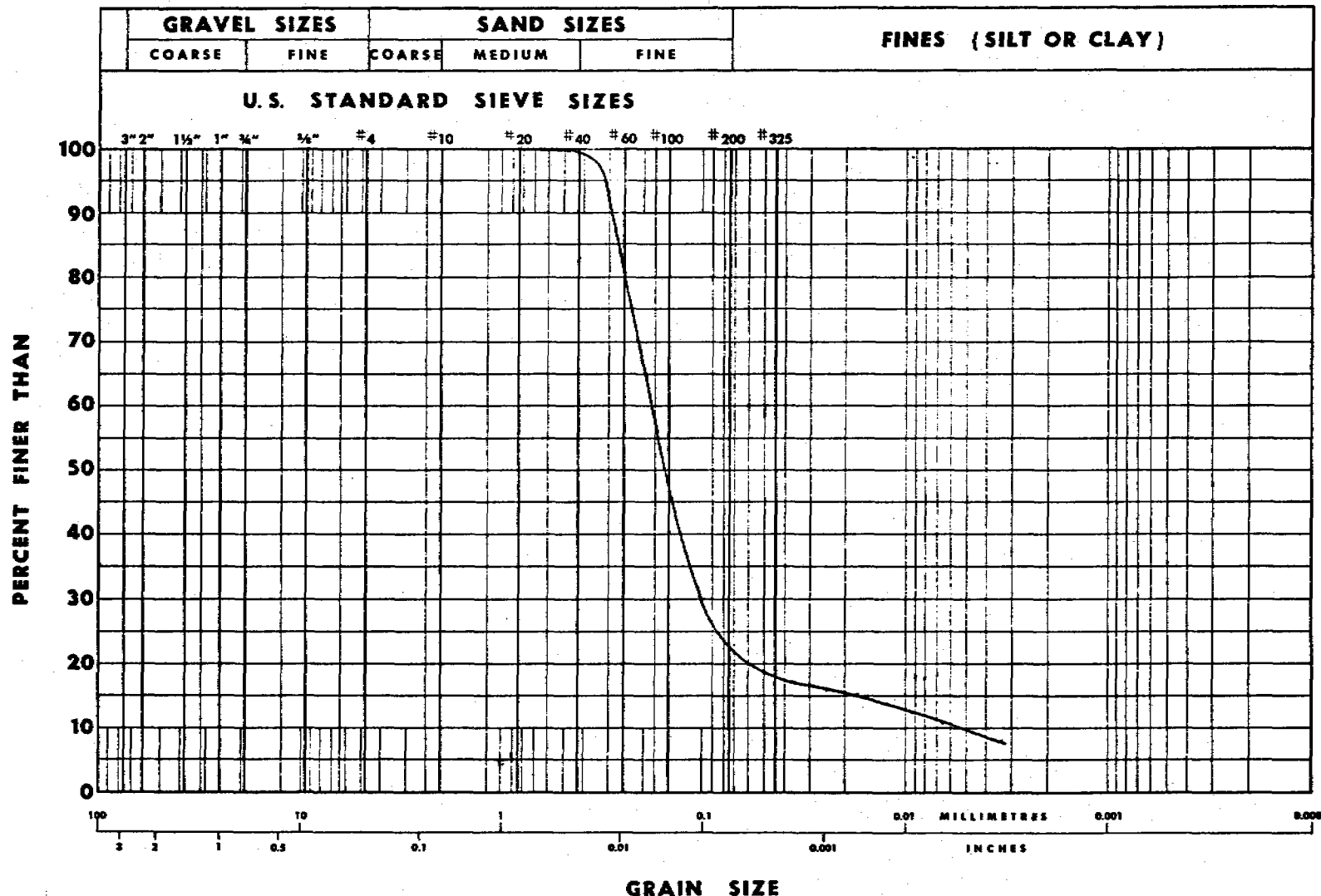
D ₁₀	_____	MM.
D ₃₀	_____	MM.
D ₆₀	_____	MM.
C _u	_____	
C _c	_____	

LAB ORDER NO. S-1065
CLIENT E 2510
SAMPLE
SOURCE
HOLE 403 DEPTH 10' 12' DATE REC'D.
TECHNICIAN 16 DATE TESTED FEB 1973



MATERIALS TESTING LABORATORIES LTD.

LAB ORDER NO. 5-1065
 CLIENT E-2510
 SAMPLE SOURCE
 HOLE 405 DEPTH 6' DATE REC'D. 5/19/77
 TECHNICIAN IG DATE TESTED 5/19/77



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

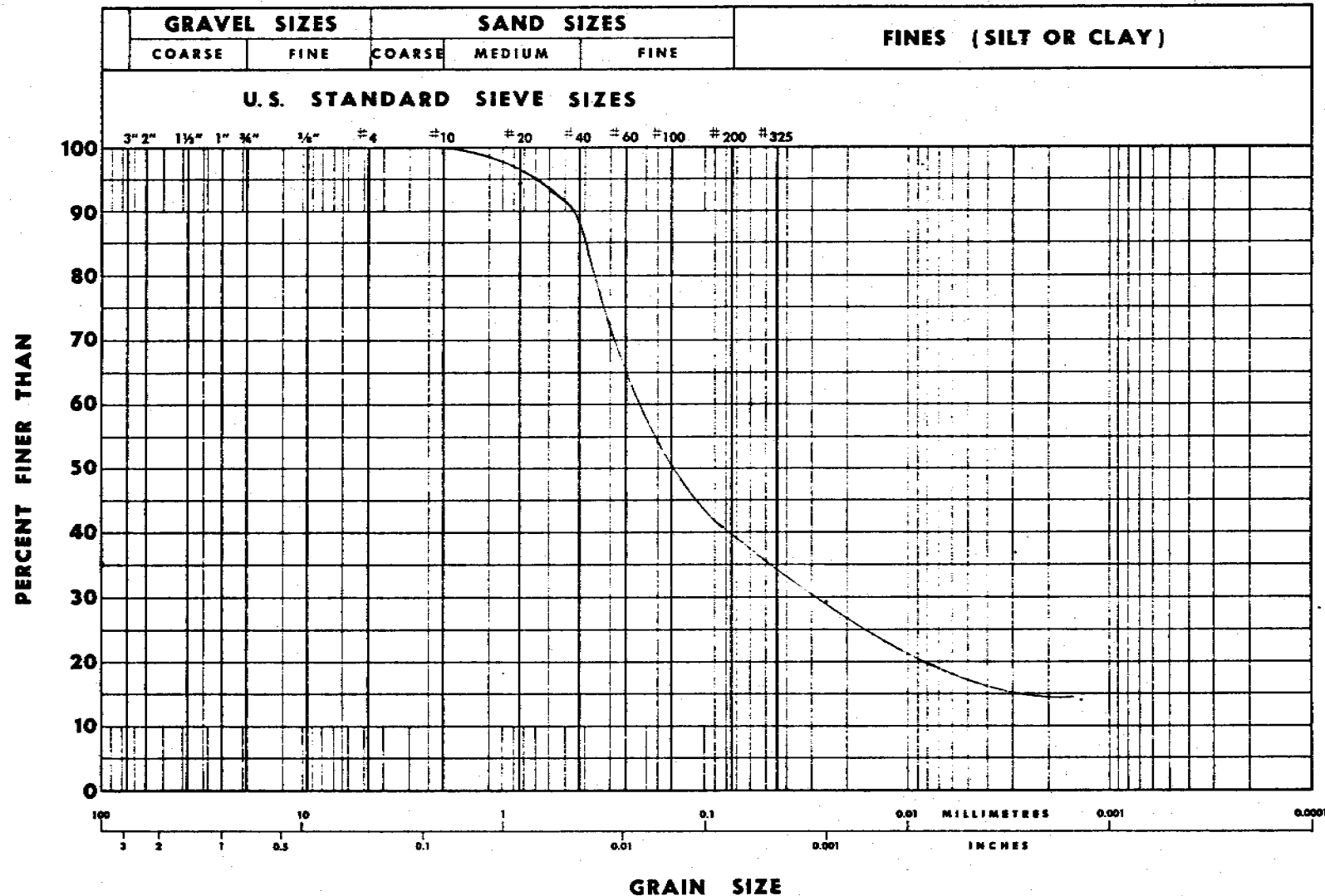
D_{10} = _____ MM.
 D_{30} = _____ MM.
 D_{60} = _____ MM.
 C_u = _____
 C_c = _____

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>E.B.</i>			FIELD ENG: <i>G.M.</i>			DATE DRILLED: <i>28/1/73</i>			AIRPHOTO NO: <i>A-22933-17</i>			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE SHEET 2								
CKD: <i>1-2</i>			TECH: <i>G.C.</i>			RIG:			SURFACE DRAINAGE: <i>GOOD</i>			VEGETATION:																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
					<i>Sm</i>		<i>F</i>	<i>Nbn</i>	26	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT																			
28									28																				
30						<i>END OF HOLE</i>			30																				
32									32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				



MATERIALS TESTING LABORATORIES LTD.

GRAIN SIZE CURVE



REMARKS: _____

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D ₁₀	=	_____	MM.
D ₃₀	=	_____	MM.
D ₆₀	=	_____	MM.
C _u	=	_____	
C _c	=	_____	

LAB ORDER NO. 5-1065

CLIENT E-2510

SAMPLE _____

SOURCE _____

HOLE 406 DEPTH 2' DATE REC'D. _____

TECHNICIAN I.G. DATE TESTED FEB 19/73

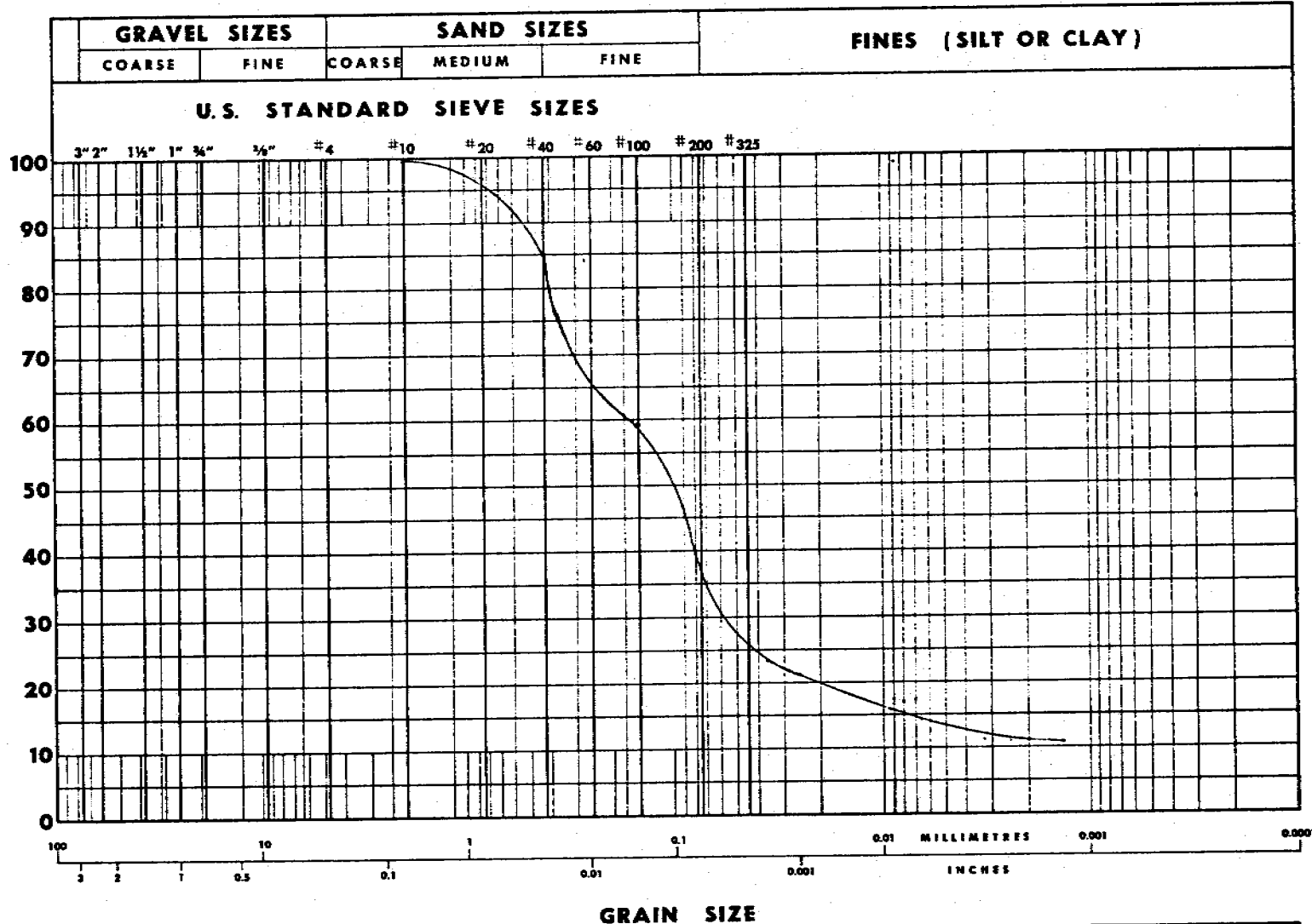
R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 28/1/73		AIRPHOTO NO: A-22933-17		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>11</i>		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
2					SM	SAND: SILTY FINE GRAINED NON PLASTIC BROWN	F	Nbn	0							DENSE SAND, 30' TO 40' 4 to 5' 0,000 BRCH
4					MH	SILT: SLIGHTLY CLAYEY TRACE OF SAND LOW PLASTIC DARK BROWN			2	12	24	64				
6					SM	SAND: SILTY FINE GRAINED NON PLASTIC CHARCOAL SPECKS DARK BROWN WET	UF	NO ICE	4							
8									6							
10									8							
12									10							
14						SLIPPING IN 14			12							
16						END OF HOLE			14							
18									16							
20									18							
22									20							
24									22							
26									24							



MATERIALS TESTING LABORATORIES LTD.

GRAIN SIZE CURVE

PERCENT FINER THAN



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D₁₀ = _____ MM.
D₃₀ = _____ MM.
D₆₀ = _____ MM.
C_u = _____
C_c = _____

LAB ORDER NO. 5-1065

CLIENT E-2510

SAMPLE

SOURCE

HOLE 407 DEPTH 4' DATE REC'D.

TECHNICIAN 19 DATE TESTED FEB 19/78

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 22/1/75		AIRPHOTO NO: A-22933-17		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: /		TECH: G.C.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: GOOD		VEGETATION: DENSE SPRUCE, 31-40', 4-5'		ELEV:		MILE B.C.S. NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %			
2					SM	SAND: SILTY FINE GRAINED NON PLASTIC OCCASIONAL PEEBLE BROWN	F	0%	2					
4									4					
6									6					
8									8					
10						----- 9 VERY SILTY		Nb	10					
12					CI	CLAY: SILTY MED PLASTIC BROWN			12					
14						END OF HOLE			14					
16									16					
18									18					
20									20					
22									22					
24									24					

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: E.B.		FIELD ENG: G.P.		DATE DRILLED: 29/1/73		AIRPHOTO NO: A 22933-19		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: 1/1		TECH: D.H.		RIG: FAIRY 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SP. 5000								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS		
										CLAY %	SILT %			SAND %	GRAVEL %	MILE
					OL	SILT: ORGANIC SANDY BLACK		F 11bn								
2									2							
4					SM	SAND: SILTY MED GRAINED NON PLASTIC GREY BROWN			4							
6									6							
8									8							
10									10							
12									12							
14					ML	SILT: SANDY (FINE) NON PLASTIC GRY			14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 27/1/73		AIRPHOTO NO: L22833-13		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: ///		TECH: D.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SP. ALPINE		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
2					SM	SAND: SILTY FINE GRAINED NON PLASTIC BROWN	F	Nbn	0							SOIL SAMPLE 45", 5" TOP OF SOIL DISPLACED 6" IN 5 FEET
4							UF	NO ICE WET	2							
6									4							
8									6							
10									8							
12									10							
14									12							
16									14							
18									16							
20									18							
22									20							
24									22							
									24							

END OF HOLE

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY												
DWN: E.B.		FIELD ENG: G.H.		DATE DRILLED: 29/11/73		AIRPHOTO NO: 1238-19		CHAINAGE:		OFFSET:		TEST HOLE						
CKD:		TECH: D.H.		RIG: FAIRLINGS 1000		SURFACE DRAINAGE: Good		VEGETATION: SEE KEY MARKS		ELEV:		MILE B.C.S. NUMBER						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)		GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										PLASTIC LIMIT	LIQUID LIMIT	CLAY %	SILT %	SAND %	GRAVEL %			
2						SAND: SILTY FINE GRAINED NON ELASTIC BROWN	F	Nbr	2									DEMO. HOLE TO 45' GOOD BURN (11' LK.) FLAT
4									4									
6						GREY BROWN			6									
8									8									
10									10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWR: E.B.			FIELD ENG: G.M.			DATE DRILLED: 24/1/73			AIRPHOTO NO: A 22923-10			CHAINAGE:			OFFSET:			TEST HOLE											
CKD			TECH: D.H.			RIG: FAIRBANKS 1000			SURFACE DRAINAGE: GOOD			VEGETATION: SEE FIGURES			ELEV:			MILE B,C,S NUMBER											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
2					SM	SAND: SILTY FINE GRAINED NON PLASTIC BROWN	F	Nbn	2							DENSE SILTY CLAY TUSSES 8"-12" & SCATTERED BIRCH BARK & RIDGE													
4						ICE: SILT INCLUSIONS		95%	4																				
6					CL	CLAY: SILTY LOW PLASTIC GREY BROWN		70%	6																				
8									8																				
10									10																				
12									12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

TEST HOLE

MILE	B,C,S	NUMBER
550	B34	413

	22	195
REMARKS		

DEAD END SPRING
PINE TO
60'; 10" Ø
SOME BARK



MATERIALS TESTING LABORATORIES LTD.

GRAIN SIZE CURVE

LAB ORDER NO. S-1065

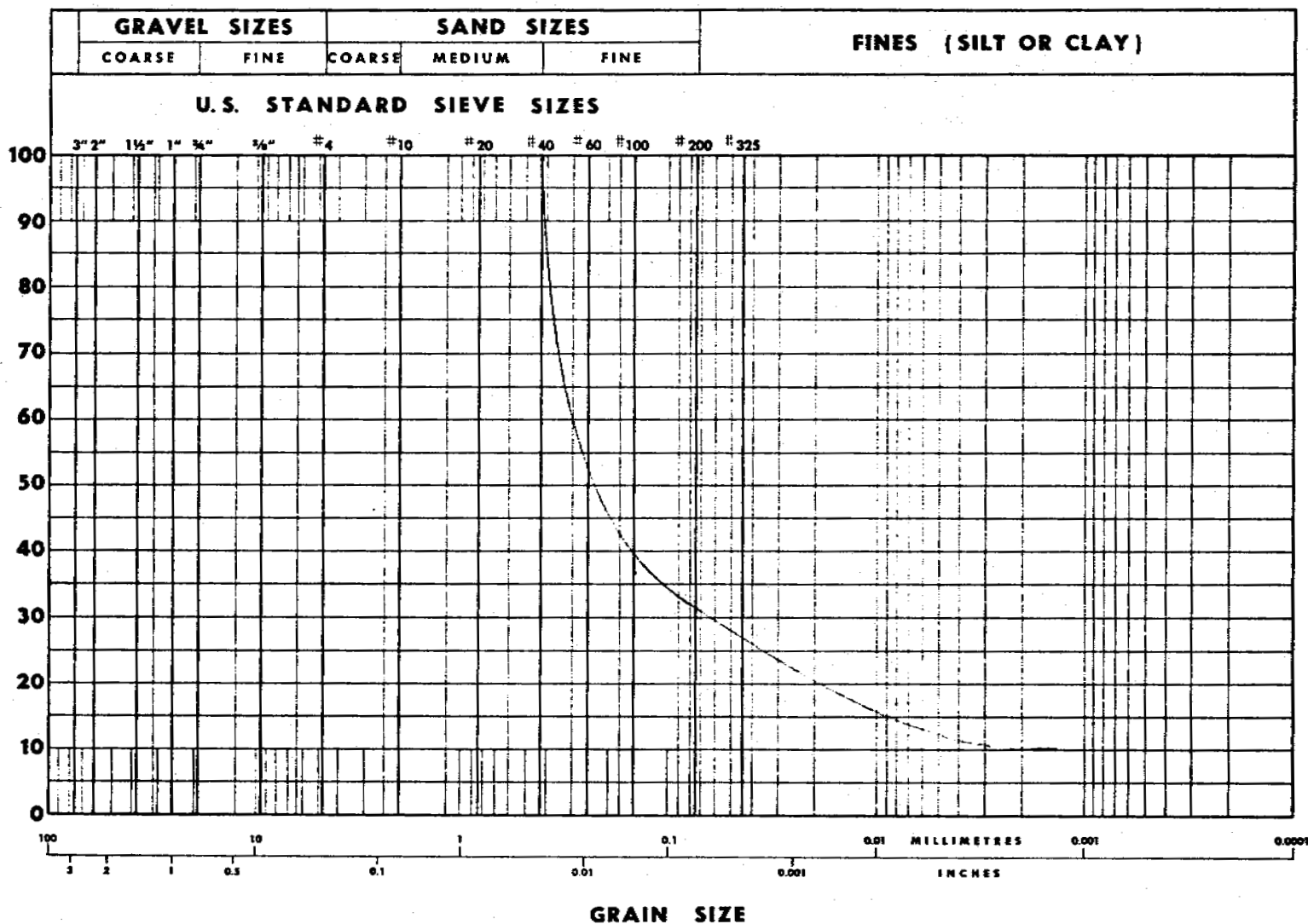
CLIENT E-2510

SAMPLE

SOURCE

HOLE 4/3 DEPTH 2' DATE REC'D.

TECHNICIAN JG DATE TESTED FEB 19/78

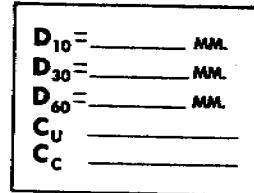


REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D ₁₀	=	_____	MM.
D ₃₀	=	_____	MM.
D ₆₀	=	_____	MM.
C _u	=	_____	
C _c	=	_____	

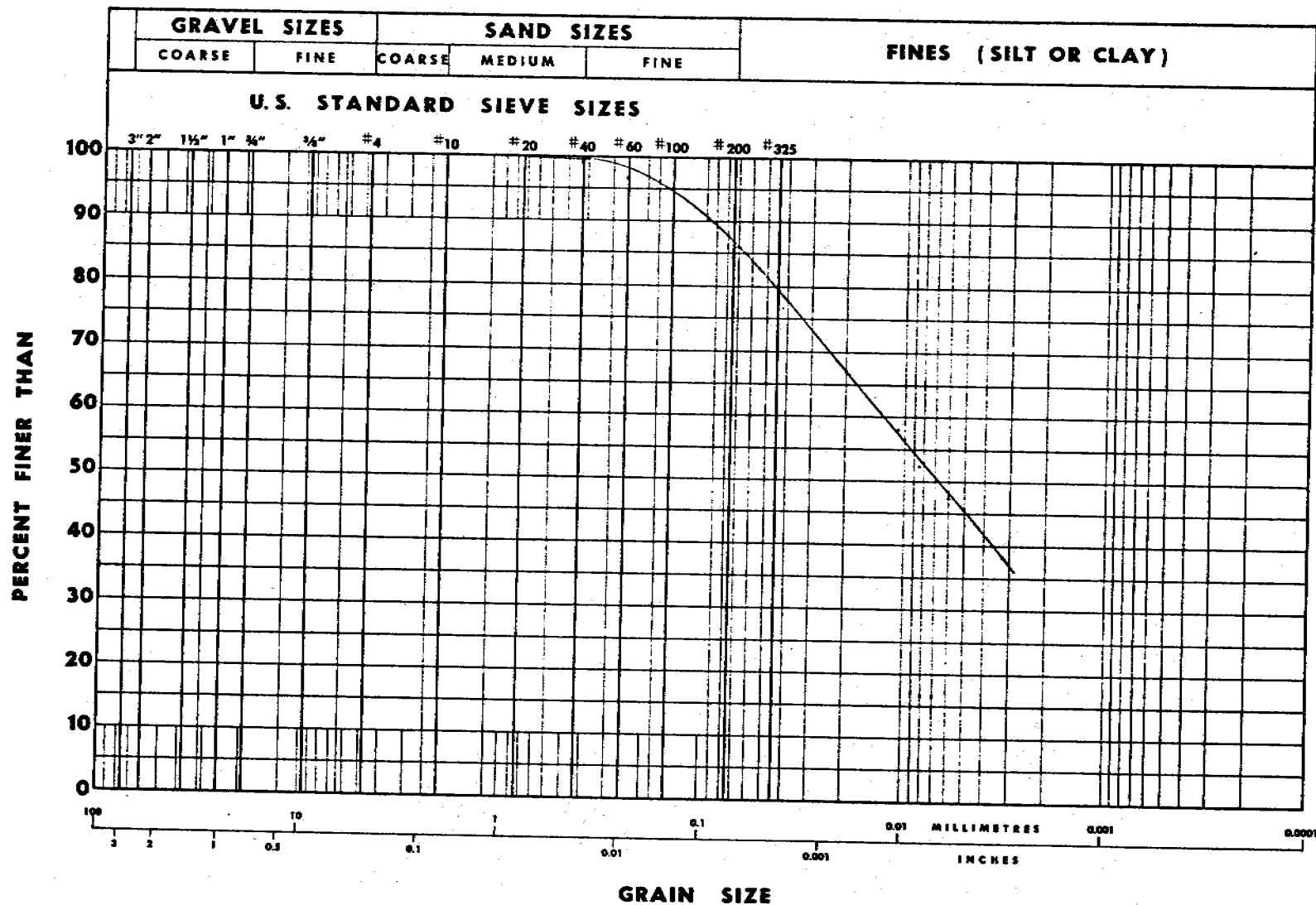
LAB ORDER NO. 51065
CLIENT E-2510
SAMPLE
SOURCE B-34
HOLE 413 DEPTH 4' DATE REC'D.
TECHNICIAN L3 DATE TESTED 1/1/77



NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM



MATERIALS TESTING LABORATORIES LTD. GRAIN SIZE CURVE



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D ₁₀	=	_____	MM.
D ₃₀	=	_____	MM.
D ₆₀	=	_____	MM.
C _u	=	_____	
C _c	=	_____	

LAB ORDER NO.	9-1065
CLIENT	E-2510
SAMPLE	
SOURCE	B34
DATE REC'D.	
DATE TESTED	18/1/71
TECHNICIAN	1 G.

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 29/1/73		AIRPHOTO NO: A 22933-15		CHAINAGE:		OFFSET:								
CKD:		TECH: D.H.		RIG: FAILING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE		
										CLAY %	SILT %	SAND %	GRAVEL %			MILE	B,C,S	NUMBER
						MOSS:												
2					OL	SILT: ORGANIC	1/4	F	0								DENSE SPALLS OF CONCRETE SCATTERED ALONG RIDGE	
4					SM	SAND: SILTY FINE GRAINED NON PLASTIC BROWN	3	Nbn	2									
6									4									
8									6									
10						GREY			8									
12									10									
14									12									
16									14									
18									16									
20									18									
22									20									
24									22									
									24									

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA																									
MACKENZIE HIGHWAY																																	
DWN: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>29/1/73</i>		AIRPHOTO NO: <i>A 22033-15</i>		CHAINAGE:		OFFSET:																							
CKD: <i>W</i>		TECH: <i>D.H.</i>		RIG:		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION:		ELEV:																							
										TEST HOLE SHEET 2																							
										MILE B,C,S NUMBER																							
										834 414																							
										REMARKS																							
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="4">GRAIN-SIZE ANALYSIS</th> <th rowspan="2">WET DENSITY (P.C.F.)</th> <th rowspan="2">DRY DENSITY (P.C.F.)</th> </tr> <tr> <th>CLAY</th> <th>SILT</th> <th>SAND</th> <th>GRAVEL</th> </tr> <tr> <td>%</td> <td>%</td> <td>%</td> <td>%</td> <td></td> <td></td> </tr> </table>				GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	CLAY	SILT	SAND	GRAVEL	%	%	%	%		
GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)																												
CLAY	SILT	SAND	GRAVEL																														
%	%	%	%																														
28									28																								
30						END OF HOLE	30		30																								
32									32																								
34									34																								
36									36																								
38									38																								
40									40																								
42									42																								
44									44																								
46									46																								
48									48																								
50									50																								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>29/1/73</i>		AIRPHOTO NO: <i>A 22933-19</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: <i>1113</i>		TECH: <i>D.H.</i>		RIG: <i>FAILING 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
2					PL	PEAT:	F	N6A	0							SERVE SPKULE TO 20' 4'-8" Ø, 000 CURCH
4									2							
6					SM	SAND: <i>SILTY FINE GRAINED NON PLASTIC GREY</i>			4							
8									6							
10									8							
12									10							
14									12							
16									14							
18									16							
20									18							
22					CI	CLAY: <i>SILTY</i>		50%	20							
24									22							
									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>EE</i>		FIELD ENG: <i>SH</i>		DATE DRILLED: <i>24/73</i>		AIRPHOTO NO: <i>A22033-18</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>---</i>		TECH: <i>D.H.</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SCIRP GRASS 25' 4" x 1' 11" - 1' 11" - 1' 11"</i>		ELEV:		MILE		B,C,S		NUMBER													
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS															
										CLAY %	SILT %																		
2					OL	SILT: ORGANIC BLACK			2																				
4									4																				
6					SM	SAND: SILTY FINE GRAINED NON PLASTIC GREY BROWN			6																				
8									8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>E.B.</i>			FIELD ENG: <i>G.M.</i>			DATE DRILLED <i>29/1/72</i>			AIRPHOTO NO:			CHAINAGE:			OFFSET:			TEST HOLE SHEET 2											
CKD: <i>1.1</i>			TECH: <i>D.H.</i>			RIG:			SURFACE DRAINAGE:			VEGETATION:			ELEV:														
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY	SILT	SAND	GRAVEL																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+																			
28					SM			Nbn	28																				
30					CL	CLAY: SILTY LOW PLASTIC GREY BROWN			30																				
32						END OF HOLE			32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWNE: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>29/4/75</i>		AIRPHOTO NO: <i>L 22033-19</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: <i>...</i>		TECH: <i>D.H.</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>...</i>								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						SAND: <i>SILTY FINE GRAINED NON PLASTIC BROWN</i> --- <i>GREY</i> --- <i>B</i>										
2					<i>SM</i>				2							<i>SCOUR SURFACE TO 15'</i> <i>4" TO 5" Ø 2000 BROWN</i> <i>FLAT</i>
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22					<i>CL</i>	CLAY: <i>SILTY SAND INCLUSIONS LOW PLASTIC</i> --- <i>END OF HOLE</i> --- <i>23</i>		<i>30%</i>	22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 29/1/73		AIRPHOTO NO: A 22933-19		CHAINAGE:		OFFSET:				
CKD: 11		TECH: G.C.		RIG: FAULTY 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:				
TEST HOLE														
MILE		B,C,S		NUMBER										
55		B33		413										
REMARKS														
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (% OF DRY WEIGHT) O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
											CLAY %	SILT %	SAND %	GRAVEL %
2					sm	SAND: SILTY FINE GRAINED NON PLASTIC BROWN		Nbn	2					
4									4					
6									6					
8									8					
10									10					
12									12					
14									14					
16						GREY BROWN CHARCOAL SPECKS			16					
18									18					
20						VERY SILTY VERY FINE GRAINED SLIGHTLY PLASTIC GREY			20					
22									22					
24									24					

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY													
DWN: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED <i>29/1/73</i>		AIRPHOTO NO: <i>A22933-19</i>		CHAINAGE:		OFFSET:											
CKD: <i>///</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>DRY GRASS</i>		ELEV:											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)		GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE SHEET 2			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+		CLAY	SILT	SAND	GRAVEL			MILE	B.C.S	NUMBER	
										%	%	%	%								
28					<i>SM</i>			<i>NDA</i>	28												
30					<i>ML</i>	<i>SILT: SLIGHTLY CLAYEY LOW PLASTIC, GREY</i>			30												
32						<i>END OF HOLE</i>			32												
34									34												
36									36												
38									38												
40									40												
42									42												
44									44												
46									46												
48									48												
50									50												
										REMARKS											

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

TEST HOLE

MILE	B.C.S	NUMBER
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
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51	51	51
52	52	52
53	53	53
54	54	54
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62	62	62
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64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

552	B32	420
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REMARKS

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: E.B.		FIELD ENG: G. D.		DATE DRILLED: 9/1/73		AIRPHOTO NO: A 22933-19		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: A. J.		TECH: G. J.		RIG: FALING 1057		SURFACE DRAINAGE: 40015		VEGETATION: DENSE SPRUCE 23-30		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					SM	SAND: SILTY FINE GRAINED NON PLASTIC MOTTLED LT. BROWN-BROWN ----- 2 1/2 DARK BROWN CHARCOAL SPECKS	F	Nbr	2							
4									4							
6							UF	NO ICE DETECTED WITH DEPTH	6							
8									8							
10									10							
12									12							
14						END OF HOLE			14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWG: E.B.			FIELD ENG: G.Mc.			DATE DRILLED: 27/1/75			AIRPHOTO NO:			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE SHEET 2								
CKD:			TECH: G.C.			RIG:			SURFACE DRAINAGE:			VEGETATION:																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+																			
28					SM		F	116n	28																				
30									30																				
32									32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: E.R.		FIELD ENG: G.M.		DATE DRILLED: 3/1/73		AIRPHOTO NO: A 22933-13		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CKD: /		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: G-2		VEGETATION: DENSE SPRUCE		ELEV:		MILE		B,C,S		NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										CLAY %	SILT %				SAND %	GRAVEL %					
						SAND: SILTY FINE GRAINED NON PLASTIC LIGHT BROWN	F	Nbr													
2					SM				2												
4						BROWN WITH BLACK SPECKS			4												
6							UF	NO ICE DET	6												
8									8												
10									10												
12									12												
14									14												
16									16												
18									18												
20									20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA			
OWN: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>29/1/73</i>		AIRPHOTO NO: <i>A-22833-18</i>		CHAINAGE:		OFFSET:	
CKD: <i>"</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION:		ELEV:	
TEST HOLE SHEET 2											
										MILE: <i>B32</i> NUMBER: <i>423</i>	
REMARKS											

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	
										CLAY	SILT	SAND	GRAVEL			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+	%	%	%	%		
26									26							
28					<i>Sm</i>		<i>OF</i>	<i>NO ICE</i>	28							
30									30							
32									32							
34									34							
36						<i>END OF HOLE</i>			36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: E.R.		FIELD ENG: G.M.L.		DATE DRILLED: 27/1/73		AIRPHOTO NO: 122033-20		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD:		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: Good		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						PEAT: CAT = 9				○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
						SAND: SILTY NON PLASTIC FINE GRAINED LIGHT BROWN	1/3 F	Nbr	0	PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+																			
2					5m				2																				
4									4																				
6						BROWN WITH COAL SPECKS	6		6																				
8									8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.S.		FIELD ENG: G.M.		DATE DRILLED: 29/1/73		AIRPHOTO NO: A 22933-20		CHAINAGE:		OFFSET:		TEST HOLE									
CND: 111		TECH: G.C.		RIG: FRILINING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER									
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS					
										CLAY %	SILT %	SAND %	GRAVEL %								
						SAND: SILTY FINE GRAINED NON PLASTIC TRACE OF ORGANICS LIGHT BROWN ----- 2 VERY FINE NON ORGANIC GREY BROWN	F	Nbn	0								FAIRLY DENSE STONE 40'-50', OLD BURN CREEK BANK				
2									2												
4									4												
6									6												
8									8												
10									10												
12							UF	NO ICE	12												
14									14												
16									16												
18									18												
20									20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY					
OWNER: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>21/1/73</i>		AERIAL PHOTO NO: <i>A 22933-20</i>		CHAINAGE:		OFFSET:			
CNO: <i>1/1</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION:		ELEV:			
										TEST HOLE SHEET 2			
										MILE B.C.S NUMBER			
										828 425			
										REMARKS			
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)	PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+	GRAIN-SIZE ANALYSIS CLAY SILT SAND GRAVEL % % % %	WET DENSITY (P.C.F.) DRY DENSITY (P.C.F.)
26					<i>Sm</i>		<i>UF</i>		26	○			
28									28	○			
30									30	○			
32									32	○			
34									34	○			
36									36	○			
38									38	○			
40									40	○			
42									42	○			
44									44	○			
46						<i>END OF HOLE</i>	<i>45</i>		46	○			
48									48				
50									50				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 8/1/73		AIRPHOTO NO: A 2293-20		CHAINAGE:		OFFSET:								
CND: 1-1		TECH: G.C.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE AIRPHOTOS		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE		
										CLAY %	SILT %	SAND %	GRAVEL %			MILE	B,C,S	NUMBER
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
2					SM	SAND: SILTY NON-COHESED NON-CLASTIC SUB-ANGULAR ----- 2 INORGANIC GREY BROWN	F	None	2									
4									4									
6									6									
8							UF	NO ICE	8									
10									10									
12									12									
14									14									
16									16									
18							F	PERMAFROST None	18									
20									20									
22									22									
24									24									
															REMARKS			
															DENSE GRAVEL 4-5 MILE			

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWR: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>21/1/73</i>		AIRPHOTO NO:		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE SHEET 2															
CD: <i>1111</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE		B,C,S		NUMBER													
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT 20 40 60 80 100 100+	LIQUID LIMIT 80 100 100+																		
28					<i>Sm</i>			<i>F Non</i>	28																				
30						<i>END OF HOLE</i>			30																				
32									32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DATE: E.B.		FIELD ENG: G.M.		DATE DRILLED: 21/1/73		AIRPHOTO NO: A-22933-2		CHAINAGE:		OFFSET:		ELEV:					
CD		TECH: G.C.		RIG: FAILING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		TEST HOLE		MILE B.C.S. NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY	SILT	SAND	GRAVEL				
						PEAT CAT #11											
						SAND: SILTY FINE GRAINED NON PLASTIC -- ORGANIC INCLUSIONS -- 2 -- INORGANIC GREY BROWN	1/3	15%									
2					SP				2								
4									4								
6									6								
8									8								
10								UF NO ICE	10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

SLIPPING IN
END OF HOLE

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY												
OWN: E.B.		FIELD ENG: G.H.		DATE DRILLED: 29/1/73		AIRPHOTO NO: A 22932-20		CHAINAGE:										
CND		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS										
								ELEV:										
								TEST HOLE										
								MILE 8, C, S NUMBER										
								B33 428										
								REMARKS										
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	CLAY	SILT	SAND	GRAVEL	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
						PEAT: CAT. #4												
						SAND: SIXTY FINE GRAINED NON PLASTIC ORGANIC INCLUSIONS INORGANIC GREY BROWN	1/3	F Nbn										
2					SM													
4																		
6																		
8								UF NO ICE										
10																		
12																		
14																		
16																		
18																		
20																		
22																		
24																		

STOPPING IN
END OF HOLE

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWR: E.B.		FIELD ENG: G.M.		DATE DRILLED: 21/1/75		AIRPHOTO NO: A22032-20		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: /		TECH: G.C.		RIG: FAIRING 1090		SURFACE DRAINAGE: Good		VEGETATION: SEE A.F. 100-105								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						SAND: SILTY FINE GRAINED NON PLASTIC ORGANIC INCLUSIONS LIGHT FRACTION - 2 MICRONIC GREY BROWN										
2					SM		F	N60	2							
4									4							
6							UF	NO ICE	6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>29/1/73</i>		AIRPHOTO NO: <i>A22932-20</i>		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD: <i>1/1</i>		TECH: <i>GC</i>		RIG:		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION:		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
28					<i>sm</i>		<i>OF</i>		28							
30						<i>END OF HOLE</i>	<i>30</i>		30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 31/1/73		AIRPHOTO NO: A22722-31		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 11		TECH: D.H.		RIG: FAIRING RIG		SURFACE DRAINAGE: GOOD		VEGETATION: SEE RED WAX		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
										%						
2					SM	SILT: ORGANIC SAND: SILTY FINE GRAINED NON PLASTIC MOTTLED LIGHT & DARK BROWN	1/2	F NLT	2							DWARK SEALING 1" 3" φ, 20' & 410 50mm H.W.M. LEVEL
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWR: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>5/1/73</i>		AIRPHOTO NO:		CHAINAGE:		OFFSET:		ELEV:				
CKD: <i>---</i>		TECH: <i>D.H.</i>		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		TEST HOLE SHEET 2				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
28					<i>SM</i>			<i>F Nbn</i>	28							
30						<i>END OF HOLE</i>	<i>30</i>		30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: E.B.		FIELD ENG: S.M.		DATE DRILLED: 3/1/75		AIRPHOTO NO: A22772-31		CHAINAGE:		OFFSET:		TEST HOLE				
CDD: 11		TECH: D.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SPARSY		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						OL SILT: ORGANIC SLIGHTLY SILTY SAND: SILTY FINE GRAINED NON PLASTIC MOTTLED LIGHT & DARK RED BROWN SILTIER WITH DEPTH	F	Nbr	2							1.0' - 2.0' 1/2 2.0' - 3.0' SMALL GRAVEL LEVEL
2									2							
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWNER: <i>E.B.</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>31/1/75</i>		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD: <i>1/1</i>		TECH: <i>D.H.</i>		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
										%						
28					SM			N60	28							
30						END OF HOLE — 30			30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: E.B.			FIELD ENG: G.M.L.			DATE DRILLED: 31/1/73			AIRPHOTO NO: A22773-75			CHAINAGE:			OFFSET:			TEST HOLE											
CKD			TECH: D.H.			RIG: FAIRING 1000			SURFACE DRAINAGE: GOOD			VEGETATION: SEE REMARKS			ELEV:			MILE B,C,S NUMBER											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
SAND: SILTY FINE GRAINED NON PLASTIC LIGHT BROWN ----- 5 GREY BROWN										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80																			
2					SP		F	Nb	2							DENSE SPRUCE FOREST SLIGHT RIDGE													
4									4																				
6									6																				
8									8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DOWN: E. B.		FIELD ENG: G M.	DATE DRILLED: 1/2/73	AIRPHOTO NO: A-22773-85	CHAINAGE:	OFFSET:	ELEV:		TEST HOLE							
CKD: 1/1		TECH: D.H. G.C.	RIG: FAIRING 1000	SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE	B,C,S	NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					SM	SAND: VERY SHTY FINE GRAINED NON PLASTIC LIGHT DREY BROWN MOTTLED TRACE OF ORGANICS - 3 GREY BROWN CHARCOAL SPECKLS SILTIER ABOVE	F	Nbr	0							DENSE GRAVEL, 33' 243' SLIGHT HILL
4									2							
6									4							
8									6							
10									8							
12									10							
14									12							
16									14							
18									16							
20									18							
22									20							
24									22							
									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>E.R.</i>		FIELD ENG: <i>G.H.</i>		DATE DRILLED: <i>1/2/75</i>		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2 MILE: <i>B17</i> B,C,S: <i>43E</i> NUMBER:					
CKD: <i>---</i>		TECH: <i>D.H. G.C.</i>		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:							
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
28					<i>SM</i>		<i>F</i>	<i>N6n</i>	28								
30						<i>END OF SAMPLING</i>			30								
32					<i>SM</i>				32								
34						<i>SILT: CLAYEY LOW PLASTIC GREY BROWN</i>			34								
36					<i>ML</i>	<i>END OF HOLE</i>			36								
38									38								
40									40								
42									42								
44									44								
46									46								
48									48								
50									50								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: G.M.C.		DATE DRILLED: 1/2/73		AIRPHOTO NO: A-22773-85		CHAINAGE:		OFFSET:		TEST HOLE SHEET 1 of 2				
CKD: /		TECH: D.H. & G.C.		RIG: 1000		SURFACE DRAINAGE: GOOD		VEGETATION: DENSE SPRUCE 20-30' HIGH		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 40 LIQUID LIMIT 80						
										20	40	60	80	100	100+	
2					CL	SILT: ORGANIC			2							
4	1	C	100		SM	SAND: SILTY FINE GRAINED NON PLASTIC BROWN		Nbn	4							124.5 103.1
6									6							124.0 103.5
8	2	C	89						8							124.5 103.8
10	3	C	100						10							125.8 104.6
12									12							
14	4	C	100						14							
16	5	C	100		CI	CLAY: SILTY, SANDY MEDIUM PLASTIC BROWN			16							117.8 91.1
18									18							
20					ML	SILT: SANDY LOW PLASTIC BROWN			20							
22									22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.		FIELD ENG G.M.C.	DATE DRILLED 1/2/73	AIRPHOTO NO: A-22773-85	CHAINAGE	MACKENZIE HIGHWAY		OFFSET	TEST HOLE SHEET 2 of 2							
CKD: 1/2		TECH D.H. & G.C.	RIG FAIRING 1000	SURFACE DRAINAGE GOOD		VEGETATION DENSE STRUCTURE 20-30'		ELEV.	MILE	B,C,S	NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
									% % % %							
28									28							
30						END of HOLE	30'		30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWG:		FIELD ENG		DATE DRILLED		AIRPHOTO NO:		CHAINAGE		OFFSET:		TEST HOLE SHEET 2					
CND		TECH		RIG		SURFACE DRAINAGE		VEGETATION:		ELEV		MILE B,C,S NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80 100 100+							
26									26								
28									28								
30						(5m)		F Nbn	30								
32									32								
34									34								
36									36								
38									38								
40						SLIGHTLY SILTY MED GRAINED BROWN	39	UF No ICE	40								
42									42								
44						END OF HOLE	44		44								
46									46								
48									48								
50									50								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY														
DWN: E.B.		FIELD ENG: G.P.L.		DATE DRILLED: 1/2/73		AIRPHOTO NO: A 22773-85		CHAINAGE:		OFFSET:												
CKD:		TECH: D.H. J.G.C.		RIG: FAIRLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE						
										CLAY	SILT	SAND	GRAVEL			MILE	B,C,S	NUMBER				
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)												
										20	40	60	80	100	100+	%	%	%	%			
2					Sm	SAND: SILTY FINE GRAINED NON PLASTIC LIGHT BROWN ----- 3 GREY BROWN	F	Nbr	2													
4									4													
6									6													
8									8													
10									10													
12									12													
14									14													
16									16													
18					ML	SILT: SLIGHTLY CURTLY NON PLASTIC GREY BROWN ----- 17			18													
20									20													
22									22													
24									24													
														REMARKS								
														SPRUCE, 30' 40' & 30% BRCH BAG SAMPLE 0'-15'								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.H.		DATE DRILLED 1/2/75		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD: 1-1-1		TECH: D.H. & G.C.		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
										%	%	%	%			
					SM	SAND: SUB-TO FINE GRAINED NON PLASTIC BROWN	UF	NO ICE	28							
30						END OF HOLE	30		30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 1/2/73		AIRPHOTO NO: A-22773-85		CHAINAGE:		OFFSET:		ELEV:												
CKD:		TECH: D.H. & G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		TEST HOLE		MILE		B,C,S		NUMBER								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY	SILT	SAND	GRAVEL											
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)															
									PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+															
									%															
					SM	SAND: SILTY FINE GRAINED NON PLASTIC LIGHT BROWN	F	Nba	0															
2									2															
4						GREY BROWN			4															
6									6															
8									8															
10									10															
12									12															
14									14															
16									16															
18									18															
20									20															
22						RED GRAINED	UF	NO ICE	22															
24									24															

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>E.B.</i>			FIELD ENG: <i>G.M.</i>			DATE DRILLED <i>1/2/73</i>			AIRPHOTO NO:			CHAINAGE:			OFFSET:			TEST HOLE SHEET 2											
CKD: <i>/</i>			TECH: <i>D.H. & G.C.</i>			RIG:			SURFACE DRAINAGE:			VEGETATION:			ELEV:			MILE B,C,S NUMBER											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT 20 40 60 80 100 100+	LIQUID LIMIT 60 80 100 100+																		
28									28																				
30						END OF HOLE			30																				
32									32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.		FIELD ENG: G.M.L.		DATE DRILLED: 1/21/73		AIRPHOTO NO: A22773-89		CHAINAGE:		OFFSET:		TEST HOLE					
CKD: 1/1		TECH: D.H. F.G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
										○ = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80 100 100+							
2					OL	SILT: ORGANIC PEAT #3 INCLUSIONS	F	10%	2							SINGLE, FAIRLY DENSE, 10-20% 2'-4"	
4						SAND: ORGANIC SILTY DARK BROWN		Nbn	4								
6						SILT FINE TO MED GRAINED NON PLASTIC GREY BROWN			6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.E.		FIELD ENG. G.H.		DATE DRILLED 1/2/73		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CXD: 111		TECH. D.H. & S.C.		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					SM		F	Nbn	20							
28									28							
30					MAH	SILT: SLIGHTLY CLAYED AND SANDY DEPOSITED END OF HOLE			30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: E.B.		FIELD ENG: G.M.C.		DATE DRILLED: 1/2/75		AIRPHOTO NO: L-22773-B9		CHAINAGE:		OFFSET:		TEST HOLE			
CKD:		TECH: D.H.F.G.C.		RIG: FAIRING 1070		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE	B,C,S		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
										CLAY %	SILT %	SAND %	GRAVEL %		
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)					
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+					
2						PEAT: CATEGORY # 16 ----- CATEGORY # 7	F	60%	2						
4						OL SILT: ORGANIC PEAT INCLUSIONS		50%	4						
6						SM SAND: SILTY FINE GRAINED NON PLASTIC GREY BROWN		Nbn	6						
8									8						
10									10						
12									12						
14									14						
16									16						
18									18						
20									20						
22									22						
24									24						

REMARKS
 10'-20', 2'4" φ
 LOW GROUND

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 1/2/73		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD:		TECH: D.H. F.G.C.		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 20 40 60 80 100 100+							
28					sm		F	Nice	28							
30						END OF HOLE 30			30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>1/2/73</i>		AIRPHOTO NO: <i>A-22773-88</i>		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD: <i>///</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE: <i>FLR</i>		VEGETATION:		ELEV:		MILE	B,C,S	NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
										%	%	%	%			
28					<i>CI</i>		<i>F</i>	<i>Nbn</i>	28							
30									30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46						<i>END OF HOLE</i>			46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.			FIELD ENG: G.M.			DATE DRILLED: 8/2/73			AIRPHOTO NO: A-22773-26			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE								
CKD /			TECH: G.C.			RIG: FAIRING 1000			SURFACE DRAINAGE: FAIR			VEGETATION: SEE STRIKE																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS															
										CLAY %	SILT %				SAND %	GRAVEL %													
						PEAT: CATEGORY #2		None																					
2					PL				2																				
4					ML	SILT: SLIGHTLY SANDY VERY FINE GRAINED NON PLASTIC BROWN	3	30%	4																				
6								None	6																				
8									8																				
10					CL CI	CLAY: VERY SILTY LOW TO MEDIUM PLASTIC DARK BROWN	9		10																				
12									12																				
14					CI CH	RED TO BROWN PLASTIC GRAVEL	13		14																				
16	1	C	100						16			1135	864																
18									18			1127	838																
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>EB</i>		FIELD ENG: <i>G.M.</i>		DATE DRILLED: <i>2/2/73</i>		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD: <i>/</i>		TECH: <i>G.C.</i>		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 20 40 60 80 100 100+						
28					CI		F	30%	28							
30									30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44						END OF HOLE			44							
46									46							
48									48							
50									50							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: E.F.		FIELD ENG: G.C.		DATE DRILLED 2/6/73		AIRPHOTO NO: A22773-96		CHAINAGE:		MACKENZIE HIGHWAY		TEST HOLE				
CKD		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: F.A.I.E.		VEGETATION: 1500 800 4000		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					MH	SILT: SLIGHTLY CLAYEY NON PLASTIC DARK BROWN		Non	2							20' TO 30' 20' TO 30' LEVEL GROUND
4									4							
6									6							
8									8							
10					CI CH	CLAY: SILTY MED TO HIGH PLASTIC DARK GREY BROWN		20%	10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY																
OWN: E.S.		FIELD ENG: G.M.		DATE DRILLED: 2/2/73		AIRPHOTO NO:		CHAINAGE:		OFFSET:												
CKD: A		TECH: G.C.		RIG:		SURFACE DRAINAGE:		VEGETATION:		ELEV:												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE SHEET 2						
										CLAY	SILT	SAND	GRAVEL			MILE	B,C,S	NUMBER				
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)												
										20	40	60	80	100	100+	%	%	%	%			
28					CH			20%	28													
30									30													
32									32													
34									34													
36									36													
38									38													
40									40													
42									42													
44									44													
46									46													
48									48													
50									50													
										REMARKS												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: E.B.		FIELD ENG: G.Mc.		DATE DRILLED: 2/2/73		AIRPHOTO NO: A22773-36		CHAINAGE:		OFFSET:		TEST HOLE				
CKD:		TECH: S.C.		RIG: FALCON 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SP. BUSHES		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					PE	PEAT: CATEGORY #15 ----- 2 CATEGORY #4	F	Nbn	2							LEVEL GROUND
4									4							
6									6							
8					CI	CLAY: SILTY MED PLASTIC GREEN BROWN		20%	8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

END

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 2/2/73		AIRPHOTO NO: A22773-97		CHAINAGE: 237+00		OFFSET:		MACKENZIE HIGHWAY		TEST HOLE			
CKD		TECH: G.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:					MILE	B,C,S	NUMBER
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY	SILT	SAND	GRAVEL				
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
										20	40	60	80	100	100+		
2					ML	SILT: NON PLASTIC BROWN	F	Nbn	2								SPUR 30' x 300' FROM LEVEL GRADE
4									4								
6									6								
8									8								
10					CL CI	CLAY: LOW TO MED PLASTIC DARK BROWN			10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: E.B.		FIELD ENG: G.M.		DATE DRILLED 3/2/73		AIRPHOTO NO: A 22829-145		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE SHEET 2							
CKD:		TECH: G.C.		RIG: FALLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE SKETCH													
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS					
										CLAY	SILT	SAND	GRAVEL								
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)												
									PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+												
26					SM	SAND: VERY SILTY FINE GRAINED NON PLASTIC DARK GREY	F	Nbr	26												
28									28												
30						END OF HOLE	50		30												
32									32												
34									34												
36									36												
38									38												
40									40												
42									42												
44									44												
46									46												
48									48												
50									50												

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 3/2/73		AIRPHOTO NO: A 22773-89		CHAINAGE:		OFFSET:		TEST HOLE												
CKD:		TECH: G.C.		RIG: FAIRING DND		SURFACE DRAINAGE: FAIR		VEGETATION: SET BACKS		ELEV:		MILE B.C.S. NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
						SAND: 3-4 FINE GRAINED NON PLASTIC BROWN ORGANIC INCLUSIONS ----- 3 INORGANIC VERY SALT																		
2					SM				2															
4					SM				4															
6									6															
8									8															
10					ML	SILT: SLIGHTLY SANDY NON PLASTIC BROWN ----- 9			10															
12									12															
14									14															
16						----- 15 GREY			16															
18									18															
20									20															
22									22															
24									24															

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: E.B.		FIELD ENG: G.M.		DATE DRILLED: 3/2/73		AIRPHOTO NO:		CHAINAGE:		VEGETATION:		ELEV:		TEST HOLE SHEET 2															
CKD:		TECH: G.C.		RIG:		SURFACE DRAINAGE: F.A.R.		OFFSET:		GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)		DRY DENSITY (P.C.F.)															
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (% OF DRY WEIGHT) ICE CONTENT (% OF SAMPLE VOLUME)	CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)	REMARKS														
26					ML	SILT		Nbn	26																				
28									28																				
30					CL	CLAY: SILTY LOW TO MED PLASTIC			30																				
32					CI	END OF HOLE			32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>EB</i>		FIELD ENG: <i>G.Mc.</i>		DATE DRILLED: <i>3/2/75</i>		AIRPHOTO NO: <i>A22773-88</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD:		TECH: <i>G.C.</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REF. CR.</i>		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
2					OL	SILT: ORGANIC PERT INCLUSIONS DARK BROWN		70%	2							SPRICE & FIR LND 30' TO 50' & HIGHER GROUND BETWEEN TWO SLOUGHS
4					ML	INORGANIC NON PLASTIC GREY BROWN		Nbn	4							
6									6							
8									8							
10					Sm	SAND: SILTY FINE GRAINED NON PLASTIC BROWN			10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

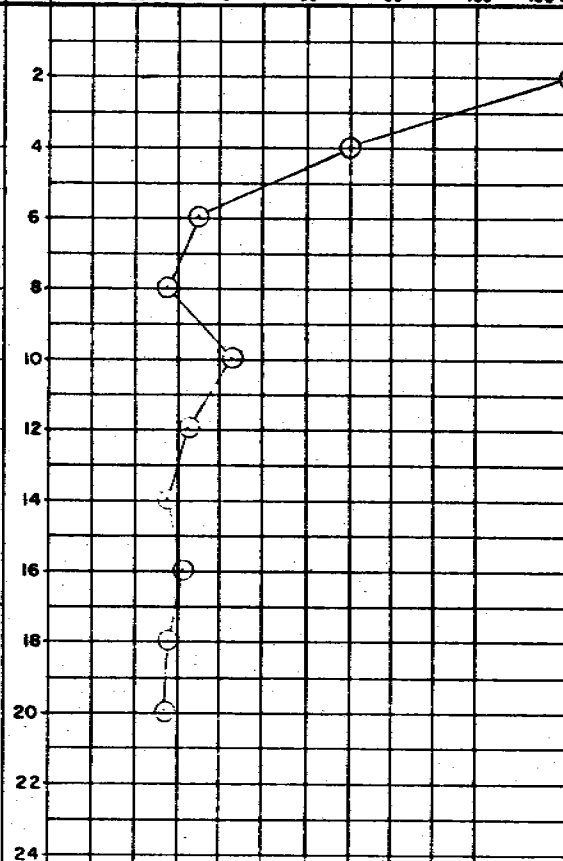
R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: E.R.		FIELD ENG: S.M.		DATE DRILLED 3/2/73		AIRPHOTO NO:		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2				
CKD:		TECH: S.C.		RIG: FAIRING 1000		SURFACE DRAINAGE: 1000		VEGETATION: SEE REMARKS		ELEV:						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WLT DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
28					SM			Nbn	28							
30									30							
32									32							
34									34							
36					CI	CLAY: SLIGHTLY SILTY MED PLASTIC GREY BROWN		35%	36							
38						END OF HOLE			38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: TC		FIELD ENG: B. C.		DATE DRILLED 4/2/73		AIRPHOTO NO:		CHAINAGE: SEE REMARKS		OFFSET:		TEST HOLE				
CKD: /		TECH: G C		RIG: FALLING 1000		SURFACE DRAINAGE: POOR		VEGETATION:		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
									%							
2					SP	SAND: FINE TO MED GRAINED NOW PLASTIC FAIRLY WELL GRADED COAR SPEC BROWN	F	Nbn	2							ISLAND IN THE MACKENZIE RIVER AT THE MOUTH OF THE GREAT BEAR RIVER SEE MOSAIC A1A
4									4							
6									6							
8									8							
10							UF		10							
12									12							
14						END OF HOLE	14		14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY							
DWN: EC		FIELD ENG: B.C.		DATE DRILLED: 5/2/73		AIRPHOTO NO: 122934-159		CHAINAGE: 83+00		OFFSET:					
CKD: EC		TECH: D.R.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: DWARF SPRUCE		ELEV:					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		TEST HOLE			
										CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
					PT	PEAT:		V _x 10%					583	C	459*
2						CAT. #4			2						
4					OL	SILT: ORGANIC		N _{bc}	4						
6					CI	CLAY SILTY PEBBLES TO 1/4" MEDIUM PLASTIC DARK GREY		N _{bn}	6						
8									8						
10								V _r 5%	10						
12								N _{bn}	12						
14					CL	SLIGHTLY SANDY LOW PLASTIC GREY			14						
16									16						
18								V _x < 1%	18						
20						END OF HOLE			20						
22									22						
24									24						

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT 20 40 60 80 100 100+
 LIQUID LIMIT 20 40 60 80 100 100+



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 5/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 82+30		OFFSET:		TEST HOLE				
CKD: <i>[Signature]</i>		TECH: D.R.		RIG: FAIRBANK 1000		SURFACE DRAINAGE: Good		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						PEAT Category 3 Category 6										
						SAND: SILT: PEAT: (TILL) fine grained with occasional stones many pockets of peat.										
2	1	C	100					V _x 15% V _x 20% V _x 5% V _r 5% V _r 1%	2							
4								N ₆₀	4							
6	2	C	86					V _r 5%	6							
8								N ₆₀	8							
10	3	C	100		OL			V _x 20% N ₆₀	10							
12	4	C	100					V _r 20% V _r 30	12							
14								N ₆₀	14							
16	5	C	83					V _s 15% V _x 5%	16							
18	6	C	96					V _s 15% V _x 5%	18							
20								V _x 5%	20							
22						organic silts & sands more pebbles		V _x 5%	22							
24						continued			24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER: TC		FIELD ENG: B.C.	DATE DRILLED: 3/2/73	AIRPHOTO NO: A 22934-159	CHAINAGE: 38+55	OFFSET:	TEST HOLE	
CKD: TC		TECH: D.R.	RIG: FAIRBANKS 1000	SURFACE DRAINAGE: POOR		VEGETATION: DWARF SPRUCE 2-3' ELEV:	MILE	B,C,S
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					PT	PEAT		
					ML	SILT: CLAYEY LOW TO MED PLASTIC BROWN	F	Nbe
2							UF	
4					SM	SAND: VERY FINE NON PLASTIC BROWN		
6						SLIGHTLY SILTY PEBBLES TO 1/2"	F	Nbn
8								
10								
12						CLAYEY LOW TO NON PLASTIC		
14					CL	CLAY: SANDY PEBBLES TO 3/8" MED PLASTIC GRAY		
16					SP	SAND: FINE PEBBLES TO 3/8" GRAY		
18								
20								
22								
24						RUST SPECS		

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT LIQUID LIMIT

20 40 60 80 100 100+

GRAIN-SIZE ANALYSIS

CLAY	SILT	SAND	GRAVEL	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
%	%	%	%		

REMARKS

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <u>TC</u>		FIELD ENG: <u>B.C.</u>	DATE DRILLED <u>7/2/73</u>	AIRPHOTO NO: <u>A 22934-159</u>	CHAINAGE:	OFFSET:	MACARENZIE HIGHWAY		TEST HOLE SHEET 2							
CKD: <u>TC</u>		TECH: <u>D.B.</u>	RIG: <u>FALLING 1000</u>	SURFACE DRAINAGE:		VEGETATION: <u>DWARF SPRUCE 2' - 3'</u>		ELEV:		MILE	B,C,S	NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					SP	SAND: FINE (TILL) JUST SPECS NON PLASTIC GREY		Nbn	20							
28									28							
30						END OF HOLE	30		30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 5/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 115+50		OFFSET:		TEST HOLE				
CKD: 115+50		TECH: D.R. H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SCRUB SPRUCE		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						Peat: ML SILT: SC SAND: fine grained SM (TILL) silt, slightly clayey low non-plastic pea stones few cobbles rust brown		Vx 5% Non	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)	PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80 100 100+						
2									2							
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 5/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 82+30		OFFSET:		TEST HOLE												
CKD: 1111		TECH: D.R.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE: 583 B.C.S: C NUMBER: 4601												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)														
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 20 40 60 80 100 100+														
2	1	C	100		OL	PEAT Category 3 category 6 SAND: SILT: PEAT: fine grained (TILL) with occasional stones many pockets of peat.		V _x 15% V _x 20% V _x 5% V _r 5% V _r 1%	2															
4								N ₆₀	4					857	40.8	Birch & Spruce 20'-40' high 2'-5' & few willow								
6	2	C	86					V _r 5%	6					791	44.5									
8								N ₆₀	8					791	36.3									
10	3	C	100					V _r 5%	10					762	32.8									
12								N ₆₀	12					303	11.8									
14	4	C	100					V _x 20%	14					673	19.2									
16								V _r 20%	16															
18	5	C	83					V _r 30	18					884	43.4									
20								N ₆₀	20					730	30.4									
22	6	C	96					V _s 15%	22					860	47.7									
24								V _x 5%	24															
								V _x 5%																

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

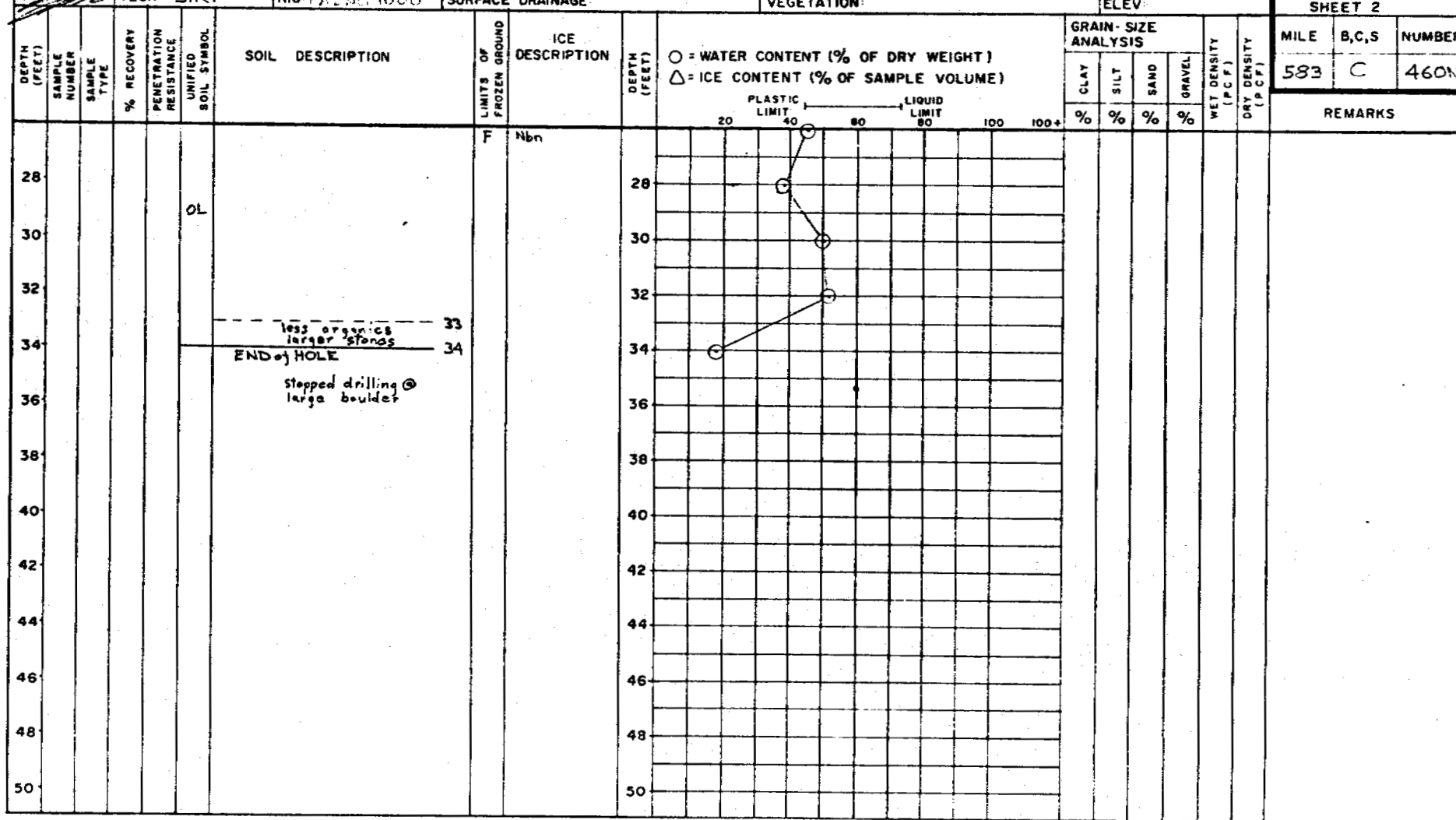
TEST HOLE
SHEET 2

MILE	B.C.S	NUMBER
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100	100	100

[illegible]

583	C	460N
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REMARKS



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>GLN</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>5/7/73</i>		AIRPHOTO NO: <i>A22934-159</i>		CHAINAGE: <i>120+90</i>		OFFSET:								
CKD: GLN		TECH: <i>H.H. + D.R.</i>		RIG: <i>FAIRING 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	TEST HOLE		
										CLAY %	SILT %	SAND %	GRAVEL %			MILE	B,C,S	NUMBER
						PT PEAT: CAT # 4												
						CH ORGANIC SILT												
2					ML	SILT: FINE SAND (TILL) LOW PLASTIC GREY		Vx: < 1%	2									SPALLS - 15" x 20" 2" to 3" Ø SCATTERED WILLOW
4								Nbn	4									
6						PEBBLES LARGE COBBLES BROWN		Vx: < 1%	6									
8									8									
10						SANDY			10									
12									12									
14						SLIGHTLY CLAYEY			14									
16									16									
18									18									
20									20									
22									22									
24						END OF HOLE			24									

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: IC		FIELD ENG: B.C.		DATE DRILLED: 5/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CXB		TECH: HH & DR		RIG: FALLING 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					OL	SILT: ORGANIC		Nbn								SPALLS 20-30' HIGH, 3'-4' Ø WITH SCATTERED BIRCH & WILLOW
2					ML	SILT: (TILL) SLIGHTLY CLAYEY LOW PLASTIC BROWN			2							
4									4							
6					SP	SAND: FINE GRAINED SLIGHTLY SILTY LOW TO NON PLASTIC GREY			6							
8									8							
10									10							
12									12							
14					ML	SILT: (TILL) SANDY PEBBLES TO 1/2" LOW PLASTIC GREY			14							
16									16							
18					SP	SAND: FINE GRAINED SLIGHTLY SILTY NON PLASTIC GREY			18							
20						END OF HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY							
OWNER: C.N.		FIELD ENG: B.C.		DATE DRILLED: 12/2/72		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE MILE B.C.S. NUMBER			
CND		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SPRUCE 5-15'		MAX. 3' 6" ELEV:					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %				SAND %
					Pe	PEAT category #1	F	V _x 10%		○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT					
2									2						
4						C1 CLAY: silty medium plastic		V _s 5%	4						
6								V _r 20%	6						
8								Nbn	8						
10	1								10						
12									12						
14									14						
16						sandy stones			16						
18	2								18						
20						SAND slightly silty non plastic brown			20						
22						END OF HOLE			22						
24									24						

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER G.N.		FIELD ENG: B.C.		DATE DRILLED: 6/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 133+00		OFFSET:		MACKENZIE HIGHWAY		TEST HOLE		
CID		TECH: D.R.H.-H.		RIG FILLING 1000		SURFACE DRAINAGE: Poor		VEGETATION: SCRUB SPRUCE 2'-4' Ø		ELEV:		MILE	B,C,S	NUMBER	REMARKS	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)		DRY DENSITY (P.C.F.)
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
2						PEAT: category # 1	F _v	10%	2							
4						CLAY: medium plastic brown	C _i	20%	4							
6						sandy odd pebble few cobbles	Nbc		6							
8							Nbn		8							
10						less sand			10							
12	1	C	82			sandier		1%	12							
14									14							
16						END of HOLE			16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: B.C.		DATE DRILLED: 6/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE: 140+00		OFFSET:		TEST HOLE												
CKD: TC		TECH: H.H. & D.F.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: POOR		VEGETATION: SPRUCE 15' to 20' ODD BIRCH		ELEV: 2704'														
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
						PT PEAT CAT. "6"		Vx 5%		○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)														
2					CI CLAY: SILTY MED PLASTIC BROWN		Vx 10%	2																
4					ML SILT: SANDY (TILL) ODD PEBBLE TO 1/4" LOW PLASTIC BROWN				4															
6									6															
8								Vx 5%	8															
10					SM SAND: SILTY (TILL) PEBBLES TO 1/2" NON PLASTIC BROWN ODD COBBLE TO 6" φ		Vx < 1%		10															
12									12															
14									14															
16						END OF HOLE			16															
18									18															
20									20															
22									22															
24									24															

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

ELEV:

524	C	470
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REMARKS

[illegible]

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.

FIELD ENG: B.C.

DATE DRILLED: 6/2/73

AIRPHOTO NO: A 22934-159

CHAINAGE: 161 + 22

OFFSET:

TEST HOLE

CKD

TECH: D.R. & H.H.

RIG: 12-115-1022

SURFACE DRAINAGE: Good

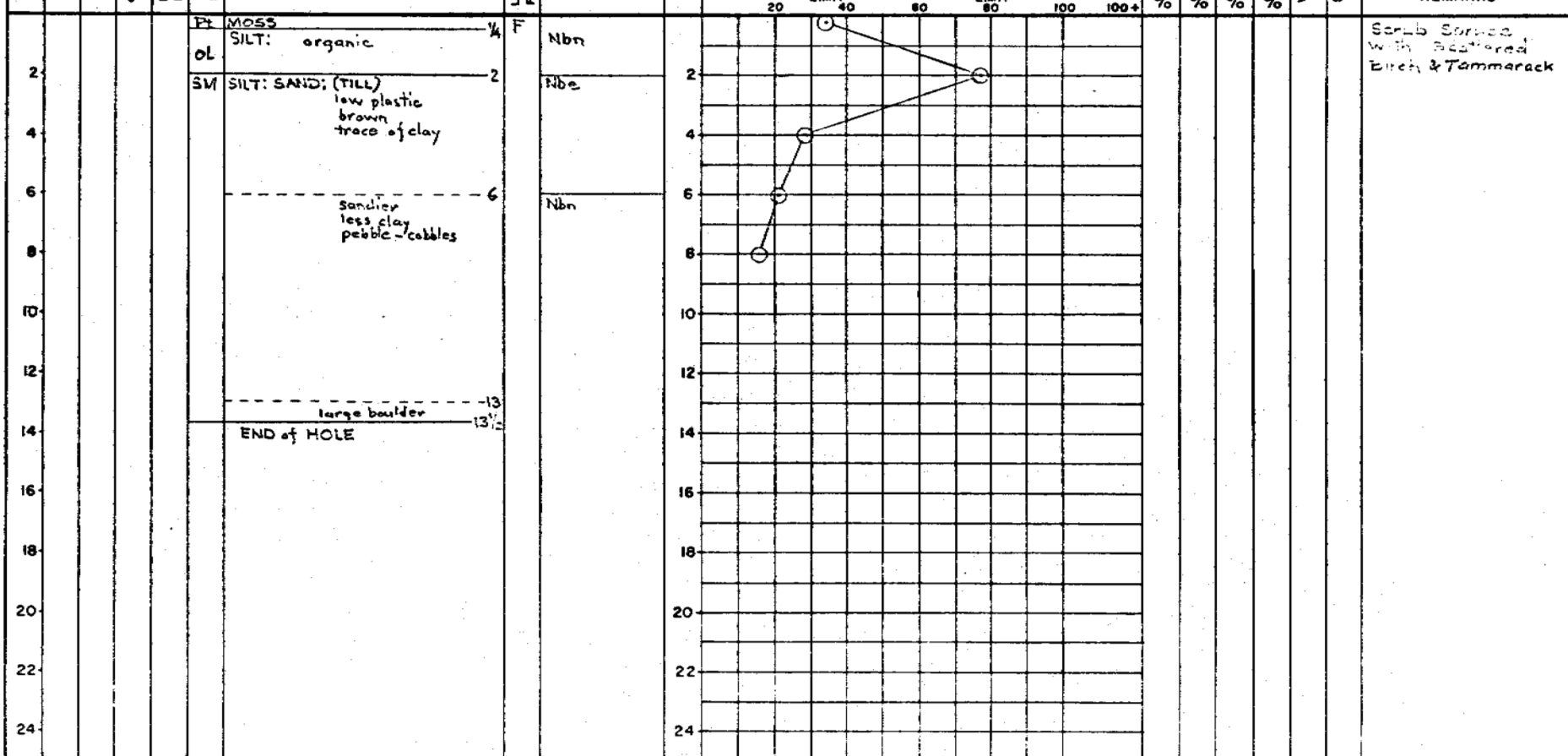
VEGETATION: SEE REMARKS

ELEV:

MILE	B.C.S	NUMBER
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585 C 471

REMARKS



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY							
OWN: T2		FIELD ENG: BC		DATE DRILLED: 6/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 162400		OFFSET:					
CKD: 162400		TECH: H.H. & D.R.		RIG: FAIRING 1200		SURFACE DRAINAGE: Good		VEGETATION: SPRUCE 15'-20' TALL		ELEV:					
TEST HOLE															
MILE		B,C,S		NUMBER											
585		C		472											
REMARKS															
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (%)	ICE CONTENT (%)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
												CLAY	SILT	SAND	GRAVEL
												%	%	%	%
2					OL	SILT: ORGANIC	1/6	Nbn	2						
4					ML	SILT: TRACE OF ORGANICS (TILL) CLAYEY SLIGHTLY SANDY PEBBLES TO 1/2"	2		4						
6					CI	CLAY: SILTY SANDY (TILL) ODD PEBBLE TO 1/4"	4		6						
8					SM	SILT: SAND (TILL) ODD PEBBLE TO 1/2"	7		8						
10									10						
12									12						
14									14						
16									16						
18									18						
20									20						
22									22						
24									24						

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: T.C.		FIELD ENG: B.C.		DATE DRILLED: 4/2/13		AIRPHOTO NO: A 22934-159		CHAINAGE: 170+06		OFFSET:		TEST HOLE									
CKD		TECH: H.J.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE		B,C,S		NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS					
										CLAY %	SILT %	SAND %	GRAVEL %								
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT											
2					OL	SILT: ORGANIC		Vx < 1%	2							SHRUB SPRUCE UP TO 35' - 2" TO 6" DIA SCATTERED BIRCH					
4					ML	SILT: CLAYEY: SOME SAND LOW PLASTIC BROWN		NF	4												
6					SM	SAND: SILTY ODD PEBBLE UP TO 1/4" NON PLASTIC GREY BROWN		Vx - 10 % ----- 5 % ----- 1 %	6												
8									8												
10					GM	GRAVEL: SILTY PEBBLES UP TO 1" SOME COBBLES AND BOULDERS GREY BROWN			10												
12									12												
14						END OF HOLE			14												
16									16												
18									18												
20									20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: B.C.		DATE DRILLED: 6/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 174+00		OFFSET:		TEST HOLE				
CKD: TC		TECH: DD & HH		RIG: FALLING BLOCK		SURFACE DRAINAGE: FAIR		VEGETATION: Sparse 2-6' + 3'		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
					OL	SILT: ORGANIC	F	Vx 20%	2							
2									2							
					SM	SILT: SAND LOW PLASTIC BROWN		Nf	4							
4									4							
									6							
6									6							
					SP	SAND: PEBBLES TO 1/2" (TILL) ODD COBBLES ODD BOULDER NON PLASTIC BROWN		Nbn	8							
8									8							
									10							
10									10							
									12							
12									12							
									14							
14						SLIGHTLY SILTY GREY BROWN		Vx 5%	14							
									16							
16									16							
									18							
18								Vx 1%	18							
									20							
20						END OF HOLE			20							
									22							
22									22							
									24							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>GLN</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>6/2/73</i>		AIRPHOTO NO: <i>A 22934-159</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>GLN</i>		TECH: <i>DR - H.M.</i>		RIG: <i>FALING 1000</i>		SURFACE DRAINAGE: <i>POOL</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						SILT: Organic		<i>5 %</i>								SPRUCE UP TO 35' HIGH - 2" TO 6" & SOME SCATTERED BIRCH
2					<i>OL</i>				2							
4					<i>SM</i>	SILT SAND: Inorganic FINE sand Low Plastic Brown			4							
6						Pebbles To 1" SANDS NON-PLASTIC		<i>Nf</i>	6							
8						Silty			8							
10									10							
12						RUST SPECS.			12							
14								<i>Nbn</i>	14							
16						Low Plastic Slightly Clayey Grey			16							
18									18							
20					<i>CH</i>	CLAY (SHALE): Grey Very Stiff High Plastic			20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: 5-1-54		FIELD ENG: Z.C.	DATE DRILLED:	AIRPHOTO NO: A22934-159	CHAINAGE:	OFFSET:	MACKENZIE HIGHWAY				TEST HOLE SHEET 2					
CND	TECH: DR - HM	RIG: FAIRING 1800	SURFACE DRAINAGE: POOR			VEGETATION: SEE REMARKS			ELEV:	MILE	B,C,S	NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
28								NbA	28							SPRUCE UP TO 25' HIGH. 2" TO 6" & SOME SCATTERED BIRCH
30									30							
32									32							
34									34							
36									36							
38									38							
40									40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: C.N.		FIELD ENG: B.C.		DATE DRILLED: 7/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE: 179+21		OFFSET:		TEST HOLE				
CKD: XXXX		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						PEAT: category #10 SILT: organic medium plastic CLAY (TILL) silty sandy medium plastic pebbles cobbles brown ----- Coal rust ----- CH ----- high plastic ----- END OF HOLE -----		Vx 5% Vs 5% Vs 10% Vs 5% Vx 5% Vx 1% Nbn	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT 							Spruce 25-30' high 2"-4" clumps of Birch
2									2							
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: J.H.W.		FIELD ENG: B.C.		DATE DRILLED: 7/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 130+47		OFFSET:		TEST HOLE				
CKD: 11.11		TECH: 11.11.		RIG: FALLING 120		SURFACE DRAINAGE: Good		VEGETATION: SERVICE TO 30', FEN BACH		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						FT MOSS										
						OL ORGANIC SILT: SANDY MED. PLASTIC BROWN	1/2 F	NE								
2						OH ORGANIC CLAY: STONES MED. PLASTIC BROWN	1 1/2	Vs = 5%	2							
4						CI CLAY: SANDY, SILTY PUST, COAL SPECS MED. PLASTIC BROWN	3	Vs = 5%	4							
6	1	C	50			SM SAND: SILTY NON PLASTIC COAL SPECS BROWN GREY AT 8' & 14'	6	Vs 1%	6					118.1	94.8	
8	2	C	100					Nb/n	8					121.0	100.1	
10									10					121.5	98.1	
12	3	C	53					Vs = 5%	12					121.3	100.2	
14								Nb/n	14							
16						SW WELL GRADED	16		16							
18									18							
20						SW Gravelly	19	Vs 5%	20					52.1	45.0	M.A.
22						END OF HOLE	20		22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

TEST HOLE

MILE	B,C,S	NUMBER
1		
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99		
100		

595	C	480
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REMARKS

[illegible]

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 7/2/73		AIRPHOTO NO: A22934-159		CHAINAGE: 200+ ft		OFFSET:		TEST HOLE				
CKD: 1111		TECH: H.H.		RIG: FALLING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE: 585 B,C,S: C NUMBER: 481				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						OH SILT: organic CI CLAY (TILL) silty, sandy stones coal specs. rust medium plastic brown		V _x 10% V _x 20%								Dwarf Spruce 10-15' high, 2-4" φ scattered Birch & Tamarack
2									2							
4									4							
6								V _x 15%	6							
8								V _x 10%	8							
10					SC SAND (TILL) silty, clayey low plastic stones coal brown	10	Nbn		10							
12								V _x V _c 10%	12							
14								V _x 5%	14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
DWN: C.V.		FIELD ENG: B.C.		DATE DRILLED: 7/2/73		AIRPHOTO NO: A 22934-157		CHAINAGE: 222+14		OFFSET:		TEST HOLE		
CKD: ---		TECH: H.H.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: Good		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %			
						PT NO. 35 C1 CLAY: (TILL) Silty, sandy medium plastic stones coal rust	1/4 F	V _x 5%	2	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)				Dwarf Spruce 15' high Scattered Birch & Tamarack
2								V _x 20%	4					
4								V _x 5%	6					
6						--- 6 sand pockets cobbles			8					
8									10					
10								V _x 1%	12					
12									14					
14									16					
16									18					
18									20					
20									22					
22									24					
24						END of HOLE	15							

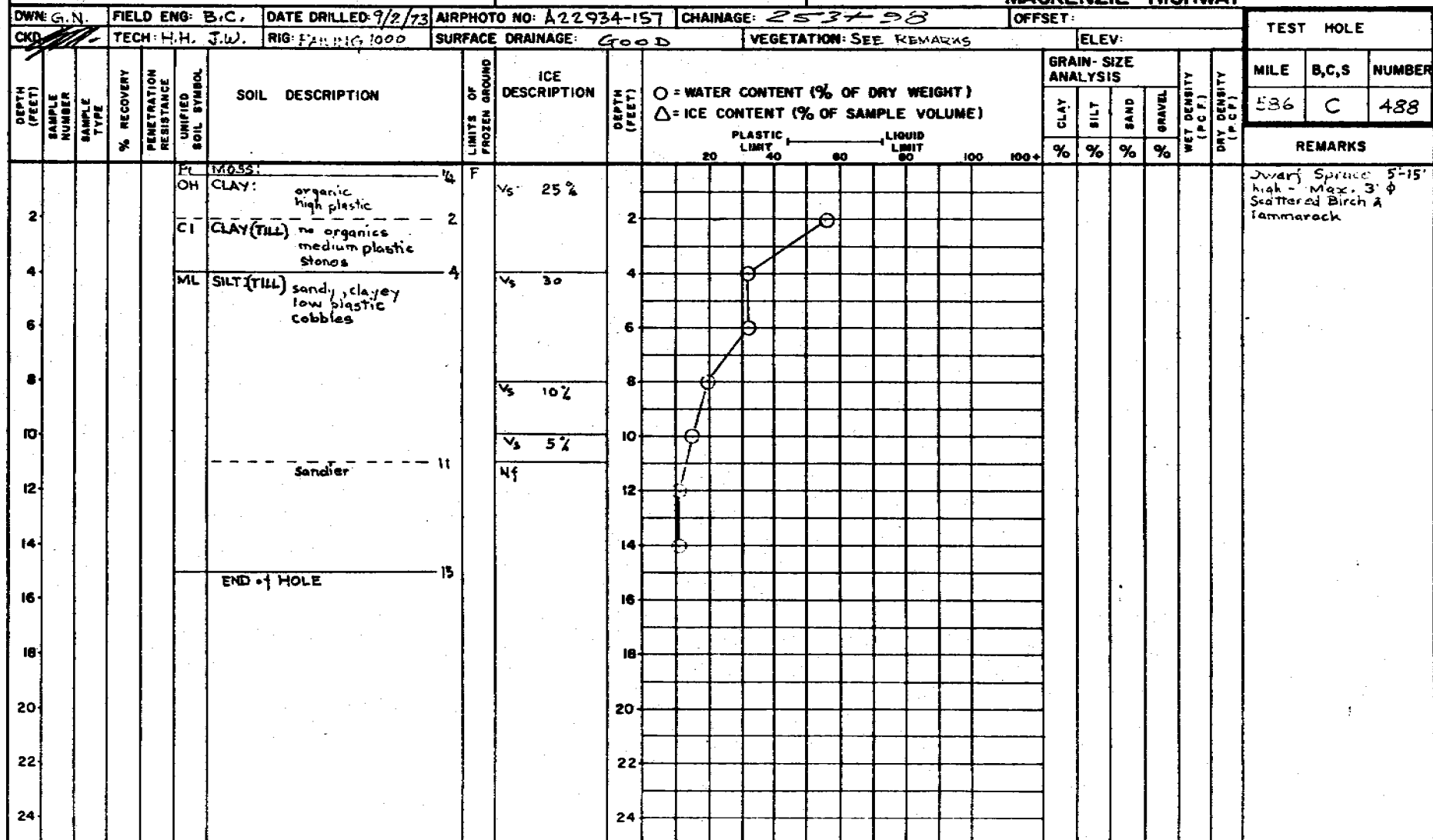
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWM G.N.		FIELD ENG. B.C.	DATE DRILLED: 7/2/73	AIRPHOTO NO: A22934-157	CHAINAGE: 228424	OFFSET:	TEST HOLE									
CID	TECH: H.H.	RIG: FAIRING 1000	SURFACE DRAINAGE: Good		VEGETATION: SEE REMARKS		ELEV:									
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
2						MOSSY CLAY: (TILL) silty sandy medium plastic boulders stones	1/4 F	Vs 5%	2							Dwarf Spruce 10'-15' high, 3" φ, scattered Birch, Tamarack
4								Vs 15%	4							
6						----- sand pockets -----	6	Vs 10%	6							
8								Vs 1%	8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						END of HOLE	15		24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: T.C.			FIELD ENG: B.C.			DATE DRILLED: 8/2/73			AIRPHOTO NO: A22934-157			CHAINAGE: 237+35			OFFSET:			TEST HOLE											
C/O: XXXX			TECH: H.H.			RIG: FAIRING 1000			SURFACE DRAINAGE: FAIR			VEGETATION: SPRUCE 10'-15' High			3" Ø ELEV:			MILE B.C.S NUMBER											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
					ML	SILT: LOW PLASTIC BROWN		Vx 10%																					
2									2																				
4									4																				
6					CI	CLAY (TILL) SANDY SILTY MED PLASTIC LIGHT BROWN STONES COBBLES BOULDERS		Nbn	6																				
8									8																				
10									10																				
12									12																				
14						END OF HOLE STOPPED DRILLING ON BOULDER			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: BC		DATE DRILLED: 8/1/73		AIRPHOTO NO: A22934-157		CHAINAGE: 245+53		OFFSET:		TEST HOLE				
CKD: TC		TECH: HH		RIG: FALLING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SPRUCE 5' TO 15' 3" Ø		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						LT MOSS ML GRAY CI CLAY: SILTY (TILL) ODD COBBLE MED. PLASTIC BROWN SP SAND: VERY FINE (TILL) SLIGHTLY SILTY NON PLASTIC BROWN END OF HOLE		Vx 30% Vx 25% Vx 10% Vx 1% Nbn	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT 							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY												
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 9/2/73		AIRPHOTO NO: A22934-157		CHAINAGE: 263+22		OFFSET:								
CKD: 111		TECH: H.H. J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: 4000		VEGETATION: SEE REMARKS		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE		
										CLAY %	SILT %	SAND %	GRAVEL %			MILE	B,C,S	NUMBER
						Pe PEAT: category 1		V _x 50%										
2						OH CLAY organic high plastic	2 1/2	V _x 40%	2									
4						CI CLAY (TILL) silty, sandy stones, cobbles brown	4 1/2	V _s 25%	4									
6								V _s 10%	6									
8									8									
10								Nf	10									
12									12									
14									14									
16									16									
18									18									
20						END of HOLE stopped drilling @ boulder	18 1/2											
22																		
24																		

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

REMARKS: Medium Dense Spruce 5'-15' high, 3" φ

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: BC		DATE DRILLED: 9/2/73		AIRPHOTO NO: A22934-157		CHAINAGE: 272+50		OFFSET:		TEST HOLE				
CKD: TC		TECH: HH		RIG: FALLING 100		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
1	T	65			PT	PEAT: CATEGORY #6		Vr 30%	1							SPARSE DWARFED SPRUCE 3' TO 15' HIGH 3" MAX ϕ
2	T	72			CI	CLAY (TILL): SILTY, SANDY RUST SPECS MED PLASTIC BROWN STONES		Vr 10%	2							
4	T	57							4							
6	T	138				DARK BROWN		Vr 20%	6							
8									8							
10	C	83						Vr 10%	10							
12	C	69							12							
14						END OF HOLE			14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 12/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 1111		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					Pe	PEAT: category #1	F	Vs 20%	2							Dense Splice 3-15' Max. 3-5" Scattered Ton-in-rock
4					Ci	CLAY (TILL) silty, sandy medium plastic with many gravelly sand pockets cobbles		Vs 10%	4							
6									6							
8									8							
10								Nbn	10							
12									12							
14					Ch	CLAY (SHALE) silty, sandy high plastic numerous rust fissures no laminations (reworked)			14							
16	2								16							
18									18							
20						END of HOLE			20							
22									22							
24									24							

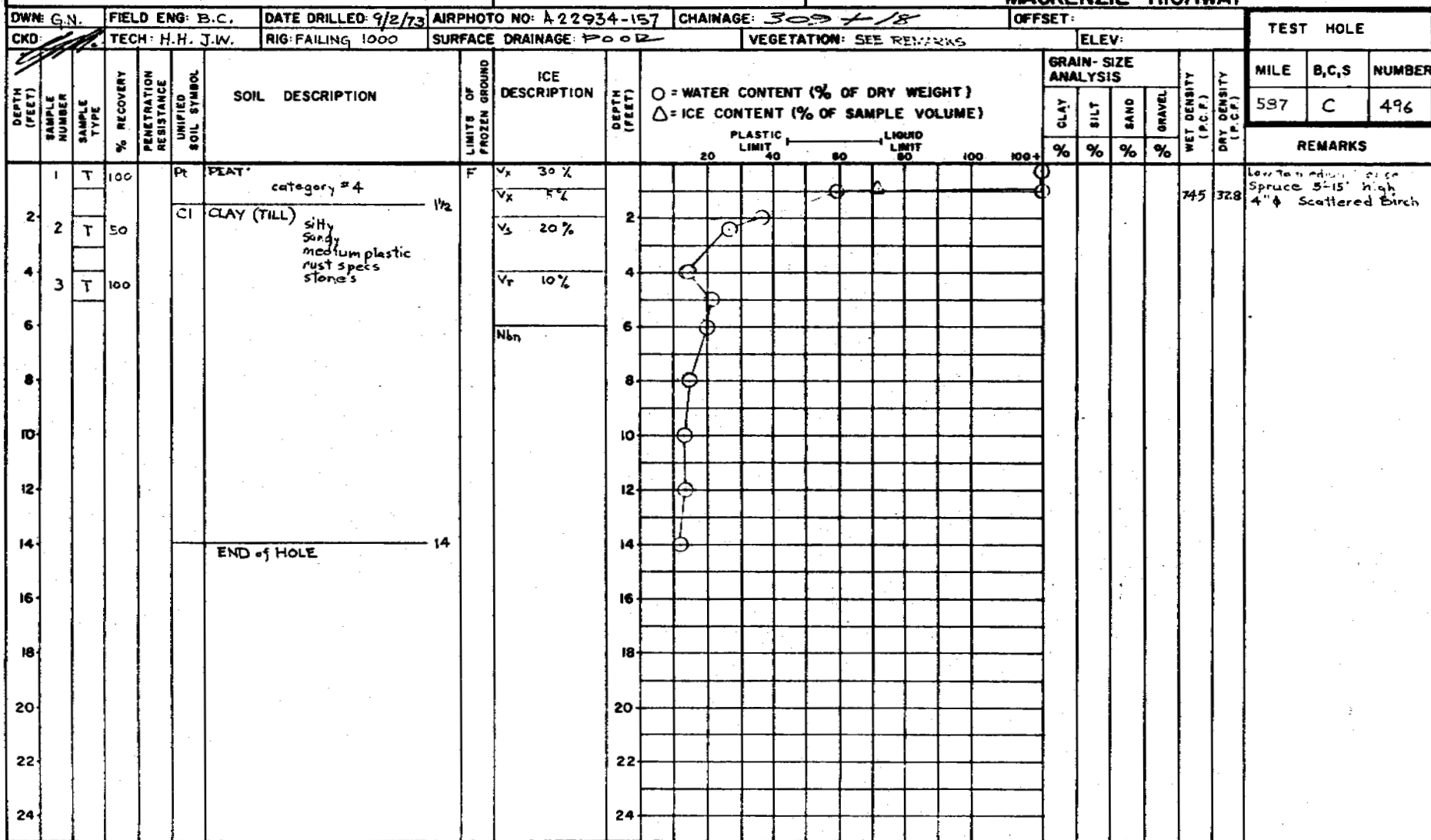
R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.	DATE DRILLED: 9/2/72	AIRPHOTO NO: A 22934-157	CHAINAGE: 286+33	OFFSET:		ELEV:								
CKD: 11		TECH: H.H. J.W.	RIG: FILLING 1000	SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		TEST HOLE								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
1	T	100				11 MESSY organic	1/4	Vs 35%								Medium Dense Spruce 10'-20' high - 4" φ
2	T	92				CI CLAY (TILL) silty medium plastic brown	3/4	Nbn	2	○	△			55.0	16.4	
4						boulders sandier	4		4	○	△			128.7	109.6	
6						SM SAND (TILL) silty stones fine grained non plastic cobbles coal specs	6		6	○						
8									8	○						
10						traces of clay	10		10	○						
12									12	○						
14						END of HOLE	14		14	○						
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.N.			FIELD ENG: B.C.			DATE DRILLED: 9/2/73			AIRPHOTO NO: A 22934-157			CHAINAGE: 223+62			OFFSET:			ELEV:			TEST HOLE								
CKD: 111			TECH: H.H. J.W.			RIG: FAIRING 1000			SURFACE DRAINAGE: POOR			VEGETATION: SEE REMARKS						MILE			B,C,S			NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						CI CLAY (TILL)		Nbr		O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
						silty, sandy medium plastic stones cobbles brown				PLASTIC LIMIT 20 40 60 80 100 100+																			
2									2																				
4									4																				
6									6																				
8									8																				
10									10																				
12						siltier more stones rust			12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

Medium Dense Spruce
15'-20' high 6" φ
with Scattered Birch

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
OWN: T.C.		FIELD ENG: B.C.		DATE DRILLED: 9/2/73		AIRPHOTO NO: A 22934-157		CHAINAGE: 30/455		OFFSET:		TEST HOLE		
CKD: 11/11/73		TECH: H.H. & J.W.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %			
						PT PEAT CAT #4		Vs 5%						
2					ML	SILT: SLIGHTLY SANDY (TILL) TRACE OF CLAY LOW PLASTIC BROWN CLAYEY PEBBLES TO 1"		Vs 20%	2					
4								Nbn	4					
6									6					
8						TRACE OF CLAY		NF	8					
10									10					
12									12					
14						END OF HOLE			14					
16									16					
18									18					
20									20					
22									22					
24									24					

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: T.C.		FIELD ENG: B.C.		DATE DRILLED: 9/2/78		AIRPHOTO NO: A22934-157		CHAINAGE: 324+00		OFFSET:		TEST HOLE				
CKD: XXXX		TECH: H.H.		RIG: FALLING 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
2					ML	PT. CROSS SILT: SANDY (TILL) PEBBLES TO 1" LOW PLASTIC BROWN	F	Vs 20%	2							MED TO DENSE SPRUCE 3' TO 20' HIGH 6" Ø OBD BIRCH
4									4							
6					CI	CLAY (TILL) SILTY PEBBLES TO 1" MED PLASTIC BROWN		Vs 5%	6							
8									8							
10						RUST SPECS			10							
12									12							
14						END OF HOLE			14							
16									16							
18									18							
20									20							
22									22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 10/2/73		AIRPHOTO NO: A 22934-157		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE SHEET 2		
CKD		TECH: H.H.		RIG: FAIRING, 1000		SURFACE DRAINAGE:		VEGETATION:						MILE	B,C,S	NUMBER
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	CONTINUED REMARKS
										CLAY	SILT	SAND	GRAVEL			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 40 60 80 100 100+						
										%	%	%	%			
					C1		F	Nbn.	28							
28									28							
30						gravelly		Nf	30							
32									32							
34									34							
36									36							
38									38							
40						END of HOLE drilling stopped @ large boulder			40							
42									42							
44									44							
46									46							
48									48							
50									50							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 10/2/77		AIRPHOTO NO: A 22934-157		CHAINAGE: 357+22		OFFSET:								
CKD: 111		TECH: H-H		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE		
										CLAY	SILT	SAND	GRAVEL			MILE	B,C,S	NUMBER
					CH	CLAY: (TILL) silty sand/ stones high plastic brown cobbles	F	V _y 5%										
2									2									
4									4									
6								V _s 10%	6									
8					CI	siltier sandier medium plastic cobbles		N _{bn}	8									
10									10									
12									12									
14						END of HOLE			14									
16									16									
18									18									
20									20									
22									22									
24									24									

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ——— LIQUID LIMIT

20 40 60 80 100 100+

REMARKS: Dense Spruce 10-30' high, Max 6" 4
Scattered Birch 6" 4

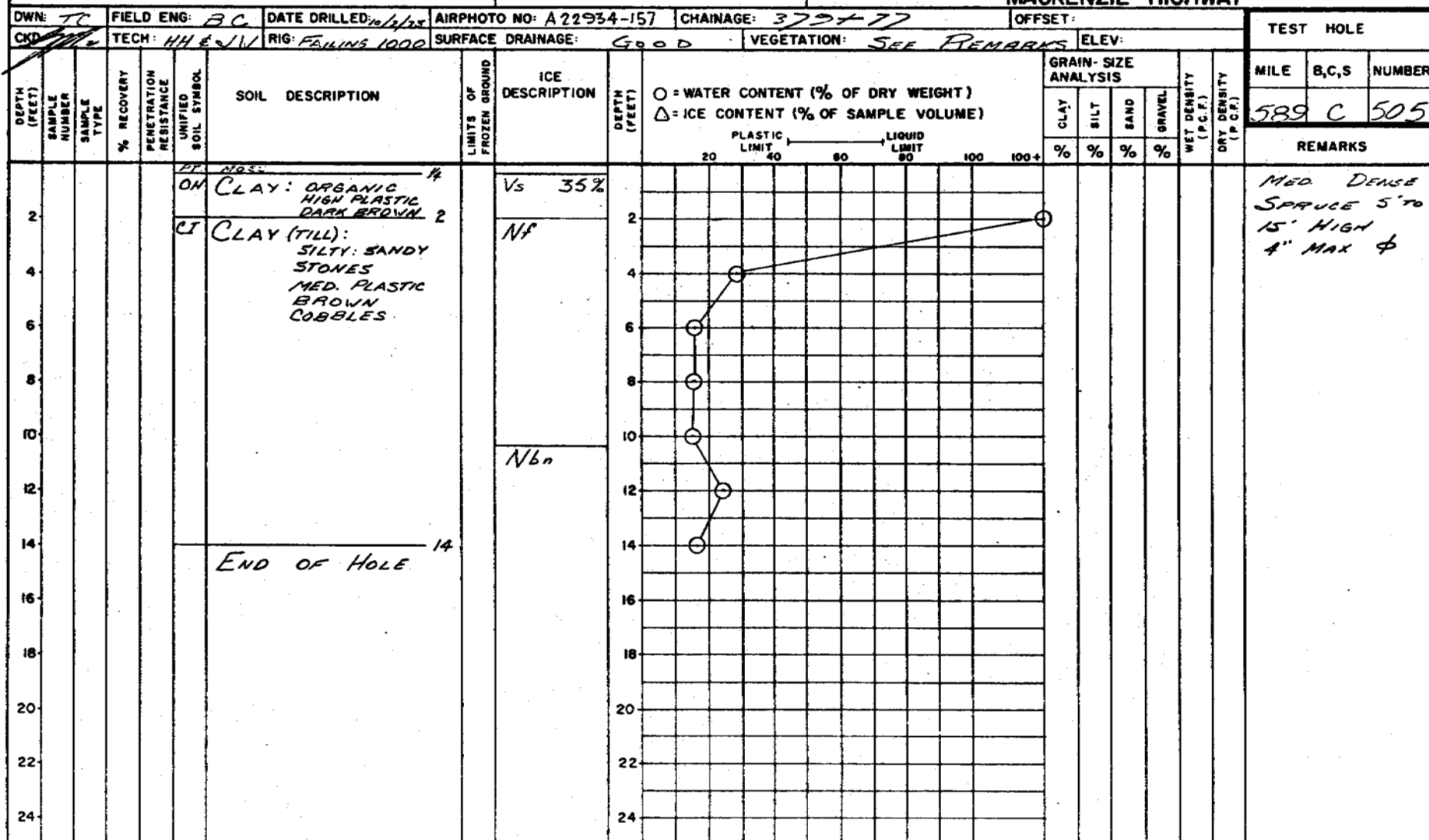
R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 10/12/77		AIRPHOTO NO: A22934-157		CHAINAGE: 362+72		OFFSET:		TEST HOLE																	
CKD: TC		TECH: HH & W.		RIG: FALLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SPRUCE STAG HIGH 4' 6"		ELEV:		MILE B,C,S NUMBER																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
1	T	100				OL SILT: ORGANIC LOW PLASTIC DARK BROWN		V _w 20% ICE 100% V _s 60% ICE 90% V _s 60%	1																				
2	T	108							2																				
3	C	91							3																				
4						CI CLAY (TILL): SILTY SANDY MED PLASTIC STONES BROWN COBBLES		V _s 5%	4																				
6	C	85							6																				
8									8																				
10									10																				
12									12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 10/12/73		AIRPHOTO NO: A 22934-157		CHAINAGE: 324+81		OFFSET:		TEST HOLE					
CKD: TC		TECH: HH & JW		RIG: FALLING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
1	1	T			OH	CLAY: organic high plastic		V _s 5%	1					83.5	61.0	SPARSE SPRUCE 5' to 15' HIGH 5" φ	
2	2	T						ICE 70%	2					60.0	15.0		
3	3	T							3					66.3	25.9		
4	4	T			CI	CLAY (TILL): silty, sandy medium plastic stones rust brown cobbles		V _s 30%	4					77.4	65.5		
6								V _s 20%	6								
8								V _x 1%	8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: TC		FIELD ENG: B.C.		DATE DRILLED: 8/1/73		AIRPHOTO NO: A22934-157		CHAINAGE: 352+39		OFFSET:		TEST HOLE				
CKD: TC		TECH: H.H. + J.W.		RIG: FALLING 1000		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						PT MO. 1 PT PEAT: CATABOY #4		Vs 40%								SPARSE SPRUCE 5' TO 15' HIGH 4" Ø
2					NL	SILT: SLIGHTLY SANDY LOW PLASTIC BROWN		Vs 10%	2							
4					CI	CLAY (TILL): SILTY, SANDY PEBBLES COBBLES MED PLASTIC BROWN		Vx 5%	4							
6									6							
8									8							
10								N60	10							
12									12							
14						END OF HOLE	14		14							
16									16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN:	FIELD ENG:	DATE DRILLED	AIRPHOTO NO:	CHAINAGE:	OFFSET:											
CKD	TECH:	RIG	SURFACE DRAINAGE:	VEGETATION:	ELEV:											
						TEST HOLE										
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)	CLAY %	SILT %	SAND %	GRAVEL %			
									PLASTIC LIMIT ——— LIQUID LIMIT							
									20 40 60 80 100 100+							
					OH	CLAY: organic high plastic brown	F	V _s 10%	2						MED DENSE SPRUCE 5'x10'	
					C1	CLAY: (TILL) silty, sandy medium plastic cobbles stones rust brown		V _s 5%	4						HIGH 3"x4"	
								V _x 1%	6							
							N/A		8							
									10							
						END of HOLE Drilling stopped @ boulder			11							
									12							
									14							
									16							
									18							
									20							
									22							
									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AIRPHOTO NO: A22954-157		CHAINAGE: 16 + 16		OFFSET:		TEST HOLE										
CKP		TECH: H.H.		RIG: FAILING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER										
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS						
										CLAY %	SILT %	SAND %	GRAVEL %									
1	T	100			Pe	Mass PEAT: category #6	4	V _x 20%					75.0	41.5	Medium Dense Spruce 15-35' High Max. 8" φ, with clumps of Birch							
2	T	92												78.0		47.0						
3	T	100			OH	CLAY: organic high plastic dark brown wood particles	2	V _s 40%								74.0	28.2					
4	C	100						V _r 13%								70.6	30.6					
6					CH	CLAY (TILL) high plastic granitic stone inclusions reddish brown (reworked shale)	5	V _h 10%									103.6	94.6				
8	C	94															129.2	107.7				
10																	129.1	108.1				
12																	128.5	106.9				
14	C	92						V _h < 1%									139.0	120.4				
16																		136.8	120.8			
18	C	100						Nbn									153.9	141.2				
20																		154.4	145.5			
22																		151.0	143.3			
24	C	100				grey	19											144.2	136.2			
															END of HOLE	24						

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWR: G.N.		FIELD ENG: B.C.		DATE DRILLED: 11/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 11/2/73		TECH: H.H.		RIG: FALLING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE	B,C,S	NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT						
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
2						CL CLAY (TILL) very silty sandy low plastic brown.	1/4	25 %	2	20						Medium Dense Spruce 5-15' high, max. 3"
4								20 %	4	40						
6						CI - - - - - medium plastic with pockets of silty sand, cobbles gravelly	6	10 %	6	60						
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20						END OF HOLE	20		20							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>11/2/75</i>		AIRPHOTO NO: <i>A 22934-159</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>TC</i>		TECH: <i>H.H. ENH</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						<i>PT MOSS</i>	<i>1/2</i>	<i>F Vs 10%</i>								
2						<i>CLAY (TILL): SILTY SANDY LOW PLASTIC SAND ROCKETS</i>			2							<i>MED to DENSE SANDS 35' to 50' HIGH 6" Ø ODD BIRCH</i>
4									4							
6						<i>STONES LESS SANDY RUST SPECS</i>		<i>Vs 5%</i>	6							
8								<i>N6n</i>	8							
10						<i>MED. PLASTIC</i>			10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						<i>END OF HOLE</i>			24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 11/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 11/2/73		TECH: H.H.		RIG: 11/2/73		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80 100 100+						
2					SM	fine grained silty non plastic brown	1/2	Nb	2							Medium sand 10-15% gravel Scattered birch
4								Nb	4							
6								Nb	6							
8								Nb	8							
10								Vx 1%	10							
12									12							
14									14							
16								Nb	16							
18					G.M.	GRAVEL Sandy silty brown	17 1/2		18							
20						END OF HOLE	20		20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: B.C.		DATE DRILLED: 11/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		TEST HOLE												
CKR: TC		TECH: HH & JN		RIG: FALLING 1000		SURFACE DRAINAGE: POOL		VEGETATION: SPRUCE STAINS		ELEV:		MILE B,C,S NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS										
										CLAY %	SILT %													
1	T	93			PT	FEAT. CATEGORY # 3		Vx 30%																
2	T	106			OH	CLAY: ORGANIC, BROWN HIGH PLASTIC.		ICE 50% Vs 30%				102.1	76.8											
3	T	111			CI	CLAY (FILL): SANDY, SILTY STONES COBBLES MED. PLASTIC BROWN		Vs 5%				94.0	56.8											
4												95.8	65.6											
5	C	100			CH	CLAY (SHALE): SOFT HIGH PLASTIC RUST LENSES DARK GREY (REWORKED) NO LAMINATIONS		Vr 10%				123.6	104.0											
6	C	10										123.5	94.8											
7	C	100				GREY		Vr 5%				123.2	103.6											
8	C	100										123.3	103.0											
20						END OF HOLE						127.5	110.0											

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>TR</i>		FIELD ENG: <i>B.C.</i>	DATE DRILLED <i>4/2/73</i>	AIRPHOTO NO: <i>A 22934-159</i>	CHAINAGE:	OFFSET:	ELEV:	TEST HOLE									
TECH: <i>H.H.</i>		RIG: <i>FALLING 1000</i>	SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE FERN</i>				MILE	B,C,S	NUMBER						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY	SILT	SAND	GRAVEL				
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+				%	%	%	%
2						ET PEAT: CATEGORY #6		Vx 30%	2								DENSE CLAY 25' to 35' HIGH MAX 6" φ SCATTERED BIRCH
4						CI CLAY (TILL): SANDY, SILTY STONES MED PLASTIC BROWN		Vx 10%	4								
6						-----5 COBBLES		Vx 5%	6								
8								N6h	8								
10						-----10 SAND POCKETS			10								
12									12								
14									14								
16						SM SILT-SAND: LOW PLASTIC BROWN			16								
18									18								
20						END OF HOLE			20								
22									22								
24									24								

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.1.

FIELD ENG: B.C.

DATE DRILLED: 14/2/73

AIRPHOTO NO: A 22934-159

CHAINAGE:

OFFSET

INZIO

TEST HOLE

~~CMB~~

TECH: H.H.

RIG: FALLING 1000

SURFACE DRAINAGE: Good

VEGETATION: SEE REMARKS

FILEY:	
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MILE	B,C,S	NUMBER
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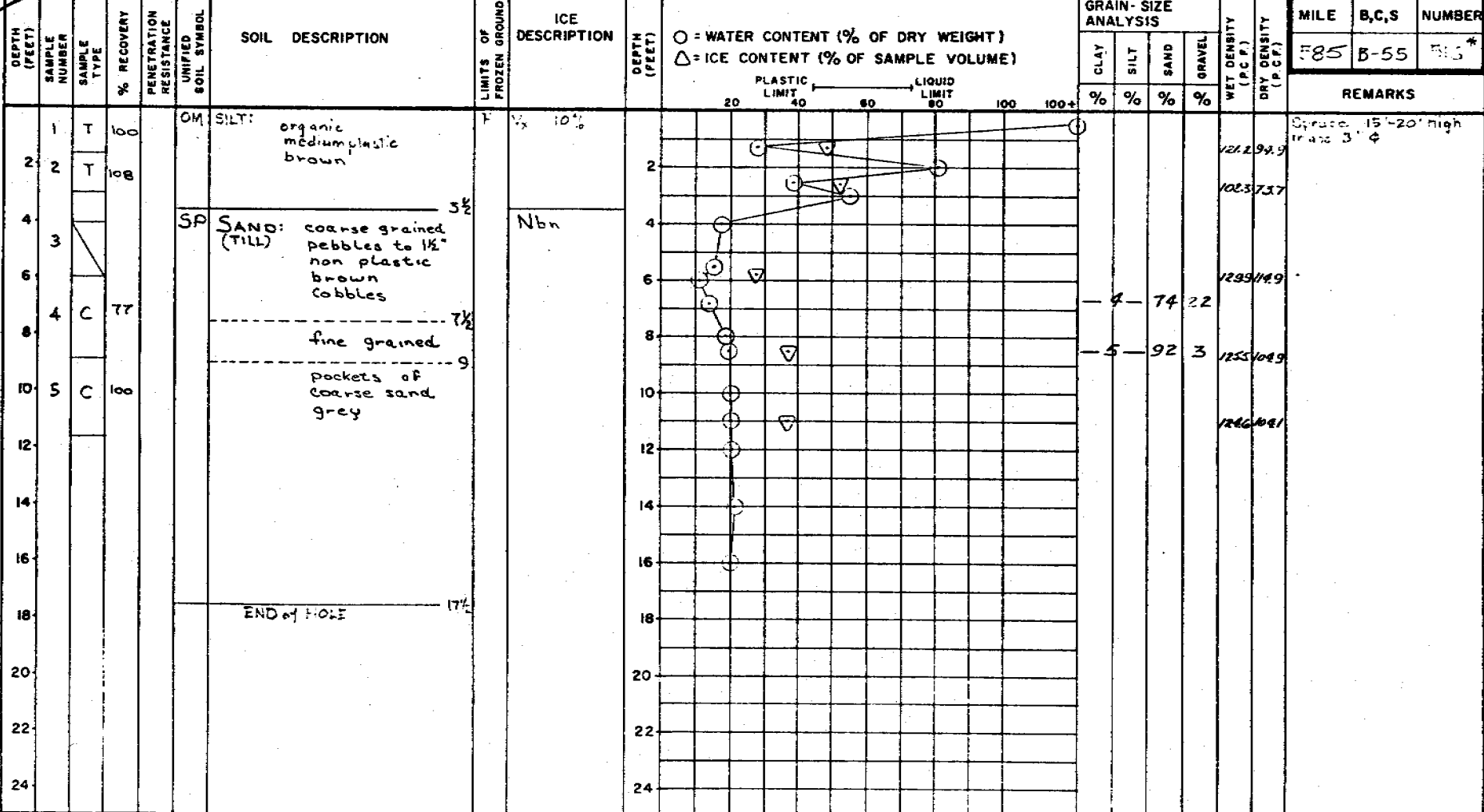


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REMARKS



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 4/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE					
CKD: 1		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: Good		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
						PEAT:		V _x 10%									
2					SM	SAND: SILT very fine grained silty low plastic brown stones.		V _x 15%	2								
4									4								
6					C1	CLAY (TILL) sandy, silty medium plastic stones gravelly rust specs		V _x 5%	6								
8	1							Nbn.	8								
10									10								
12						cobbles			12								
14									14								
16	2				SM	SILT- SAND: low plastic brown			16								
18									18								
20					C1	CLAY: silty, sandy med. plastic, brown			20								
22						END of HOLE			22								
24									24								

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT 20 40 60 80 100 100+
 LIQUID LIMIT 80 100 100+

Dense Spruce 20-35'
 max. 6" φ with
 scattered Birch

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <u>GLV</u>		FIELD ENG: <u>B.C.</u>		DATE DRILLED: <u>9/2/73</u>		AIRPHOTO NO: <u>A22934-157</u>		CHAINAGE: <u>36+47</u>		OFFSET:		TEST HOLE									
CKD: <u>GLV</u>		TECH: <u>H.T. & J.W.</u>		RIG: <u>FAIRING 1000</u>		SURFACE DRAINAGE: <u>POOR</u>		VEGETATION: <u>SEE REMARKS</u>		ELEV:		MILE B.C.S. NUMBER									
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS					
										CLAY %	SILT %	SAND %	GRAVEL %								
						CLAY(TILL) SILTY SLIGHTLY SANDY MED. PLASTIC BROWN		Nb													
2									2												
4						PEBBLES COBBLES LOW PLASTIC RUST SPECS.	4		4												
6									6												
8									8												
10						SANDIER	10		10												
12						BOULDERS	12		12												
14						END OF HOLE	14		14												
16									16												
18									18												
20									20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 13/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		VEGETATION: DENSE SPRUCE 5'-20' ~ 3'-4'		ELEV:		TEST HOLE										
CND		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: 400D		OFFSET:		GRAIN-SIZE ANALYSIS		MILE: 58.5		B.C.S: B-54		NUMBER: 519								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS						
1	T	100				PT PEAT: CATEGORY #10		V _r 30%	1							1150	57.8							
2	T	100				CI CLAY (TILL):		ICE 70%	2							54.1	53.6							
3		69				SILTY; SANDY MED. PLASTIC RUST SPECIES BROWN		V _s 40%	4							98.2	67.2							
4									6							108.2	78.2							
6	4	C	78			SAND POCKETS SHALE INCLUSIONS		V _r 5%	8							112.1	83.1							
8									10							116.8	92.8							
10	5	C	103			SC SAND (SANDSTONE):			12							122.5	100.1							
12						SLIGHT CEMENTATION SHALE INCLUSIONS RUST LENSES COAL POCKETS LOW PLASTIC GREY BROWN			14							117.8	96.2							
14	6	C	100						16							115.3	89.5							
16						BEDDING PLANE			18							112.6	89.0							
18	7	C	75						20							120.1	93.0							
20									22							115.5	90.0							
22	10	C	83			NO SHALE INCLUSIONS NO COAL POCKETS BLUE GREY			24							122.6	100.0							
24						END OF HOLE										128.0	105.2							
																128.4	107.4							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <u>TC</u>		FIELD ENG: <u>BC</u>		DATE DRILLED: <u>12/17</u>		AIRPHOTO NO: <u>A 22934-159</u>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <u>MM</u>		TECH: <u>HH</u>		RIG: <u>FALLING ROD</u>		SURFACE DRAINAGE: <u>GOOD</u>		VEGETATION: <u>SEE REMARKS</u>																					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS															
										CLAY %	SILT %																		
					OL	SILT: organic sandy low plastic		Nb _n							DENSE SURFACE 25' TO 30' HIGH 8" MAX. & SCATTERED BIRCH														
2								V _x 5%	2																				
4					ML	SILT: sandy low plastic no organics brown	3 1/2		4																				
6					GM	GRAVEL: silty, sandy up to cobbles	6		6																				
8					SP	SAND: FINE GRAINED NON PLASTIC GREY BROWN	8		8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				
						END OF HOLE	14																						

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 2/15/73		AIRPHOTO NO: A 22934-159		CHAINAGE: 77+00		OFFSET:		ELEV:		TEST HOLE 1 of 5															
CHD		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE SKETCHES						MILE 533 S NUMBER 5227															
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
1	T		100		14	PEAT: Category #6		V _r 25%	2					473	11.5	Dense Spruce 40' h. Max. 10" φ with few Birch OFF-SET 170' L													
2	T		100			CH CLAY: sandy high plastic dark brown	1 1/2	V _r 5%	2					786	57.9														
3	T		62						4					1075	77.7														
4	T		125					Nbn	4					928	63.9														
6									6																				
8						slightly silty	8		8																				
10	5								10																				
12									12																				
14									14																				
16									16																				
18									18																				
20						GP GRAVEL: sandy non plastic brown	19 1/2	Nf	20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <u>GN</u>		FIELD ENG: <u>B.C.</u>		DATE DRILLED: <u>12/13/73</u>		AIRPHOTO NO: <u>A22934-159</u>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE SHEET 2 of 5							
CKD: <u> </u>		TECH: <u>H.H.</u>		RIG: <u>FALLING 1000</u>		SURFACE DRAINAGE: <u>POOR</u>		VEGETATION: <u>SEE FRONT SHEET</u>		GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)		DRY DENSITY (P.C.F.)							
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	WATER CONTENT (% OF DRY WEIGHT) ○	ICE CONTENT (% OF SAMPLE VOLUME) △	CLAY %	SILT %	SAND %	GRAVEL %	REMARKS					
28					GP	GRAVEL continued	27 1/2	Nf	28	20											
30					C1	CLAY (SHALE): silty sandy rust specs pebbles med. plastic grey		Nbn	30												
32						no pebbles	32		32												
34									34												
36									36												
38									38												
40									40												
42									42												
44									44												
46					SP	SAND (SANDSTONE) slight cementation non plastic grey	46		46												
48									48												
50									50												

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: G.N.		FIELD ENG: B.C.		DATE DRILLED: 12/13/67		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE 3 of 3									
CKD: 12/13/67		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE FRONT SHEET															
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNITED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										CLAY %	SILT %	SAND %	GRAVEL %										
					SP	SAND (SANDSTONE) continued	F	Nbn		O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)													
										20	40	60	80	100	100+								
52									52														
54									54														
56									56														
58									58														
60									60														
62									62														
64									64														
66					SC	trace of clay low plastic			66														
68									68														
70									70														
72									72														
74									74														

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 12-13/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE SHEET 4 of 5				
CKD: ///		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE FRONT SHEET		ELEV:						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					SC	SAND (SANDSTONE): continued	F	Nbn								
78									78							
80									80							
82									82							
84									84							
86									86							
88									88							
90					CH	CLAY(SHALE): silty high plastic grey	89		90							
92					SC	SAND (SANDSTONE): slight cementation trace of clay low plastic grey	91		92							
94									94							
96					CH	CLAY: SHALE silty high plastic grey	95		96							
98									98							
100									100							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: C.N.		FIELD ENG: B.C.		DATE DRILLED: 12-13-27		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		TEST HOLE 5 of 5				
CKD: XXXX		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE FRONT SHEET		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					CH	CLAY: SHALE continued		Nbn								
102									102							
104						END of HOLE	104		104							
106									106							
108									108							
110									110							
112									112							
114									114							
116									116							
118									118							
120									120							
122									122							
124									124							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: G.H.		FIELD ENG: B.C.		DATE DRILLED: 14/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: XXXX		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+							
									% % % % % % % %							
2					CI	CLAY: (TILL) silty sandy medium plastic brown	F	Vx 5%	2							Dense Spruce 50-60' tall max 12" db Scattered Birch
4						pebbles rust specs		Nbn	4							
6	1								6							
8									8							
10									10							
12						sand pockets			12							
14	2								14							
16									16							
18									18							
20						END OF HOLE			20							
22									22							
24									24							
										17 61 22						

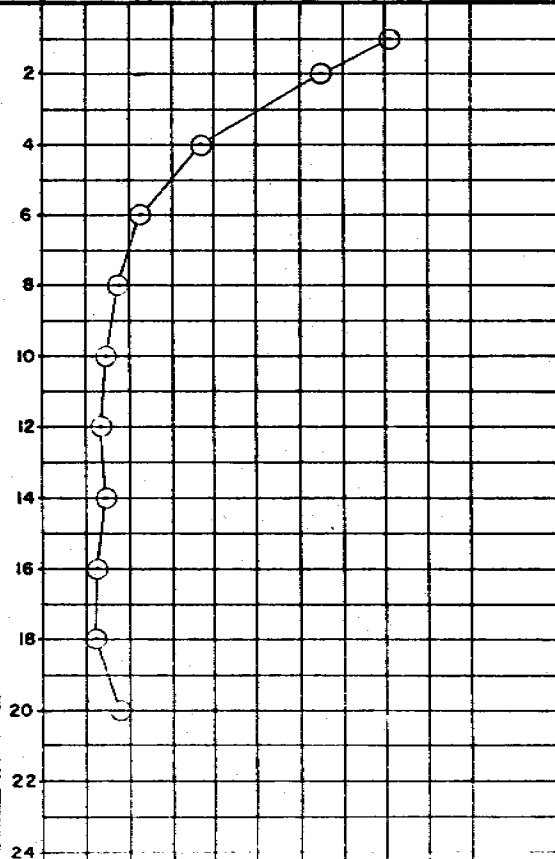
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 14/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: XXXX		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						OM SILT: organic medium plastic		V _w 40%								Dense Spruce 25'-35' high max 6" φ scattered Birch
2						ML SILT: sandy rust specs low plastic brown		V _s 30%	2							
4						CI CLAY(TILL): sandy, silty rust specs stones med. plastic brown		V _h 15%	4							
6								V _x 10%	6							
8									8							
10									10							
12									12							
14									14							
16						SP SAND(TILL) fine non plastic brown gravelly		Non	16							
18						CI CLAY(TILL) silty sandy med. low plastic			18							
20						END of HOLE			20							
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
 △ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ——— LIQUID LIMIT
 20 40 60 80 100 100+



R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 20/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE									
CHKD: 		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: DENSE SPRUCE 15-30' HIGH		ELEV:		MILE B.C.S NUMBER									
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)								
										CLAY	SILT			SAND	GRAVEL						
										%	%	%	%								
2					OH	CLAY: organic high plastic brown-black	1/2	VS 35%	2												
4	1	C	92		C1	CLAY (TILL) sandy, silty rust specs. medium plastic brown	3	Nbr	4			110.8	78.5								
6	2	C	89		SM SP	SAND (TILL) fine grained silty rust specs. coal specs. pebbles cobbles low-nonplastic	6		6			124.7	102.7								
8	3	C	61						8			134.5	112.4								
10									10			124.8	104.0								
12	4	C	94						12			128.9	107.2								
14									14			128.5	106.8								
16																					
18																					
20																					
22																					
24																					
END of HOLE																					

REMARKS

Bag sample 3-14'

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY											
DWN: S.N.		FIELD ENG: E.C.		DATE DRILLED: 20/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE					
CND		TECH: J.W.		RIG: FALLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE INVENTORY		ELEV:		MILE B.C.S. NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
						1.1. 10-25 CH CLAY: organic C1 CLAY (TILL) silty, sandy medium plastic pebbles rust specs.		Vs 25% V _s 40% V _r 5% V _r 1% Nf Nbn		○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
2									2								Medium Dense Spruce 10-15 m. Max. 5" φ
4									4								
6									6								
8									8								
10	1					SP SAND (TILL) sand	9		10								
12						C1 CLAY (TILL) silty, sandy medium plastic pebbles rust specs. cobbles brown	10										
14									14								
16									16								
18									18								
20						END OF HOLE	20		20								
22									22								
24									24								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: TC		FIELD ENG: B.C.		DATE DRILLED: 20/4/74		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: TC		TECH: J.M.		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: POOR		VEGETATION: DENSE SPRUCE 15'-25'-6" ELEV:				MILE B,C,S NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %			
1	T	117			OH	CLAY: ORGANIC HIGH PLASTIC DARK BROWN	1/4	Vs 30%						
2	T	125			CI	CLAY (TILL): SANDY, SILTY MED. PLASTIC STONES COBBLES BROWN	1 3/4	Vs 40%						
3					SP	SAND (TILL): NON PLASTIC BROWN	7	N6n						
4					CI	CLAY (TILL): SANDY, SILTY MED. PLASTIC STONES COBBLES BROWN	8 1/2							
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16					CH	HIGH PLASTIC GREY	16							
17														
18														
19														
20						END OF HOLE	20							

DRILL HOLE REPORT

MACKENZIE HIGHWAY

TEST HOLE		
MILE	B,C,S	NUMBER
586	B-59	531

REMARKS

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 21/8/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE												
CND: TC		TECH: HH		RIG: FALLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE F-1000-1000		ELEV:		MILE B,C,S NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS										
										CLAY %	SILT %													
2						HI PEAT - 4 SAND (TILL): TRACE OF CLAY RUST SPECS COAL SPECS NON PLASTIC STONES BROWN	1/2 F	Vf 20% Nf	2	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)					DENSE SPRUCE 30'-35' HIGH 8" MAX φ SCATTERED BIRCH									
4									4															
6	1								6															
8									8															
10						CI CLAY (TILL): VERY SANDY SILTY RUST SPECS COAL SPECS STONES MED. PLASTIC BROWN	7	Nbn	10															
12	2								12															
14									14															
16									16															
18									18															
20									20															
22									22															
24									24															

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 21/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CUB		TECH: P.H.		RIG: FAILING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					CI	CLAY: (TILL) silty, sandy medium plastic gravelly rust specs brown	4'	Nln	2							Larix Spruce 5'-25' High, Max. 6" φ Scattered Birch
4								V _r 25%	4							
6								V _r 40%	6							
8	1				CH	coal specs less sand high plastic	8	Nln	8							
10									10							
12					CI	cobbles medium plastic	11		12							
14									14							
16	2					sandier	16		16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
OWN: G.V.		FIELD ENG: E.C.		DATE DRILLED: 21/2/73		AERPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: XXXX		TECH: E.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)				
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+				
2					CL	SILT: organic	1/2	V _v 10%	2					1-25' High, 25-45' High, Max. 10' 4" weathered hard.
4					CH	CLAY (TILL) silty, sandy high plastic coal specs rust specs pebbles brown		V _r 5%	4					
6								Nbn	6					
8								V _s 55%	8					
10					CI	--- 6 --- sandier medium plastic cobbles		V _x 10%	10					
12								Nbn	12					
14					CH	--- 12 --- less sand high plastic gravel pockets			14					
16	2								16					
18									18					
20									20					
22									22					
24									24					
END of HOLE						20								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OFFSET:

TEST HOLE

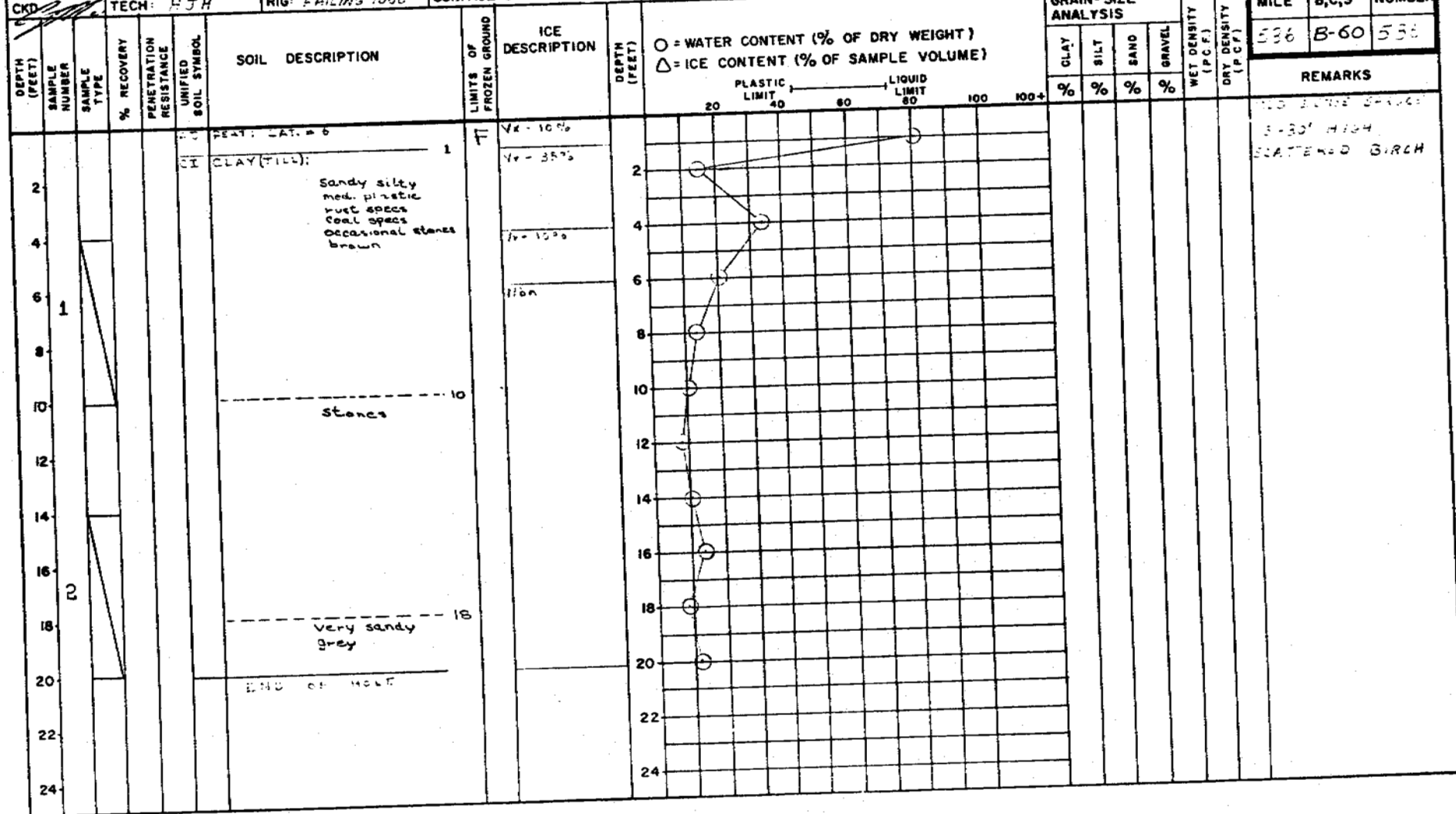
VEGETATION: SEE REMARKS

[illegible][illegible]

536	B-60	536
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REMARKS

3-30' HIGH
MATERIAL GIRCH



DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 2/14/77		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE												
CND: TC		TECH: HH		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS										
										CLAY %	SILT %													
						PEAT: category #1		Vr 20%																
2					CH	CLAY (TILL) silty, sandy high plastic brown		Vx 30%	2															
4								Vs 60%	4															
6								Vr 25%	6															
8						coal specs rust specs		Vr 20%	8															
10	1							Vr 30%	10															
12						woody pieces		Vx 20%	12															
14					C1	no wood medium plastic sandier		Vx 5%	14															
16								Nbn	16															
18						sandy gravel			18															
20									20															
22									22															
24						END OF HOLE			24															

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: CKD		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AIRPHOTO NO: A02934-157		CHAINAGE:		OFFSET:		TEST HOLE				
		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE 13 VAS		ELEV:						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
2						OH CLAY: organic CI CLAY (TILL) silty, sandy, medium plastic, rust spots. Brown		V _s 50% V _i 20%	2							Medium Spruce 15-30' Tall, Max. 6" φ, with Scattered Birch, S ↓
4						stones Coal specs.			4							
6						gravelly Cobbles sandier			6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWNER: G.N.		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE				
CND		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
										PLASTIC LIMIT	LIQUID LIMIT					
2					CH	CLAY: organic high plastic	1 1/2	Nbn	2							Medium Dense Spud 5-25' High, Mac. 5' φ
4					C1	CLAY (fill) no organics silty, sand, stones, cobbles medium plastic brown			4							
6									6							
8									8							
10									10							
12									12							
14					CH	high plastic grey	14		14							
16									16							
18									18							
20									20							
22						END OF HOLE			22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER: G.N.		FIELD ENG: P.C.		DATE DRILLED: 12/2/77		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE				
CND: XXXX		TECH: P.W.		RIG: TAILING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
2						CI CLAY (TILL) silty sand, medium elastic shells coarse brown rust specs		40%	2							
4									4							
6									6							
8						Coal specs			8							
10									10							
12									12							
14					CH	high plastic grey			14							
16									16							
18									18							
20						END of HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: G.N.		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AERIAL PHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE									
CUB		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE		B.C.S		NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										CLAY %	SILT %										
						CLAY (TILL)		Vs 30%													
2						silty, sandy medium plastic pebbles cobbles boulders brown		Vs 20%	2												
4									4												
6								Nbn	6												
8									8												
10						very sandy		Nf	10												
12									12												
14									14												
16									16												
18									18												
20						END of HOLE			20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 2/2/72		AIRPHOTO NO: A 22934-157		CHAINAGE:		OFFSET:		TEST HOLE				
CND		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: CTF REMAINS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					CH	CLAY: organic not plastic black	1'	Vs 40%	2							Medium Dense Service 10-15' High, Max 5' 4"
4					CI	CLAY (TILL) silty, sandy stones coarse medium plastic brown rust spots coal specs	2 1/2'	Vs 35%	4							
6							UF		6							
8									8							
10									10							
12									12							
14					CH	high plastic grey	13'		14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 2/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: XXXX		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					CI	CLAY (TILL) silty, sandy medium plastic pebbles brown rust, coal specs.	F	Vs 50% Vs 40%	2							
4									4							
6									6							
8									8							
10						Sandier			10							
12									12							
14									14							
16					CH	high plastic grey more cobbles			16							
18									18							
20						END of HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 21/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE				
CYR		TECH: J.W.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: SPRUCE 10-25' HIGH - 3" ↑		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					CI	CLAY (TILL) silty, sandy medium plastic pebbles	1/4 F	Nf	2							
4								fin	4							
6	1				GP	GRAVEL (TILL) silty, clayey brown plastic fines	5' UF		6							
8						large boulder granitic			8							
10					CH	CLAY (TILL) silty, sandy high plastic cobbles			10							
12									12							
14	2								14							
16									16							
18									18							
20						END of HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <u>TC</u>		FIELD ENG: <u>BC</u>		DATE DRILLED: <u>2/2/73</u>		AIRPHOTO NO: <u>A22934-157</u>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE										
CHK: <u>ML</u>		TECH: <u>LV</u>		RIG: <u>FALLING 1000</u>		SURFACE DRAINAGE: <u>POOR</u>		VEGETATION: <u>SEE REMARKS</u>																
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)														
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+														
1	T	75			OH	CLAY: ORGANIC	1/4	F	1	40%														
2	T	89			CI	CLAY (TILL): SILTY, SANDY RUST SPECS STONES	1	UF	2															
4	C	43				MED. PLASTIC BROWN COAL SPECS			4															
6									6															
8									8															
10						COBBLES	10		10															
12					CH	HIGH PLASTIC GREY	12		12															
14									14															
16									16															
18									18															
20						VERY SANDY	19		20															
22						END OF HOLE	20		22															
24									24															

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.

FIELD ENG: B.C.

DATE DRILLED: 15/2/77

AIRPHOTO NO: A22934-159

CHAINAGE:

OFFSET:

TEST HOLE

CKD

TECH: H.H

RIG: FAILING 1000

SURFACE DRAINAGE: Good

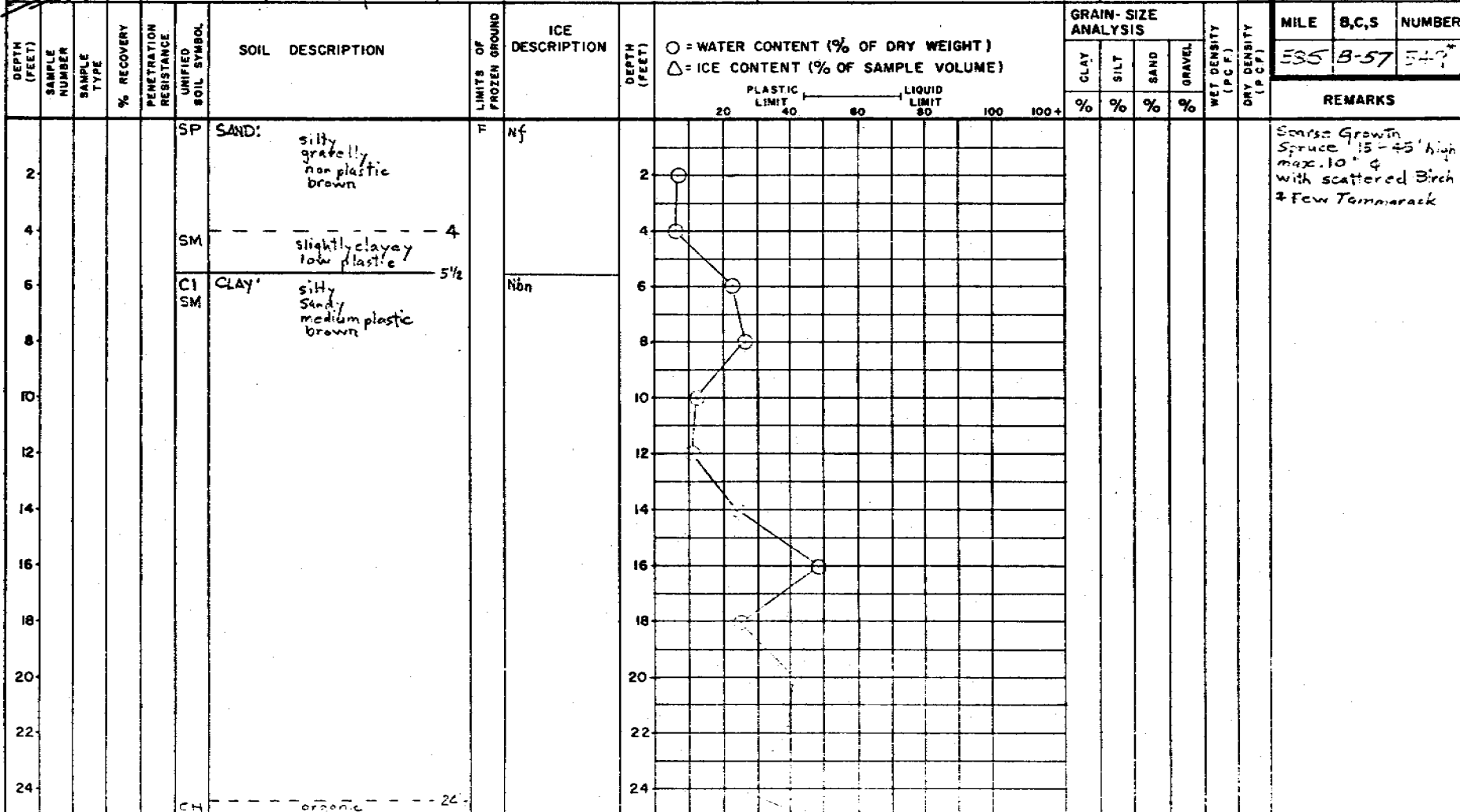
VEGETATION: SEE REMARKS

ELEV:

FILE	S,C,S	NUMBER
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ESS	B-57	542*
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REMARKS



R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.H.		FIELD ENG: B.C.		DATE DRILLED: 15/2/73		AIRPHOTO NO: A 22934-159		CHAINAGE		OFFSET		ELEV		TEST HOLE SHEET 2															
CKD: <i>[Signature]</i>		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE SHEET 1						MILE: 535		B,C,S: B-57		NUMBER: 100											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
28					OH	END of HOLE		N ₆₀	28																				
30									30																				
32									32																				
34									34																				
36									36																				
38									38																				
40									40																				
42									42																				
44									44																				
46									46																				
48									48																				
50									50																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 15/2/73		AIRPHOTO NO: A22934-159		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: 2		TECH: H.H.		RIG: FAILING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS																					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS															
										CLAY %	SILT %				SAND %	GRAVEL %													
2					C1	CLAY (TILL): silty, sandy medium plastic with gravel pebbles shale stone inclusions coal rust brown.		V _x 15 %	2					Sparse Spruce 25-40' high, max 8" with scattered Birch															
4								Nbn.	4																				
6	1	C	41						6																				
8	2	C	50			organic inclusion 8% 8 3/4		V _x 10 %	8																				
10								Nbn	10																				
12	3	C	33					V _x 1 %	12																				
14								Nbn	14																				
16	4	C	66						16																				
18	5	C	52					V _x < 5 %	18																				
20						END OF HOLE	20	Nbn	20																				
22									22																				
24									24																				

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: G.N.			FIELD ENG: B.C.			DATE DRILLED: 22/2/73			AIRPHOTO NO: A 22934-157			CHAINAGE:			OFFSET:			TEST HOLE											
CKD			TECH: H.M.			RIG: FAIRING 1000			SURFACE DRAINAGE: POOR			VEGETATION: DENSE SPRUCE 10-30' HIGH			ELEV:			MILE			B,C,S			NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+																			
2						C1 CLAY (TILL) silty, sandy gravelly brown	1/4' F	Nbn	2																				
4								V _s 10%	4																				
6						GC GRAVEL (TILL) coarse sandy, silty, clayey cobbles plastic fines brown	4 1/2'	Nbn	6																				
8									8																				
10									10																				
12									12																				
14									14																				
16						C1 CLAY (TILL) sandy, silty medium plastic cobbles grey-brown	15'		16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE												
CKD: 		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: POOR		VEGETATION: DENSE SPRUCE 15-30m		ELEV:														
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)														
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+														
2					OH	CLAY: organic high plastic silty black	1/4	60%	2															
4					CI	CLAY (TILL) silty, sandy medium plastic gravelly pockets cobbles	2 1/2		4															
6								V _r 15%	6															
8								V _r 5%	8															
10								Non	10															
12									12															
14									14															
16					CH	high plastic grey	1 1/2		16															
18									18															
20									20															
22									22															
24									24															

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: G.N.		FIELD ENG: Y.C.	DATE DRILLED: 22/2/73	AIRPHOTO NO: A22934-157	CHAINAGE:	OFFSET:	ELEV:	TEST HOLE			
CKD		TECH: H.H.	RIG: FAILING 1000	SURFACE DRAINAGE: FAIR	VEGETATION: SEE REMARKS			MILE	B,C,S	NUMBER	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS	
										CLAY	SILT
										SAND	GRAVEL
										WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
REMARKS											

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT LIQUID LIMIT

20 40 60 80 100 100+

Dense Spruce 15'-30'
High, Max. 6' 0"
Scattered Birch &
Tamarack

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: G.N.		FIELD ENG: B.C.		DATE DRILLED: 22/2/73		AIRPHOTO NO: A22934-157		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: CKD		TECH: H.H.		RIG: FAIRING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: DENSE SPRUCE		15-35 HIGH ELEV:						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					Pt	PEAT: Category #4 category #1	7'	V _r 30%	2							
4					CI	CLAY: (TILL) silty, sandy, medium plastic gravel pockets cobbles brown	3 1/4'	V _r 35%	4							
6								V _r 5%	6							
8	1							Nbn	8							
10									10							
12									12							
14									14							
16	2								16							
18					CH	high plastic grey	17'		18							
20						END OF HOLE	20'		20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <u>TC</u>		FIELD ENG: <u>BC</u>		DATE DRILLED: <u>24/7</u>		AIRPHOTO NO: <u>A 22934-155</u>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <u>111</u>		TECH: <u>NW</u>		RIG: <u>FALLING 1000</u>		SURFACE DRAINAGE: <u>GOOD</u>		VEGETATION: <u>SEE REMARKS</u>		ELEV:		MILE <u>591</u> B.C.S. <u>3-70</u> NUMBER <u>559</u>				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						<u>OH</u> <u>CLAY: ORGANIC</u> <u>CLAY (TILL):</u> SILTY SANDY STONES COBBLES RUSTY COAL SPRES MED. PLASTIC BROWN		<u>VS</u> <u>30%</u>		○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
2									2							
4									4							
6									6							
8									8							
10	<u>1</u>					--- 10 PREDOMINATELY LIMESTONE BOULDERS			10							
12									12							
14						--- 14 BEDROCK (LIMESTONE) WEATHERED LIGHT GREY			14							
16									16							
18									18							
20						--- 20 END OF HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 24/4/73		AIRPHOTO NO: 122934-155		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: BC		TECH: JV		RIG: FAIRBANKS 1200		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS																					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						OH CLAY: ORGANIC	1/3	N6																					
						CI CLAY (TILL): SANDY, SILTY STONES PEBBLES COBBLES	1	NF																					
2									2																				
4									4																				
6	1	C	25			BEDROCK (LIMESTONE) WEATHERED GREY-WHITE RQD = 0? CONES SHATTERED 1" - 1 1/2" THICKNESS	5'		6																				
8									8																				
10	2	C	33						10																				
12						END OF HOLE	12		12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWG: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>23/9/70</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD		TECH: <i>LW</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE B,C,S NUMBER						
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS		
										CLAY %	SILT %	SAND %	GRAVEL %					
						OF CLAY: <i>ORGANIC HIGH PLASTIC BROWN</i>	<i>1/2</i>	<i>F</i>		<i>○</i> = WATER CONTENT (% OF DRY WEIGHT) <i>△</i> = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+								
2								<i>V_s 45%</i>	2							<i>EPOCH MED DENSE 30' to 40' 8" MAX Ø OLD SPRUCE</i>		
4						<i>CI CLAY (TILL) SANDY, SILTY MEDIUM PLASTIC RUST, STIGAPS</i>	<i>2 1/2</i>	<i>V_x 10%</i>	4									
6									6									
8						<i>BEDROCK (LIMESTONE) weathered grey</i>	<i>7</i>	<i>UF</i>	8									
10									10									
12									12									
14									14									
16									16									
18									18									
20						<i>END OF HOLE</i>	<i>20</i>		20									
22									22									
24									24									

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: TC		FIELD ENG: BC		DATE DRILLED: 25/1/72		AIRPHOTO NO: A22934-155		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CHD: 111		TECH: HHE/EB		RIG: MAYER 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS						MILE	B,C,S	NUMBER
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						CL SILT: organic		V _x 20%								
2	1					SM SAND (TLL) silty, low-nonglacial, brown		V _x 5%	2							
4									4							
6									6							
8									8							
10	2								10							
12						----- siltier -----			12							
14									14							
16						CH CLAY (TLL) silty, sand, cgl, rust, gray			16							
18									18							
20						END OF HOLE			20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

TEST HOLE

ELEV:

VEGETATION: SEE REMARKS

MILE	B,C,S	NUMBER
------	-------	--------

59/ B-72-504

REMARKS

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

Diagram illustrating the Plastic Limit (40) and Liquid Limit (80) on a scale, with a midpoint marked at 60.

CLAY	%
SILT	%
SAND	%
GRAVEL	%

WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
120	115
125	120
130	125
135	130
140	135
145	140
150	145
155	150
160	155
165	160
170	165
175	170
180	175
185	180
190	185
195	190
200	195
205	200
210	205
215	210
220	215
225	220
230	225
235	230
240	235
245	240
250	245
255	250
260	255
265	260
270	265
275	270
280	275
285	280
290	285
295	290
300	295
305	300
310	305
315	310
320	315
325	320
330	325
335	330
340	335
345	340
350	345
355	350
360	355
365	360
370	365
375	370
380	375
385	380
390	385
395	390
400	395
405	400
410	405
415	410
420	415
425	420
430	425
435	430
440	435
445	440
450	445
455	450
460	455
465	460
470	465
475	470
480	475
485	480
490	485
495	490
500	495
505	500
510	505
515	510
520	515
525	520
530	525
535	530
540	535
545	540
550	545
555	550
560	555
565	560
570	565
575	570
580	575
585	580
590	585
595	590
600	595
605	600
610	605
615	610
620	615
625	620
630	625
635	630
640	635
645	640
650	645
655	650
660	655
665	660
670	665
675	670
680	675
685	680
690	685
695	690
700	695
705	700
710	705
715	710
720	715
725	720
730	725
735	730
740	735
745	740
750	745
755	750
760	755
765	760
770	765
775	770
780	775
785	780
790	785
795	790
800	795
805	800
810	805
815	810
820	815
825	820
830	825
835	830
840	835
845	840
850	845
855	850
860	855
865	860
870	865
875	870
880	875
885	880
890	885
895	890
900	895
905	900
910	905
915	910
920	915
925	

MED DENSE
SPRUCE STAG
HIGH MAX 11"
CLUMP OF
BIRCH

DRILL HOLE REPORT

MACKENZIE HIGHWAY

OWN: TC		FIELD ENG: RC		DATE DRILLED: 2/1/72		AIRPHOTO NO: A22934-155		CHAINAGE:		OFFSET:		TEST HOLE				
CND: HH		TECH: HH		RIG: FAIRBANKS 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE	B,C,S	NUMBER		
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2						CI CLAY (TILL) SANDY, SILTY MEDIUM PLASTIC RUSTY, COARSE PEBBLES STONES	F	Ndn	2							DENSE STRIPS 25 TO 45' HIGH MAX 12" Ø CLUMPS OF BROWN OOD WILLOW AND BLACK POPLAR
4									4							
6									6							
8									8							
10						SM SAND (TILL) SILTY LOW-MOD PLASTIC FEW PEBBLES			10							
12									12							
14						TRACE OF CLAY			14							
16									16							
18						GRAVELLY			18							
20									20							
22									22							
24						END OF HOLE			24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC		FIELD ENG: BC		DATE DRILLED: 22/2/72		AIRPHOTO NO: A22934-157		CHAINAGE: 12+00		OFFSET:		TEST HOLE												
CKD: JH		TECH: JH		RIG: Fellows 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S. NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS										
										CLAY %	SILT %				SAND %	GRAVEL %								
						OH CLAY		5%	2							DENSE SPRUCE 20-35' HIGH MAX 8" Ø SCATTERED BIRCH								
						organic high plastic		10%	4															
2						C1 CLAY (TILL)			6															
						sandy, silty medium plastic pebbles rust, coal brown			8															
4									10															
						predominantly SHALE STONE		Non	12															
6									14															
						reddish-brown with boulders gypsum layers 1/2"			16															
8									18															
									20															
10									22															
									24															
12																								
14																								
16																								
18																								
20																								
22																								
24																								

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 23/7/75		AIRPHOTO NO: A20034-155		CHAINAGE: 438+60		OFFSET:		ELEV:		TEST HOLE															
CKD: [Signature]		TECH: HH		RIG: FANUC 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE PLAN		GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)		DRY DENSITY (P.C.F.)															
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)	CLAY %	SILT %	SAND %	GRAVEL %	REMARKS														
2					CI	CLAY (TILL): SANDY, SILTY STONES MED. PLASTIC BROWN			2	○					DEER SPRUCE 15' TO 25' HIGH MAX 8" Ø SCATTERED BIRCH														
4						PREDOMINATELY LIMESTONE BOULDERS			4	○																			
6						BED ROCK: (LIMESTONE) WEATHERED GREY			6	○																			
8									8	○																			
10									10	○																			
12									12	○																			
14									14	○																			
16									16	○																			
18									18	○																			
20									20	○																			
22									22	○																			
24									24	○																			

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC			FIELD ENG: BC			DATE DRILLED: 24/1/73			AIRPHOTO NO: A 22934-157			CHAINAGE: 10774-500			OFFSET:			ELEV:			TEST HOLE								
CND: TC			TECH: BC			RIG: FALLING HEAD			SURFACE DRAINAGE: GOOD			VEGETATION: SEE PHOTO																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						2' MOSS				O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
						CH CLAY: ORGANIC				PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+																			
2						CI CLAY (TILL) SILTY, SANDY MEDIUM PLASTIC CONGLOMERATES FINDINGS BROWN			2																				
4									4																				
6									6																				
8	1	C	28						8																				
10	2	C	100			BEDROCK (LIMESTONE) WEATHERED GREY			10																				
12									12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>TL</i>		FIELD ENG: <i>BC</i>	DATE DRILLED: <i>24/73</i>	AIRPHOTO NO: <i>A 22934-157</i>	CHAINAGE: <i>15470</i>	OFFSET:	TEST HOLE									
CKD: <i>TL</i>	TECH: <i>HH</i>	RIG: <i>FALCON 1000</i>	SURFACE DRAINAGE: <i>FAIR</i>	VEGETATION: <i>SEE REMARKS</i>	ELEV:											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						<i>PRAT: CATEGORY "1"</i>		<i>15%</i>								<i>DENSE SPRUCE 5" to 60" H/3" 14" MAX Ø SCATTERED BIRCH & WILLOW</i>
2					<i>CI</i>	<i>CLAY (TILL)</i>			2							
4						<i>SIXTY, SANDY MEDIUM PLASTIC STONES RUST, COAL</i>		<i>5%</i>	4							
6							<i>Non.</i>		6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						<i>END OF HOLE</i>			24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC		FIELD ENG: BC		DATE DRILLED: 25/1/72		AIRPHOTO NO: 102934-135		CHAINAGE: 505+6.2		OFFSET:		TEST HOLE																	
CKD: TC		TECH: H.H. EB		RIG: MAMMOET 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE PENYAKS		ELEV:		MILE B,C,S NUMBER																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+																			
1	1	T	100		CH	CLAY, silty, high plastic, brown	14	10%	2					1053	124	DENSE SANDWICH 50 TO 60' HIGH 14" MAX. Ø OCCASIONAL BIRCH													
2									4																				
4	2	C	93		C1	CLAY (TILL) silty, sandy medium plastic coal, rust specs. brown stones	8 1/2		6																				
6									8																				
8	3	C	97						10																				
10	4	C	100						12																				
12	5	C	86			sand & gravel pockets	10 1/2		14																				
14									16																				
16					SP SM	SAND (TILL) fine grained non plastic	16		18																				
18									20																				
20									22																				
22									24																				

R.M. HARDY AND ASSOCIATES LTD.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: TC		FIELD ENG: BC		DATE DRILLED: 25/6/73		AIRPHOTO NO: A22934-155		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE SHEET 2		
CH: TC		TECH: H.H. EB		RIG: MAYHEW 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
28									28							DENSE SPRUCE 50' to 60' HIGH 1 1/2" MAX Ø OCCASIONAL BIRCH
30					SC	clayey			30							
32									32							
34					CH	CLAY (TILL) silty, sandy high plastic coal rust stones grey			34							
36									36							
38									38							
40						END OF HOLE			40							
42									42							
44									44							
46									46							
48									48							
50									50							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>72</i>	FIELD ENG: <i>RL</i>	DATE DRILLED: <i>25/2/73</i>	AIRPHOTO NO: <i>A22934-155</i>	CHAINAGE: <i>275 + 67</i>	OFFSET:	TEST HOLE
CKD: <i>[initials]</i>	TECH: <i>13 E JV</i>	RIG: <i>MATHEW 1000</i>	SURFACE DRAINAGE: <i>POOR</i>	VEGETATION: <i>Spr Penicillaria</i>	ELEV:	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B,C,S	NUMBER
										CLAY %	SILT %	SAND %	GRAVEL %					
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
2					GM	silty sand medium plastic gray coal & rust brown			2									
4									4									
6									6									
8									8									
10									10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									
						END OF HOLE											DENSE SPRUCE 40' HIGH 12" MAX. Ø OCCASIONAL BIRCH	

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: BC		DATE DRILLED: 26/6/73		AIRPHOTO NO: AML934-155		CHAINAGE: 597+58		OFFSET:		TEST HOLE				
CKD: TC		TECH: LHF EE		RIG: WATWEN 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						PT PEAT: CATEGORY #1		Vx 50%		O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
2						CI CLAY: MEDIUM PLASTIC SILTY		Ice 80%	2							DENSE SPRUCE 15' TO 20' HIGH 6" MAX. Ø
4						CI CLAY (FILL) SILTY, SANDY MEDIUM PLASTIC COAL, RUST STONES		1/bn	4							
6									6							
8									8							
10						SAND FROSTED MORE STONES			10							
12						CH HIGH PLASTIC GREY			12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						END OF HOLE			24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: TC	FIELD ENG: AC	DATE DRILLED: 26/1/73	AIRPHOTO NO: A22934-155	CHAINAGE: 607+57	MACKENZIE HIGHWAY
CKD: TC	TECH: H. H. E. EB	RIG: MAYHEW 1000	SURFACE DRAINAGE: POOR	VEGETATION: SEE REMARK	TEST HOLE
				OFFSET:	
				ELEV:	

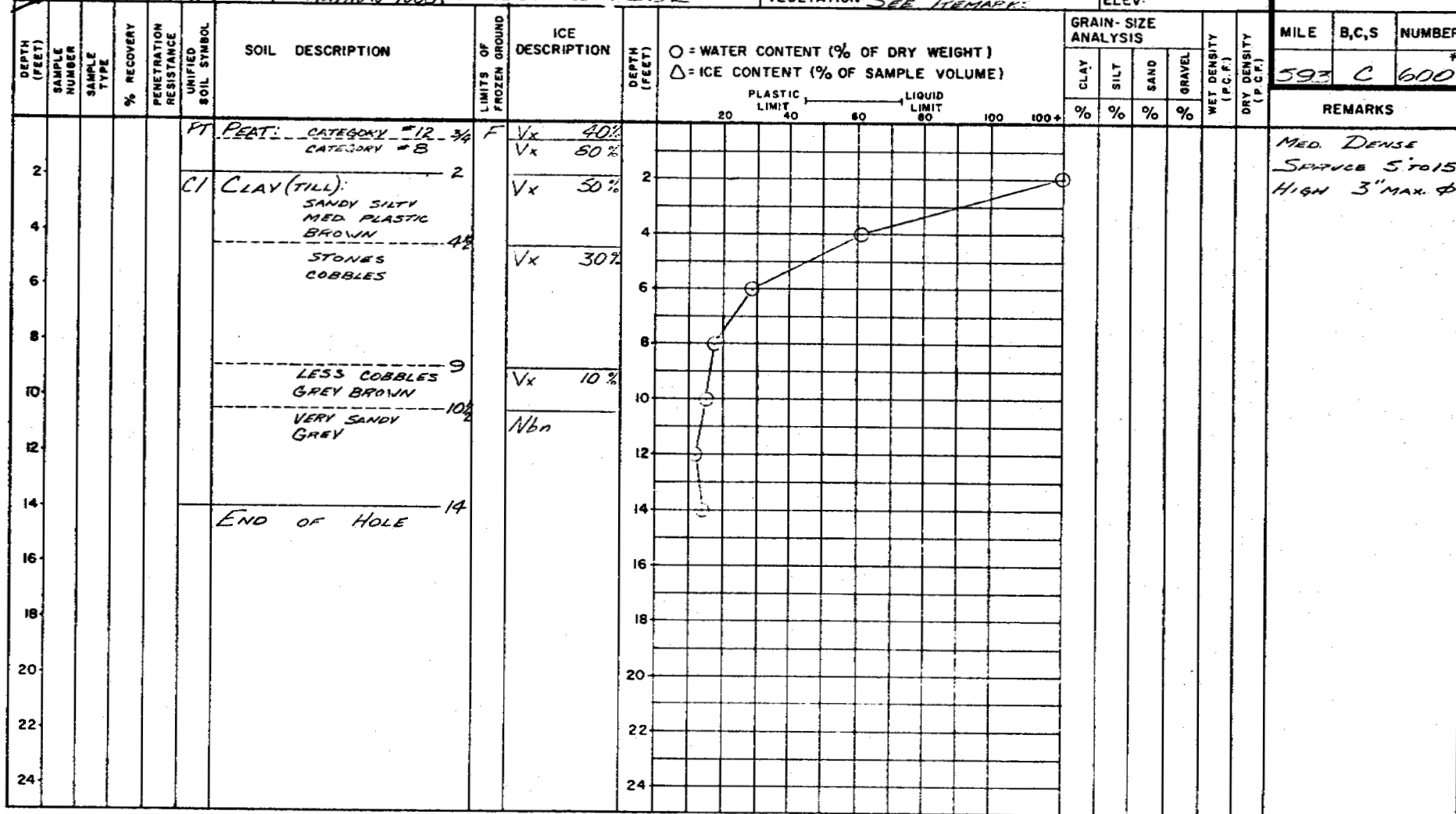
TEST HOLE

MILE	B,C,S	NUMBER
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593	C	600
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REMARKS

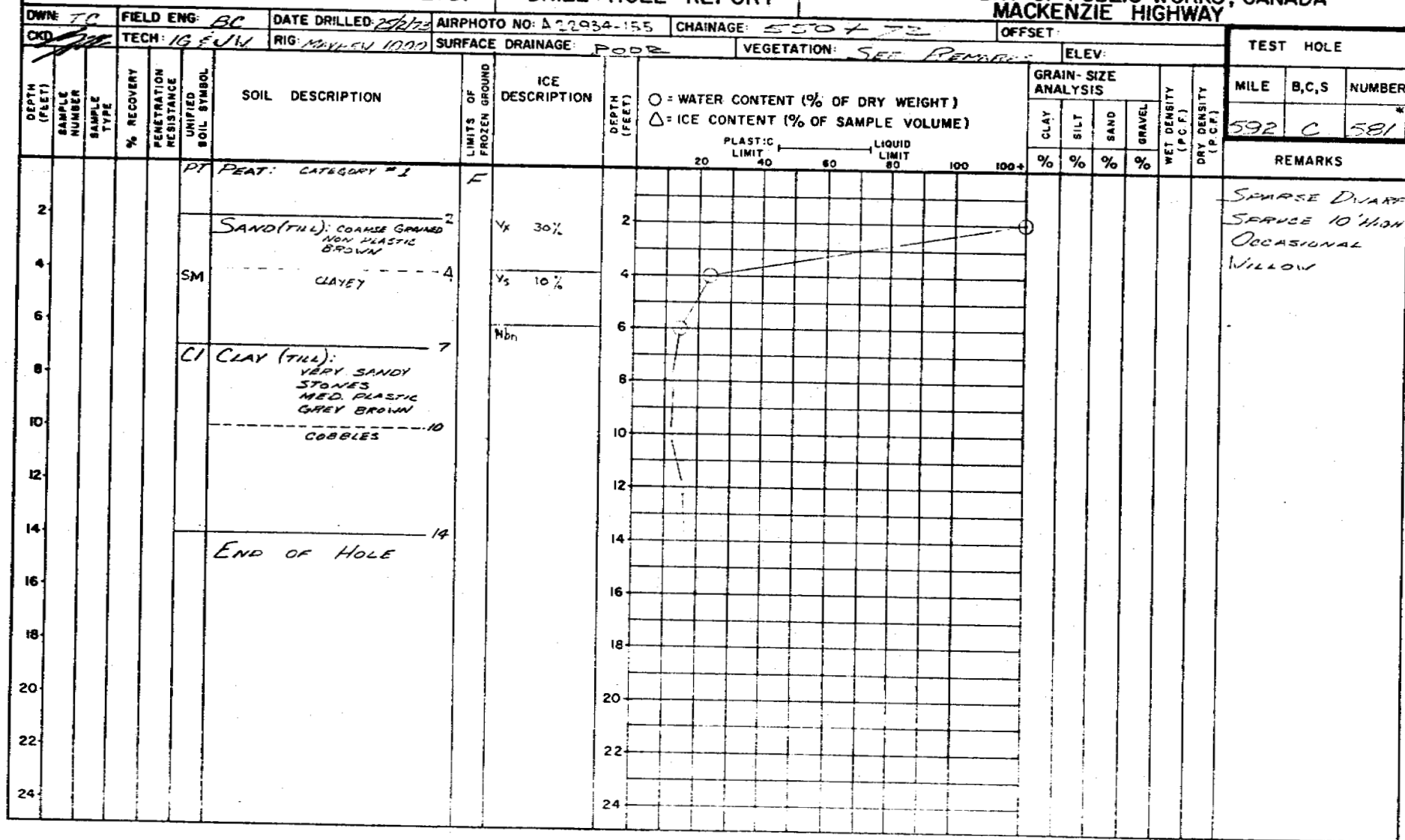
MED. DENSE
SPRUCE 5 TO 15
HIGH 3" MAX. Ø



DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: <u>TC</u>		FIELD ENG: <u>RC</u>	DATE DRILLED: <u>25/2/73</u>	AIRPHOTO NO: <u>A2792-1-55</u>	CHAINAGE: <u>5-1-1+70</u>	OFFSET:	MACKENZIE HIGHWAY		TEST HOLE							
CKD: <u>156-11</u>		TECH: <u>156-11</u>	RIG: <u>MAVIER 1000</u>	SURFACE DRAINAGE: <u>GOOD</u>		VEGETATION: <u>SEE REMARKS</u>		ELEV:	MILE	B,C,S	NUMBER					
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						CH CLAY (TILL) SANDY SILTY CLAYES HIGH PLASTIC BROWN	14'	F N60								DENSE SAND 30' HIGH 8" MAX. Ø
2									2							
4							LF		4							
6									6							
8									8							
10									10							
12									12							
14						END OF HOLE	14'		14							
16									16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY												
OWN: <u>IC</u>		FIELD ENG: <u>BC</u>		DATE DRILLED: <u>25/1/73</u>		AIRPHOTO NO: <u>A22934-155</u>		CHAINAGE: <u>557 + 50</u>		OFFSET:								
CO		TECH: <u>12 F JV</u>		RIG: <u>MAYHEW 1000</u>		SURFACE DRAINAGE: <u>POOR</u>		VEGETATION: <u>SEE REMARKS</u>		ELEV:								
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE		
										CLAY %	SILT %	SAND %	GRAVEL %			MILE	B,C,S	NUMBER
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
2					CH	PLAT. CLAY (TILL) silty, sandy high plastic streaks brown	1/2 F	5%	2								MED DENSE SPRUCE 20' HIGH 8" MAX φ	
4					CI	medium plastic coal & rust		Non	4									
6									6									
8					CI GM	gravelly			8									
10							LIF		10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>5/2/75</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE: <i>61.5+15</i>		OFFSET:		TEST HOLE				
CKD: <i>100</i>		TECH: <i>MBE/CA</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE B.C.S. NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						OH CLAY: ORGANIC HIGH PLASTIC DARK BROWN		Vs 70%								DENSE SILT CLAY 5' to 20' MAX 4" MAX. Ø
2								Vx 60%	2							
4									4							
6					CI OL	CLAY (TILL): SILTY SANDY STONES RUSTY COAL SPECS MED. PLASTIC BROWN ORGANICS		Nbn	6							
8									8							
10						NO ORGANICS			10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: EC		DATE DRILLED: 24/7/73		AIRPHOTO NO: A22934-155		CHAINAGE: 636+70		OFFSET:		TEST HOLE				
CK: 112		TECH: EBETC		RIG: MAYHEW 100		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY	SILT	SAND	GRAVEL			
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+							
						VI FEAT. CATEGORY 2 1/2		20%								
						CI CLAY (TILL):		Nbn								
2						SANDY, SILTY STONES MED PLASTIC BROWN			2							
4									4							
6						----- 6 DARKER RUST SPECS COAL SPECS			6							
8									8							
10									10							
12						CH HIGH PLASTIC GREY			12							
14									14							
16						END OF HOLE			16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>TC</i>		FIELD ENG: <i>EC</i>		DATE DRILLED: <i>24/1/72</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE: <i>612+51</i>		OFFSET:		TEST HOLE				
CKD: <i>111</i>		TECH: <i>FR ETC</i>		RIG: <i>MANUAL 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE <i>57</i> B,C,S <i>C</i> NUMBER <i>536</i>				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
PT PEAT: CATEGORY = <i>3</i> $\frac{1}{2}$ F <i>14</i> 20% CI CLAY (TILL): SANDY, SILTY STONES COBBLES MED PLASTIC BROWN ----- 5 GREY BROWN RUST SPECS COAL SPECS ----- 10 BOULDERS ----- 14 END OF HOLE																
2									2							DENSE SANDSTONE 5' to 15' HIGH 3" MAX. Ø OLD BIRCH
4									4							
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 24/2/73		AIRPHOTO NO: A22934-155		CHAINAGE: 6524.4		OFFSET:		TEST HOLE																	
CKD: 1/1		TECH: ERET		RIG: HAYDEN 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						PT PEAT: CATEGORY "4"		V _x 30%								DENSE SANDUCE 5' TO 20' HIGH 4" MAX Ø OLD BIRCH													
						CI CLAY (TILL): SANDY, SILTY STONES RUST & COAL SPECS COBBLES MED. PLASTIC BROWN		N ₆₀																					
2									2																				
4									4																				
6									6																				
8								V _x 21%	8																				
10						BOULDERS			10																				
12								N ₆₀	12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: TC		FIELD ENG: BC		DATE DRILLED: 24/1/72		AIRPHOTO NO: A22934-155		CHAINAGE: 662+81		OFFSET:		TEST HOLE				
CK: TC		TECH: EB & TC		RIG: MINI-MAC		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+						
2						OH CLAY: ORGANIC HIGH PLASTIC DARK BROWN		Vs 50%	2							DENSE SPRUCE 10' to 25' HIGH 4" MAX Ø ODD TAMMARACK
4						CI CLAY (TILL): SANDY SILTY STONES COBBLES RUST & COAL SPECS MED PLASTIC BROWN		Nbn	4							
6						SP SAND: MED. GRAINED SILTY NON PLASTIC BROWN			6							
8						----- 9 FINE GRAINED			8							
10									10							
12						CI CLAY (TILL) ----- 11 SILTY, SANDY MEDIUM PLASTIC BROWN			12							
14						----- 14 END OF HOLE			14							
16									16							
18									18							
20									20							
22									22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: TC	FIELD ENG: BC	DATE DRILLED: 2/2/77	AIRPHOTO NO: A 22934-155	CHAINAGE: 686+90	OFFSET:	TEST HOLE
CKD: TC	TECH: EB-TC	RIG: Manual 1000	SURFACE DRAINAGE: Poor	VEGETATION: LF PINE	ELEV:	

TEST HOLE

MILE	B.C.S	NUMBER
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
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24	24	24
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90	90	90
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92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

595 C 590

REMARKS

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B,C,S	NUMBER
										CLAY %	SILT %	SAND %	GRAVEL %					
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
2						CLAY (TILL): SANDY, SILTY STONES COBBLES BOULDERS MED PLASTIC BROWN	1/4	V _s 40% V _w 5%	2									
4								V _s 15%	4									
6								N ₆₀	6									
8									8									
10									10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									
														REMARKS				
														MED. DENSE SPRINGS 10' TO 15' HIGH 2' MAX & DED BIRCH				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: TC		FIELD ENG: EC		DATE DRILLED: 26/1/75		AIRPHOTO NO: A22934-155		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: TC		TECH: 13 E JV		RIG: MAXHELI 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						OL SILT organic										
2						CH CLAY (TILL) silty, sandy stones high plastic brown			2							MED DENSE SPRUCE 20' HIGH 4" MAX. ϕ
4						coal rust			4							
6									6							
8									8							
10									10							
12									12							
14						grey			14							
16									16							
18									18							
20						END OF HOLE			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>12/2/73</i>		AIRPHOTO NO: <i>A 22934-155</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKP: <i>111</i>		TECH: <i>12 & 111</i>		RIG: <i>Howell 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>Spr. Pines</i>		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNITED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
LEAT: CATEGORY #1 CH CLAY (FRL): 2 1 4 2 6 1 8 1 10 1 12 1 14 1 16 2 18 2 20 2 22 2 24 2																
2					CH	CLAY (FRL):		Vs 40%	2							DENSE SPRUCE 30' HIGH 6" MAX. #
4					CI	no fragments high plastic sandy silty rust. clust brown		Vs 50%	4							
6						very sandy silty		Vx 25%	6							
8								Non	8							
10									10							
12									12							
14						less sand			14							
16					CH	very high plastic			16							
18									18							
20						boulders			20							
22						END OF HOLE			22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: TC		FIELD ENG: BC		DATE DRILLED: 26/2/73		AIRPHOTO NO: A 22934-155		CHAINAGE:		OFFSET:		TEST HOLE												
CKD: TC		TECH: 16 FJM		RIG: MARYHEW 1000		SURFACE DRAINAGE: POOL		VEGETATION: SEE REMARKS		ELEV:		MILE B,C,S NUMBER												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY	SILT	SAND	GRAVEL											
										%	%	%	%											
						OH CLAY ORGANIC	12 F																	
						CI (CLAY (TILL):																		
						SANDY SILTY																		
						STONES																		
						MED. PLASTIC																		
						BROWN																		
						COBBLES																		
						COAL, ROCK																		
2								Vs 10%	2															
4								Vs 30%	4															
6								Nbn	6															
8	1								8															
10						CI SC			10															
12						VERY SANDY			12															
14									14															
16						CH			16															
18						GREY			18															
20						HIGH PLASTIC			20															
22									22															
24						END OF HOLE			24															

DIVARE SURFACES
15' HIGH 4" MAX
Ø

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: TC		FIELD ENG: RC	DATE DRILLED: 26/1/78	AIRPHOTO NO: A20934-155	CHAINAGE: 572+97	OFFSET:	WACKENZIE HIGHWAY											
CD	TECH: 13 EUN	RIG: MAYHEM 1000	SURFACE DRAINAGE: POOR		VEGETATION: SEE PROFILE	ELEV:	TEST HOLE											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	MILE	B,C,S	NUMBER
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
										CLAY	SILT	SAND	GRAVEL					
										%	%	%	%					
2						OH CLAY. ORGANIC			2									
4						CI CLAY (TILL): SANDY SILTY STONES MED. PLASTIC BROWN		vs 20%	4									
6									6									
8									8									
10									10									
12									12									
14						CH HIGH PLASTIC			14									
16						END OF HOLE			16									
18									18									
20									20									
22									22									
24									24									

REMARKS
 LUNARF SINKHOLE
 10' HIGH 4" Ø
 OCCASIONAL
 LARCH & LARCH

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DATE		FIELD ENG.	DATE DRILLED	AIRPHOTO NO.	CHAINAGE	OFFSET	ELEV.		TEST HOLE							
TECH.		RIG	SURFACE DRAINAGE	VEGETATION												
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
									CLAY SILT SAND GRAVEL							
									%							
2						SLT: ORG. MDC		V _x 20%	2							MED DENSE SPRUCES 20' to 35' HIGH 6" MAX Ø OCCASIONAL BIRCH
4						CH CLAY: SILTY HIGH PLASTIC BROWN		V _x 10%	4							
6						CL CLAY (TR.):		V _x 15%	6							
8						SANDY SATY SPONGES COBBLES MED. PLASTIC RED-BL		V _x 10%	8							
10						SANDIER		V _x 5%	10							
12							N/A		12							
14						CH GREY			14							
16						END OF HOLE			16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC		FIELD ENG: BC		DATE DRILLED: 26/1/73		AIRPHOTO NO: A22934-155		CHAINAGE:		OFFSET:		TEST HOLE		MILE		B,C,S		NUMBER											
CKD: 1111		TECH: HH & EB		RIG: MAYHEW 1000		SURFACE DRAINAGE: POOL		VEGETATION: SEE REMARKS		ELEV:																			
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
						VT PEAT: CATEGORY #1		Vx 40%								DENSE SPRUCE 15' TO 25' HIGH 4" MAX. Ø OCCASIONAL TIMBERACK													
2					CI CLAY: SILTY MED. PLASTIC BROWN		Vx 30%		2																				
4							Vs 40%		4																				
6					CI (CLAY (TILL)) SANDY SILTY STONES MED PLASTIC BROWN	5	Vs 30%		6																				
8	1						Vx 10%		8																				
10							Vs 15%		10																				
12							Vx 5%		12																				
14									14																				
16					CI SM VERY SANDY	15	Vx 10%		16																				
18					LESS SANDY	16	N/br		18																				
20					CH HIGHLY SANDY GREY	18			20																				
22									22																				
24						END OF HOLE			24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>26/12/73</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE: <i>564+62</i>		OFFSET:		TEST HOLE				
CND: <i>212</i>		TECH: <i>IGFJN</i>		RIG: <i>MANVEL 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE B.C.S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
						PT PEAT: CATEGORY 4										
2						OH CLAY: ORGANIC HIGH PLASTIC		V_x 20%	2							MED DENSE SAPRUC 20' HIGH 6" MAX ϕ OCCASIONAL WILLOW
4						CI CLAY (TILL) SHT. SANDY MEDIUM PLASTIC STONY MIST		V_y 10%	4							
6									6							
8									8							
10								Non	10							
12						SANDIER			12							
14						CH HIGH PLASTIC GLEY			14							
16						END OF HOLE			16							
18									18							
20									20							
22									22							
24									24							