

Report on
GEOTECHNICAL INVESTIGATIONS
MACKENZIE HIGHWAY
MILE 544 to MILE 635

Prepared for
DEPARTMENT OF PUBLIC WORKS OF CANADA

Volume 7



April 20, 1973



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING



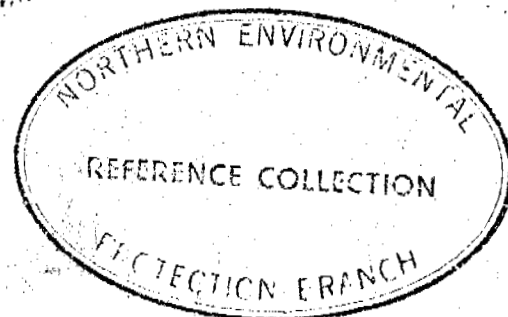


This report is in seven volumes. A Table of Contents is at the front of each volume.

Volume Number

Contents

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4	Test Hole Logs and Test Data Test Holes 201 through 400
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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

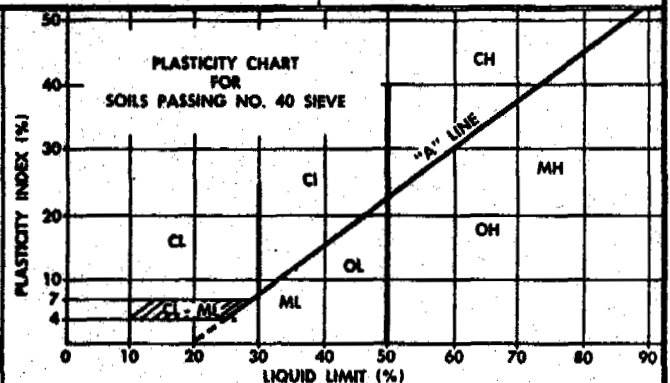
The plastic and liquid limits are shown on the water content chart by a horizontal bar. The Atterberg system is discussed in the following section.

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%	ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			GC		YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-(SILT) CLAY MIXTURES		ATTERBERG 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%	ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			SC		YELLOW	CLAYEY SANDS, SAND-(SILT) CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE NEGLECTABLE 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 NEGLECTABLE 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 ON 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

<u>Predominant Characteristic</u>	<u>Category</u>	<u>Name</u>
	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.

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DWN: <i>44</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>9/3/73</i>			AIRPHOTO NO: <i>A22934-147</i>			CHAINAGE: <i>1601+70</i>			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>44</i>			TECH: <i>Drill B.</i>			RIG: <i>1/2" NEW 1000</i>			SURFACE DRAINAGE: <i>POOR</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 %																
0						~~CLAY, SANDY GRAVEL~~ SAND; SILTY, PIECES OF SANDSTONE & SILTSTONE, POZZOLANS	1/4 F	Nf	0																				
2					SM				2																				
4					GS	GRAVEL; SANDY, WELL-GRADED CLEAN	3'		4																				
6									6																				
8					CI	CLAY (TILL) SANDY, SILTY MED PLASTIC, BROWN SHALE INCLUSIONS CALCAREOUS	7'	UF	8																				
10					CH	CLAY (SHALE) HIGH PLASTIC LAMINATED GREY FISSURED	10'		10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

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OWN: <i>CPA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>9/3/73</i>		AIRPHOTO NO: <i>A 22934-147</i>		CHAINAGE: <i>1603+25</i>		OFFSET:						
CKD: <i>11</i>		TECH: <i>DR + W.B.</i>		RIG: <i>WYHEW 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 (P.C.F.)	DRY DENSITY (P.C.F.)	TEST HOLE MILE B.C.S. NUMBER
										CLAY	SILT	SAND	GRAVEL			
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 40 60 80 100 100+							
						SC HARD SHALE & FEA GRAVEL 1/4'		Yx > 5%	0							MODERATELY DENSE SPRUCE 30'- HIGH 8" φ MAX Willows & POPULAR
2					SW SAND - SILTY. CLEAR BROWN		Ndn	2								
4					GP HARD SHALE & GRAVEL SLIGHTLY SILTY NON-PLASTIC CALCAREOUS			4								
6								6								
8					SANDIER			8								
10								10								
12								12								
14								14								
16								16								
18								18								
20								20								
22								22								
24						END OF HOLE (REFUSAL BY BOULDERS)			24							

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DWR: <i>CPA</i>		FIELD ENG: <i>3D</i>	DATE DRILLED: <i>10/3/73</i>	AIRPHOTO NO: <i>A 22934-147</i>	CHAINAGE: <i>1598 + 30</i>	OFFSET:	MACKENZIE HIGHWAY											
CND: <i>4</i>	TECH: <i>MBB.F</i>	RIG: <i>VIAMHE. 1000</i>	SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE RED-NEKS</i>	ELEV:	TEST HOLE SHEET 1 OF 2											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS 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					
										%	%	%	%	REMARKS				
0						OL OH		<i>(EST. 25%)</i>	0									SCRUB SPRUCE 5-30' HIGH 6" Ø MAX OCCASIONAL BIRCH
2						CI	2'	Vs 30%	2									
4								Nf	4									
6									6									
8						CH	8'	Nbn	8									
10								UF	10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									

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[illegible]

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DWN: <i>CL</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>9/3/73</i>		AIRPHOTO NO: <i>A 22934-149</i>		CHAINAGE: <i>12+150</i>		OFFSET:		TEST HOLE				
CKD: <i>H</i>		TECH: <i>M.D.</i>		RIG: <i>FAIRING</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 (EST.)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0					GC	GRAVEL, SILTY, CLAYEY, COARSE SAND, SILTSTONE INCLUSIONS	F	Vx 10%	0							
2									2							SCATTERED WILLOWS
4						SANDSTONE-SILTSTONE; + GRAVELLY (TILL-LIKE)			4							* CREEK BOTTOM
6					CI	CLAY (TILL); SANDY SILTY, MED PLASTIC - GREY COBBLES 9'	UF	WATER	6							FLOOD PLAIN
8									8							
10						SHALE INCLUSIONS CALCAREOUS			10							
12					CH	CLAY (SHALE); HARD, HIGH PLASTIC, LAMINATED GREY COLOR.			12							
14						END OF HOLE			14							
16									16							
18									18							
20									20							
22									22							
24									24							

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TEST HOLE

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DWN: CBA		FIELD ENG: B.D.		DATE DRILLED: 10/3/78		AIRPHOTO NO: A 22934-145		CHAINAGE: 1648+02		OFFSET:		TEST HOLE																	
CKD: 11		TECH: M.D.		RIG: MAYHEW/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) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT 40 80																			
										20 40 60 80 100 100+																			
0						OH ORGANIC CLAY, HIGH PLASTIC, BROWN, ROOTLETS OCCASIONAL PEBBLES	TI	Vx 40%	0						DENSE SPRUCE 5-20' HIGH 3" Ø MAX														
2					CI CLAY (TILL); SANDY SILTY, BROWN MED PLASTIC, PEBBLES CALCAREOUS, RUST SPECKS, LARGE STONES		Vx 30%	2																					
4								4																					
6								6																					
8								8																					
10							Nbn	10																					
12						BROWN — — — 12 GREY		12																					
14						SHALE INCLUSIONS 14 END OF HOLE		14																					
16								16																					
18								18																					
20								20																					
22								22																					
24								24																					

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DWN: <i>204</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>10/3/73</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE: <i>6554.55</i>		OFFSET:		ELEV:		TEST HOLE				
CKD: <i>1</i>		TECH: <i>H.D.</i>		RIG: <i>MAYHEW 100</i>		SURFACE DRAINAGE: <i>FAIR</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.)	MILE	B,C,S	NUMBER
										CLAY %	SILT %	SAND %	GRAVEL %					
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT								
0								<i>CEST. 2</i>	0	20	40	60	80	100	100+			
2					<i>CL</i>	<i>ORGANIC SAT. CLAYEY GRAVELLY</i>	<i>F</i>	<i>Vx 20%</i>	2									<i>DENSE SPRUCE 10-30' HIGH 6" MAX OCCASIONAL CLUMP OF WILLOWS</i>
4					<i>GM</i>	<i>GRAVEL; SANDY, SILTY, ROOTLETS, NON-PLASTIC RUST STAINS. MOTTLED BLACK BROWN</i>		<i>Vx 40%</i>	4									
6					<i>CI</i>	<i>CLAY (Till);</i>		<i>Ndn</i>	6									
8						<i>SILTY, SANDY MED PLASTIC, BROWN PEBBLES, CALCAREOUS BEDROCK INCLUSIONS</i>			8									
10									10									
12					<i>CE</i>	<i>SHALE INCLUSIONS</i>			12									
14					<i>CH</i>	<i>CLAY (SHALE); MEDIUM HIGH PLASTIC, GREY CALCAREOUS</i>			14									
16						<i>END OF HOLE</i>			16									
18									18									
20									20									
22									22									
24									24									

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OWN: <i>TC</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>3/14/78</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CD: <i>TC</i>		TECH: <i>MRE/CA</i>		RIG: <i>FALLING 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 %																
0						OH CLAY: ORGANIC 1/2 F		Vs 70%	0																				
1	1	T	75			CI CLAY (TILL):		Vs 35%	1																				
2						SANDY SILTY		Vs 20%	2																				
3	2	C	0			RUSTY COAL SPERS		NF	3																				
4						STONES		Vs 35%	4																				
5						COBBLES		Vs 10%	5																				
6						MED. PLASTIC		Vs 2%	6																				
7						BROWN			7																				
8						LESS STONES 8			8																				
9									9																				
10									10																				
11									11																				
12									12																				
13									13																				
14						GREY 14			14																				
15									15																				
16									16																				
17									17																				
18									18																				
19									19																				
20						END OF HOLE 20			20																				
21									21																				
22									22																				
23									23																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>TL</i>		FIELD ENG: <i>BC</i>		DATE DRILLED: <i>6/5/73</i>		AIRPHOTO NO: <i>A22934-155</i>		CHAINAGE:		OFFSET:		TEST HOLE																	
CHK: <i>TL</i>		TECH: <i>MR IDEGA</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 %																
								(EST.)		○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 40 60 80 100 100+																			
1	1	T	67			04 CLAY: ORGANIC HIGH PLASTIC DARK BROWN		V _x 20%	1							DENSE SPRUCE 1' to 15' HIGH 3" MAX Ø													
2	2	T	0			01 CLAY (TILL): SANDY SILTY STONES RUST & COAL SPECS MED. PLASTIC BROWN		V _r 30%	2																				
4								V _s 60%	4																				
6								V _s 40%	6																				
8								N6m	8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20	3	T	33			GREY	16		20																				
22						END OF HOLE	20		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: 6/4/73		AIRPHOTO NO: A22934-153		CHAINAGE: 862+78		OFFSET:		ELEV:		TEST HOLE															
CKD: ~~TC~~		TECH: C.A.F.M.R.		RIG: FALLING 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE REMARKS																					
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 %																
0									0	PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 60 80 100 100+																			
2						CI (CLAY (MIL): sandy, silty medium plastic rust color brown		Vx 5%	2							DENSE BIRCH & WILLOW 5x40 HIGH 10" MAX. Ø													
4						BEDROCK (LIMESTONE) weathered fractured grey		N/A	4																				
6	1	C	45						6																				
8									8																				
10									10																				
12									12																				
14									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: CKA		FIELD ENG: B.C.		DATE DRILLED: 7/3/73		AIRPHOTO NO: A22934-153		CHAINAGE: 215+30		OFFSET:		ELEV:		TEST HOLE										
CKD: 10		TECH: 02		RIG: FAILING		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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
0						CLAY (TILL) MED PLASTIC, PEBBLES RUST & COAL SPECS BROWN		5%	0							DENSE SPRUCE & BIRCH 3-30' HIGH 4" φ MAX								
2						BED ROCK		Nbn	2															
4						INTERBEDDED LAYER OF CLAY(SHALE) & LIMESTONE - FRACTURED - GRAY			4															
6									6															
8									8															
10									10															
12	C		50						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: <i>CRA</i>		FIELD ENG: <i>EC</i>		DATE DRILLED: <i>7/3/73</i>		AIRPHOTO NO: <i>A 22934-153</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE										
CKD: <i>42</i>		TECH: <i>CA</i>		RIG: <i>FAILING</i>		SURFACE DRAINAGE: <i>POOR</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS								
										CLAY %	SILT %	SAND %	GRAVEL %											
0					OH	CLAY ORGANIC. HIGH PLASTIC DK. BROWN	F	Vs 25%	0							VERY DENSE SPRUCE & BIRCH 5'-35' HIGH 8" ϕ MAX								
2					CI	CLAY (TILL) SILTY, SANDY MED PLASTIC BROWN PEBBLES		Vx 5%	2															
4									4															
6									6															
8									8															
10								Vx < 1%	10															
12									12															
14						SILTIER - GREY.			14															
16									16															
18								Vx 40%	18															
20								Vx 10%	20															
22									22															
24						END OF HOLE			24															

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWG: C-14		FIELD ENG: BC	DATE DRILLED: 7/3/73	AIRPHOTO NO: A22934-153	CHAINAGE:	OFFSET:	ELEV:	TEST HOLE							
CKD: M		TECH: MB	RIG: FAIRLIFT	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)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
								(EST. %)				CLAY	SILT	SAND	GRAVEL
												%	%	%	%
0					OH	CLAY - ORGANIC HIGH PLASTIC BROWN	F	Vx 40%	0						
2					CI	CLAY (TILL)			2						
4						SILTY, SANDY MED PLASTIC BROWN		NF	4						
6						PEBBLES RUST & COAL SPECS		Vx < 5%	6						
8									8						
10									10						
12									12						
14									14						
16						BEDROCK INTERBEDDED CLAY (SHALE) & LIMESTONE LAYERS			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>JA</i>			FIELD ENG: <i>BD</i>			DATE DRILLED: <i>7/3/73</i>			AIRPHOTO NO: <i>A22934-153</i>			CHAINAGE:			OFFSET:			TEST HOLE											
CRD: <i>JA</i>			TECH: <i>PT</i>			RIG: <i>7-1/2"</i>			SURFACE DRAINAGE: <i>POOR</i>			VEGETATION: <i>Spruce Forest</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0	1	T	70		OL	PENT & ORGANIC SILTY CLAY, 1/4" ORGANIC CLAY, SILTY, MEDIUM PL. BROWN COLOR.	F	Vx 15%	0					61.7	26.1	DENSE SPRUCE 15-20' HIGH 4" DIA OCCASIONAL BIRCH													
2					CL	CLAY; SILTY, LOW PLASTIC LIGHT BROWN. PEBBLES		Vx < 5%	2					53.6	44.0														
4	1				CI	CLAY (TILL); SILTY, SANDY MEDIUM PLASTIC PEBBLY, BROWN COLOR.			4																				
6	2	T	100						6																				
8	1	C	61						8																				
10									10					121.9	105.0														
12	1								12					123.9	107.6														
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: C.A.		FIELD ENG: ED		DATE DRILLED: 7/3/73		AIRPHOTO NO: A22934-153		CHAINAGE:		OFFSET:		TEST HOLE									
CND: 18		TECH: W.B.		RIG: 100-102		SURFACE DRAINAGE: POOR		VEGETATION: S&P		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 (EST. %)	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 %						
0						OH ORGANIC CLAY; LOW MEDIUM PLASTIC DR. BROWN	F	VX 10%	0									DENSE SPRUCE 15-20' HIGH 4" dia			
2						CI CLAY SILTY MED PLASTIC BROWN		Nbr	2												
4						CI CLAY (TILL) SANDY, SILTY. MED. PLASTIC PEBBLES BROWN			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												

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

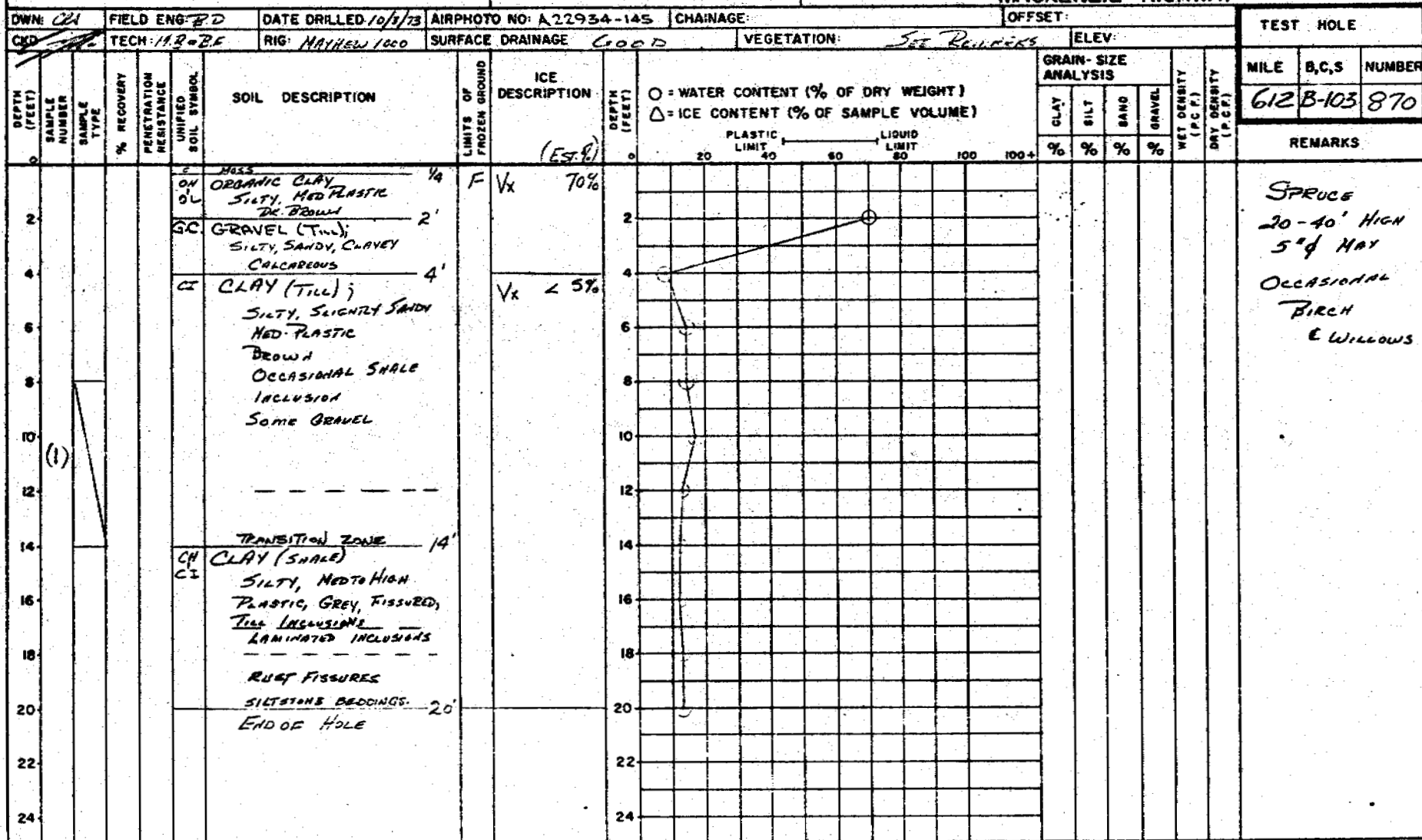
[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA. MACKENZIE HIGHWAY									
DWN: 10		FIELD ENG: B.D.		DATE DRILLED: 8/3/73		AIRPHOTO NO: A22934-153		CHAINAGE:		OFFSET:		TEST OLE									
CKD: 18		TECH: 10		RIG: 10		SURFACE DRAINAGE: POOR		VEGETATION: 10		ELEV:		MILE E.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 %										
0						PEAT (CAT #4)		Vx 75%	0					Dunes Since 3-30' HIGH 4" MAX							
2						CLAY - SILTY SANDY LOW PLASTIC		Vx 55%	2												
4						CI CLAY (TILL)		Vx 15%	4												
6						SILTY SANDY MED PLASTIC PEBBLES GRAY RUST SPACES			6												
8		T	25			SANDIER		Vx 3%	8												
10									10												
12						(CH) HIGH PLASTIC		Vx < 1%	12												
14									14												
16		C	50						16												
18						End of Hole			18												
20									20												
22									22												
24									24												

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: CRA		FIELD ENG: BD.		DATE DRILLED: 8/3/73		AIRPHOTO NO: A22934-151		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE			
CKD: EV.		TECH: CR1		RIG: FALLING		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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
0					OH	ORGANIC CLAY; HIGH PLASTIC, DK BROWN	1/4'	Vx 30%	0							MED-DENSE SPRUCE 5-40' HIGH 6" φ MAX	
2					CL	CLAY SILTY SANDY MED PLASTIC BROWN	1/2'	Vr 45%	2								
4	1	T	100						4								
6								Vs 70%	6								
8					CI	CLAY(TIU); SILTY SANDY MED PLASTIC BROWN PEBBLES GRAY	12'	Vr 45%	8								
10	1							Vx 5%	10								
12									12								
14	2	T	100					Vx < 1%	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>CH</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>2/3/73</i>		AIRPHOTO NO: <i>A22934-151</i>		CHAINAGE: <i>115+54</i>		OFFSET:		TEST HOLE				
CKD: <i>11</i>		TECH: <i>PD</i>		RIG: <i>TRILING</i>		SURFACE DRAINAGE: <i>FAIR</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0	(1) T		100		PT	PEAT (CAT #4)			0							
-2	(2) T		100		OL	ORGANIC SILT; CLAYEY LOW PLASTIC, SANDY, DARK		Vx 20	2					57.9	64.0	
	(3) T		100		ML	SILT; CLAYEY, ORGANICS LOW PLASTIC, BROWN INTERBEDDED WITH FINE SAND		Vx, Vv 50%	2					86.0	102.2	
4	(1) C				CL	CLAY; SILTY, MEDIUM PLASTIC, TRACE OF SAND, LIGHT BROWN COLOR.		Vx 30%	4					106.5	116.1	
6	(2) C				CI	CLAY (TILL); SILTY, SANDY MEDIUM PLASTIC COBBLES, SANDY INCLUSIONS, RUST STAINED ROCKETS OF FINE SAND		Vx 20%	6					132.7	114.0	
8	(3) C								8					140.6	124.5	
10	(4) C								10					126.2	121.4	
12	(5) C								12					140.5	126.2	
14									14					133.7	123.0	
16					CI	CLAY (TILL) SANDY SILTY MED PLASTIC PEBBLES GRAY LIMESTONE INCLUSIONS		Nbn	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: <i>CH</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>10/9/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>25</i>		TECH: <i>M.D.</i>		RIG: <i>MAYHEW 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 %																
0						<i>F MASS - ORGANIC SFT.</i>		<i>(EST. 2)</i>	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
2					<i>OH</i>	<i>ORGANIC CLAY - SILTY MED TO HIGH PLASTIC DK BROWN</i>	<i>F</i>	<i>Vx 40%</i>	2							<i>MODERATELY DENSE STRUC 5-25' HIGH 5 1/4" MAX</i>													
4					<i>CI</i>	<i>CLAY (TILL); SILTY, SANDY MED TO HIGH PLASTIC BROWN RUST SPECKS CALCAREOUS PEBBLES</i>	<i>Ndn</i>		4																				
6							<i>UF</i>		6																				
8									8																				
10					<i>CI</i>	<i>CLAY (SHALE) SOFT MED TO HIGH PLASTIC GREY</i>			10																				
12					<i>CH</i>				12																				
14						<i>VERY HARD</i>			14																				
16									16																				
18									18																				
20						<i>END OF HOLE</i>			20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
DWN: <i>CH</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>10/3/73</i>		AIRPHOTO NO: <i>A22934-14S</i>		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: <i>75</i>		TECH: <i>MD</i>		RIG: <i>MAHEW 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE S.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 %			
0						<i>NOT RECORDED</i>		<i>(Est. 4)</i>	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)				
										PLASTIC LIMIT	LIQUID LIMIT			
2					CL	CLAY, SILTY, SANDY MED PLASTIC, BROWN CALCAREOUS	F	Vk 10%	2					MODERATELY DENSE SPRUE 5-25' HIGH 5" MAX
4					CI	CLAY (TILL) SILTY, BROWN MED PLASTIC SMALL INCLUSIONS PEBBLES		Vk 40%	4					
6					CH	CLAY (SHALE) HIGH PLASTIC BROWN SOFT		Nbn	6					
8									8					
10						LAMINATED BEDDING.			10					
12						VERY HARD			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>CH</i>		FIELD ENG: <i>B.D</i>		DATE DRILLED: <i>10/3/73</i>		AIRPHOTO NO: <i>A22934-14S</i>		CHAINAGE: <i>1627+15</i>		OFFSET:						
CHD: <i>CH</i>		TECH: <i>M.D</i>		RIG: <i>MAY-JEW/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.)	TEST HOLE		
										CLAY %	SILT %			SAND %	GRAVEL %	MILE
0						<i>F MASS COVER</i>		<i>EST. 2</i>	0							
2						<i>OL ORGANIC SILT, SANDY, TRACE OF ORGANICS, MED PLASTIC PEBBLES, DK. BROWN</i>	<i>F</i>	<i>Vx 60%</i>	2							<i>MODERATELY DENSE SPRUCE 10-30' HIGH 6" MAX</i>
4						<i>GC GRAVEL; COARSE SAND, CLAYEY RUST STAINS, BROWN CALCAREOUS</i>		<i>Vx 50%</i>	4							
6						<i>CL CLAY (TILL); SILTY, SANDY, MED. PLASTIC RUST STAINED BROWN, PEBBLES CALCAREOUS</i>		<i>Vs 10%</i>	6							
10								<i>Vx 50%</i>	10							
12								<i>Nbn</i>	12							
14						<i>SHALE INCLUSIONS END OF HOLE</i>			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>RA</i>			FIELD ENG: <i>SD</i>			DATE DRILLED: <i>11/3/73</i>			AIRPHOTO NO: <i>A22934-145</i>			CHAINAGE: <i>1681+20</i>			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>11</i>			TECH: <i>HD</i>			RIG: <i>DIAMW1000</i>			SURFACE DRAINAGE: <i>FAIR</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.)	MILE	B.C.S	NUMBER										
										CLAY %	SILT %	SAND %	GRAVEL %																
0									0	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					OL	ORGANIC SILT; CLAYEY MED PLASTIC ORGANIC INCLUSIONS 2'	F	V _x 50%	2																				
4						GRAVEL; COARSE SANDY CLAYEY SILTY, BROWN. PEBBLES, CALCAREOUS SHALE INCLUSIONS		V _s 20%	4																				
6								V _x 5%	6																				
8									8																				
10								nbn	10																				
12						CH CLAY (SHALE); FIRM, HIGH PLASTIC, GREY LAMINATED	12'		12																				
14							15'		14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

DENSE
 SPRUCE
 10-35' HIGH
 8" d MAX

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>CH</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>10/3/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE: <i>1623+88</i>		OFFSET:		TEST HOLE																	
CKD: <i>71</i>		TECH: <i>MD</i>		RIG: <i>MARSH 1000</i>		SURFACE DRAINAGE: <i>FAIR</i>		VEGETATION: <i>SEE RAINDR</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 %																		
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										20	40	60	80	100	100+														
										PLASTIC LIMIT	LIQUID LIMIT																		
2					P ₁	PEAT #2	F	V _x 60%	2																				
4					CH	ORGANIC CLAY; SILTY, SLIGHTLY SANDY HIGH PLASTIC BROWN		V _x 80%	4																				
6					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN		V _x 20%	6																				
8						CLAYEUS		V _x 10%	8																				
10					CH	SHALE INCLUSIONS CLAY (SHALE) HIGH PLASTIC GREY		Nb _n	10																				
12									12																				
14						END OF HOLE			14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

MODERATELY
DENSE
SPRUE
10-25' HIGH
4" MAX

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CM		FIELD ENG: BD	DATE DRILLED: 10/3/73	AIRPHOTO NO: A 72934-145	CHAINAGE: 1629+06	OFFSET:	ELEV:	TEST HOLE								
CKD: BS	TECH: MD	RIG: MAYER 180	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 %			
0						CI CLAY (TILL);	F	Vx 10% (EST. R)	0							MODERATELY DENSE PODLAR 15-30' HIGH 6" φ MAX
2						SANDY, PEBBLES			2							
4						BROWN, CALCAREOUS			4							
6						RUST SPECKLES, TRACES OF ROOTS			6							
8						FEW PEBBLES		Vs 30%	8							
10						TRACES OF ROOTS		Ndn	10							
12									12							
14						GREY-BROWN			14							
16						SHALE INCLUSIONS			16							
18						END OF HOLE.			18							
20									20							
22									22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

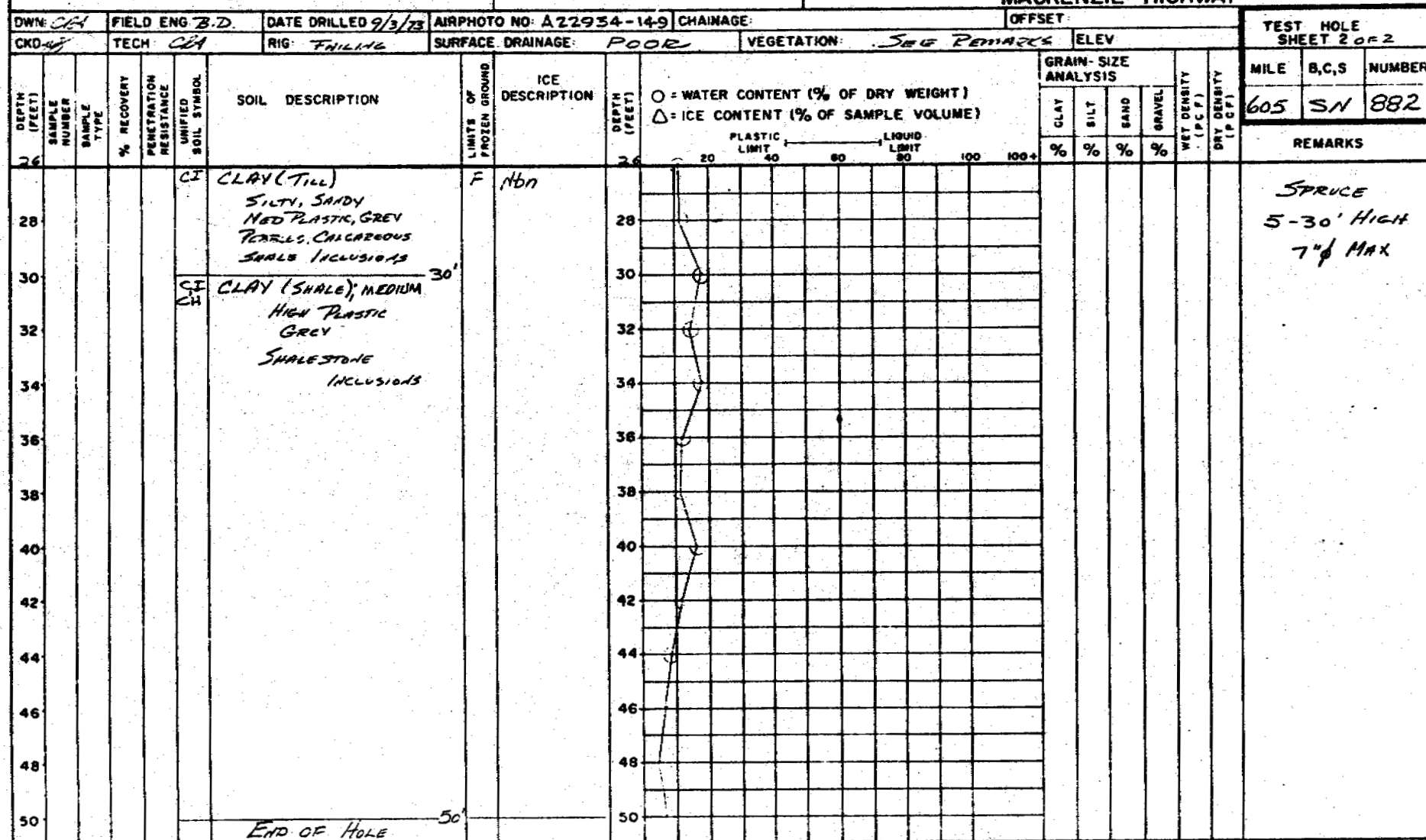
OWNER: <u>CDA</u>		FIELD ENG: <u>BD</u>	DATE DRILLED: <u>11/3/79</u>	AIRPHOTO NO: <u>A-22934-145</u>	CHAINAGE: <u>1707+00</u>	OFFSET:	ELEV:	TEST HOLE								
CD# <u>614C</u>		TECH: <u>M.B.M.D.</u>	RIG: <u>NAYHEW 1000</u>	SURFACE DRAINAGE: <u>POOR</u>	VEGETATION: <u>SGR REMAINS</u>				MILE	B,C,S	NUMBER					
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 %			
0						<u>Peat #2</u>	F	Vx 60% <i>(EST.)</i>	0							MODERATELY DENSE SCRUB SPRUCE 5-20' HIGH 3" φ MAX WILLOWS
2					CI	<u>CLAY (TILL)</u> <u>SILTY SANDY, GENERALLY</u> <u>LOW PLASTIC, BROWN</u> <u>BED ROCK INCLUSIONS</u>		Vx 20%	2							
4									4							
6					GC	<u>QUITE GRAVELLY</u>			6							
8						<u>FINES ARE CALCAREOUS</u>			8							
10						<u>LESS GRAVELLY</u> <u>HARD PLASTIC, SILTY</u> <u>CALCAREOUS</u>			10							
12						<u>PEN GRAVEL TO 8"</u>		Vs 10%	12							
14					CI	<u>OCCASIONAL STONE &</u> <u>COBBLE</u>	UF	No ICE	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: CBA		FIELD ENG: BD		DATE DRILLED: 11/3/73		AIRPHOTO NO: A22934-145		CHAINAGE: 1714+50		OFFSET:		TEST HOLE				
CKD: 11		TECH: CBA		RIG: TASTING		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)	GRAM-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					GM	GRAVEL	1/4	Vx 25%	0							DENSE SPRUCE 5-25' HIGH 4" φ MAX Willows
2					GC	SANDY, SILTY, CLAYEY NON TO LOW PLASTIC BROWN			2							
4									4							
6									6							
8					CH	CLAY (SHALE)	7'	Vr 20%	8							
10						SILTY HIGH PLASTIC CALcareous GREY		Vr 5%	10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						END OF HOLE	14'		24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY					
OWN: <i>SA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>11/2/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE: <i>1727+25</i>		OFFSET:			
CKD: <i>1</i>		TECH: <i>CM</i>		RIG: <i>TRAILING</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:			
TEST HOLE													
MILE <i>614</i> B.C.S. <i>C</i> NUMBER <i>881</i>													
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)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
0									0		CLAY		
2						<i>NESS</i> OH <i>ORGANIC CLAY; SILTY</i> <i>HIGH PLASTIC</i> <i>PK BROWN</i>	<i>1/4</i>	<i>VS 60%</i>	2		SILT		
4						<i>CLAY (TILL)</i> <i>SANDY, GRAVELLY</i> <i>SILTY, LOW TO MED</i> <i>PLASTIC, BROWN</i> <i>RUSSIA COAL SPECKS</i> <i>CALICHEOUS</i>	<i>2 1/2</i>	<i>Vx 20%</i>	4		SAND		
6									6		GRAVEL		
8									8				
10								<i>Vr 5%</i>	10				
12						<i>GREY SHALE</i> <i>INCLUSIONS</i>	<i>12'</i>		12				
14						<i>END OF HOLE</i>	<i>14'</i>		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>064</i>		FIELD ENG: <i>12</i>		DATE DRILLED: <i>9/3/8</i>		AIRPHOTO NO: <i>A22534-149</i>		CHAINAGE: <i>1237+75</i>		OFFSET:		TEST HOLE SHEET 1 OF 2				
CKD: <i>11</i>		TECH: <i>064</i>		RIO: <i>FRILING</i>		SURFACE DRAINAGE: <i>FOR</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 (EST)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT	LIQUID LIMIT					
										80	90	100	100+			
2					OH	ORGANIC CLAY HIGH PLASTIC DK BROWN	F	Yr 20%	2							SPRUCE 5-30' HIGH 7" Ø MAX
4					CI	CLAY (TILL) SILTY, SANDY MED PLASTIC, BROWN, PEBBLES RUST SPICKS CALCAREOUS		Yr 15%	4							
6									6							
8									8							
10								Yx 3%	10							
12									12							
14									14							
16									16							
18								Nbn	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: <i>JA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>9/3/73</i>		AIRPHOTO NO: <i>A22954-149</i>		CHAMARGE: <i>1175+85</i>		OFFSET:		TEST HOLE					
CKD: <i>V</i>		TECH: <i>JA</i>		RIG: <i>FAILING</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	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	
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)								
									PLASTIC LIMIT LIQUID LIMIT 40 80				CLAY %	SILT %	SAND %	GRAVEL %	
0						ON ORGANIC CLAY HIGH PLASTIC, DR. BROWN	F	Vs 20%	0								
2					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN PEBBLES RUST & COAL SPOTS CALCAREOUS		Vr 5%	2								
4									4								
6								Vr 10%	6								
8									8								
10						GRAVELLY 10' FINE SANDSTONE INCLUSIONS			10								
12									12								
14						COBBLES 14' END OF HOLE			14								
16									16								
18									18								
20									20								
22									22								
24									24								

MADERNELL
 DENSE
 SPRUCE
 5'-35' HIGH
 8" MAX

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>FI</i>		FIELD ENG <i>BD</i>	DATE DRILLED <i>8/3/73</i>	AIRPHOTO NO: <i>A22964-151</i>	CHAINAGE:	OFFSET:	ELEV.		TEST HOLE SHEET 2 OF 2							
CND	TECH	RIS	SURFACE DRAINAGE	FAIR	VEGETATION	SEE REMARKS			MILE	S.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 %			
26					CI	CLAY (TILL)		ESTD 10%	26							
28						SILTY-SANDY		Ndn	28							
30						MED PLASTIC			30							
32						GRAY			32							
34						PEBBLES			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: 21		FIELD ENG: RD		DATE DRILLED: 8/3/77		AIRPHOTO NO: A22934-151		CHAINAGE: 1036+50		OFFSET:		TEST HOLE				
CKD: 1		TECH: CR		RIG: FAILING		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE 601 S.C.S. NUMBER 886				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAM-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
2						SC SAND (FINE), CLAYEY. SILTY LOW PLASTIC		Vs 50%	2							MED DENSE SPRUCE 5-25' HIGH 3" φ MAX
4	(1)	T	75			CI CLAY; SILTY, SANDY (FINE) LOW TO MED PLASTIC LIGHT BROWN		Vx 2%	4							
6								Vr 1%	6							
8	(2)	T	100			CI CLAY (TILL) SILTY-SANDY MED PLASTIC GRAY PEBBLES RUST STAINS		Ndn	8							
10									10							
12									12							
14	(3)	T	50						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: CRA		FIELD ENG: J.D.		DATE DRILLED: 11/1/15		AIRPHOTO NO: A22934-145		CHAINAGE: 1740+80		OFFSET:						
CKD: 11		TECH: CRA		RIG: FAIRING		SURFACE DRAINAGE: POOR		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
										CLAY	SILT	SAND	GRAVEL	614	C	887
										%	%	%	%	REMARKS		
0						OH	1/4'	(Est.) Vs 50%	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
2						CL	2 1/2'	Vx 20%	2	PLASTIC LIMIT 40 — LIQUID LIMIT 60						MODERATELY DENSE STRUCTURE 5-15' HIGH 2" MAX
4									4							
6									6							
8									8							
10								Vr 5%	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>CH</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE: <i>1753+40</i>		OFFSET:		TEST HOLE																	
CKD: <i>8</i>		TECH: <i>CH</i>		RIG: <i>FALLING</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 %																
0									0	○ = 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. HAD PLASTIC BELOW	F	Vx 25%	2							DENSE SPRUCE & POPLAR 5-30' HIGH 6" MAX													
4					SP SM	SAND (COARSE) NON PLASTIC SILT MOTTLED BROWN		HF	4																				
6					GC	GRAVEL; FINE SILTY, CLAYEY		Vx 5%	6																				
10						10' SILTIER, MORE CLAY			10																				
14						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: <i>USA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE: <i>1766+70</i>		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>✓</i>		TECH: <i>11/11/73</i>		RIG: <i>MAYHEW 100</i>		SURFACE DRAINAGE: <i>POOR</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.)	MILE	B,C,S	NUMBER										
										CLAY	SILT	SAND	GRAVEL																
										%	%	%	%																
						<i>PEAT #4</i>		<i>15.8%</i> <i>80%</i> <i>100%</i> <i>60%</i>																					
2						<i>GC GRAVEL ;</i>			2																				
4						<i>SILTY, CLAYEY, COARSE GRAINED SAND LOW PLASTIC, BROWN SHALE INCLUSIONS. CALCAREOUS</i>			4																				
6						<i>CE CLAY (TILL)</i>		<i>15</i> <i>10%</i>	6																				
8						<i>SILTY, COARSE GRAINED SAND MED PLASTIC, BROWN PEBBLES, ROCK FRAGMENTS CALCAREOUS</i>			8																				
10									10																				
12						<i>FINE SANDY, CLAYEY SILTSTONE</i>			12																				
14						<i>CN CLAY (SHALE)</i>			14																				
16						<i>SILTY, BROWN LOW PLASTIC</i>			16																				
18						<i>END OF HOLE</i>			18																				
20									20																				
22									22																				
24									24																				

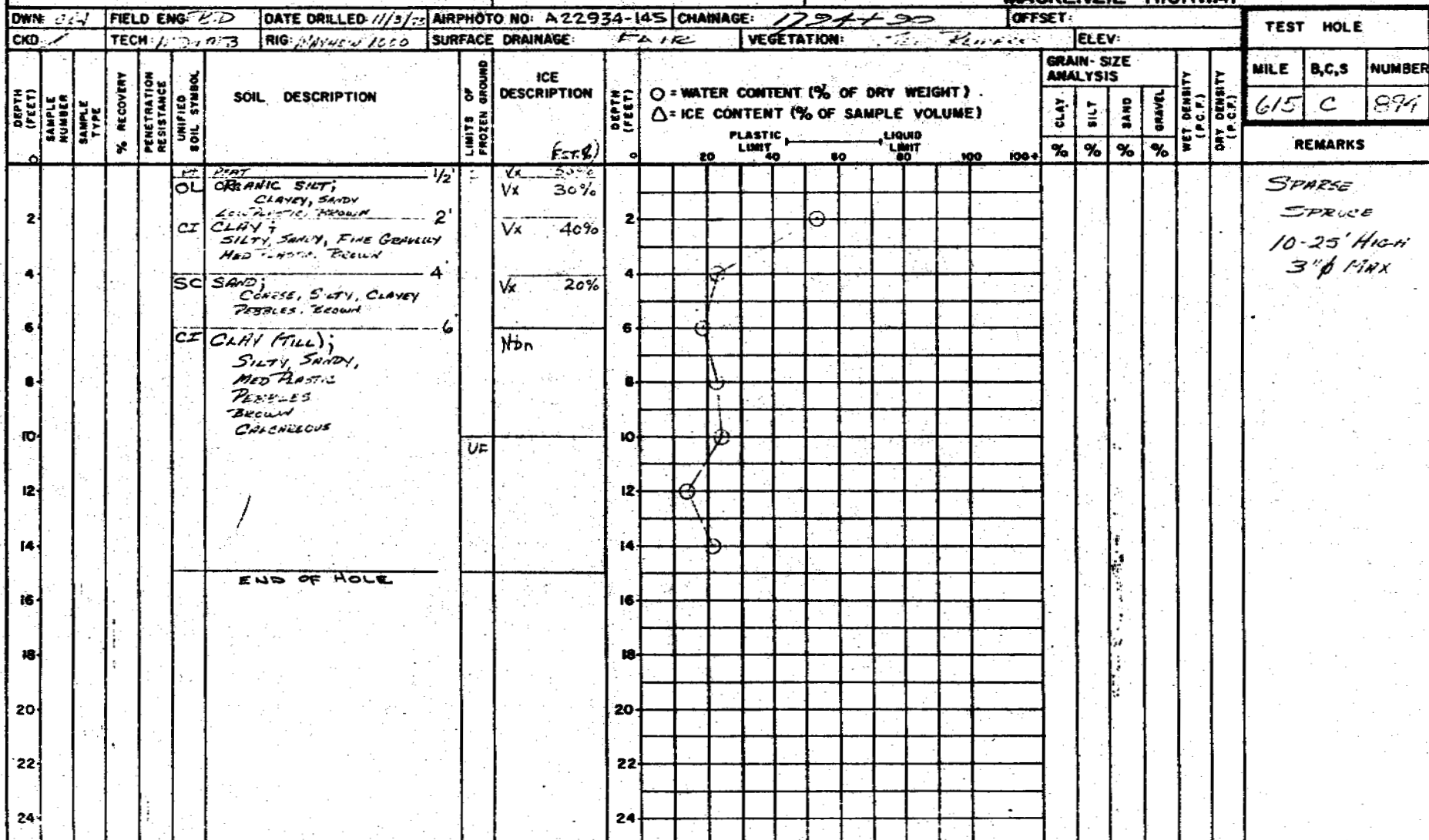
MODERATELY
DENSE
5-20' HIGH
3" MAX
OCCASIONAL
BIRCH

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: 10		FIELD ENG: 10	DATE DRILLED: 11/3/72	AIRPHOTO NO: A22934-145	CHAINAGE: 178.4-20	OFFSET:	MACKENZIE HIGHWAY										
CND: 10	TECH: 10	RIG: 10	SURFACE DRAINAGE: 10	VEGETATION: 10	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)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B.C.S	NUMBER
0						10			0						615	3	892
2						10			2						REMARKS		
4						10			4						SPARSE		
6						10			6						SOURCE		
8						10			8						10-20' HIGH		
10						10			10						3' MAX		
12						10			12						OCCASIONAL		
14						10			14						POPLAR		
16						10			16						WILLOWS		
18						10			18								
20						10			20								
22						10			22								
24						10			24								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: 124		FIELD ENG: BD		DATE DRILLED: 11/5/75		AIRPHOTO NO: A22934-145		CHAINAGE: 1785+80		OFFSET:		TEST HOLE				
CKD:		TECH: R. J. 195		RIG: N.Y. 1500		SURFACE DRAINAGE: FAIR		VEGETATION: SEE PLANTS		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 (EST.)	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					ML	1/2' SILT LOW PLASTIC, BROWN		100% 30%	2							SPARSE SPRUCE 10-30' HIGH 8" / MAX OCCASIONAL POPLAR & WILLOWS
4					GM	GRAVEL (FINE); COARSE GRAINED SAND SILTY, BROWN ROOT STRIPS TRACES OF ROOTLETS CALCAREOUS	Nbn	4								
6								6								
8								8								
10								10								
12								12								
14					CI	12' CLAY (TILL); SANDY, SILTY MED. PLASTIC, BROWN PEBBLES, CALCAREOUS		14								
16								16								
18								18								
20								20								
22								22								
24								24								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CIA		FIELD ENG: BD	DATE DRILLED: 11/3/77	AIRPHOTO NO: A22934-145	CHAINAGE: 1813+60	OFFSET:	MACROELEV THERMAL		TEST HOLE								
CKD: 1	TECH: CEA	RIG: FAIRING	SURFACE DRAINAGE: POOR	VEGETATION: SEA	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					MILE	B,C,S	NUMBER
										CLAY	SILT	SAND	GRAVEL	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)		
										%	%	%	%				
0								(EST. 1)	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)					616	C	896
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+					REMARKS		
2					OL OH	ORGANIC CLAY; SILTY, MED PLASTIC DK BROWN	1/4'	F Vs 80%	2								MODERATELY DENSE STRUC 5-15' HIGH 2nd MAX
4					CE	CLAY; SILTY, MED PLASTIC DK BROWN OCCASIONAL ROCK CALCARBOUS	2'	Vs 30%	4								
6									6								
8					CS	CLAY (TILL); SILTY, SANDY, MED PLASTIC, BROWN PEBBLES, COBBLES COAL & RUST SPECKS	8'	Vr 5%	8								
10									10								
12									12								
14						SAME INCLUSIONS	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: 616		FIELD ENG: 30		DATE DRILLED: 11/3/73		AIRPHOTO NO: A 22954-145		CHAINAGE: 1820+30		OFFSET:								
CKD: 6		TECH: 067		RIG: FILLING		SURFACE DRAINAGE: P003		VEGETATION: SEE REINFORCES		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
0					SM	SAND; COARSE GRAINED GRAVELLY, SILTY BROWN NON-PLASTIC (SLUFFING) END OF HOLE	F	Vc 10%	0									
2									2									
4									4									
6									6									
8									8									
10									10									
12									12									
14									14									
16									16									
18									18									
20									20									
22									22									
24									24									

MODERATELY
 DENSE
 SPRUCE & POPLAR
 5-20' HIGH
 6" d MAX

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: 25

FIELD ENG:

DATE DENIED 11-6-

AUGUST 1964

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
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MACKE

CKD

TECH: M2901B

BIG: A8-1-1-1-1-1

AIRPHOTO NO: A 22934-147	CH
SURFACE DAMAGE	

AGE: 1821 + 40	OFF
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100

100

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
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68	68	68
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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

1	2	3
4	5	6

6/6	S	890
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REMARKS

SPARSE
SPRUCE
10-30' HIGH
5" ϕ MAX
WILLOWS

TEST HOLE DRILLED
ON NORTH BANK
OF HELAVA
CREEK.

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>CB1</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>11/3/75</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE: <i>1837+20</i>		OFFSET:							
CKD: <i>100</i>		TECH: <i>UA</i>		RIG: <i>FALLING</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:							
TEST HOLE																	
MILE		B,C,S		NUMBER													
<i>616</i>		<i>C</i>		<i>899</i>													
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)		GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
										CLAY	SILT	SAND	GRAVEL				
										%	%	%	%				
0					CI	CLAY; SILTY, MED PLASTIC BROWN		Vr 45%	0								
2									2								
4						ROCK FRAGMENTS 4'			4								
6						WEATHERED SHALE 6'			6								
8					CI	CLAY (TILL) 8'		Vx 20%	8								
10						SILTY-SANDY MED PLASTIC BROWN		Vx 5%	10								
12						PEBBLES RUST & COAL SPECKS SHALE INCLUSIONS		Vx 20%	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									
OWN: <i>CH</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>11/3/73</i>			AIRPHOTO NO: <i>A22934-145</i>			CHAINAGE: <i>1845+25</i>			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>1</i>			TECH: <i>CA</i>			RIG: <i>FAIRING</i>			SURFACE DRAINAGE: <i>FAIR</i>			VEGETATION: <i>SEE REMARKS</i>			GRAIN-SIZE ANALYSIS			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) PLASTIC LIMIT ——— LIQUID LIMIT ——— 20 40 60 80 100 100+										CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS			
0						<i>WATER COVER</i>		<i>EST. 2</i>	0																	MODERATELY DENSE SPRUCE & POPLAR 5-50' HIGH 8"φ MAX			
2					CL	SILT; SANDY, CLAYEY; LOW PLASTIC BROWN CALCAREOUS		Vs 35%	2																				
4								Vr 20%	4																				
6									6																				
8					CL	CLAY (TILL); SANDY, SILTY, GRAVELLY LOW PLASTIC, BROWN PEBBLES TO COBBLES RUSTY CONG. SURF. CALCAREOUS	7	Vx 5%	8																				
10					CH	CLAY (SHALE); HIGH PLASTIC BROWN	10		10																				
12						GREY	12		12																				
14							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: C61		FIELD ENG: R.D.		DATE DRILLED: 9/3/73		AIRPHOTO NO: A22934-147		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: ~~1~~		TECH: D.P. B.		RIG: MAYHEW 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			
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT LIQUID LIMIT 40 60 80 100 100+							
0						MOSS COVER		(F.T.B.)	0							
2					GM	GRAVEL; FINE SANDY SILTY	1/4'	Vx 10%	2							
4					CI	CLAY (TILL)	4'	Nbn	4							
6						SILTY MED PLASTIC BROWN CALCAREOUS			6							
8									8							
10									10							
12									12							
14						Grey			14							
16									16							
18									18							
20						END OF HOLE	20'		20							
22									22							
24									24							

SPARSE
SCRUB
SPRUCE
10' HIGH
3" φ MAX

9 61 30

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: CH		FIELD ENG: B.D.		DATE DRILLED: 9/3/73		AIRPHOTO NO: A22934-147		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CKD: H		TECH: D.G.M.B.		RIG: MAYHEW 1000		SURFACE DRAINAGE: FAIR		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 %								
0						1" Moss Cover			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						MODERATELY DENSE SPRUCE. 30-50' HIGH 8" Ø MAX OCCASIONAL WILLOW, POPLAR & BIRCH					
2					GC GRAVEL; ORGANIC SANDY, SILTY, CLAYEY NON TO LOW PLASTIC	1/4'	F Nbn	2													
4					SM SAND; COARSE, SILTY SHARP NON PLASTIC BROWN	3'	UF No ICE	4													
6					SC SAND; SILTY, CLAYEY MED. GRAINED LOW PLASTIC BROWN	6 1/2'		6													
8								8													
10								10													
12								12													
14					SM SAND (TILL); SILTY NON-PLASTIC CLAY (TILL) INCLUSIONS SHALE INCLUSIONS	14'	WET.	14													
16	(1)							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: <i>GA</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>9/1/77</i>		AIRPHOTO NO: <i>A22834-147</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>JS</i>		TECH: <i>DRMB</i>		RIG: <i>MAYQU 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 (EST %)	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 40 LIQUID LIMIT 60						
0					OH	ORGANIC CLAY; SILTY MED PLASTIC ROOTLETS, BLACK		Vx 40%	0							SPARSE SPRUCE 15-30' HIGH 3"φ MAX
2					CI	CLAY (TILL-LIKE) SILTY, SANDY MED PLASTIC, BROWN FIBBLES CHALCAREOUS		Vs 30%	2							
4									4							
6									6							
8					ML	SILT; SANDY, CLAYEY LOW TO MED PLASTIC BEDDING		Nbn	8							
10									10							
12									12							
14					CH	CLAY (SHALE); GREY MED PLASTIC POST FISSURED STRATIFIED			14							
16									16							
18									18							
20									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: <i>CHA</i>		FIELD ENG: <i>DD</i>		DATE DRILLED: <i>4/5/72</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>W</i>		TECH: <i>MD</i>		RIG: <i>HAIRNEW 1000</i>		SURFACE DRAINAGE: <i>FL 12</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B,C,S	NUMBER											
										CLAY %	SILT %	SAND %	GRAVEL %																
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										20	40	60	80	100	100+														
2						CH CLAY (SHALE); MED. PLASTIC WEATHERED, RUST SPRINKS, ORGANIC CLAY ORGANICS, RUST FISSURED, DK BROWN		Vx 10%	2																				
4						CH CLAY (SHALE); FIRM. HIGH PLASTIC BROWN			4																				
6									6																				
8									8																				
10									10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

GLEY ——— 14'

END OF HOLE ——— 20'

POPLAR,
50' HIGH
6" & MAX
AND
WILLOWS
WITH
OCCASIONAL
SPRUCE

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CIA</i>		FIELD ENG: <i>BD</i>	DATE DRILLED: <i>10/3/75</i>	AIRPHOTO NO: <i>A 22934-145</i>	CHAINAGE:	OFFSET:	TEST HOLE										
CKD: <i>11</i>	TECH: <i>MD</i>	RIG: <i>HAINES, 150</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 %				
0						<i>LMNS COVER</i>		<i>(EST 4%)</i>	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+							
2					CI	CLAY; SILTY, MED PLASTIC BROWN, PEBBLES CALCAREOUS ORGANICS		<i>Vr 30%</i>	2							<i>MODERATELY DENSE SPECUL 10-25' HIGH 4"φ MAX</i>	
4					CI	<i>SHALE INCLUSIONS</i> CLAY (TIL); SILTY, SANDY, MED PLASTIC,		<i>Nbn</i>	4								
6									6								
8									8								
10					CH	HIGHER PLASTIC			10								
12					CI CH	CLAY (SHALE); STRATIFIED HARD DARK GREY-BROWN; RUST FISSURED.			12								
14						<i>GREY</i>			14								
16									16								
18									18								
20						<i>END OF HOLE</i>			20								
22									22								
24									24								

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
OWN: CPA		FIELD ENG: B.D.		DATE DRILLED: 10/3/77		AIRPHOTO NO: A 22934-145		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: R.S.		TECH: M.D.		RIG: MTHSW 1005		SURFACE DRAINAGE: FLOOD		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 %			
0						CI CLAY (TILL);		Vx 60%	0					MODERATELY DENSE SPRUCE 10-40' HIGH 8" MAX
2						SILTY MED PLASTIC OCCASIONAL PEBBLE CALCAREOUS BROWN		Vx 10%	2					
4									4					
6						MORE CLAY ---		Nbn	6					
8						CH CLAY (SHALE);		Vx 10%	8					
10						BROWN HIGH PLASTIC TRACE OF CALCIUM CARBONATE; HARD.		Nbn	10					
12									12					
14									14					
16						GREYISH ---			16					
18									18					
20						LAMINATED, GREY-DARK TRACE OF CALCIUM CARBONATE RUST STAINS.			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: <i>DA</i>		FIELD ENG: <i>DD</i>		DATE DRILLED: <i>10/9/77</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>1</i>		TECH: <i>DD</i>		RIG: <i>HARVEY 100</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)	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)					GRAIN-SIZE ANALYSIS				WET DENSITY (T.P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B,C,S	NUMBER						
										PLASTIC LIMIT	LIQUID LIMIT	CLAY %	SILT %	SAND %	GRAVEL %														
0						<i>(MUD CAP)</i>		<i>(SEE 2)</i>	0	20	40	60	80	100	100+	%	%	%	%										
2					CE	CLAY (TILL) SILT, BROWN HARD PLASTIC, CHALKY PEBBLES, RUST SPOTS TRACE OF ORGANICS FEW PEBBLES			2																				
4									4																				
6						NO PEBBLES			6																				
8						TRACE OF SHALE			8																				
10					CH	CLAY (SHALE) HIGH PLASTIC HARD BROWN FISSED			10																				
12									12																				
14									14																				
16									16																				
18						GREY			18																				
20									20																				
22						END OF HOLE			22																				
24									24																				

POPULAR & WILLOW
20' HIGH
6" MAX

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>CHA</i>		FIELD ENG: <i>JD</i>		DATE DRILLED: <i>11/3/72</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>CH</i>		TECH: <i>CHA</i>		RIG: <i>TRAILING</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE S.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 20 40 60 80 100 100+						
0						OH O'L CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN RUST STREAKS PEBBLES TO COBBLES CARBACEOUS SHALE INCLUSIONS	1/4 1/2	F Vc 45% Vr 10% Vx 10%	0							
2									2							MODERATELY DENSE SPRUCE 5-45' HIGH 6" MAX WILLOWS
4									4							
6	(1)								6							
8									8							
10	(1)	T				GRAY		Vx 10%	10							
12									12							
14						CH CLAY (SHALE) SILTY, HIGH PLASTIC GREY	13'	100%	14							
16									16							
18									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									
OWN: <i>CM</i>			FIELD ENG: <i>SD</i>			DATE DRILLED: <i>11/3/73</i>			AIRPHOTO NO: <i>A22934-1-3</i>			CHAINAGE:			OFFSET:			TEST HOLE											
CKD: <i>614</i>			TECH: <i>Q3</i>			RIG: <i>FILLING</i>			SURFACE DRAINAGE: <i>POOR</i>			VEGETATION: <i>SEE PHOTOS</i>			ELEV:			MILE <i>614</i> B.C.S. <i>B-105</i> NUMBER <i>910</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 %																
										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					OH	ORGANIC CLAY HIGH PLASTIC DK. BROWN	4	Vs 35%	2							SPARSE SPRUCE & WILLOW 5-15' HIGH 3" φ MAX													
4					CI	CLAY (TILL) SILTY, SANDY MED PLASTIC BROWN PEBBLES RUST & COAL SPECKS CHALCOPRUS	2	Vr 30%	4																				
6									6																				
8								Vr 5%	8																				
10									10																				
12									12																				
14								Vr < 1%	14																				
16									16																				
18					CH	CLAY (SHALE) HIGH PLASTIC, GREY SHALES/STONE INDICATIONS 20	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: <i>OLA</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>1/7/73</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE:		OFFSET:		TEST HOLE									
CKD: <i>4</i>		TECH: <i>CB</i>		RIS: <i>TRILING</i>		SURFACE DRAINAGE: <i>FNIR</i>		VEGETATION: <i>See Remarks</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 %								
0						<i>MISS</i> <i>OH</i> ORGANIC CLAY, SILTY HIGH PLASTIC DK. BROWN		<i>60%</i>	0							<i>DEISE</i> <i>SPRUCE</i> <i>WILLOWS</i> <i>5-15' HIGH</i> <i>2" MAX</i>					
2									2												
4						ICE ZONE CLAY (SILT) VERY SILTY, SANDY MED PLASTIC, BROWN ROOTS, CARBONACEOUS ROOT & COAL STECKS		<i>ICE 100%</i> <i>1x 3%</i>	4												
6									6												
8						SANDIER, SAND INCLUSIONS		<i>N/A</i>	8												
10						SANDSTONE & SILTSTONE, CLAYEY BEDDINGS LOW PLASTIC, POOR CEMENTATION			10												
12									12												
14									14												
16									16												
18						MED PLASTIC CLAY (SAND) HIGH PLASTIC BROWN			18												
20						END OF HOLE			20												
22									22												
24									24												

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CH</i>		FIELD ENG: <i>BD</i>	DATE FIELD: <i>11/3/79</i>	AIRPHOTO NO: <i>A 22934-145</i>	CHAINAGE: <i>1850+60</i>	OFFSET:	TEST HOLE									
CKD: <i>CH</i>	TECH: <i>ADA PLB</i>	RIG: <i>NAVH&W 1500</i>	SURFACE DRAINAGE: <i>POLE</i>		VEGETATION: <i>S&P PINE</i>	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 (Est %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0						<i>DIAGNOSTIC</i>			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT: 20 40 60 80 100 100+ LIQUID LIMIT: 50						
2					<i>OH</i>	<i>ORGANIC CLAY, SILTY, MOD PLASTIC, ROOTLETS OCCASIONAL PEBBLES</i>	<i>F</i>	<i>30%</i>	2							<i>MODERATELY DENSE STRUC 10-30' HIGH 6" φ MAX OCCASIONAL BIRCH & POPLAR</i>
4					<i>CL</i>	<i>CLAY (TILL); SANDY, VERY SILTY, PEBBLES LOW-MOD PLASTIC, BROWN CALCAREOUS</i>		<i>20%</i>	4							
6								<i>10%</i>	6							
8								<i>20%</i>	8							
10						<i>FEWER PEBBLES DARKER</i>		<i>10%</i>	10							
12									12							
14									14							
16						<i>END OF HOLE</i>	<i>15'</i>		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>CKA</i>		FIELD ENG: <i>PD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A 22934-145</i>		CHAINAGE: <i>1853+30</i>		OFFSET:			
CKD: <i>6</i>		TECH: <i>MD-1113</i>		RIG: <i>MAN-15000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>See Remarks</i>		ELEV:			
TEST HOLE													
MILE: <i>617</i> B.C.S: <i>C</i> NUMBER: <i>913</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 (P.C.F.)	DRY DENSITY (P.C.F.)
0									0	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+			
2						<i>2' Pent #4</i>		<i>60%</i>	2				
4						<i>CLAY</i>		<i>50%</i>	4				
6						<i>SILTY, MED PLASTIC</i>			6				
8						<i>SMALL PEBBLES</i>			8				
10						<i>BROWN</i>			10				
12						<i>CHALKY</i>			12				
14									14				
16									16				
18									18				
20									20				
22									22				
24									24				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS

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: <i>CPA</i>			FIELD ENG: <i>ED</i>			DATE DRILLED: <i>9/3/73</i>			AIRPHOTO NO: <i>D2224-143</i>			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>4</i>			TECH: <i>MD</i>			RIG: <i>TRILING</i>			SURFACE DRAINAGE: <i>GOOD</i>			VEGETATION: <i>See Remarks</i>									MILE <i>606</i> B.C.S. <i>B-96</i> NUMBER <i>9/6</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 %																
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 20 40 60 80 100 100+																			
2	(1)	T	67		Pt	Pt #13 - organic silty clay; silty, med plastic grey		Vx 30%	2																				
2	(2)	T	67		Ct	occasional rootlet. occasional stone.		Vx 20%	2																				
4	(1)	C	33					Vs 40%	4																				
6								Vr 75%	6																				
8	(2)	C	50						8																				
10	(3)	C	50						10																				
12								Vx 10%	12																				
12									12																				
14	(4)	C	33		CH	rust streaks, laminated sandstone, silty, med plastic grey, locally fissured			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: CKD		FIELD ENG: SB		DATE DRILLED: 9/5/73		AIRPHOTO NO: 000000-125		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CKD		TECH: 112		RIG: F-100		SURFACE DRAINAGE: F-100		VEGETATION: T-100		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					
0	(1) T	75			PT	PEAT #3		Vx 10%	0												
2	(2) T	100			CL	ORGANIC CLAY; SILTY SANDY, CLAY MED. PLAST. TONE OF CHRYSE		Vs 9.5%	2												
4	(1) C	23			CL	CLAY; SILTY SANDY RED-PLAST. TONE OF CHRYSE MED. PLAST. TONE OF CHRYSE TONE OF CHRYSE		Vx 10%	4												
6	(2) C	100			CI	CLAY (SHALE) SLIGHTLY CALCAREOUS SILTY, LOW TO MED PLAST. BROWN CONSIDERABLE PLASTICITY SOME SILTSTONE			6												
10						CLAY (SHALE) WEATHERED GRAY & PUFF MOTTLED LAMINATED			10												
14						CLAY (SHALE) LAMINATED GRAY			14												
16						HARDNESS OF 2'			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: 112		FIELD ENG: 220		DATE DRILLED: 9/3/73		AIRPHOTO NO: A 22934-149		CHAINAGE: 112+56		OFFSET:		TEST HOLE				
CKD: 10		TECH: 22A		RIS: 112+56		SURFACE DRAINAGE: 112+56		VEGETATION: 112+56		ELEV:		MILE S.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 %			
0						PT PEAT, CAT. # 4 DARK BROWN COLOR.		45%	0							
2									2							
4						SC SAND, SILTY CLAYEY LOW PLASTIC BROWN (DIE) AND GRAINED PEBBLES 1/2" DIA.		25%	4							
6	(1)	T	1/2			CI CLAYEY SILTY SAND 1/2" TENSILE BROWN PEBBLES 1/2" DIA. PEBBLES 1/2" DIA. CALCAREOUS.		5%	6							
8									8							
10									10							
12						12' Boulders			12							
14						13' Gravel		1%	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: CH		FIELD ENG: ED		DATE DRILLED: 12/3/73		AIRPHOTO NO: A22934-143		CHAINAGE: 1278 ± 80		OFFSET:		TEST HOLE				
CKD: JH		TECH: MD		RIG: TULLIS		SURFACE DRAINAGE: POOR		VEGETATION: SLR		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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0						OH ORGANIC CLAY; VERY SILTY, SANDY, MED PLASTIC DK BROWN	F	Vx 60%	0							SPRUCE 10'-20' HIGH 3" φ MAX.
2								Vx 20%	2							
4					CI	CLAY; SILTY, TRACES OF ORGANICS BROWN			4							
6									6							
8					CI CH	CLAY (TILL); SILTY, SANDY, PEBBLES MED TO HIGH PLASTIC CALCAREOUS		Vx 10%	8							
10									10							
12								Hdn	12							
14						— GREY SILTSTONE —			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: 14		FIELD ENG: 82		DATE DRILLED: 12/3/77		AIRPHOTO NO: A72934-143		CHAINAGE: 1822+27		OFFSET:		TEST HOLE				
CKD: 14		TECH: M.D.		RIG: FUELING		SURFACE DRAINAGE: GOOD		VEGETATION: S.L. Redwood		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 %			
						MOSS COVER		(EST.)		O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
0					OL	ORGANIC SILT; CLAYEY, LOW PLASTIC BROWN, PEBBLES		Vx 10%	0							
2					SM	SAND; FINE GRAINED - SILTY, PEBBLES ORGANIC, BROWN		150	2							
4									4							
6									6							
8					GM	GRAVEL (TILL); SANDY, SILTY BROWN, CARBONACEOUS	8'		8							
10						END OF HOLE (SLUFFING)	10'		10							
12									12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

617 C 920

HILLY -
SPRUCE & PINE
15-30' HIGH
6" MAX

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: CEA		FIELD ENG: EV		DATE DRILLED: 12/3/75		AIRPHOTO NO: A22834-143		CHAINAGE: 1824+60		OFFSET:		TEST HOLE									
CKD: JF		TECH: M.D.		RIG: FAIRING		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)	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			
												CLAY	SILT	SAND	GRAVEL						
												%	%	%	%						
0						SV SAND; GRAVELLY (FINE), SILTY, RUSSET, BROWN, CALcareous SHALE STONE FERRUGINOUS 2'		NDN	0												
2						G.P. GRAVEL SANDY, TRACE OF SILT, BROWN			2												
4									4												
6						END OF HOLE 5'			6												
8									8												
10									10												
12									12												
14									14												
16									16												
18									18												
20									20												
22									22												
24									24												

SPARSE
SPRUCE
10-30' HIGH
6" φ MAX
OCCASIONAL
BIRCH
&
WILLOWS
(HILLY TERRAIN)

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: 02		FIELD ENG: 87	DATE DRILLED: 12/3/60	AIRPHOTO NO: A22934-143	CHAINAGE: 1897+60	OFFSET:	ELEV:	TEST HOLE								
CNO: 78	TECH: DR	RIG: MARIEN	SURFACE DRAINAGE: POOL	VEGETATION: OPEN PINE				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 %			
0						SW SAND; 10% + #4 WELL-GRADED CLEAN ANGULAR & ROUNDED	F	Vx 20%	0							MODERATELY DENSE SPRUCE 5-25' HIGH 6" d MAX OCCASIONAL BIRCH
2									2							
4						<u>ORGANIC CLAY; SILTY</u>			4							
6									6							
8									8							
10									10							
12						GM GRAVEL (FINE); SILTSTONE, SANDY			12							
14						CI CLAY; SILTY, SANDY, RED PLASTIC BROWN CALICHEOUS			14							
16						GM GRAVEL; SANDY (TILL) SILTY, ANGULAR.			16							
18							UF		18							
20									20							
22									22							
24									24							
						END OF HOLE										

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: <i>ORA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>12/3/13</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE: <i>1902 + 50</i>		OFFSET:		TEST HOLE																	
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MAKIN 1000</i>		SURFACE DRAINAGE: <i>FAIR</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 (EST %)	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 LIQUID LIMIT 20 40 60 80 100 100+																			
0						<i>8" OS COVER.</i>																							
2					GW	GRAVEL; WELL-GRADED SLIGHTLY SILTY 25% ANGULAR & ROUNDED			2								<i>MADEHIELY DENSE SERV SPRUCE; 5-15' HIGH 6" M.H., BIRCH & WILLOWS</i>												
4								<i>Vx 20%</i>	4																				
6					SM	SILTIER SAND; SILTY, GRAVELLY, ORGANIC SILTSTONES, LOW TO MED PLASTIC.			6																				
8									8																				
10					SM	SAND; ANGULAR SILTY;			10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24						END OF HOLE			24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CL</i>		FIELD ENG: <i>JD</i>		DATE DRILLED: <i>12/3/00</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>1917+45</i>		OFFSET:		TEST HOLE					
CKD: <i>14</i>		TECH: <i>JE</i>		RIG: <i>MR-4500</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS	
										CLAY %	SILT %	SAND %	GRAVEL %				
0									0								
2					CL	CLAY; SILTY, LOW TO MED PLASTIC, BROWN	1/4'	VS 10%	2							MODERATELY DENSE SPRUCE 5-35' HIGH 8" MAX OCCASIONAL BIRCH & WILLOWS	
4									4								
6									6								
8					ML	SILT; SANDY FINE, LEWIS	7 1/2'		8								
10					CL	CLAY (TILL); SILTY, SANDY, LOW PLASTIC, BROWN	8'		10								
12					SM	SAND (TILL); LOW PLASTIC	10'	NBN	12								
14					SC	VERY SILTY			14								
16					CI	CLAY (TILL); MED PLASTIC BROWN	12'		16								
18						END OF HOLE	15'		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									
DWN: <i>CH</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>12/3/73</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE: <i>1985+95</i>		OFFSET:		TEST HOLE					
CKD: <i>CH</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE S.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
											CLAY	SILT	SAND	GRAVEL			
								EST %			PLASTIC LIMIT	LIQUID LIMIT					
0						<i>MOSS COVER</i>			0		20	40	60	80	100	100+	
2					CL	CLAY; SILTY, LOW TO MED PLASTIC BROWN, ROOTLETS.	F	Vx 10%	2								MODERATELY DENSE SPRUCE 5-20' HIGH 4" MAX BIRCH 9 WILLOWS
4					ML	SILT; CLAYEY TRACE OF FINE SAND, OCCASIONAL SILTSTONE & COBBLES LOW PLASTIC		Vx 10%	4								
6								Vx 10%	6								
8					SM	SAND; FINE GRAINED BROWN OCCASIONAL STONE, NP.			8								
10					CL	CLAY (TILL); SILTY, SANDY LOW PLASTIC		Vx 20%	10								
12					ML	SILT (TILL); TRACE OF FINE SAND AND CLAY, PEBBLES AND COBBLES.			12								
14						EDGE 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: <i>CLA</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>12/3/73</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE: <i>1946+70</i>		OFFSET:		TEST HOLE				
CKD: <i>4</i>		TECH: <i>DR</i>		RIG: <i>MILLEN 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 (EST %)	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 40 ——— 80						
0									0							
2					CI	<i>Mass</i> <i>CLAY;</i> <i>SILTY, MED PLASTIC</i> <i>TRACE OF ORGANICS</i> <i>BROWN</i>	<i>1/4</i> F	<i>Nbn</i>	2							<i>MODERATELY</i> <i>DENSE</i> <i>SPRUCE</i> <i>10' HIGH</i> <i>4" φ MAX</i>
4					ML	<i>FOOTLETS & SQA INCLUSIONS</i> <i>SILT; FINE</i> <i>SANDY, FINE GRAVELLY</i> <i>TILL, CLAYEY, LOW PLASTIC</i> <i>BROWN</i>		<i>Vs 15%</i>	4							
6						<i>SILT LENSESES</i>			6							
8									8							
10								<i>Vx 10%</i>	10							
12					CI	<i>CLAY (TILL)</i> <i>SILTY, SANDY</i> <i>MED PLASTIC, TERIBLES</i> <i>BROWN</i>	<i>1 1/2</i>	<i>Nbn</i>	12							
14									14							
16						<i>END OF HOLE</i>	<i>15</i>		16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

ELEV

TEST HOLE

MILE	B,C,S	NUMBER
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6/19	C	950
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REMARKS

MODERATELY
DENSE
SPRUCE
15-20' HIGH
6" ϕ MAX

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWG: 314		FIELD ENG: B.D	DATE DRILLED: 12/3/73	AIRPHOTO NO: A 22934-143	CHAINAGE: 1381 + 12	OFFSET:	MACKENZIE HIGHWAY		TEST HOLE							
CKD: 04	TECH: 72	RIG: M&J HEN 1950	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			
0						Max Cover		Est 2	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 40 60 80 100 120+ LIQUID LIMIT 60 80 100 120+						
2					ML	SILT; FINE SANDY LOW PLASTIC BROWN, ORGANIC		Vs 10%	2							MODERATELY DENSE SPRUCE 10-15' HIGH 4" Max
4					CI	CLAY (TILL); SILTY SANDY MEDIUM PLASTIC, BROWN			4							
6					CL	SILTIER		Vx 5%	6							
8					CI	LESS SILTY			8							
10					CL	PEBBLES, FAIRLY SANDY			10							
12					CI	SILTIER & SANDIER LOW-MEDIUM PLASTIC			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: <i>CRA</i>		FIELD ENG: <i>E.D.</i>		DATE DRILLED: <i>12/3/85</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>1987+80</i>		OFFSET:							
CKD: <i>AK</i>		TECH: <i>MD</i>		RIG: <i>FALLING 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:							
										TEST HOLE							
										MILE	B,C,S	NUMBER					
										619	C	932					
										REMARKS							
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNITED 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	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
0						<i>MOSS COVER</i>			0	20	40	60	80	100	100+		
2					<i>OL OH</i>	<i>ORGANIC CLAY SILTY, MED PLASTIC DK BROWN</i>	<i>F</i>	<i>Vx 80%</i>	2								
4					<i>CL CI</i>	<i>CLAY (TILL) SILTY, LOW TO MED PLASTIC OCCASIONAL PEBBLE, BROWN CALCAREOUS</i>		<i>Vx 70%</i>	4								
6									6								
8					<i>GH</i>	<i>GRAVEL; SANDY, SILTY</i>		<i>Vx 10% Hbn</i>	8								
10					<i>CI</i>	<i>CLAY (TILL) SANDY, MED TO HIGH PLASTIC, BROWN PEBBLES</i>			10								
12									12								
14									14								
15						<i>END OF HOLE</i>			15								
16									16								
18									18								
20									20								
22									22								
24									24								

MODERATELY
DENSE
SPRUE
10-30' HIGH
4" MAX

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER: <i>CPA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>12/3/78</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE: <i>12547.50</i>		OFFSET:		MACKENZIE HIGHWAY		TEST HOLE		
CKD: <i>H</i>		TECH: <i>MD</i>		RIG: <i>PHILING</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>619</i> B.C.S: <i>C</i> NUMBER: <i>933</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			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 50						
										% % % % % % % %						
0						<i>MISS COVER</i>		<i>(EST.)</i>	0							
2					<i>OL-OH</i>	<i>ORGANIC CLAY</i> <i>SILTY, MED PLASTIC</i>	<i>F</i>	<i>Vx 80%</i>	2							<i>MODERATELY DENSE</i> <i>SPRUCES 5-15' HIGH</i> <i>3" MAX</i>
4					<i>CL</i>	<i>CLAY;</i> <i>VERY SILTY, SANDY</i> <i>LOW PLASTIC, BROWN</i> <i>OCCASIONAL PEBBLE</i>		<i>Vs 80%</i>	4							
6					<i>GM</i>	<i>GRAVEL (TILL);</i> <i>SANDY, SILTY, COBBLES,</i> <i>BROWN, FLAT SILTSTONE</i> <i>& SHALE INCLUSIONS</i>		<i>Vx 60%</i> <i>Vx 10%</i>	6							
10					<i>ML</i>	<i>SILT (TILL);</i> <i>FINE SANDY,</i> <i>LOW PLASTIC, BROWN</i> <i>PEBBLES</i>		<i>Nbn</i>	10							
15						<i>END OF HOLE</i>			15							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>CL4</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>12/3/75</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>2001 + 55</i>		OFFSET:		TEST HOLE																	
CKD: <i>LA</i>		TECH: <i>N.D.</i>		RIG: <i>FEILING</i>		SURFACE DRAINAGE: <i>POOLS</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0						<i>MOSS DEBRIS COVER</i>		<i>(EST %)</i>	0																				
2					<i>OH</i>	<i>ORGANIC CLAY SILTY, HIGH PLASTIC BROWN</i>		<i>Vs 90%</i>	2							<i>Moderately Dense SAND 10-20' HIGH 4" MAX</i>													
4					<i>CI</i>	<i>CLAY; SILTY, MED PLASTIC BROWN, HEAVY CRACKED WITH ICE CRYSTALS.</i>		<i>Vx 60%</i>	4																				
6									6																				
8						<i>PEBBLES</i>		<i>Vx 10%</i>	8																				
10					<i>GM</i>	<i>LOW PLASTIC, NO PEBBLES / 0 GRAVEL; SANDY, SILTY BROWN</i>		<i>Yc 5%</i>	10																				
12					<i>CI</i>	<i>CLAY; SILTY, SANDY, LOW TO MED PLASTIC, BROWN, LARGE ROCKS</i>		<i>N60</i>	12																				
14						<i>END OF HOLE</i>			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									
DWE: <i>CL</i>		FIELD ENG: <i>BN</i>		DATE DRILLED: <i>12/9/73</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE: <i>2010+15</i>		OFFSET:		ELEV:		TEST HOLE							
CKD: <i>8</i>		TECH: <i>10</i>		RIG: <i>FALLING</i>		SURFACE DRAINAGE: <i>POOR</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 %								
0						<i>MOSS-PEAT COVER.</i>			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						MILE <i>620</i> B,C,S <i>C</i> NUMBER <i>935</i>					
										20	40	60	80	100	100+						
2					<i>OL</i>	<i>ORGANIC CLAY</i>	<i>F</i>	<i>Vx 90%</i>	2							<i>MODERATELY DENSE SPRUCE 15-25' HIGH 4" φ MAX</i>					
4					<i>OH</i>	<i>SILTY, MED PLASTIC DK BROWN</i>			4												
6					<i>GC</i>	<i>GRAVEL (FINE) SANDY, SILTY, TRACE OF CLAY BROWN, NON-PLASTIC FLAT SILTSTONE INCLUSIONS</i>		<i>Vx 20%</i>	6												
8						<i>TILL-LIKE</i>			8												
10					<i>CI</i>	<i>CLAY (TILL-LIKE); SILTY, LOW TO MED PLASTIC PEBBLES, BROWN</i>		<i>Vx 10%</i>	10												
12					<i>GC</i>	<i>GRAVEL; SANDY, SILTY, TRACE OF CLAY BROWN, FLAT SILTSTONE</i>		<i>NBN</i>	12												
14					<i>CI</i>	<i>CLAY (TILL); SANDY, SILTY, MED. PLASTIC, BROWN, PEBBLES</i>			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								
OWN: <i>CH</i>		FIELD ENG: <i>LP</i>		DATE DRILLED: <i>12/3/73</i>		AERIAL PHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>2017+25</i>		OFFSET:		TEST HOLE				
CKD: <i>4</i>		TECH: <i>M.D.</i>		RIG: <i>FEELING</i>		SURFACE DRAINAGE: <i>G0012</i>		VEGETATION: <i>30% RE-VEGETATION</i>		ELEV:		MILE: <i>620</i> S.C.S: <i>C</i> NUMBER: <i>936</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 %			
0						(HASS-ORGANIC SILTY CLAY GUEL)			0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					GM	GRAVEL; SANDY, SILTY, NOT PLASTIC BROWN		F Vx 10%	2							MODERATELY DENSE SPRUCE 25-50' HIGH 12" Ø MAX OCCASIONAL BIRCH
4						FINER ----- 4'			4							
6						COARSER ----- 6'		NDA	6							
8						VERY SILTY, FINE SANDY ----- 8'			8							
10					SW GM	SAND; COARSE, FINE GRAVELLY, VERY FINE GRAIN SAND ----- 10'			10							
12					CL	CLAY (TILL) SILTY, SANDY, LOW PLASTIC GREY, PEBBLES ----- 12'			12							
14									14							
16						END OF HOLE ----- 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: <i>CP</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>12/3/73</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>2024+80</i>		OFFSET:						
CKD: <i>2</i>		TECH: <i>M.D.</i>		RIG: <i>FRILING</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>50% REDWOODS</i>		ELEV:						
TEST HOLE																
MILE		B,C,S		NUMBER												
<i>620</i>		<i>S</i>		<i>937</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 (P.C.F.)	DRY DENSITY (P.C.F.)	
										PLASTIC LIMIT	LIQUID LIMIT	CLAY %	SILT %	SAND %	GRAVEL %	
										20	40	60	80	100	100+	
0					ML	SILT; SANDY, CLAYEY, LOW PLASTIC ORGANICS, BROWN	TI	(EST. 8%)	0							
2					ML	SILT; TRACE OF SAND, PEBBLES BROWN		Vx 10%	2							
4					GM	GRAVEL; SAND (COARSE), SILTY BROWN		Nbn	4							
6						LESS SILT			6							
8						WET-UNFROZEN			8							
10					SC	SAND (TILL); VERY SILTY, TRACE OF PLASTICITY, BK BROWN	UF	No ICE	10							
12						END OF HOLE			12							
14									14							
16									16							
18									18							
20									20							
22									22							
24									24							

MODERATELY
DENSE BRUCE
25-50' HIGH
12" ϕ MAX

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CH		FIELD ENG: BD	DATE DRILLED: 12/8/70	AIRPHOTO NO: A22934-143	CHAINAGE: 2027+50	OFFSET:	TEST HOLE SHEET 1 OF 2									
CKD: 11	TECH: DR	RIG: Maynew 100	SURFACE DRAINAGE: GOOD	VEGETATION: 3rd Rowing	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+						
0																
2						GW GRAVEL (FINE); WELL GRADED SANDY ROOTS	F	HP	2							MED DENSE SPRUCE 6-25' HIGH 8" φ MAX
4					NL SILT SANDY LOW PLASTIC BROWN CI CLAY (FIL) SGT MED PLASTIC CHALKY, PEBBLES BROWN CH ———— 6' HIGH PLASTIC		Vx 5%	4								
6									6							
8									8							
10									10							
12									12							
14									14							
16									16							
18						DARK GREY 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>CL</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>12/3/72</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE		OFFSET					
CND: <i>CL</i>		TECH: <i>DR</i>		RIG: <i>ANNEW 1000</i>		SURFACE DRAINAGE: <i>Good</i>		VEGETATION: <i>See Remarks</i>		ELEV					
TEST HOLE SHEET 2 of 2		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)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
26					CH	CLAY (TILL) SILTY, HIGH PLASTIC PEBBLES, GREY CALCAREOUS, STRATIFIED		Vx 5%	26						MODERATELY DENSE SPRUCES 6-25' HIGH 8" MAX
28					GM	GRAVEL (TILL); SANDY, FINE, SILTY GREY			28						
30									30						
32					SM	STRATIFIED, CLAYEY SAND; SILTY, ANGULAR AND SUBROUNDED			32						
34									34						
36					ML SM	SILT; SANDY, NON PLASTIC, GREY			36						
38					HL	SILT (TILL); SANDY, CLAY (TILL) INCLUSIONS GREY			38						
40					HL	SILT; FINE SAND, CLAYEY, LOW PLASTIC GREY.		MDA	40						
42									42						
44									44						
46									46						
48						END OF HOLE			48						
50									50						

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

ELEV:

RAIN- \$17

MILE	B,C,S	NUMBER
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REMARKS

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0						GLASS COVER		(EST.)	0	PLASTIC LIMIT ——— LIQUID LIMIT ——— 20 40 60 80 100 100+						MILE 620 C NUMBER 959
2					NL	SILT; CLAYEY SANDY, LOW PLASTIC CEMENT INCLUSIONS, BROWN 2'	F	NEN	2							MODERATELY DENSE SPRUCE 20' HIGH 6" Ø MAX OCCASIONAL BIRCH
4					CL	CLAY; SILT, LOW PLASTIC BROWN		Vx 50%	4							
6					CH	— 6' TILL INCLUSIONS — 7' HIGH PLASTIC			6							
8									8							
10					CI	— 9 1/2' LOW TO MED PLASTIC VERY SILTY	UF		10							
12							F	Vs 5%	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									
DWN: <i>22</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>14/3/75</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>2043+85</i>		OFFSET:		TEST HOLE																	
CKD: <i>17</i>		TECH: <i>ER</i>		RIG: <i>14125/1200</i>		SURFACE DRAINAGE: <i>POD</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 %											
0						ON ORGANIC CLAY; SILTY HIGH PLASTIC BLACK	F	Vx 60%	0					SPARSE STRESS 10' HIGH 4" DIA															
2					ICE		ICE 100%	2																					
4					CI CLAY; SILTY, MEDIUM PLASTIC, BROWN		Vx 60%	4																					
6					CL CLAY (TILL)			6																					
8					SILT; GRAVELLY LOW PLASTIC, BROWN		Vs 5%	8																					
10					CH HIGH PLASTIC			10																					
12					GREY			12																					
14								14																					
16						END OF HOLE			16																				
18									18																				
20									20																				
22									22																				
24									24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CA		FIELD ENG: BD	DATE DRILLED: 12/8/75	AIRPHOTO NO: A22934-143	CHAINAGE: 2052+40	OFFSET:	TEST HOLE								
CKD: 1	TECH: DR	RIG: PIATHEW 1600	SURFACE DRAINAGE: POOR	VEGETATION: LSP	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)	PLASTIC LIMIT	LIQUID LIMIT	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
												CLAY %	SILT %	SAND %	GRAVEL %
0						PEAT #11	F	Vs 75%	0	20	40				
2					CI	CLAY; MED PLAST, SILTY SANDY, BROWN HONEYCOMBED WITH ICE. 4 1/2'			2						
4					SP SM	SAND; SILTY, FINE GRAVELLY POORLY GRADED		Vx 20%	4						
6									6						
8									8						
10						CLEARER -- 10'			10						
12					SM	SAND (TILL) SILTY, OCCASIONAL CLAY TILL LUMP BROWN		Vx 5%	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>CKD</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>12/3/73</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE: <i>2061+20</i>		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>11</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		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 (Est %)	DEPTH (FEET)	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)		CLAY %	SILT %	SAND %	GRAVEL %	REMARKS													
0									0								MODERATELY DENSE SPECICE 10-15' HIGH 8" & MAX												
1					Peat #4		Vx 50%	1																					
2					SM SAND; SUBROUNDED AND ANGULAR. SILTY, BROWN, CALCAREOUS		NE	2																					
4					GW GRAVEL; WELL GRADED, SLIGHTLY SILTY CALCAREOUS			4																					
6					ANGULAR & SUBROUNDED			6																					
8					CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN		Vx 10%	8																					
10					SM SAND; SILTY GRAVELLY LOW PLASTIC BROWN		UF	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: CAI		FIELD ENG: B.D.		DATE DRILLED: 12/3/73		AIRPHOTO NO: A 22934-145		CHAINAGE:		OFFSET:		TEST HOLE									
CKD: 15		TECH: DR		RIG: HAYDEN 1000		SURFACE DRAINAGE: GULL		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 %								
0										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)											
										20	40	60	80	100	100+						
2						PEET #4 CLAY (TILL) SANDY, SILTY, MED PLASTIC BROWN, RUST SPECKS PEBBLES TO COBBLES	10'	Non	2							MODERATELY DENSE SPRUCE 20' HIGH 8" φ MAX					
4									4												
6									6												
8									8												
10									10												
12									12												
14						CH CLAY (TILL) MED TO HIGH PLASTIC GREY, RUST SPECKS PEBBLES, SHALE & SILTSTONE INCLUSIONS	13'		14												
16	(1)								16												
18									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									
OWN: <i>CLH</i>			FIELD ENG: <i>J.D.</i>			DATE DRILLED: <i>12/3/73</i>			AIRPHOTO NO: <i>A22934-145</i>			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>11</i>			TECH: <i>DR</i>			RIG: <i>MARHEW 1000</i>			SURFACE DRAINAGE: <i>GOOD</i>			VEGETATION: <i>SEE REMARKS</i>						MILE <i>615 B-106</i>			NUMBER <i>7.11</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 %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+																			
2					Pe	PEAT #4	1'	F	Nf																				
4					SM	SAND; ANGULAR & SUBANGULAR SILTY, POORLY GRADED																							
6						CLEAN																							
8					ML	SILT; VERY	7 1/2'																						
10						SANDY, LOW PLASTIC, BROWN-GREY.																							
12																													
14					CL	CLAY (TILL);	14'																						
16					CH	MED TO HIGH PLASTIC GRAY																							
18																													
20						END OF HOLE	20'																						
22																													
24																													

MODERATELY
DENSE SPRUCE
10-20' HIGH
5" Ø MAX

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>CPA</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>12/3/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE										
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MANHATTAN 1010</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>See map</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 %								
0						GH <i>ORGANIC CLAY; HIGH PLASTIC BLACK</i>		<i>EST. 10%</i>	0					<i>MODERATELY DENSE SPRUCE 18-20 HIGH 10" DIA</i>										
2					AL SC	<i>SILT; SANDY, GRAVELLY LOW PLASTIC, CLAYEY BROWN</i>			2															
4									4															
6					ML SC	<i>SILT; CLAYEY SANDY, LOW PLASTIC BROWN</i>			6															
8									8															
10					CI	<i>CLAY (TILL); SILTY, SANDY, GREY, MED PLASTIC OCCASIONAL ROCK (DRIED MATERIAL REACTS WITH WATER TO PRODUCE HEAT)</i>		<i>Hbn</i>	10															
12									12															
14									14															
16									16															
18									18															
20						<i>END OF HOLE</i>			20															
22									22															
24									24															

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>ORA</i>		FIELD ENG: <i>BD</i>	DATE DRILLED: <i>12/3/73</i>	AIRPHOTO NO: <i>A 22934-145</i>	CHAINAGE:	OFFSET:	MACKENZIE HIGHWAY									
CKD: <i>18</i>		TECH: <i>DR</i>	RIG: <i>MAYHEM 1020</i>	SURFACE DRAINAGE: <i>POOR</i>	VEGETATION: <i>SEE REMARKS</i>	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.)	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+							
									% % % %							
0						<i>MOSS COVER</i>		<i>(EST.)</i>	0							
2					<i>OH</i>	<i>ORGANIC CLAY; SILTY, MED PLASTIC BROWN</i>	<i>F</i>	<i>Vx 20%</i>	2							<i>MODERATELY DENSE SPRUCE 15-20' HIGH 8"φ MAX</i>
4					<i>ML</i>	<i>SILT (TILL); SANDY, CLAYEY LOW PLASTIC, PEBBLES & COBBLE INCLUSIONS</i>		<i>Vx 70%</i>	4							
6								<i>N50</i>	6							
8									8							
10	<i>(1)</i>				<i>GP</i>	<i>GRAVEL; ANG. & ROUNDED SANDY</i>			10							
12					<i>CL</i>	<i>CLAY (TILL); VERY SILTY, LOW PLASTIC, GREY SILTSTONE INCLUSIONS, OCCASIONAL PEBBLE</i>			12							
14									14							
16					<i>ML</i>	<i>SILT (TILL) SANDY, CLAYEY PEBBLES & FOLKS, GREY</i>		<i>Vs 10%</i>	16							
18									18							
20					<i>CH</i>	<i>CLAY (TILL) HIGH PLASTIC BROWN</i>			20							
22						<i>END OF HOLE</i>			22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: CBA		FIELD ENG: B.D.		DATE DRILLED: 13/3/73		AIRPHOTO NO: A22934-145		CHAINAGE:		OFFSET:		TEST HOLE				
CND 11		TECH: H.D.		RIG: FILING		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 %			
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80						
2					P ₊	PEAT	1'	Vs 80%	2							SPRUCE 15-30' HIGH 5" d MAX
4					SC	SAND (TILL); COARSE GRAINED, SILTY CLAYEY, BROWN, MID- PLASTIC, TRACES OF SHALE ROOTLETS CARBOHYDRES LESS SILTY CLAY FINER SAND	4'	Vs 30%	4							
6					CH	CLAY, TRACES OF SAND HIGH PLASTIC, BROWN OCCASIONAL PEBBLE GREY, 1/16 SAND	6'	Vs 40%	6							
8							8'	Vs 15%	8							
10									10							
12									12							
14									14							
16								Vs 5%	16							
18								Vs 15%	18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

R. M. HARDY AND ASSOCIATES LTD.										MACKENZIE HIGHWAY										TEST HOLE	
OWN: CH		FIELD ENG: 82		DATE DRILLED: 13/3/73		AIRPHOTO NO: A22934-145		CHAINAGE:		OFFSET:		ELEV:		MILE		B,C,S		NUMBER			
CKD: 44		TECH: T.D.		RIG: FILLING		SURFACE DRAINAGE: GOOD		VEGETATION: SEE PLANTS													
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 %								
0						MOSS COVER			0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)											
									20	PLASTIC LIMIT 40 60 80 100 100+ LIQUID LIMIT											
2						CI CLAY (TILL) SILTY, MED PLASTIC BROWN, OCCASIONAL PEBBLE	1/2'	Vx 80% Nbn	2							SPARSE SPRUCE 20-50' HIGH 8" φ MAX POPLAR 40' HIGH 5" φ MAX					
4						SC SAND FINE GRAVELLY, SILTY TRACES OF CLAY, POORLY GRADED, SHALE & SILTSTONE INCLUSIONS, BROWN	4'		4												
6									6												
8						SANDY GRAVELLY	8'		8												
10						GRAVELLY SANDY	10		10												
12									12												
14						CI CLAY (TILL) VERY SILTY, QUITE SANDY LOW TO MED PLASTIC, BROWN SILTSTONE & SHALE INCLUSIONS	12'		14												
16						GREY	16'		16												
18						LESS SANDY	18		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: <i>ORA</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>13/9/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE:		OFFSET:								
CKD: <i>11</i>		TECH: <i>22</i>		RIG: <i>MAYHEW 1416</i>		SURFACE DRAINAGE: <i>GOOD</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.)	TEST HOLE		
										CLAY	SILT	SAND	GRAVEL			MILE	B,C,S	NUMBER
0						<i>Mass-peat (GFC)</i>		<i>(F.T. 1)</i>										
2					CI	CLAY, SANDY LOW PLASTIC BEDDED, ROOTLETS SHALE INCLUSIONS	F	Hdn	2								MODERATELY DENSE POPULAR 20' HIGH 10" HIGH WILLOWS	
4					GW	GRAVEL (FINE) SANDY, WELL GRADED		NF	4									
6					GM	CLEAN ——— 6' SHALESTONE INCLUSIONS SANDIER			6									
8									8									
10									10									
12					SM	SILTY SAND ——— 12'			12									
14									14									
16						——— 16' SILTIER		Vx 15%	16									
18					CI	CLAY (TILL); GRAVELLY, GREY MED PLASTIC		NF	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: <i>CKH</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>13/7/73</i>		AIRPHOTO NO: <i>A22934-145</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD:		TECH: <i>J.R.</i>		RIG: <i>MANHILL 1000</i>		SURFACE DRAINAGE: <i>G-000</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT	LIQUID LIMIT					
										20	40	60	80	100	100+	
2					NL	<i>SILT; CLAYEY, LOW PLASTIC BROWN, CRACKLES</i>	<i>1/4'</i>	<i>Vx 40%</i>	2							<i>MODERATELY DENSE SPRUCE 10-15' HIGH 8" MAX</i>
4									4							
6					SP	<i>SAND; VARYING COARSE-FINE GRAVELLY, SILTY, BROWN CLAY(TILL) INCLUSIONS</i>	<i>5'</i>	<i>NF</i>	6							
8									8							
10					GM	<i>GRAVEL (FINE) SILTY, SANDY (TILL) CLAY INCLUSIONS BROWN</i>	<i>10'</i>		10							
12									12							
14						<i>VERY SILTY</i>	<i>14'</i>		14							
16					SW	<i>SAND; (CONG.) CLEAN</i>	<i>15'</i>		16							
18					CI	<i>CLAY (TILL) SILTY, SANDY, MOD PLASTIC GREY, PEBBLES,</i>	<i>17'</i>	<i>NFI</i>	18							
20						<i>END OF HOLE</i>	<i>20'</i>		20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS	
	MODERNLY DENSE SPRUCE 20-30' HIGH 6" MAX

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>CDN</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>13/3/73</i>		AIRPHOTO NO: <i>A22-934-145</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE										
CKD: <i>72</i>		TECH: <i>DR</i>		RIG: <i>MANTEL 1500</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>See Remarks</i>						MILE <i>617</i> S.C.S. <i>B-110954*</i> NUMBER										
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS										
										CLAY %	SILT %													
0					OH	ORGANIC CLAY SILTY, SANDY, MED PLASTIC BROWN		Vs 25%	0					SPARSE SPRUCES 10' HIGH 4" MAX										
2									2															
4					AL	SILT (TILL) SANDY, CLAYEY, LOW PLASTIC BROWN OCCASIONAL PEBBLE	4 1/2'	UF No ICE	4															
6									6															
8									8															
10						VERY SILTY, SANDY	10'		10															
12									12															
14									14															
16									16															
18					CH	CLAY (TILL); HIGH PLASTIC, GREY PEBBLES & SAND	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: CBA		FIELD ENG: B.D.		DATE DRILLED: 3/3/73		AIRPHOTO NO: A22934-143		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CKD: 1		TECH: VR		RIG: HAYHEW 1600		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 %										
0						OL ORGANIC SILT, CLAYEY OH LOW PLASTIC, BLACK CL CLAY (TILL) GRAVELLY	F	Vx 50%	0					SPARSE SPRUCE TAMARACK 15' HIGH 4" MAX							
2					SM SAND, SILTY, LOW PLASTIC WATER SATURATED	UF		2													
4								4													
6					GRAVELLY, SATURATED FINE GRAVEL, SANDY SHALESTONE INCLUSIONS			6													
8								8													
10								10													
12								12													
14								14													
16								16													
18								18													
20								20													
22								22													
24						END OF HOLE (WATER FLOWING FROM HOLE) AFTER PULL OUT.			24												

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: <i>OK</i>		FIELD ENG: <i>BD</i>	DATE DRILLED: <i>3/3/73</i>	AIRPHOTO NO: <i>A 22934-143</i>	CHAINAGE:	OFFSET:	ELEV:	TEST HOLE										
CKD: <i>5</i>		TECH: <i>DR</i>	RIG: <i>MATHEW 1000</i>	SURFACE DRAINAGE: <i>POOR</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS		
										CLAY %	SILT %	SAND %	GRAVEL %					
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT: 20 40 60 80 100 100+ LIQUID LIMIT: 80 100 100+								
2					OH C1	ORGANIC CLAY SILTY, MED TO HIGH PLASTIC		V _x E V _s 20%	2							SPARSE SPRUCE 10-15' HIGH 5" φ MAX		
4					ML	SILT (TILL); CLAYEY, LOW PLASTIC, BROWN, ROOTLETS, PEBBLES SHALESTONE INCLUSIONS CALcareous.			4									
6					GM	GRAVEL; (FINE) SILTY, BROWN		V _x 10%	6									
8					GC	GRAVELLY (TILL); CLAYEY MED PLASTIC FINES, SILTY, SHALESTONE INCLUSIONS			8									
10					SC	SAND (TILL) SILTY, CLAY LUMPS, LOW PLASTIC, BROWN		Abn	10									
12									12									
14									14									
16					GC	GRAVEL; (TILL) CLAYEY SILTY, LOW PLASTIC BROWN, SHALE INCLUSIONS			16									
18					AL	SILT (TILL); COARSE SAND, GRAVELLY LOW PLASTIC, BROWN			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: <i>CH</i>		FIELD ENG: <i>J.D.</i>		DATE DRILLED: <i>13/3/73</i>		AIRPHOTO NO: <i>A 22731-143</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>CH</i>		TECH: <i>PD</i>		RIG: <i>FRILLING</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			
									O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)							
									PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+							
0						<i>PT PEAT ; CATEGORY #4</i>		<i>Vx 80%</i>	0							<i>MODERNLY DENSE SPRUCE 10-15' HIGH 3" φ MAX</i>
2					<i>CI CLAY; SILTY, SANDY, MED PLASTIC BROWN, OCCASIONAL PEBBLES</i>		<i>Vx 30%</i>	2								
4					<i>CI CLAY (FIN) VERY SILTY, SANDY, MED PLASTIC. BROWN, RUST STAINS.</i>		<i>Vx 20% Vs 15%</i>	4								
6								6								
8					<i>SANDIER</i>		<i>Ndn</i>	8								
10								10								
12					<i>SILTIER SANDIER</i>			12								
14								14								
16					<i>GREY</i>			16								
18					<i>CI CH MEDIUM- HIGH PLASTIC.</i>			18								
20					<i>END OF HOLE</i>			20								
22								22								
24								24								

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: CCA		FIELD ENG: B.D.		DATE DRILLED: 13/3/73		AIRPHOTO NO: A22934-143		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 12		TECH: DR		RIG: FAILING		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REMARKS		ELEV:		MILE 8,C,S NUMBER				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					Pe	Peet; CATEGORY #4	F	Vs 95%	2							MODERATELY DENSE STRUCC 20-40' HIGH 10" φ MAX
4					CL	CLAY (TILL); VERY SILTY, MED PLASTIC BROWN	UF	1400	4							
6					ML	SILTY (TILL);			6							
8					CL	CLAYEY, SANDY, LOW PLASTIC, BROWN			8							
10					SC	SAND (TILL) SILTY, CLAYEY, LOW PLASTIC, BROWN			10							
12					ML	SILTY (TILL); CLAYEY, SANDY VERY LOW PLASTIC BROWN			12							
14									14							
16					ML	LOW PLASTIC			16							
18					CL	GREY			18							
20					ML	SANDIER			20							
22					SC	OCCASIONAL PEBBLE			22							
24						END OF HOLE			24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY												
OWN: <i>CEA</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>12/3/77</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD: <i>22</i>		TECH: <i>22</i>		RIG: <i>PHILIP 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>See Notes</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 %					
0						<i>1st Moss Cover.</i>		<i>(Est %)</i>	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT: 40 — 60 — 80 — 100 — 100+ LIQUID LIMIT: 80 — 100 — 100+								
2					OL	ORGANIC SILT; LOW PLASTIC BLACK	F	Vx 25%	2							<i>SPRUCE</i> <i>10-20' HIGH</i> <i>3" MAX</i> <i>OCCASIONAL</i> <i>THIN TRACK</i>		
4					CL	CLAY (TILL) SILTY, SANDY, LOW PLASTIC, BROWN CALCAREOUS, PEBBLES TO COBBLES		Vx 50%	4									
6									6									
8								Vs 10%	8									
10					ML	SILT (TILL) SANDY, MED PLASTIC BROWN, SILTSTONE SANDSTONE, RUST SPECKS		NON	10									
12									12									
14									14									
16					CL	CLAY (SHALE); SILTY, FINE SANDY LOW PLASTIC GREY SILTSTONE BEDDINGS			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: <i>CH</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>13/3/13</i>		AIRPHOTO NO: <i>A 22934-143</i>		CHAINAGE:		OFFSET:		TEST HOLE											
CKD: <i>TH</i>		TECH: <i>N.D</i>		RIG: <i>FAIRING</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>ICE REMAINS</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										CLAY %	SILT %	SAND %	GRAVEL %										
0						<i>Pe</i> PEAT		<i>Vx</i> 95%	0							<i>SPRUCE</i> <i>SPRUCE</i> <i>10-20' HIGH</i> <i>3" φ MAX</i> <i>OCCASIONAL</i> <i>TAMARACK</i>							
2					<i>CL</i> CLAY (TILL); VERY SILTY, SANDY LOW PLASTIC, BROWN, PEBBLES		<i>Vs</i> 45%	2															
4	(1)	C	100		<i>ML</i> SILT (TILL); CLAYEY FINE SAND, LOW PLASTIC PEBBLES & SANDWICHES CLAY LAYERS, HIGH PL.		<i>Vs</i> 30% 10%	4							121.1 98.7								
6							<i>Vx</i> 10%	6							121.8 99.7								
8	(2)	C	100				<i>Vr</i> 10%	8							130.8 112.2								
10	(3)	C	45		<i>SM</i> SAND; FINE GRAINED, BEDDED SILT STONE & FINE SAND STONE INCLUSIONS TRACES OF CLAY, SILT STRINGERS BROWN.		<i>Nbn</i>	10							134.7 117.9								
12	(4)	C	100		SILTSTONE; INTERBEDDED FINE SANDSTONE, WELL CEMENTED FISSED, BROWN.		<i>Vx</i> 5%	12							140.1 126.3 141.2 128.3 144.3 132.4								
14								14							144.0 132.3								
16	(5)	C	100		GREY CLAYEY			16							150.0 128.9								
18	(1)							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>CA</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>13/3/73</i>			AIRPHOTO NO: <i>A2295A-143</i>			CHAINAGE:			OFFSET:			TEST HOLE											
CKD: <i>12</i>			TECH: <i>J.R.</i>			RIG: <i>MAY 45/1000</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS					WET DENSITY (PCF)	DRY DENSITY (PCF)	REMARKS												
										CLAY %	SILT %	SAND %	GRAVEL %																
0						(MOSS, ORGANIC SILT, CLAY, G.I.P.)		(EST. %)	0	○ = 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 MED PLASTIC, BROWN CALCAREOUS, PEBBLES OCCASIONAL STONE 2" & +		Vs 40%	2																				
4						————— 5'		Vx 40%	4																				
6						RUST & COAL SPECKS SHALESTONE INCLUSIONS			6																				
8									8																				
10									10																				
12									12																				
14									14																				
16					CH	CLAY (SHALE) SILTY, SANDY, MED TO HIGH PLASTIC, GREY PEBBLES, SHALESTONE & CLAY TILL INCLUSIONS			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: <i>1</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>14/3/73</i>		AIRPHOTO NO: <i>A22934-143</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD: <i>2</i>		TECH: <i>M.D.</i>		RIG: <i>FRILING 1002</i>		SURFACE DRAINAGE: <i>FAIR</i>		VEGETATION: <i>SEE REMARKS</i>		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.)	MILE	B,C,S	NUMBER
										CLAY	SILT	SAND	GRAVEL					
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)								
										PLASTIC LIMIT 40 60 80 100 100+								
2						PENT ? TREE ROOTS ON SURFACE		Vx 90%										
2						CL CLAY: (TILL) 1 1/2'		Vs 40%										
4	(1)	C	93			SILTY, SANDY LOW TO MED PLASTIC LIGHT BROWN COAL STRECKS, SEVERAL PEBBLES & STONES OCCASIONAL SAND LENSES												
6						GC GRAVEL: (TILL) CLAYEY 6 1/2'		Vs 30%										
8	(2)	C	95			SANDY SILTY LOW PLASTIC YELLOW BROWN PEBBLES TO COBBLES												
10	(3)	C	89			GM SANDIER, NON PLASTIC 10'		Vs 10%										
12																		
14	(4)	C	83															
16	(5)	C	100			ML SILT: (TILL) 15 1/2'		Vr 5%										
18						CLAYEY, SANDY HIGH TO LOW PLASTIC GREY, SOME INCLUSIONS		Vx 5%										
20						SILT STONE: FINE SANDY CLAYEY, GREY 20'												
22						END OF HOLE												
24																		

1349 1167
1355 1174
1213 974
1277 1135
1353 1267
1361 1169
1328 1213
1356 1234

NOTE:
BAG SAMPLES
2-14' TAKEN
FROM PILOT
HOLE. W/Cs
TAKEN ALSO

610 B-115 762

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: <i>CPA</i>		FIELD ENG: <i>ED.</i>		DATE DRILLED: <i>13/5/73</i>		AIRPHOTO NO: <i>A 2293A-142</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD: <i>72</i>		TECH: <i>DR.</i>		RIG: <i>HA/HW 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEA REPAIRS</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS		
										CLAY %	SILT %	SAND %	GRAVEL %					
0						<i>MOSS COVER</i>			0	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT								
2					CI	CLAY; SANDY, SILTY MED PLASTIC, BROWN ORGANIC SILT INCLUSIONS SAND INCLUSIONS PEBBLES TO COBBLES		<i>NDN</i>	2							<i>DENSE SPRUE 30' HIGH 10" φ MAX</i>		
4					CL	CLAY (TILL); VERY FINE SAND, LOW PLASTIC, CALCAREOUS PEBBLES		<i>Vx 30%</i>	4									
6								<i>NDN</i>	6									
8									8									
10					ML	SILT (TILL); SANDY, TRACE OF CLAY LOW PLASTIC, BROWN			10									
12									12									
14					CI	CLAY (TILL) SILTY, MED PLASTIC GRAY, SHALE SILT INCLUSIONS			14									
16									16									
18									18									
20									20									
22									22									
24						END OF HOLE			24									

R.M. HARDY AND ASSOCIATES LTD.										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DRILL HOLE REPORT																			
DWN: CRA		FIELD ENG: R.D.		DATE DRILLED: 12/7/83		AIRPHOTO NO: A22934-143		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE					
CKD: 11		TECH: DR		RIG: MATHEN 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SEE DRAWING											
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 %						
0									0	○ = 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					CI	CLAY; SILTY, SANDY MED PLASTIC, BROWN		hbn	2							DENSE SPRUCE 40' HIGH 8" 10" MAX			
4					CI	GREY CLAY (TILL); SILTY, SANDY, MEDIUM PLASTIC, BROWN	4'	Vs 15%	4										
6									6										
8					SM	SAND; (TILL) SILTY, BROWN LOW PLASTIC	8'	Vs 10%	8										
10	(1)								10										
12									12										
14									14										
16									16										
18					CI	CLAY (TILL) SILTY, SANDY LOW TO MED PLASTIC, GREY PEBBLED, CALCAREOUS	18'	hbn	18										
20							20'		20										
22						END OF HOLE			22										
24									24										

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: CH		FIELD ENG: B.D.	DATE DRILLED: 12/5/73	AIRPHOTO NO: A22934-143	CHAINAGE:	OFFSET:	TEST HOLE									
CKD: 11		TECH: M.D.	RIG: FAILING 1022	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			
										%	%	%	%			
0						PEAT, CATEGORY #4		(EST. ?)	0							
2					P _r			V _x 60%	2							MODERATELY DENSE SPRUCE 25-30' HIGH 12" φ MAX
4	(1)	C	100		CI	CLAY (TILL); SILTY, SANDY. MEDIUM PLASTIC BROWN, PEBBLES, SHALE INCLUSIONS, GRAVELLY SILT & SAND STRATIFICATIONS		V _r 15%	4							
6									6							
8	(2)	C	100			BEDDINGS OF CLAY & SILT VARVES INTERBEDDED WITH CLAY TILL TO 16' DARK BROWN AND LIGHT GREY COLORED TO 10' (PHOTOGRAPHED) - GREY.		V _x 10%	8							
10	(3)	C	83					V _s 10%	10							
12								V _r 10%	12							
14	(4)	C	100						14							
16	(5)	C	100			GRAVELLY - - - - -		V _x 5%	16							
18						COARSE SAND LAYERS			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: CBA		FIELD ENG: B.D.		DATE DRILLED: 11/3/73		AIRPHOTO NO: A22934-1A2		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 117		TECH: DR		RIG: MATHIAS 1500		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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 20 40 60 80 100 100+						
2					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN OCCASIONAL PEBBLE GREY	F	Vx & Vs 20%	2							MODERATELY DENSE SPRUCE 30-40' HIGH 8" MAX OCCASIONAL WILLOWS
4							Abn		4							
6									6							
8									8							
10								Vx & Vs 10%	10							
12									12							
14									14							
16									16							
18								Vx 25%	18							
20					CI	CLAY (TILL) MED TO HIGH PLASTIC			20							
22						END OF HOLE			22							
24									24							

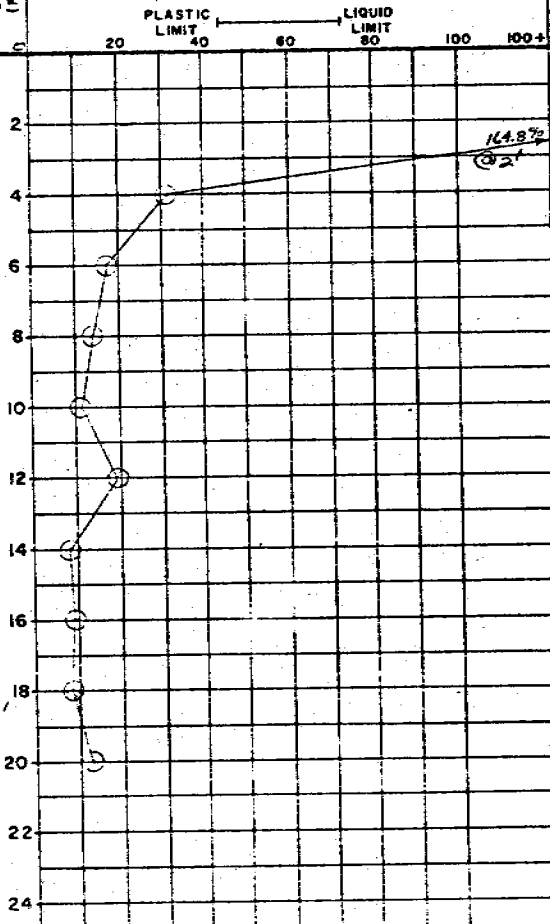
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

REMARKS

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <u>TH</u>		FIELD ENG: <u>P.D.</u>		DATE DRILLED: <u>15/3/73</u>		AIRPHOTO NO: <u>A 22934-92</u>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <u>14</u>		TECH: <u>D.R.</u>		RIG: <u>MAYHEW 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 %			
0									0	20	40	60	80	100	100+	
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 40 60						
2					CL CI	CLAY; SILTY SANDY ORGANIC LOW-MEDIUM PLASTIC, BROWN		Nbn	2							MODERATELY DENSE SPRUCE 20' HIGH - 6" Ø MAX. OCCASIONAL TAMARACK
4					CI	CLAY (TILL); SILTY SANDY, MEDIUM PLASTIC, PEBBLES, SHALY INCLUSIONS, BROWN		Nf	4							
6					CL	GRAVELLY & SILTIER, LOW PL.		Nbn	6							
8					CI	MEDIUM PLASTIC			8							
10					CI	GRAVELLY			10							
12					GC	OCCASIONAL COBBLE			12							
14									14							
16					CI	GREY-BROWN, PEBBLY HIGHER PLASTIC			16							
18	(1)				CH	GREY COLOR.			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: CRH			FIELD ENG: P.D.			DATE DRILLED: 16/12/73			AIRPHOTO NO: AZ2934-100			CHAINAGE: 2338+70			OFFSET:			ELEV:			TEST HOLE								
CKD: 16			TECH: DR			RIG: MAYHEW 1000			SURFACE DRAINAGE: GOOD			VEGETATION: See Plan																	
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 %																		
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+																			
0					OL	SILT; ORGANIC CLAY; LOW PLASTIC, SANDY, BLACK.	1/4'	Vx 40%	0																				
2					CI	CLAY; SILTY, FINE SANDY, MOD. PLASTIC BROWN	2'	Vr 20%	2																				
4									4																				
6					GM	GRAVEL (COARSE) SILTY, SHALESTONE INCLUSIONS	6'	15%	6																				
8									8																				
10					SM	SAND; SILTY, FINE GRAINED, SHALE INCLUSIONS (REF)	10'		10																				
12					CI	CLAY (TILL); SANDY, GREY MOD. PLASTIC SANDY INCLUSIONS PEBBLES	12'		12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24						END OF HOLE	24'		24																				

MODERATELY
DENSE
SPRUCE
20'-30' HIGH
8" d MAX



R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: ☒		FIELD ENG: B.D.		DATE DRILLED: 3/16/73		AIRPHOTO NO: A22934-100		CHAINAGE: 2347+55		OFFSET:		ELEV:		TEST HOLE															
CKD: ☒		TECH: DR.		RIG: NAIHEW		SURFACE DRAINAGE: GOOD		VEGETATION:		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 (NIL)	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)		CLAY %	SILT %	SAND %	GRAVEL %	REMARKS													
										PLASTIC LIMIT 20 40 60 80 100 100+																			
0									0																				
2									2																				
4									4																				
6									6																				
8									8																				
10									10																				
12								No MASSIVE ICE ENCOUNTERED	12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

END OF HOLE

20

NOTE:
 Probe hole
 to check if
 massive ice is
 present is in
 hole #1019.

THIS TEST HOLE
 WAS DRILLED ON
 A SMALL RISE 50'
 NORTH OF TH#1019
 ON E.

NOTE: TH#1019 WAS
 DRILLED IN A HOLLOW
 OF AN ESKE RISE.

10% SLOPE
 WEST.

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CA		FIELD ENG: BJD	DATE DRILLED: 12/2/73	AIRPHOTO NO: A 22484-102	CHAINAGE: 1234+80	OFFSET:	ELEV:		TEST HOLE							
CKD: 1/1	TECH: DR	RIG: MARYHEV 1000	SURFACE DRAINAGE: POOR		VEGETATION: 1/2	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			
											%	%	%	%		
0					OL	SILT; ORGANIC CLAYEY		Nbn	1							
2					CI	SANDY, MEDIUM PLASTIC, BROWN			2							
4					ML	SILT; (T.LL) CLAYEY, LOW PLASTIC BROWN		Vx 15%	4							
6					CI	CLAY; (T.LL) SILTY SANDY, MED PLASTIC BROWN		Nbn	6							
8								Vx 20%	8							
10					CL	SANDIER, LOW PLASTIC GREY		Nbn	10							
12					SC	SAND; (ML) CLAYEY, SILTY GREY, LOW PLASTIC			12							
14									14							
16						END OF HOLE			16							
18									18							
20									20							
22									22							
24									24							

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CL</i>		FIELD ENG: <i>B.J.D.</i>	DATE DRILLED: <i>11/14/73</i>	AIRPHOTO NO: <i>A 22934-102</i>	CHAINAGE: <i>4250+07</i>	OFFSET:	TEST HOLE									
CKD: <i>2</i>	TECH: <i>D.R.</i>	RIG: <i>N. 445W 1000</i>	SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>--- Pines</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 %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2						<i>34' GRAVEL:</i> <i>SILTY SAND</i> <i>ANGULAR SUB-ANG</i>	<i>F</i>	<i>115%</i>	2							
4						<i>CL CLAY: (TILL)</i> <i>SILTY SANDY</i> <i>SLIGHTLY GRAVELLY</i> <i>LOW PLASTIC</i> <i>GREY-BROWN</i>			4							
6								<i>Vx 10%</i>	6							
8									8							
10									10							
12									12							
14									14							
16						<i>END OF HOLE</i>			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>CPA</i>		FIELD ENG: <i>DD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A-22934-95</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>11</i>		TECH: <i>MD</i>		RIG: <i>TRILING</i>		SURFACE DRAINAGE: <i>FA 10'</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>621</i> B.C.S. <i>8-113</i> NUMBER <i>978</i>				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION EST %	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+						
2					GM	GRAVEL; SANDY, SILTY, ROOTLETS ROSTIC BROWN	1/2'	Vx 15%	2							MODERATELY DENSE SPRUCE 10-15' HIGH 3" φ MAX OCCASIONAL BIRCH
4						LESS SILTY, SHALESIDE INCLUSIONS	4'	NB	4							
6						SILTIER	6'	Vx 20%	6							
8					ML	SILT (TILL) CLAYEY, SANDY, PEBBLES LOW PLASTIC, BROWN	7'	Vx 30%	8							
10									10							
12						OCCASIONAL THIN SEDS. OF CLAY, GREY HIGH PLASTIC	12'		12							
14									14							
16					CL	CLAY (TILL) SILTY, SANDY, PEBBLES MED PLASTIC, GREY	16'	Vx 15%	16							
18									18							
20									20							
22									22							
24						END OF HOLE	20		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										
DWN: <i>CC1</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>4/3/73</i>		AIRPHOTO NO: <i>A 22934-98</i>		CHAINAGE: <i>2051+20</i>		OFFSET:		TEST HOLE				
CND: <i>✓</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 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 %			
0								<i>(EST.)</i>	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT						
2					<i>GW</i>	<i>GRAVEL;</i> <i>CLEAN, WELL GRADED</i> <i>ORGANIC SILT</i> <i>INCLUSIONS</i>	<i>1/4'</i>	<i>HF</i>	2							<i>MODERATELY</i> <i>DENSE</i> <i>30-40' HIGH</i> <i>8" MAX</i>
4									4							
6					<i>CL</i>	<i>CLAY (TILL);</i>		<i>HF</i>	6							
8						<i>SILTY SAND, LOW TO MED.</i>			8							
10						<i>PLASTIC, PEBBLES,</i>			10							
12						<i>SILT & CLAY INCLUSIONS</i>			12							
14						<i>BROWN</i>			14							
16						<i>SILTIER, MORE PEBBLY</i>			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: CCA		FIELD ENG: B.D.		DATE DRILLED: 5/3/73		AIRPHOTO NO: A 22921-98		CHAINAGE:		OFFSET:		TEST HOLE					
CKD: H		TECH: P.D.		RIG: FAIRING		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				
										%	%	%	%				
0	(1)				CL	CLAY (TILL); SILTY, SANDY, LOW TO MED PLASTIC LIGHT BROWN, ROOTLETS	1/2'	Vs 40%	0								MODERATELY DENSE SPRUCE 20-40' HIGH 4" Ø MAX OCCASIONAL BIRCH & POPLAR
2					CI			Vs 30%	2								
4					GC	GRAVEL (TILL); SILTY SAND, CLAYEY LOW PLASTIC BROWN	4'		4								
6						GRAY, LESS SAND	6'		6								
8						SANDIER, BROWN	8'		8								
10	(1)							Vs 10%	10								
12									12								
14						SHALE INCLUSIONS	14'		14								
16					CH	CLAY (SHALE); HIGH PLASTIC GRAY	16'	Vs 10%	16								
18									18								
20						END OF HOLE	20'		20								
22									22								
24									24								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CDA		FIELD ENG: BD		DATE DRILLED: 12/1/73		AIRPHOTO NO: A 2295A-73		CHAINAGE: 2022+10		OFFSET:		TEST HOLE				
CKD7		TECH: MD		RIG: FALLING		SURFACE DRAINAGE: POOR		VEGETATION: SELF 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)	PLASTIC LIMIT	LIQUID LIMIT	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.)	DRY DENSITY (P.C.)	REMARKS	
												CLAY	SILT	SAND	GRAVEL	
												%	%	%	%	
0	(1)	C	100		ML	PEAT #14 SILT CLAYEY, LOW PLASTIC LIGHT BROWN	1/2'	Vx 40%	2	20	60					SPARSE SPRUCE 5-10' HIGH 3" MAX
2					CE	CLAY (TILL) SILTY, SANDY MED PLASTIC, LIGHT BROWN COBBLES, SHALE INCLUSIONS	2'	Vx 20%	2	20	60					
4	(1)	C	75			VERY SANDY NO COBBLES	6'	Vx 30%	4	20	60					
6	(2)	C	60		CI	CLAY (SHALE); RANDOM ORIENTATION ASSURED, SILT VARIES, BROWN HIGHER PLASTIC GREY COLOR FINE SAND STRINGERS	8'	Vs 15%	6	20	60					
8	(3)	C	66					Vr 15%	8	20	60					
10	(4)	C	83		CH	INTACT LAMINATED SILTSTONE BEDDINGS HIGH PLASTIC GRAY	12'		10	20	60					
12									12	20	60					
14									14	20	60					
16									16	20	60					
18									18	20	60					
20									20	20	60					
22									22	20	60					
24									24	20	60					

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>CM</i>		FIELD ENG: <i>RD</i>		DATE DRILLED: <i>15/5/72</i>		AIRPHOTO NO: <i>A22934-9a</i>		CHAINAGE:		OFFSET:						
CKD: <i>77</i>		TECH: <i>DR</i>		RIG: <i>MAYNELL 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:						
TEST HOLE																
MILE		B.C.S		NUMBER												
621		5-122		986												
REMARKS																
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	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.)
											CLAY	SILT	SAND	GRAVEL		
											%	%	%	%		
0									0							
2						CL CLAY, SILTY, LOW PLASTIC - 1/4' SANDY, MEDIUM PLASTIC, SHALY INCLUSIONS BROWN COLOR.		10%	2							
4									4							
6									6							
8						CE CLAY (TILL); VERY SILTY, SANDY MED PLASTIC, BROWN REDDISH OCCASIONAL STONE			8							
10									10							
12									12							
14									14							
16									16							
18						CH CLAY (TILL) SANDY, HIGH 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									
DWN: <i>CKA</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>14/3/73</i>		AIRPHOTO NO: <i>A22934-08</i>		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: <i>W</i>		TECH: <i>DR</i>		RIG: <i>HAIRLEY 1006</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>Soft Spruce</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 %																
0									0	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, NON PLASTIC BROWN	F	1bn	2								MODERNLY DENSE SPRUCE 40' HIGH 10" φ MAX												
4								Nf	4																				
6									6																				
8									8																				
10	(1)					COARSER ——— 10'			10																				
12						——— 12' SILTIER & FINER			12																				
14									14																				
16									16																				
18						COARSER ——— 18'			18																				
20						END OF HOLE 20'		Nbn	20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <u>11</u>			FIELD ENG: <u>PD</u>			DATE DRILLED: <u>15/3/73</u>			AIRPHOTO NO: <u>A 2292A-58</u>			CHAINAGE: <u>2113+70</u>			OFFSET:			ELEV:			TEST HOLE								
CKD: <u>11</u>			TECH: <u>MD</u>			RIG: <u>FAILING</u>			SURFACE DRAINAGE: <u>POCC</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 %																
								(F.T. 9)		O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT ——— 20 40 60 80 100 100+																			
0																													
2	(1)	T	100		PT	PEAT; CATEGORY #15 1/2 10'	F	Vx 30%	2																				
					OL	ORGANIC SILT, MED PLASTIC																							
					EL	CLAYEY, SLIGHTLY SILTY, BK BROWN																							
4					CI	CLAY (TILL);		Vx 10%	4																				
					CH	SILTY, SAND POCKETS																							
						MED TO HIGH PLASTIC																							
						LIGHT BROWN TEBBLES																							
6	(1)	C	100		SM	SANDY, SILTY, FINE GRAINED		Vr 10%	6																				
						MED PLASTIC, YELLOW BROWN																							
8	(2)	C	60		ICL	CLAY (TILL);		Vr 20%	8																				
					ICP	SILTY, SANDY,																							
						LOW TO MED PLASTIC, TEBBLES																							
						SHALE INCLUSIONS																							
						COAL POCKETS																							
						OCCASIONAL STONE TO 1 1/2"		Vx 30%	10																				
10	(3)	C	60		CL	SANDY-GRAVELLY, LOW PL.		Vx 10%	12																				
12	(4)	C	33						14																				
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: <i>CPA</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>14/3/73</i>		AIRPHOTO NO: <i>A 22934-98</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>H</i>		TECH: <i>DR</i>		RIG: <i>NAVLEN 1200</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 %			
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					SM	SAND; SILTY, NON PLASTIC BROWN, COARSE		HF	2							MODERATELY DENSE SPRUCE 40' HIGH 8" φ POPLAR
4									4							
6						----- 6' BOULDERS			6							
8									8							
10									10							
12						END OF HOLE (SLOUSHING)			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>DL</i>		FIELD ENG: <i>ED</i>		DATE DRILLED: <i>19/3/73</i>		AIRPHOTO NO: <i>A 22934 - 98</i>		CHAINAGE: <i>2134 + 50</i>		OFFSET:					
CKD: <i>DL</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:					
TEST HOLE		MILE		B.C.S		NUMBER									
		622		C		992									
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)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	
0									0			CLAY %	SILT %	SAND %	GRAVEL %
2					OL	SILT, ORGANIC CLAYEY LOW PLASTIC BLACK COLOR	1/4'	V _s 50%	2						
4					CL	CLAY; SILTY, SANDY LOW MED PLASTIC BROWN		160	4						
6					CI	CLAY (TILL); SILTY, SANDY MEDIUM PLASTIC BROWN COLOR	6'		6						
8									8						
10									10						
12					CH	CLAY (SHALE); SILTY, MED TO HIGH PLASTIC, GREY	12'		12						
14									14						
15						END OF HOLE	15'		15						
16									16						
18									18						
20									20						
22									22						
24									24						

MODERATELY
DENSE
SPRUCE
40' HIGH
10" MAX

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>CEA</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>15/5/75</i>			AIRPHOTO NO: <i>A 22934-9B</i>			CHAINAGE: <i>2147+10</i>			OFFSET:			TEST HOLE											
CKD: <i>✓</i>			TECH: <i>M.D.</i>			RIG: <i>FAILING</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0						<i>1' PEAT</i>		<i>(EST. %)</i>	0							<i>SPARSE TO MODERATELY DENSE 15-25' HIGH 6"φ MAX</i>													
2	<i>(1)</i>	<i>T</i>	<i>75</i>		<i>OH</i>	<i>ORGANIC CLAY; MED-HIGH PLASTIC SLIGHTLY SILTY, DK BROWN MANY FIBEROUS ROOTS</i>	<i>F</i>	<i>Vx 50%</i>	2																				
4					<i>CC</i>	<i>CLAY (TILL); SILTY, SANDY, MED PLASTIC LIGHT BROWN, CALCAROUS RUST SPOTS</i>		<i>Vr 10%</i>	4																				
6					<i>CL</i>	<i>GRAVELLY</i>			6																				
8						<i>SILTIER</i>			8																				
10	<i>(2)</i>	<i>C</i>						<i>Vx 10%</i>	10																				
12					<i>CI</i>	<i>SHALY INCLUSIONS.</i>		<i>Vr 10%</i>	12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DRILL HOLE REPORT					TEST HOLE														
OWN: <i>CMA</i>		FIELD ENG: <i>SD</i>		DATE DRILLED: <i>15/3/77</i>		AIRPHOTO NO: <i>A 22934-98</i>		CHAINAGE: <i>2154+35</i>		OFFSET:		ELEV:		MILE		B,C,S		NUMBER	
CKD: <i>AB</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1300</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>						620		C		994	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (F.T.V.)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS			
										CLAY %	SILT %	SAND %	GRAVEL %						
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						MODERATELY DENSE SPRUCE 15-20' HIGH 6" Ø MAX			
2						DL ORGANIC SILT, CLAYEY, MED PLASTIC, BROWN ROOTLETS	1/4' F	V _x 20%	2										
4						CI CLAY (TILL); SILTY, SANDY MED PLASTIC, BROWN	2'		4										
6									6										
8								V _s 20%	8										
10						PEBBLES	8'	16n	10										
12									12										
14									14										
16									16										
18									18										
20									20										
22									22										
24						END OF HOLE	15'		24										

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CRH</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>15/3/78</i>		AIRPHOTO NO: <i>A 22734-9B</i>		CHAINAGE: <i>2169+27</i>		OFFSET:		TEST HOLE							
CKD: <i>11</i>		TECH: <i>D.R.</i>		RIG: <i>MAYHEW1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SA REDWICKS</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						
										%	%	%	%						
0						<i>MOSS COVER</i>			0	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT									
2					<i>OL</i>	<i>ORGANIC SILT</i>	<i>F</i>	<i>Nbn</i>	2							<i>MODERATELY DENSE SPRUCE 40' HIGH 8"φ MAX</i>			
					<i>ML</i>	<i>CLAYEY MED PLASTIC</i>													
4					<i>ML</i>	<i>SILT</i>		<i>1/5 20%</i>	4										
						<i>CLAYEY, MED PLASTIC, BROWN</i>													
6						<i>SILT (TILL)</i>			6										
						<i>CLAYEY, SANDY, LOW PLASTIC, BROWN</i>													
8						<i>PEBBLES</i>			8										
10						<i>SILTIER</i>			10										
						<i>10' SILTSTONE, TILL INCLUSIONS, LOW TO NON PLASTIC BROWN</i>		<i>Nbn</i>	12										
12									14										
14						<i>14' GREY</i>			16										
16									18										
18									20										
20						<i>END OF HOLE</i>			22										
22									24										

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: <u>CL</u>		FIELD ENG: <u>B.J.D.</u>		DATE DRILLED: <u>15/3/73</u>		AIRPHOTO NO: <u>A22934-98</u>		CHAINAGE:		OFFSET:		TEST HOLE				
CKO: <u>CL</u>		TECH: <u>M.D.</u>		RTG: <u>FAIR 10-0</u>		SURFACE DRAINAGE: <u>GOOD</u>		VEGETATION: <u>See</u>		ELEV:		MILE <u>623</u> S.C.S. <u>9-126</u> NUMBER <u>996</u>				
DEPTH (FEET)	SAMPLE TYPE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0					CL	SILT; ORGANIC, CLAYY LOW PLASTIC DK BROWN ROOTLETS		Vx 30%	0							
2	(5)				CI	CLAY: (TILL) SANDY SILTY MED PLASTIC BROWN SANDIER		Vs 10%	2							
4	(2)	C			CH	HIGH PLASTIC MOTTLED BROWN SHALE INCLUSIONS		Nbc	4							
6	(3)	C			CI	MED PLASTIC		Vx 30%	6							
8	(3)	C			CH	HIGH PLASTIC		Vx 20%	8							
10	(3)	C			CI	MED PLASTIC		Nbn	10							
12	(3)	C			CH	CLAY; (SHALE) LAMINATED, ROOT FISSURED WITH CLAY DEPOSITED IN FISSURES, FRIABLE DUN GREEN, ROOTS HI PLASTIC SILTY (SAND)		Vs 10%	12							
14	(3)	C			CH	BODDINGS, HIGH PLASTIC, GELLY MORE INTACT WITH DEPTH		Vr 10%	14							
16	(3)	C							16							
18									18							
20									20							
22									22							
24									24							

MODERATELY
DENSE
SPRUCE
4" MAY
20-30' HIGH

NOTE:
Bag Sample #2
4-10'
OBTAINED FROM
PILOT HOLE

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: CRA		FIELD ENG: E.D.		DATE DRILLED: 8/5/73		AIRPHOTO NO: A 22934-9A		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: 6		TECH: DR.		RIG: MATHIEU 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE: 623 B/C S NUMBER: 997																	
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																
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 200+																			
0						MOSS COVER			0																				
2					OL	ORGANIC SILT LOW PLASTIC, BLACK	F	NBN	2							MODERATELY DENSE SPRUCE 20-40' HIGH 10" MAX													
4					ML	SILT (TILL) CLAYEY, SANDY, MED PLASTIC, BROWN, PEBBLES SHALE INCLUSIONS		Vs 10%	4																				
6					SC	SAND (TILL) CLAYEY, MED PLASTIC BROWN, SILT (TILL) + SHALES INCLUSIONS			6																				
8									8																				
10									10																				
12					CH	CLAY (SHALE) HIGH PLASTIC GREY		NBN	12																				
14									14																				
16									16																				
18						SILTSTONE, FINE SANDY, HARD, GREY.			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: <i>CHA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>15/3/13</i>		AIRPHOTO NO: <i>A22954-98</i>		CHAINAGE: <i>2192+60</i>		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>14</i>		TECH: <i>MD</i>		RIG: <i>FRILLING</i>		SURFACE DRAINAGE: <i>FAIR</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 %																
0						MOSS COVER			0																				
2					OL	ORGANIC SILT CLAYEY, FINE SAND LOW TO MED PLASTIC, DK. BROWN	F	Vx 40%	2							MODERATELY DENSE SPRUCES 20-30' HIGH 4" ϕ MAX													
4					SL	SAND, VERY FINE SILTY, SLIGHTLY CLAYEY CORRLES		Vx 80%	4																				
6					CL	CLAY (TILL) SANDY, SILTY LOW TO MED PLASTIC LIGHT BROWN		Vr 20%	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>CPA</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>5/3/73</i>			AIRPHOTO NO: <i>A2293A-98</i>			CHAINAGE: <i>2209+00</i>			OFFSET:			TEST HOLE											
CKD: <i>6</i>			TECH: <i>D.R.</i>			RIG: <i>MAYHEW 1000</i>			SURFACE DRAINAGE: <i>POOR</i>			VEGETATION: <i>SEE REMARKS</i>			ELEV:			MILE <i>623</i> B.C.S. <i>C</i> NUMBER <i>999</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 %																
0						<i>MOSS COVER</i>		<i>(5.2%)</i>	0																				
2					<i>OL</i>	<i>ORGANIC SILT CLAYEY, MED PLASTIC, BLACK ROOTLETS</i>	<i>F</i>	<i>1/2 10%</i>	2							<i>MODERATELY DENSE SPRUCE 40' HIGH 8" φ MAX</i>													
4					<i>CI</i>	<i>CLAY (TILL) SILTY, SANDY, MED PLASTIC, BROWN PEBBLES</i>			4																				
6					<i>ML</i>	<i>SILT (TILL) SANDY, CLAYEY LOW PLASTIC BROWN, SHALE INCLUSIONS</i>		<i>1/2 15% Nbn</i>	6																				
8					<i>GP</i>	<i>GRAVEL SILTY, BROWN POORLY GRADED</i>		<i>HF</i>	8																				
10					<i>CI</i>	<i>CLAY (SHALE) SILTY, SANDY MED PLASTIC GREY</i>		<i>Nbn</i>	10																				
12									12																				
14									14																				
15						<i>END OF HOLE</i>			15																				
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>GRA</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>15/9/73</i>			AIRPHOTO NO: <i>A 22934-78</i>			CHAINAGE: <i>2828+60</i>			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>M</i>			TECH: <i>D.R.</i>			RIG: <i>WILLOW 1000</i>			SURFACE DRAINAGE: <i>POOR</i>			VEGETATION: <i>SEE 2828+75</i>									MILE <i>624</i> S.C.S. <i>C</i> NUMBER <i>1000</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 %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
								(EST'D)		PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+																			
0					OL	MBSS ORGANIC SILT; CLAYEY, LOW PLASTIC BLACK-BROWN	1/4'	Vx 20%	0																				
2					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC, BROWN OCCASIONAL PEBBLE	2'		2																				
4									4																				
6					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC, BROWN SHALE INCLUSIONS MORE SHALY & CLAYEY	6'	Vs 10%	6																				
8									8																				
10									10																				
12					OH	CLAY (TILL); SANDY, HIGH PLASTIC GREEN, PEBBLES, SHALE & ROCK INCLUSIONS	12'	Hdn	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>CR</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>6/3/78</i>		AIRPHOTO NO: <i>A-22954-78</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>AK</i>		TECH: <i>DR</i>		RIG: <i>MH/HEU/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 %			
0								EST %	0							SPARSE SPRUCE
2					OL	ORGANIC SILT CLAYEY, LOW PLASTIC	1/4'	Vx 30%	2							
4					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN, PEBBLES SAND SILT & CLAY BEDDING PLANES OCCASIONALLY	2'	Vx 20%	4							
6								Vs 10%	6							
8									8							
10					CH	CLAY (SHALE); HIGH PLASTIC GREY, FISSURED	10'	hbn	10							
12									12							
14									14							
16									16							
18						SHALESTONE GREY	18		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: <i>CHA</i>		FIELD ENG: <i>3D</i>		DATE DRILLED: <i>15/3/73</i>		AIRPHOTO NO: <i>A 22934-98</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</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 (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	MILE	B,C,S	NUMBER					
										CLAY %	SILT %						SAND %	GRAVEL %			
0																					
2					OL	ORGANIC SILT; CLAYEY, LOW PLASTIC BLACK	1/4'	Vx 20%													
4					ML CI	SILT; CLAYEY, LOW TO MED PLASTIC, FINE SAND BROWN	4'	Vx 35%													
6																					
8					CE	CLAY SILTY, SANDY MED PLASTIC, BROWN	8'	Nbn													
10					CS	CLAY (TILL); SILTY, SANDY (FINE) MED PLASTIC, BROWN PEBBLES	10'														
12																					
14						SHALESTONE GREY	14'														
16																					
18																					
20						END OF HOLE	20'														
22																					
24																					

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

PLASTIC LIMIT LIQUID LIMIT

20 40 60 80 100 100+

SPARSE
SPRUCE

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CR1		FIELD ENG: RD		DATE DRILLED: 1/3/73		AIRPHOTO NO: A 2293A - 75		CHAINAGE: 2277+20		OFFSET:		TEST HOLE				
CXD: 1		TECH: DR		RIG: HBY-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 %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 40 60 80 100 100+ LIQUID LIMIT						
0						ORGANIC SILT; CANARY - LOW TO MED PLASTIC FROZEN FEET 0.5		Vx 30%	0							
2						CLAY (TILL); SILTY, SANDY MED PLASTIC, FISSILES A'		nb	2							
4						CLAY (TILL); SILTY, SANDY MED PLASTIC, FISSILES A'			4							
6						CLAY (TILL); SILTY, SANDY MED PLASTIC, FISSILES A'		Vs 20%	6							
8						CLAY (SHALE); GRAY, RUST FISSURED		nb	8							
10									10							
12									12							
14									14							
15						END OF HOLE			15							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>CE</i>		FIELD ENG: <i>R.J.D.</i>		DATE DRILLED: <i>14/3/73</i>		AIRPHOTO NO: <i>A22954-98</i>		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: <i>10</i>		TECH: <i>M.D.</i>		RIG: <i>FEILIN 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>5m RAINIER</i>		ELEV:		MILE <i>624</i> B.C.S. <i>8-128</i> NUMBER <i>1005</i>																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)																
										CLAY %	SILT %																		
0									0																				
2						CLAY: (TILL) SANDY, SILTY MODERATELY PLASTIC, BROWN		Vs 15%	2																				
4						SHALE: WEATHERED SOFT LIGHT BROWN SILTSTONE INCLUSIONS			4																				
6						SILTSTONE & SHALE		Nbn	6																				
8									8																				
10						CLAY: (SHALE) HARD DK BROWN			10																				
12									12																				
14									14																				
16									16																				
18									18																				
20						END OF HOLE			20																				
22									22																				
24									24																				

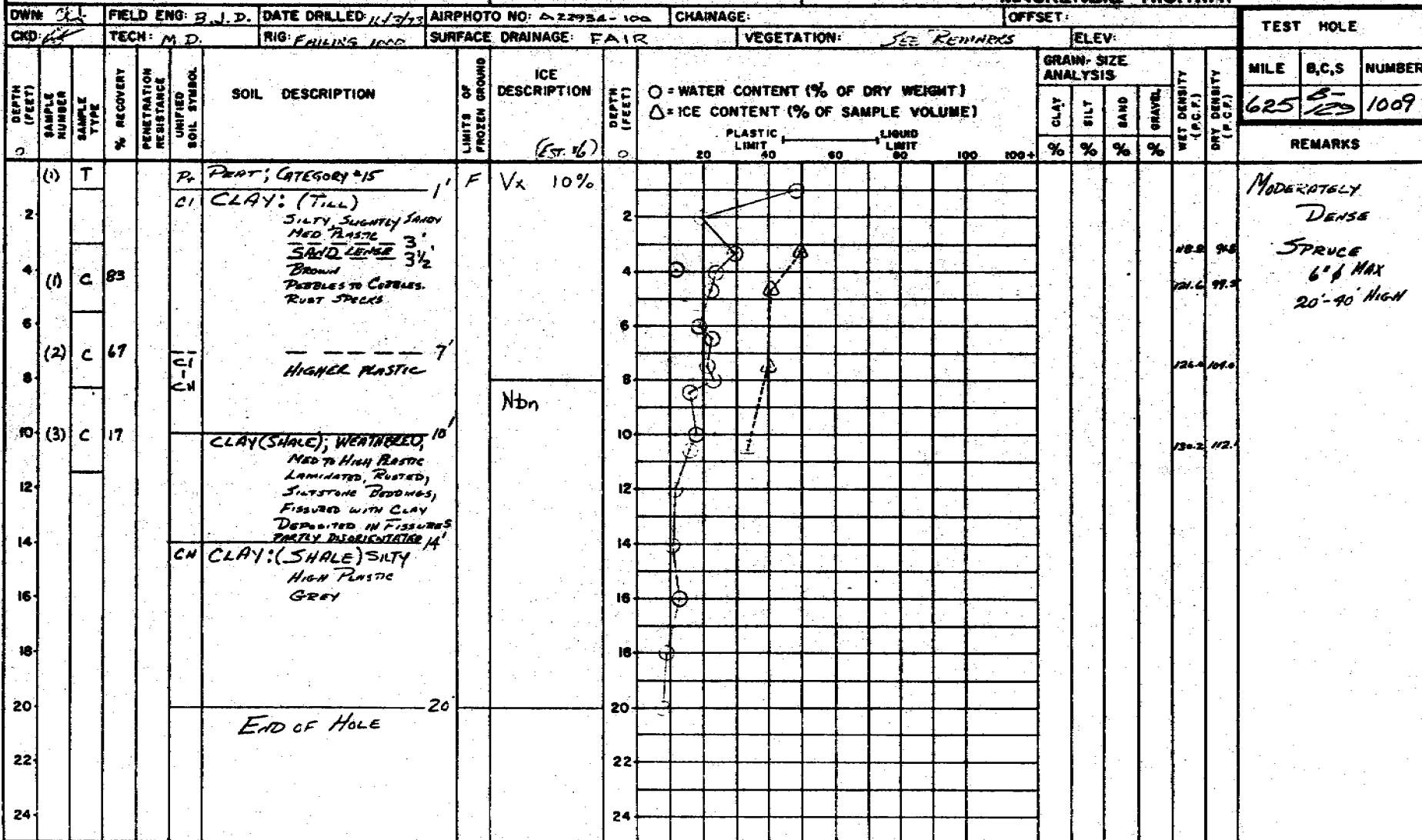
MODERATELY
DENSE
SPRUCES
8" ϕ MAX
20-40' HIGH

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>RA</i>		FIELD ENG: <i>DD</i>		DATE DRILLED: <i>15/3/73</i>		AIRPHOTO NO: <i>A22934-98</i>		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: <i>RA</i>		TECH: <i>DR</i>		RIG: <i>144-100</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>624</i> B.C.S. <i>8-1006</i> 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 %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										20	40	60	80	100	100+														
2					OL	ORGANIC SILT CLAYEY LOAM-BROWN		Ice	2							SPRUCE 25' HIGH 6" φ MAX WILLOWS													
4					CL	CLAY (TILL); SILTY, SANDY LOW PLASTIC YELLOW BROWN		Vx 20%	4																				
6					CI	CLAY (SHALE); SILTY STRATIFIED SILTSTONE BEDDINGS BROWN			6																				
8									8																				
10									10																				
12					CH	HIGH PLASTIC GREY HARD.		Vs 10%	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								
OWN: CEA		FIELD ENG: B.D		DATE DRILLED: 15/5/73		AERIAL PHOTO NO: A 22934-100		CHAINAGE: 2250+25		OFFSET:		TEST HOLE				
CKD: HA		TECH: D.R		RIG: MAYHEM 1000		SURFACE DRAINAGE: DOOR		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 %			
0								(EST 2%)	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100%	
2					CL	ORGANIC SILT; CLAYEY, MED PLASTIC BROWN	14'	1/2 20%	2							
4					CI	CLAY (TILL); SANDY, SANDY MED PLASTIC, BROWN PEBBLES	2'	116n	4							
6									6							
8						SHALESTONE INCLUSIONS	8'		8							
10					CH	HIGH PLASTIC SILTSTONE INCLUSIONS.	10'		10							
12									12							
14									14							
16						END OF HOLE	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: <i>CB</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>15/3/73</i>		AIRPHOTO NO: <i>A 22931-100</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>15</i>		TECH: <i>DP</i>		RIS: <i>MAYHEW 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			
										○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT ——— LIQUID LIMIT ——— 20 40 60 80 100 100+						
0									0							
2					CI	CLAY; SILTY SANDY, MED PLASTIC GRAN. OCCASIONAL PEBBLES	1/4'	hbn	2							
4					GW	GRAVEL; WELL GRADED CLEAN ANG. FRACTURED		NP	4							
6						SILTSTONE	6'	hbn	6							
8						BROWN			8							
10						SANDSTONE	8'		10							
12									12							
14									14							
16									16							
18						GREY	18'		18							
20							20'		20							
22						END OF HOLE			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: <i>CH</i>		FIELD ENG: <i>B.D</i>		DATE DRILLED: <i>15/3/73</i>		AIRPHOTO NO: <i>A22934-100</i>		CHAINAGE: <i>2304+40</i>		OFFSET:						
CRD: <i>B</i>		TECH: <i>DR</i>		RIG: <i>MC/HEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:						
TEST HOLE																
MILE		B,C,S		NUMBER												
625		C		1010												
REMARKS																
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	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.)
											CLAY	SILT	SAND	GRAVEL		
											%	%	%	%		
0									0							
2						CLAY (TILL); SILTY, SANDY, MED PLASTIC, ORGANIC INCLUSIONS, CALCARREOUS		Vs 15%	2							
4								Vx 10%	4							
6						SHALY INCLUSIONS		Abn	6							
8						CLAY (SHALE); WEATHERED, SILTY, SANDY, MED PLASTIC, BROWN, FISSURED, RUST SPECKS			8							
10									10							
12						GRY, HIGH PLASTIC			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>CLA</i>		FIELD ENG: <i>B J D</i>		DATE DRILLED: <i>10/2/73</i>		AIRPHOTO NO: <i>A22934-100</i>		CHAINAGE:		OFFSET:		TEST HOLE											
CKD: <i>45</i>		TECH: <i>M.D.</i>		RIG: <i>FALIN 3 1002</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>See Remarks</i>		ELEV:		MILE <i>625</i> S.C.S. <i>130</i> NUMBER <i>1011</i>											
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS							
										CLAY %	SILT %	SAND %	GRAVEL %										
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)													
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+													
2	(1)	T	100		P ₂	PEAT CAT #10216 CI CLAY: (T.M.) SLIGHTLY SANDY, SILTY MED PLASTIC, LIGHT BROWN TRACE OF ROOTLETS, & SILTSTONE INCLUSIONS.		V _s 30% V _x 20%	2														
4	(1)	C	100		CI	CLAY: SILTY MED TO HIGH PLASTIC FINE AGGREGATED BROWN SHALE & SILT MOUND INCLUSIONS.		V _s 5% V _x 8%	4														
6	(2)	C	100		CH	CLAY: (SHALE) WEATHERED HIGH PLASTIC. BROWN INTACT, MUCH HARDER FEW RUST FISSURES		V _s 2%	6														
8	(3)	C	100						8														
10	(4)	C	50						10														
12	(5)	C	50						12														
14									14														
16									16														
18									18														
20									20														
22									22														
24									24														

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>CU</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>16/5/13</i>		AIRPHOTO NO: <i>A2293A-100</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD: <i>78</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>								
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 %			
0								(EST. %)	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
2									2							SPARSE SPRUCE OCCASIONAL POPLAR
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

CKD		TECH		RIG		SURFACE DRAINAGE		VEGETATION		ELEV		TEST HOLE		
DATE DRILLED		AIRPHOTO NO		CHAINAGE		OFFSET		ELEV		TEST HOLE		SHEET 2 OF 2		
MILE		B,C,S		NUMBER		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)	WATER CONTENT (% OF DRY WEIGHT)	ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
26									26					
28						CLAY: (TILL)		10%	28					
30						SILTY, MED TO HIGH PLASTIC			30					
32						GREY SHALE INCLUSIONS			32					
34						OCCASIONAL FIBRILES			34					
36									36					
38									38					
40						END OF HOLE	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: <i>CDI</i>		FIELD ENG: <i>JD</i>		DATE DRILLED: <i>11/3/78</i>		AIRPHOTO NO: <i>A2293A-100</i>		CHAINAGE: <i>2332+50</i>		OFFSET:		TEST HOLE																	
CKD: <i>CD</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 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 (EST. %)	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											
												CLAY %	SILT %	SAND %	GRAVEL %														
0									0																				
2					OL	ORGANIC SILT; CLAYEY, MOD PLASTIC, BROWN	1/4'	F	2									MODERATELY DENSE SPRUCE 20' HIGH 6" MAX											
4					CI	CLAY (TILL); SILTY, SANDY LOW TO MOD PLASTIC PEBBLES	2'		4																				
6									6																				
8									8																				
10					CH	CLAY (SMALL); MED TO HIGH PLASTIC GRAY	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								
OWN: <i>CPA</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>6/9/73</i>		AIRPHOTO NO: <i>A 22934-100</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>DR</i>		TECH: <i>DR</i>		RIG: <i>MANHEIM 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE <i>626 8-13</i> NUMBER <i>1016</i>				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
									20	PLASTIC LIMIT ——— LIQUID LIMIT 40 ——— 60 ——— 80 ——— 100 ——— 100+						
2					CL	CLAY (TILL); SILTY, SANDY, MED PLASTIC BROWN PEBBLE	1/4 F	Vx 20%	2							MODERATELY DENSE SPRUCE 20' HIGH 6" Ø MAX
4					GH	GRAVEL; SILTY, SILT (TILL) INCLUSIONS ANGULAR & FRACTURED		NF	4							
6					CI	CLAY (TILL); GRAVEL SHALE INCLUSIONS MED PLASTIC BROWN	6'	Vr 20%	6							
8									8							
10									10							
12					CH	CLAY (SHALE); SILTY, HIGH PLASTIC GREY, ROOT COLORING FISSED	12'	NBN	12							
14									14							
16									16							
18									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									
OWNER: CR4		FIELD ENG: B.J.D.		DATE DRILLED: 18/3/75		AIRPHOTO NO: A 22934 - 100		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: 11		TECH: M.D.		RIG: FALLING 1000		SURFACE DRAINAGE: FAIR-GOOD		VEGETATION: SEE REMARKS		ELEV:		MILE: 626.5																	
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 %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 40 60 80 100 100+																			
0	(1)	T	50		CL	PEST CAT #13 ORGANIC CLAY: SILTY, SANDY, MED. LOW PLAST. LIGHT BROWN	1/2'	F Vs 10%	0																				
2					GC	GRAVEL: CLAYEY, SILTY LOW TO MOD PLASTIC SHALE INCLUSIONS		Nbn	2																				
4									4																				
6					CI	CLAY: (TILL) GRAVELLY MOD PLASTIC BROWN TRACE OF RUST	6'	Vs 10%	6																				
8									8																				
10					CI	CLAY: (SHALY TILL) SILTY, MOD PLASTIC LAMINATIONS GREY BROWN RUST STAINED OCCASIONAL PEBBLE (INTACT SHALE) HARD.	10'		10																				
12									12																				
14									14																				
16									16																				
18									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: <i>U</i>		FIELD ENG: <i>B.D</i>		DATE DRILLED: <i>16/3/75</i>		AIRPHOTO NO: <i>A 2293A - 100</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>R</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 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 %			
0								(EST. 2)	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					OL	ORGANIC SILT; CLAYDY, SANDY	1/4'	F	2							
4					CI	MED PLASTIC, BLACK	2'		4							
6					CE	CLAY (TILL); SILTY, SANDY, MED PLASTIC, PEBBLES, RUST & COAL SPALLS,			6							
8									8							
10					CH	CLAY (SHALE) HIGH PLASTIC GREY, RUST FISSURES.	8'		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: 12A		FIELD ENG: RD		DATE DRILLED: 12-3-73		AIRPHOTO NO: A22934-100		CHAINAGE: 2359+40		OFFSET:		TEST HOLE					
CKD: 12A		TECH: MD		BIG: 12-3-73		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	
0									0	CLAY %	SILT %	SAND %	GRAVEL %				
0	(1)	T	100		CH	NOSS COVERED SOIL ORGANIC CLAY, SILTY, FINE ROOTS 1/2'	F	Vr 10%	0								SPRICE SPRICE 3" MAX 5-15' HIGH
2					CH	CLAY: (TILL) SILTY, SLIGHTLY SANDY, MED TO HIGH PLASTIC, BROWN RUST SPICKS, COBBLES TRACE OF ROOTLETS			2								
4					CL	VERY SILTY, LOW PLASTIC		Vr 30%	4								
6					CI	LESS SILTY MED PLASTIC		Vr 10%	6								
8						SILTSTONE CHIPS			8								
10					CI	10'			10								
12					CH	SILTIER MED TO HIGH PLASTIC, LIGHT BROWN NO RUST			12								
14					CL	12'			14								
16	(1)	C	85			VERY SANDY CLAY SHALE / INCLUSIONS SUB-ROUNDED / BROWN / PEEK			16								
18					CH	CLAY: SHALE LAMINATED DARK GREY SILTSTONE INCLUSIONS			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>1/1</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>18/3/73</i>		AIRPHOTO NO: <i>A22934-100</i>		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2 of 2				
CKD: <i>1/1</i>		TECH: <i>M.D.</i>		RIG: <i>FOULING 1000</i>		SURFACE DRAINAGE: <i>FAIR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>627</i> B.C.S: <i>S</i> NUMBER: <i>1020</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 %			
						CH CLAY: (SHALE) LAMINATED, DARK GRAY SILTSTONE STRINGERS		F 1161								
28									28							
30									30							
32									32							
34									34							
36									36							
38									38							
40						END OF HOLE	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: <i>CH</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>16/5/78</i>		AIRPHOTO NO: <i>A 22934-152</i>		CHAINAGE: <i>2368+35</i>		OFFSET:		TEST HOLE																	
CRD: <i>27</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE <i>626</i> B.C.S. <i>C</i> NUMBER <i>1021</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 %																
0								(EST. <i>1</i>)	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT 40 ——— 80 ——— 100 ———																			
2					OL	ORGANIC SILT, CLAYEY, MED PLASTIC BLOCK, ROOTLETS	1/4'	ICE 20%	2							MODERATELY DENSE SPRUCE 30' HIGH 8" φ MAX													
4					CI	CLAY (TILL) SILTY, SANDY MED PLASTIC, BROWN PEBBLES	2'	VS 10%	4																				
6									6																				
8									8																				
10					CL	GRAVELLY VERY SILTY	10'	None	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: <i>14</i>		FIELD ENG: <i>RJD</i>		DATE DRILLED: <i>12/13/71</i>		AIRPHOTO NO: <i>A22954-102</i>		CHAINAGE: <i>2378+85</i>		OFFSET:		TEST HOLE				
CND: <i>14</i>		TECH: <i>14</i>		RIG: <i>SP-112 1000</i>		SURFACE DRAINAGE: <i>G000</i>		VEGETATION: <i>50% P...</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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
										PLASTIC LIMIT ——— LIQUID LIMIT ———						
2		T	100			CLAY: SILTY, TRACE OF ORGANIC, LOW TO 1/60 PLASTIC, LIGHT RUST BROWN, OCCASIONAL RUST STREAKS	1/4	Vs 15%	2					100.3	78.8	SPRUCE 5" MAX 10-30' HIGH
4		C	50		CL CLAY (TILL);		Vs 40%	4					144.5	90.3		
6		C	100		SILTY SAND / LOW PLASTIC BROWN		Vs 60%	6					106.4	78.6		
8		C	100		PEBBLES TO COBBLES COARSE RUST STREAKS		Vr < 5%	8					131.4	123.9		
10					SAND INCLUSIONS GRANITE ROCK INCLUSIONS			10					134.5	120.0		
12		C	99		SOME LIMESTONE INCLUSIONS		Vx 5%	12					128.8	114.3		
14		C	50		RUST FISSURED			14					134.4	120.4		
16					END OF HOLE	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								
OWNER: <i>OLA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>16/9/83</i>		AIRPHOTO NO: <i>A 22934-102</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>Maynew 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>See Remarks</i>		ELEV:		MILE: <i>627.5</i> B.C.S. <i>1023</i> 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 40 60 100 100+						
										% % % %						
0								(EST. 4')	0							
2					OL	ORGANIC SILT; CLAYEY, LOW PLASTIC BROWN ROOTLETS	4'	Ndn	2							MODERATELY DENSE FORUL C-PELAR 30' HIGH 6" MAX
4					CL	CLAY (TILL); VERY SILTY, SANDY LOW PLASTIC, BROWN PEBBLES, SMALL - ROCK INCLUSIONS	2'		4							
6									6							
8									8							
10					GM, GC	GRAVEL; SANDY, TRACES OF CLAY LOW PLASTIC TO NON PLASTIC SHALE INCLUSIONS	8'	NP	10							
12									12							
14					CE	CLAY (TILL); SILTY, SANDY, MOD PLASTIC BROWN, OCCASIONAL PEBBLE	14'	Ndn	14							
16					ML	SILT (TILL); CLAYEY, TRACES OF VERY FINE SAND LOW PLASTIC BROWN	16'		16							
18									18							
20						END OF HOLE	20'		20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWH: <i>CL4</i>		FIELD ENG: <i>ED</i>	DATE DRILLED: <i>16/3/73</i>	AIRPHOTO NO: <i>A22954-102</i>	CHAINAGE:	OFFSET:	MAGNITUDE: <i>THROWWAY</i>		TEST HOLE							
CNO: <i>8</i>	TECH: <i>DR</i>	RIG: <i>MAYHEW 1000</i>	SURFACE DRAINAGE: <i>GOOD</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 %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT 40 LIQUID LIMIT 80						
2					<i>CI</i>	<i>CLAY; SILTY</i>	<i>14'</i>	<i>F</i>	2							<i>MODERATELY DENSE</i> <i>SPRUCE & POPLAR</i> <i>30' HIGH</i> <i>6" MAX</i>
4					<i>CI</i>	<i>CLAY (TILL); SILTY, SANDY</i>	<i>2'</i>		4							
6					<i>GN</i>	<i>GRAVEL (FINE) SANDY, SILTY</i>	<i>6'</i>	<i>4x - 20%</i>	6							
8						<i>ANGULAR FRAGMENT</i>		<i>HF</i>	8							
10						<i>SILTSTONE</i>	<i>8'</i>	<i>UF</i>	10							
12						<i>HARDNESS OF 5 GREY</i>			12							
14									14							
16									16							
18									18							
20						<i>END OF HOLE</i>	<i>20'</i>		20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: <i>CLA</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>16/5/77</i>		AIRPHOTO NO: <i>A22984-102</i>		CHAINAGE: <i>23867.90</i>		OFFSET:		TEST HOLE																	
CKD: <i>E</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>G000</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE <i>627</i> B,C,S <i>C</i> NUMBER <i>1025</i>																	
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0									0																				
2					<i>CI</i>	<i>CLAY; SILTY, SANDY, MED PLASTIC BROWN, TRACES OF ORGANICS</i>	<i>4'</i>	<i>Vs 20%</i>	2							<i>MODERATELY DENSE SPRUCE</i> <i>10' HIGH</i> <i>4" MAX</i>													
4					<i>CI</i>	<i>CLAY (Tm); SILTY, SANDY MED PLASTIC GREY, OCCASIONAL PEBBLES CALCAREOUS</i>		<i>Nbn</i>	4																				
6									6																				
8								<i>Vs 20%</i>	8																				
10					<i>GM</i>	<i>GRAVEL; SILTY, BROWN SILTSTONE INCLUSIONS</i>	<i>10'</i>	<i>Nf</i>	10																				
12						<i>SANDSTONE (VERY FINE SAND) BROWN</i>	<i>12'</i>	<i>Nbn</i>	12																				
14						<i>SAND INCLUSIONS</i>	<i>15'</i>		14																				
16						<i>END OF HOLE</i>			16																				
18									18																				
20									20																				
22									22																				
24									24																				

DRILL HOLE REPORT

MACKENZIE HIGHWAY

DWN: C01		FIELD ENG: B.D		DATE DRILLED: 11/3/79		AIRPHOTO NO: A2232A-102		CHAINAGE: 2355+30		OFFSET:		ELEV:		TEST HOLE	
CKD: #		TECH: DR		RIG: MAYHEW		SURFACE DRAINAGE: FAIR		VEGETATION: SEE REELPH		ELEV:		MILE		S.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 %				
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)					
									20	PLASTIC LIMIT	LIQUID LIMIT				
2					OL	ORGANIC SILT; CLAYEY, SANDY, MED PLASTIC BROWN, ROOTS	1/4'	Vr 25%	2					MODERATELY DENSE STRUCC 20-40' HIGH 8" MAX	
4					ML	SILT (TILL); GRAVELLY, MED PLASTIC	2'	Hf	4						
6								Vs 40%	6						
8					CI	CLAY (TILL) SILTY, SANDY, MED PLASTIC, BROWN PEBBLES, SHALE INCLUSIONS LARGER STONES.	6'	Hbn	8						
10									10						
12									12						
14									14						
16						END OF HOLE	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: <i>1/1</i>		FIELD ENG: <i>P.D.</i>		DATE DRILLED: <i>11/13/78</i>		AIRPHOTO NO: <i>A 22 134-98</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CND: <i>1/1</i>		TECH: <i>MD</i>		RIG: <i>1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>P.R.</i>		ELEV:		MILE <i>620</i> B.C.S. <i>118</i> NUMBER <i>1027</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
0									0	CLAY	SILT	SAND	GRAVEL			
										%	%	%	%			
0									0							
2									2							
4									4							
6									6							
8	(1)	C	100						8						122.1	78.5
10	(2)	C	100						10						121.1	74.9
12									12						127.3	105.3
14	(3)	C	100						14						128.7	107.1
16									16						133.2	114.3
18	(4)	C	100						18						119.9	94.0
20									20						120.9	98.2
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>DA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A 22934-98</i>		CHAINAGE:		OFFSET:		TEST HOLE				
GND: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 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 (EST. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					OL	ORGANIC SILT; CLAYEY, MED PLASTIC BLACK	F	Vx 20%	2							
4					CI	CLAY; SILTY, SANDY, MED PLASTIC BROWN		Vs 10%	4							
6					CI	CLAY (TILL); SANDY, SILTY MED PLASTIC BROWN, PEBBLES		Vx 40%	6							
10									10							
12					ML	SILT (TILL); SANDY LOW TO MED PLASTIC GREY		Ndn	12							
14					CI	CLAY (SHALE); SILTY, SANDY LOW TO MED PLASTIC GREY			14							
16									16							
18									18							
20						END OF HOLE			20							
22									22							
24									24							

MODERATELY
DENSE
SPRUCES
20' HIGH
6" Ø MAX

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CBA		FIELD ENG: B.D.		DATE DRILLED: 1/13/73		AIRPHOTO NO: A22734-75		CHAINAGE:		OFFSET:		MACKENZIE HIGHWAY		TEST HOLE		
CHK: 27		TECH: DR		RIG: MAYHEW 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		ELEV:		MILE: 620.5-118			NUMBER: 1029	
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 %			
0								(EST. 4)	0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT						
2					CI	CLAY (TILL); SILTY, SANDY MED PLASTIC BROWN, PEBBLES TRACE OF ORGANIC - SILT NEAR SURFACE	F	Nbn	2							MODERATELY DENSE - SPRUCE 20-25' HIGH 6" φ MAX
4							Vx	40%	4							
6									6							
8									8							
10					GM	GRAVEL SANDY, SILTY ANGULAR & FRACTURED		Nf	10							
12									12							
14									14							
16					CI	CLAY (TILL) SILTY, SANDY, MED PLASTIC, GRAY OCCASIONAL PEBBLES LESS SAND		Nbn	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								
OWN: <i>CC</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>7/3/73</i>		AERIAL PHOTO NO: <i>A22954-102</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>116</i>		TECH: <i>D.R.</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>See Plan</i>		ELEV:		MILE <i>628</i> B.C.S. <i>8-33</i> NUMBER <i>1030</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 %			
					OL	ORGANIC SILT: CLAYEY Low Plastic Brown	F	Nbr:								MODERN DECK SPRUCE 8" ϕ MAX 20' HIGH
2					SC	SAND: VERY SILTY-CLAYEY MED Plastic Brown		Vr 20%	2							
4					NL	SILT: (TILL) CLAYEY SANDY Low to MED Plastic Brown, PEBBLES		Nbr	4							
6									6							
8									8							
10									10							
12								12bn	12							
14									14							
16									16							
18									18							
20						END OF HOLE	20		20							
22									22							
24									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: <i>CLA</i>		FIELD ENG: <i>B.D.</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A2293A-102</i>		CHAINAGE:		OFFSET:		TEST HOLE					
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 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)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
											CLAY %	SILT %	SAND %	GRAVEL %			
0									0								
2					OL	ORGANIC SILT; CLAYEY, SANDY, LOW PLASTIC, BROWN		<i>nb</i>	2	○							MODERATELY DENSE SPRUCE 20-30' HIGH 8" d MAX OCCASIONAL POPLAR
4					CI	CLAY (TILL); SILTY, SANDY MED TO HIGH PLASTIC BROWN, PEBBLES 5 1/2" GRAVELLY			4	○							
6									6	○							
8									8	○							
10	(1)				CN	CLAY; HIGH PLASTIC SILT LOOSER			10	○							
12									12	○							
14					CI	CLAY (TILL) SILTY, GRAVELLY LOW TO MED PLASTIC			14	○							
16									16	○							
18									18	○							
20						SILTSTONE & SANDSTONE @ 20' END OF HOLE			20	○							
22									22								
24									24								

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER		FIELD ENG.	DATE DRILLED	AIRPHOTO NO.	CHAINAGE	OFFSET	TEST HOLE	
CKD		TECH	RIG	SURFACE DRAINAGE	VEGETATION	ELEV.	MILE	B,C,S
JH		M.D.	FALLING 1000	FAIR	SEE REMARKS		627	C
							NUMBER	
							1033	
							REMARKS	
							SPRUCE	
							8" MAX	
							15-40" HIGH	

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: <u>CD</u>		FIELD ENG: <u>R.J.D.</u>		DATE DRILLED: <u>18/3/77</u>		AIRPHOTO NO: <u>A 22954-102</u>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <u>111</u>		TECH: <u>D.R.</u>		RIG: <u>MAYHEW 1000</u>		SURFACE DRAINAGE: <u>GOOD</u>		VEGETATION: <u>SEE REMARKS</u>		ELEV:		MILE <u>629</u> S.C.S. <u>8-134</u> NUMBER <u>1035</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 %			
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					SH SW	SAND: SILTY WELL-GRADED CLEAN BROWN ANGULAR & SUB-ROUNDED	F	NF	2							
4									4							
6									6							
8									8							
10									10							
12									12							
14					CN	CLAY: (SHALE) HIGH PLASTIC DK GRAY	UF		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: <i>CEA</i>			FIELD ENG: <i>B.D.</i>			DATE DRILLED: <i>16/3/78</i>			AIRPHOTO NO: <i>A 22954-102</i>			CHAINAGE: <i>24234.85</i>			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>J</i>			TECH: <i>DR</i>			RIG: <i>HA/HLE 1300</i>			SURFACE DRAINAGE: <i>DOOR</i>			VEGETATION: <i>SEE REMARKS</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 %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						MODERATELY DENSE SPRUCE 40' HIGH 10" φ MAX													
2					OL	ORGANIC SILT; CLAYEY, LOW PLASTIC BLACK	1/4' F	ICE 30% Yr 20%	2																				
4					SN	SAND (TILL) SILTY, VERY FINE GRAVELLY, BROWN LOW PLASTIC 7' GREY	4' NF		4																				
6									6																				
8									8																				
10					CH	CLAY (TILL) SILTY, SANDY HIGH PLASTIC GREY LARGE COBBLES	10' U.F.		10																				
12									12																				
14									14																				
16									16																				
18									18																				
20									20																				
22									22																				
24						END OF HOLE			24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

ELEV:

GRAIN-SIZE ANALYSIS

MILE	B,C,S	NUMBER
628	C	1037

REMARKS

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

PLASTIC LIMIT ————— LIQUID LIMIT

20 40 60 80 100 120

**DRY DENSITY
(P.C.F.)**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

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

PLASTIC LIMIT ————— LIQUID LIMIT

0	11063	
C1	CLAY: (Till)	4
	SILTY, SANDY MED PLASTIC BROWN, ORGANIC INCLUSIONS, RUST SPOTS	
HL	SILT: (Till)	6
	CLAYEY, SANDY MED TO LOW PLASTIC LIGHT BROWN, PEBBLES CALICHEOUS	
C1	CLAY: (Till)	9
	SILTY, MED PLASTIC GRAY OCCASIONAL LARGE ROCK	
	END OF HOLE	12

Vr	20%
Yr	20%
Nbn	

6

Hours of Sleep	Hours of Study
2	14
3	12
4	10
5	8
6	6
7	4
8	2

SPARSE
SPRUCE

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: CBA		FIELD ENG: BJD		DATE DRILLED: 19/3/78		AIRPHOTO NO: A22934-102		CHAINAGE: 2734+80		OFFSET:		ELEV:		TEST HOLE															
CND: 111		TECH: MD		RIG: FALLING 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 (PCF)	DRY DENSITY (PCF)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+																			
2					OL	DEPT ORGANIC SILT: LOW PLASTIC DK BROWN	1/2'	Vs 80%	2							SPARSE SPRUCE 3" MAX 10-15' HIGH													
4					CL	CLAY: SILTY, SANDY, LOW PLASTIC MOTTLED BROWN	2'	Vs 60%	4																				
6					CL	CLAY: (FILL) SILTY, SANDY, LOW PLASTIC MOTTLED BROWN COBBLES	4'	Vs 20%	6																				
8								Vr 10%	8																				
10					CI	LESS SMT & SAND MED TO HIGH PLASTIC	10'		10																				
12					CH	CLAY: HIGH PLASTIC GRAY	12'		12																				
14									14																				
16						END OF HOLE	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: <i>Q1</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>16/5/73</i>		AIRPHOTO NO: <i>A 22934-10Z</i>		CHAINAGE: <i>2441+20</i>		OFFSET:		TEST HOLE		
CKD: <i>11-1</i>		TECH: <i>D.R.</i>		RIG: <i>MATHEV 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 %			
										O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)				
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+				
0						<i>CLAY (TILL)</i>	<i>1/4'</i>	<i>ICE 20%</i>	0					<i>SPARSE SPRUCE</i>
2						<i>SILTY, SANDY</i>		<i>V_r 25%</i>	2					
4						<i>MED PLASTIC</i>		<i>V_s 20%</i>	4					
6						<i>BROWN, PEBBLES</i>	<i>UF</i>		6					
8						<i>ORGANIC INCLUSIONS</i>			8					
10									10					
12						<i>VERY SILTY</i>			12					
14						<i>SNAIL INCLUSIONS</i>			14					
16						<i>END OF HOLE</i>	<i>15'</i>		16					
18									18					
20									20					
22									22					
24									24					

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: CEA						FIELD ENG: B.J.D.		DATE DRILLED: 10/3/73		AIRPHOTO NO: A22984-102		CHAINAGE: 2455+60		OFFSET:		ELEV:		TEST HOLE		
CKD: 11						TECH: D.R.		RIG: MARYHFW 1000		SURFACE DRAINAGE: DOOR		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)	PLASTIC LIMIT — LIQUID LIMIT				GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
0						OL ORG. SILTY CLAYEY MOD PLASTIC BLACK	F	Vr 40%	0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)				CLAY % SILT % SAND % GRAVEL %						628 C 1092
2					KI	CLAY; SILTY HIGHLY CALCAREOUS GREY-BROWN		Vr 10%	2											MODERATELY DENSE SPRUCE 6" φ MAX 20' HIGH
4									4											
6					CL	CLAY: (FILL) SILTY BROWN LOW PLASTIC SMALL INCLUSIONS		Vr 50% Nbn	6											
8									8											
10									10											
12									12											
14									14											
15						END OF HOLE			15											

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>HA</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>11/3/75</i>		AIRPHOTO NO: <i>A22754-10Z</i>		CHAINAGE: <i>2466+60</i>		OFFSET:		ELEV:		TEST HOLE										
CKD: <i>P</i>		TECH: <i>M.D.</i>		RIG: <i>FAIRBANKS 1000</i>		SURFACE DRAINAGE: <i>POOR</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 %											
0									0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)														
									20	PLASTIC LIMIT ——— LIQUID LIMIT 40 ——— 60 ——— 80 ——— 100 ——— 100+														
2						<i>1/2' PART ORGANIC SILT: SLIGHTLY CLAYEY LOW PLASTIC, ROOTLESS DK. BROWN</i> <i>2' MASSIVE ICE</i> <i>3 1/2' ICE; SILT INCLUSIONS WITH CALCIUM CARBONATES</i>	<i>Vs 60%</i> <i>Vs 40%</i> <i>ICE 100%</i> <i>ICE 90%</i> <i>SOIL INCL.</i>	2																
4									4															
6									6															
8									8															
10						<i>CH CLAY; (TILL) SILEY, HIGH PLASTIC BROWN, SILT LENSES OCCASIONAL PEBBLES</i> <i>14' VERY SANDY LOW TO MED PLASTIC</i> <i>15' END OF HOLE</i>	<i>Vx 10%</i>	10																
12									12															
14									14															
16									16															
18									18															
20									20															
22									22															
24									24															

MODERATELY
DENSE
SPRUCES
3' MAX
10-20' HIGH

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWNER: <i>CP</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>16/3/73</i>		AIRPHOTO NO: <i>A 2298A-102</i>		CHAINAGE: <i>2473+75</i>		OFFSET:		ELEV:		TEST HOLE							
CKD: <i>111</i>		TECH: <i>M.D.</i>		RIG: <i>MHYHEW 1200</i>		SURFACE DRAINAGE: <i>POOR</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)	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			
												CLAY %	SILT %	SAND %	GRAVEL %						
0									0												
2					CI	ORGANIC SILT-CLAY: MED PLASTIC BLACK	1/4'	Vr 30%	2									MODERATELY DENSE SPRUCE			
4					SC	SAND (Till) SILTY CLAYEY MED PLASTIC PEBBLES CALCAREOUS	2'	Vr 15%	4												
6						SHALE INCLUSIONS	6		6												
8					CH	CLAY: (Till) SATY SAND HIGH PLASTIC BROWN SHALE INCLUSIONS CALCAREOUS GRAY	8'	Nbn	8												
10							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									
OWN: <i>CH</i>		FIELD ENG: <i>P. J. D.</i>		DATE DRILLED: <i>10/3/73</i>		AERIAL PHOTO NO: <i>A 22934-102</i>		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE															
CKD: <i>111</i>		TECH: <i>D. R.</i>		RIG: <i>MATHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>See Remarks</i>		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) Δ = ICE CONTENT (% OF SAMPLE VOLUME)	CLAY %	SILT %	SAND %	GRAVEL %	REMARKS														
0						<i>MOSS COVER</i>			0						<i>MODERATELY DENSE SPRUCE 10" Ø MAX 40' HIGH</i>														
2					<i>OL</i>	<i>ORGANIC SILT: CLAYEY LOW PLASTIC DUBOIS, ROTILATS 2'</i>	<i>F</i>	<i>Vr 30%</i>	2																				
4					<i>SH</i>	<i>SAND: FINE SILTY, LOW TO MED PLASTIC BROWN</i>		<i>Vc 5%</i>	4																				
6									6																				
8						<i>CLAY TILL INCLUSIONS 8'</i>			8																				
10					<i>CI</i>	<i>CLAY: (TILL) SILTY, SANDY LOW TO MED PLASTIC BROWN</i>	<i>UF</i>		10																				
12						<i>PEBBLES GRAY 12'</i>			12																				
14									14																				
16						<i>16' LIMESTONE R.</i>			16																				
18						<i>OCCASIONAL CLAY SHALE INCLUSIONS</i>			18																				
20						<i>END OF HOLE 20'</i>			20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWR: <i>CEH</i>		FIELD ENG: <i>B.J.D.</i>		DATE DRILLED: <i>10/2/73</i>		AIRPHOTO NO: <i>A 22954-102</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>11A</i>		TECH: <i>D.R.</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE <i>628</i> B.C.S. <i>135</i> NUMBER <i>1048</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 %			
0						<i>MOSS COVERED</i>			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT LIQUID LIMIT						
2					<i>OL</i>	<i>ORGANIC SILT: CLAYEY Low Plastic DK BROWN</i>	<i>F</i>	<i>Vr 20%</i>	2							<i>SPARSE SPRUCE 4" MAX 10' HIGH</i>
4					<i>CI</i>	<i>CLAY: (TILL) SILTY, SANDY RED PLASTIC BROWN PEBBLES</i>		<i>16n</i>	4							
6							<i>UF</i>		6							
8									8							
10									10							
12									12							
14						<i>SHALE INCLUSIONS</i>			14							
16						<i>GREY, SILTSTONE INCLUSIONS</i>			16							
18									18							
20						<i>END OF HOLE</i>			20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>CPA</i>			FIELD ENG: <i>B.J.D.</i>			DATE DRILLED: <i>19/3/73</i>			AIRPHOTO NO: <i>A22954 - 10Z</i>			CHAINAGE:			VEGETATION: <i>SEE REVISIONS</i>			ELEV:			TEST HOLE								
CHK: <i>1</i>			TECH: <i>M.D.</i>			RIG: <i>FALLING 1000</i>			SURFACE DRAINAGE: <i>GOOD</i>																				
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNITED 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 %														
0									0																				
2						CL <i>PEAT</i> <i>CLAY: SILTY, SANDY</i> <i>LOW PLASTIC</i> <i>LIGHT BROWN</i>	<i>1/2'</i>	<i>F</i> <i>V_x 60%</i> <i>V_x 20%</i>	2																				
4						<i>COBBLES</i> <i>CN CLAY: (TILL)</i> <i>SILTY, SLIGHTLY SANDY</i> <i>HIGH PLASTIC</i> <i>BROWN, PEBBLES</i> <i>RUST SPECKLES & STAINS</i> <i>OCCASIONAL COBBLE</i>	<i>4'</i>	<i>UF</i>	4																				
6									6																				
8									8																				
10									10																				
12						<i>GRAY</i>	<i>12'</i>		12																				
14						<i>SILTIER</i>	<i>14'</i>		14																				
16									16																				
18									18																				
20									20																				
22									22																				
24									24																				

MODERATELY
DENSE
SPRUCE
3" MAX
10-20' HIGH

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 11/5/75		AIRPHOTO NO: A21954-102		CHAINAGE: 5171+09		OFFSET:		TEST HOLE												
CD: 111		TECH: M.D.		RIG: FILLING, 1000		SURFACE DRAINAGE: POOR		VEGETATION: OT. S. L. 1222		ELEV:		MILE 626 C NUMBER 1051#												
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 %											
					PL	PEAT: CAT. 3	F	Vs 10%	0	PLASTIC LIMIT 40 LIQUID LIMIT 80 20 40 60 80 100 100+														
2					SW SM	SAND: COARSE FINE GRAVELY FAIRLY SILTY		Nbn	2															
4									4															
6					CI	CLAY (FILL) COARSE SANDY SILTY MED PLASTIC MED-DARK BROWN RUST		Vx 15%	6															
8								Vr 10%	8															
10									10															
12						GREY PEBBLES MORE SAND			12															
14					SC	EXTREMELY SANDY COARSE			14															
16									16															
18									18															
20									20															
22									22															
24						END OF HOLE			24															

SARUCE, MED DENSE, 15'-30' HIGH, 100% 4" &

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC		FIELD ENG: B.J.D.		DATE DRILLED: 17/3/73		AIR PHOTO NO: A22934-102		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE							
CID: 11.1		TECH: D.R.		RIG: MAYHEW 1200		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)	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			
												CLAY %	SILT %	SAND %	GRAVEL %						
2					OH	CLAY: ORGANIC HIGH PLASTIC BROWN	F	V _L 20%	2									LOW TO MED. DENSITY SPRUCE 20' HIGH 3" 8"			
4					CI	CLAY (TILL): VERY SANDY SILTY STONES MED. PLASTIC BROWN		V _X 10%	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: B.J.D.		DATE DRILLED: 11/2/73		AIRPHOTO NO: A2295A-102		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 0000		TECH: D.R.		RIG: MATHEN 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE REMARKS		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.)	REMARKS
										CLAY %	SILT %	SAND %	GRAVEL %			
					OL	SILT: ORGANIC CLAYEY LOW PLASTIC DARK BROWN	F	V _L 20%	0							Low Density SPADGE 10' HIGH 4" to 6" φ
2					CI	CLAY (FILL): SILTY, SANDY PEBBLES MED PLASTIC BROWN		V _L 25%	2							
4					SM	SAND: VERY SILTY LOW PLASTIC BROWN		NF	4							
6									6							
8									8							
10									10							
12									12							
14					CI	CLAY (FILL): SILTY, SANDY STONES LOW-MED PLASTIC GREY			14							
16					CL				16							
18					CI				18							
20					CH				20							
22						END OF HOLE (DRILLING STOPPED ON) BOULDER			22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: 72		FIELD ENG: B.J.D		DATE DRILLED: 16/7/75		AIRPHOTO NO: A2292A-102		CHAINAGE: 5196+00		OFFSET:		TEST HOLE																	
CKD: 113		TECH: D.R.		RIG: MAYHEW 1000		SURFACE DRAINAGE: D002		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 %																
0					OL	SILT: ORGANIC CLAYEY LOW PLASTIC BLACK	F	V _w 20%	0							MED. DENSE SPRINGS 15'-25' HIGH 6" φ													
2								V _x 25%	2																				
4					SC	SAND (FILL): FINE GRAINED CLAYEY STONES OCCASIONAL COBBLES LOW PLASTIC BROWN		V _s 15%	4																				
6									6																				
8									8																				
10					CI	CLAY (FILL): SILTY SANDY STONES COBBLES MED. PLASTIC GREY		V _x <5%	10																				
12								NOT	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						
DWR: <i>TC</i>		FIELD ENG: <i>BID</i>		DATE DRILLED: <i>11/11/73</i>		AERIAL PHOTO NO: <i>A 2293A - 102</i>		CHAINAGE: <i>5133+30</i>		OFFSET:		TEST HOLE		
CDB: <i>111</i>		TECH: <i>M.D.</i>		RIG: <i>FAIRBANKS DDD</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 %			
2					OL	SILT: ORGANIC CLAYEY, SANDY	1/2	Vx 20%	2					MED DENSE SAMPLE 20 to 50' HIGH 10" MAX ϕ OCCASIONAL BROWN & YELLOW
4					GH	SAND: GRAVELLY SILTY COBBLES	2 1/2	Vx 10%	4					
6					CL	CLAY (FILL): SILTY SANDY LOW PLASTIC STONES COBBLES BROWN GREY	6	Vx 10%	6					
8									8					
10									10					
12					CI	MED PLASTIC			12					
14									14					
16									16					
18									18					
20									20					
22									22					
24						END OF HOLE			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: E.B.			FIELD ENG: B.J.D.			DATE DRILLED: 17/5/75			AERIAL PHOTO NO: A2295A-10Z			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE								
CKD:			TECH: D.R.			RIG: MARYNEW			SURFACE DRAINAGE: GOOD			VEGETATION: SEE REMARKS			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 %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS												
0					OL	SAND: VERY ORGANIC SILTY ROOTLETS BROWN	F	NF	0								SPRUCE, 50' HIGH 12" Ø POPLAR, 30' HIGH 8" Ø SPARSE												
2					CL	CLAY (YEL): SILTY SANDY LOW PLASTIC BROWN			2																				
4					GM	GRAVEL: SANDY SILTY NON PLASTIC BROWN			4																				
6									6																				
8					SP	SAND: CLEAN FINE SHARP ROOTLETS		Vc 5%	8																				
10									10																				
12						END OF HOLE			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.B.		FIELD ENG: B.J.D.		DATE DRILLED: 17/3/73		AIRPHOTO NO: A32954-102		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD:		TECH: D.R.		RIG: MAYHEW		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)	WATER & ICE CONTENT		GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS											
										○ = WATER CONTENT (% OF DRY WEIGHT)	△ = ICE CONTENT (% OF SAMPLE VOLUME)	CLAY %	SILT %	SAND %	GRAVEL %														
0					OL	SILT: ORGANIC SANDY LOW PLASTIC BROWN	F	Nr	0									BIRCH, POPLAR, SPRUCE, 25' HIGH 6"-8" φ MED DENSE											
2					GP	GRAVEL (TILL) SILTY ANGULAR FRACT. ODD SHALE INCL.			2																				
4						----- 4 LACKING FINES CLAY TILL INCLUSIONS			4																				
6									6																				
8						----- 8 SILTSTONE INCL.			8																				
10									10																				
12					SW	SAND (FILL) GRAVELLY CLEAN SILTSTONE CHUNKS			12																				
14									14																				
16					GM	GRAVEL (TILL) SANDY CLEAN SILTSTONE CHUNKS			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: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 17/3/73		AERIAL PHOTO NO: A2293A-102		CHAINAGE: 5117 + 52		OFFSET:		TEST HOLE		
CKD: <i>127</i>		TECH: D.R.		RIG: MAYHEW		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 %			
0					OL	MOSS: 4" SILT: ORGANIC CLAYEY MED PLASTIC DK. BROWN	F	V _x 95% V _r 20%	0					SCRUB SPRUCE, 15' HIGH, 3" φ, MED DENSE
2					SM	SAND: 2 SILTY MED GRAINED LOW PLASTIC BROWN ANGULAR		V _s 70%	2					
4									4					
6					CL	CLAY: (TILL) 6 SILTY SANDY REBBLES LOW-MED PLASTIC SHALE INCLUSIONS BROWN		V _s 10%	6					
8					CI				8					
10									10					
12					CI	CLAY: 12 SILTY MED TO HIGH PLASTIC GREY ODD STONE		V _r 10%	12					
14									14					
16						END OF HOLE 15			16					
18									18					
20									20					
22									22					
24									24					

DRILL HOLE REPORT

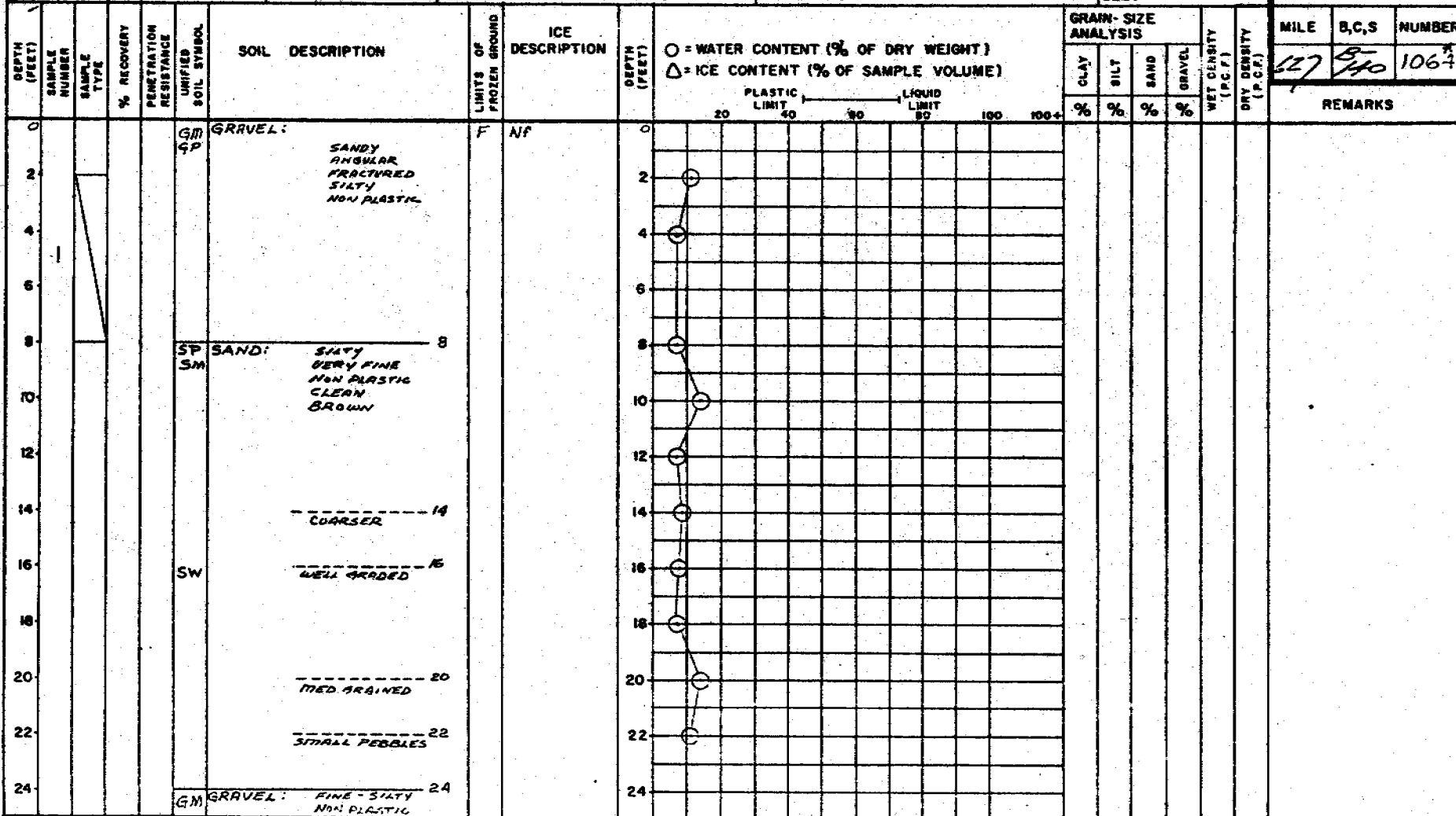
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWNER E.B.		FIELD ENG. B.J.D.		DATE DRILLED 11/3/75	AIRPHOTO NO. A22934-102	CHAINAGE: 5106+47	OFFSET:	ELEV:		TEST HOLE						
TECH: M.D.		RIG: FRILING 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 FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS				WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
									CLAY %	SILT %	SAND %	GRAVEL %				
0					PE	PERT: ORGANIC CLAY: SILTY SANDY PEBBLES		V _x 70% V _a 30%	0							MEDICAL SPRUCE, 10'-25' HIGH, MAX 4" Ø
2					CL OH				2							
4					CI	CLAY: SILTY SANDY MEDIUM PLASTIC		V _a 15%	4							
6									6							
8					GM GP	GRAVEL: FINE SANDY			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

OWNER: E.B.	FIELD ENG: B.J.D.	DATE DRILLED: 18/3/73	AIRPHOTO NO: AZ124 - 102	CHAINAGE:	INVERSE POINT:	OFFSET:	TEST HOLE
CKD: 100	TECH: D.R.	RIG: MAYHEW	SURFACE DRAINAGE: GOOD	VEGETATION: LARCH	ELEV:		



R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 18/5/73		AIRPHOTO NO: A2293A-102		CHAINAGE:		OFFSET:		TEST HOLE			
CKD: ...		TECH: D.R.		RIG: MAYHEW		SURFACE DRAINAGE: GOOD		VEGETATION: BURNED 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 %				
0					OH	CLAY: ORGANIC SILTY BK. BROWN ROOTLETS	F	Vr 20%	0						
2					CI	CLAY (TILL): SILTY SANDY PERBBLES MED PLASTIC BROWN		Nbn	2						
4								Vr 20%	4						
6									6						
8									8						
10					ML	SILT (TILL): VERY SANDY CLAYEY LOW-MED PLASTIC BROWN		NF	10						
12					SM				12						
14									14						
16					SM	SAND: MED-COARSE GRAINED SILTY NON PLASTIC BROWN			16						
18									18						
20									20						
22								Nbn	22						
24									24						

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

OWN: <i>E.B.</i>		FIELD ENG: <i>B.J.D.</i>	DATE DRILLED: <i>18/3/73</i>	AIRPHOTO NO: <i>A22934-102</i>	CHAINAGE:	OFFSET:	ELEV:		TEST HOLE							
CNO: <i>112</i>	TECH: <i>D.R.</i>	RIG: <i>MAYHEW</i>	SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</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)						
										20	40	60	80	100	100+	
2					SM	SAND: ORG. SILT DIRTY BROWN	F	Nbn	2							
4					SW	CORSE CLEAN			4							
6					CL CI	CLAY (TILL): SILTY SANDY LOW-MED PLASTIC PEBBLES - BROWN			6							
8					SW	SAND: COARSE CLEAN		Nr	8							
10									10							
12									12							
14									14							
16									16							
18					GM GP	GRAVEL (TILL) GAP GRADED			18							
20					CI CH	CLAY (TILL) SILTY SANDY PEBBLES MED-HIGH PLASTIC GREY		Nbn	20							
22									22							
24									24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY						
OWN: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 18/3/73		AIRPHOTO NO: A-22734-102		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: /		TECH: D.R.		RIG: MAYHEW		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 %			
0					GM	GRAVEL (TILL): ORGANIC SILT LOW PLASTIC BROWN ----- 2 INORGANIC SANDIER SOME SHALE		Nf	0					BURNED SPRUCE & BIRCH, SPARSE
2									2					
4									4					
6									6					
8									8					
10									10					
12						----- 12 CLAY TILL INCLUSIONS			12					
14					CL	CLAY (TILL): SILTY SANDY PEBBLES LOW PLASTIC BROWN ----- 14			14					
16					SM	SAND: SILTY NON PLASTIC PEBBLES BROWN ----- 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:		DATE DRILLED:		AIRPHOTO NO: A22934-102		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: /		TECH:		RIG:		SURFACE DRAINAGE: G000		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 %																
26					SM		F	NF	26																				
28					CI	CLAY (TILL) SILTY SANDY MED PLASTIC PEBBLES GREY		Vr < 1%	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										
OWN: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 17/3/73		AERIAL PHOTO NO: A22534-102		CHAINAGE: 509/ + 60		OFFSET:								
GND: 1/1		TECH: D.R.		RIG: 176/HW		SURFACE DRAINAGE: FAIR		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)								
										PLASTIC LIMIT LIQUID LIMIT 20 40 60 80 100 100+								
2					SM	MOSS: 1/4 SAND: SILTY MED GRAINED NON PLASTIC ODD PEBBLE REDDISH BROWN ----- 4 COARSER ----- 6 CLAY (FILL) SILTY SANDY PEBBLES OCL. STONE LOW-MED PLASTIC BROWN	F Y 40% Vr < 1%											
4																		
6																		
8																		
10																		
12																		
14																		
16																		
18																		
20																		
22																		
24																		
														REMARKS				
														SPRUCE 50'-40' HIGH; 8" DB 7000 BIRCH; MED DENSE				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
OWN: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 10/3/73		AIRPHOTO NO: A2173A-102		CHAINAGE:		OFFSET:		TEST HOLE				
CND: 11		TECH: D.R.		RIG: MAYHEW		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 %			
0					OL	SILT: ORGANIC CLAYEY SANDY LOW PLASTIC BROWN	F	NBn	0							POPULAR & SPRUCE, 30 HIGH, 6" d, MED TO HIGH DENSE
2					ML	SILT: SANDY CLAYEY, LOW PLASTIC BROWN			2							
4					MH	SILT (TILL) CLAYEY SANDY PEBBLES MED PLASTIC BROWN			4							
6									6							
8					GM	GRAVEL: FINE SANDY CLEAN OCC. SHALE INCL.		NF	8							
10						END OF HOLE			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: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 10/3/73		AIRPHOTO NO: A2278A-102		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: 11		TECH: D.R.		RIG: MIA/HEW		SURFACE DRAINAGE: Dood		VEGETATION: SPRUCE, 15' 4" MED DEN		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 %			
0					OL	SILT: ORGANIC CLAYEY LOW PLASTIC BROWN	F	Vr 20%	0							
2					C1	CLAY (TILL): SILTY SANDY MED PLASTIC PEBBLES BROWN		Vr 30%	2							
4								Vs 20%	4							
6						SANDY			6							
8						GREY		Nbn	8							
10									10							
12					CL C1	LOW-MED PLASTIC		Vr 30%	12							
14									14							
16					GM	GRAVEL (TILL): CLAYEY SANDY LOW-MED PLASTIC GREY		NF	16							
18						VERY SANDY			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: E.B.		FIELD ENG: B.J.D.		DATE DRILLED: 18/3/73		AIRPHOTO NO: A22934-102		CHAINAGE:		OFFSET:		TEST HOLE MILE B.C.S NUMBER 1071 *							
CKD: J		TECH: D.R.		RIG: MAYHEW		SURFACE DRAINAGE: D002		VEGETATION: SCRUB SPRUCE & SPARLE		ELEV:									
DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION (E.T. %)	DEPTH (FEET)	GRAIN-SIZE ANALYSIS		WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS					
										CLAY %	SILT %								
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)									
										PLASTIC LIMIT 20 40 60 80 100 100+ LIQUID LIMIT 80									
2					CL	ORGANIC SILT: CLAYEY Low PLASTIC Brown, ROOTLETS 2'		Vr 20%	2										
4					ML	SILT: CLAYEY Low PLASTIC Brown 4'			4										
6					CI	CLAY: (TILL) SILTY SANDY, MED PLASTIC Brown, PEBBLES SILTSTONE INCLUSIONS		Abn	6										
8									8										
10									10										
12									12										
14									14										
16					CI	MED TO HIGH PLASTIC GREY SAND LENSES AND STRATIFICATIONS 16'			16										
18					CH				18										
20						END OF HOLE			20										
22									22										
24									24										

DRILL HOLE REPORT

MACKENZIE HIGHWAY

TEST HOLE		
MILE	B,C,S	NUMBER
1.28	B- 141	1072

REMARKS

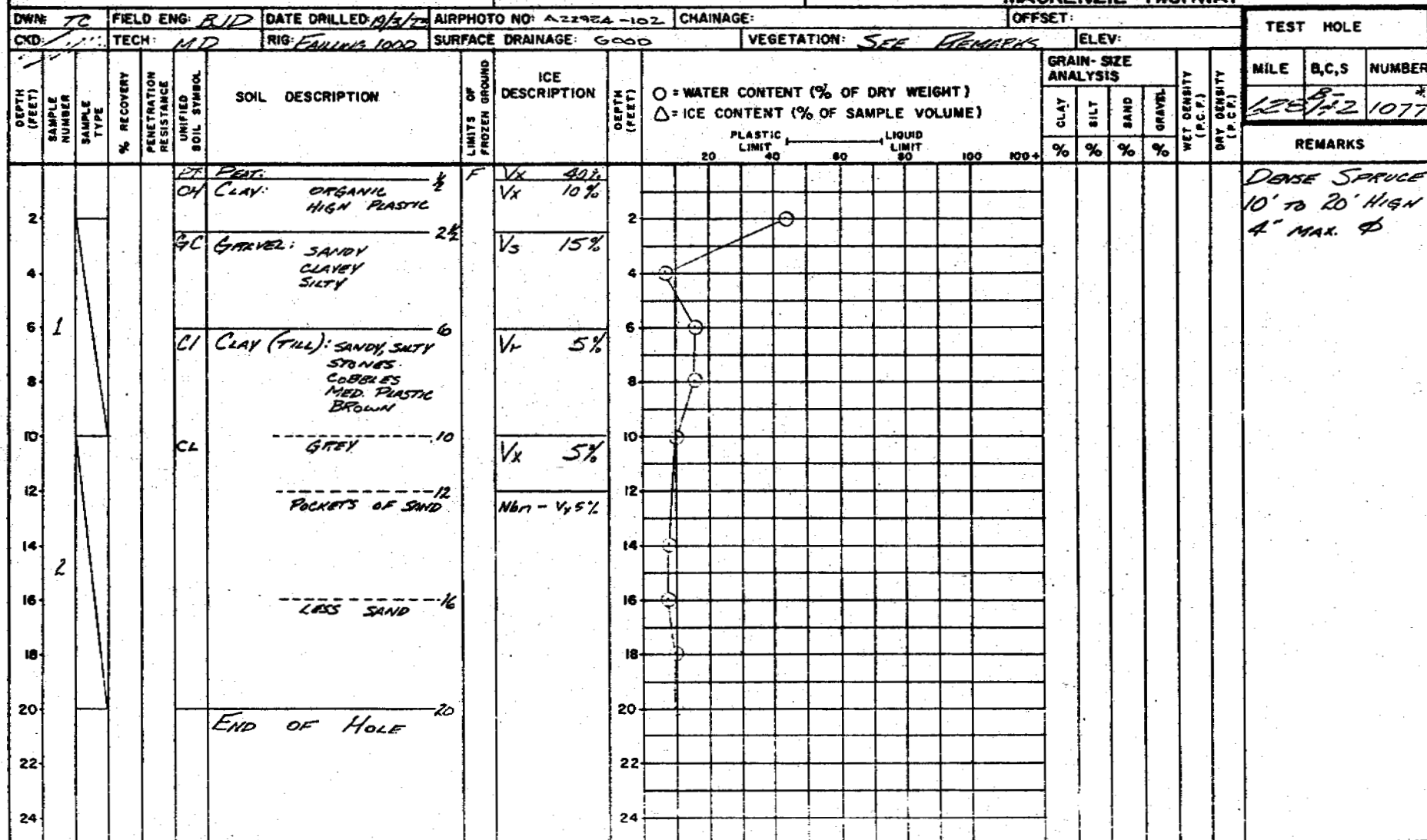
R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>CH</i>		FIELD ENG: <i>BJD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A 2273A-102</i>		CHAINAGE:		OFFSET:		TEST HOLE				
CKD: <i>1</i>		TECH: <i>DP</i>		RIG: <i>MARVEL 25</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>See Runway</i>		ELEV:		MILE <i>628</i> S.C.S. <i>FA</i> NUMBER <i>1073</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 %			
0						<i>MOSS COVER</i>			0							
2					OL	<i>ORGANIC SILT Low Plastic</i>		<i>Nbn</i>	2							<i>SPARSE TO MODERATELY DENSE SPRUCE 6" MAX 15-20' HIGH</i>
4					CL	<i>CLAY (TILL) SILTY, SANDY Low Plastic BROWN OCCASIONAL PEBBLES SANDIER</i>	<i>Vr 20%</i>		4							
6						<i>GREY</i>			6							
8						<i>DARK BROWN</i>	<i>Nbn</i>		8							
10									10							
12						<i>GREY</i>			12							
14						<i>Low Plastic GREY-BROWN</i>			14							
16						<i>SANDSTONE INCLUSIONS</i>			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: 31		FIELD ENG: JTD		DATE DRILLED: 17/5/73		AIRPHOTO NO: A22934-102		CHAINAGE: 5079+85		OFFSET:		ELEV:		TEST HOLE															
CKD:		TECH: DR		RIG: MAHLE 100		SURFACE DRAINAGE: POOR		VEGETATION: 500 P.M.																					
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 %																
0						MOSS COVER			0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT 40 60 80 100 100+ LIQUID LIMIT 80 100 100+																			
2					CI	CLAY: SILTY, ORGANIC MED. PLASTIC DE BROWN. ROOTS	1/2	ICE 60% Vr 30%	2							SPARSE TO MODERATELY DENSE SCRUB SPRUCE 4" φ MAX 10-15' HIGH													
4					SH	SAND: SILTY BROWN OCCASIONAL STONE	2'	Vr 10%	4																				
6					CI	CLAY: (TILL) SILTY, SANDY MED PLASTIC BROWN, PEBBLES SAND INCLUSIONS	4'	Nbn	6																				
8								Nf	8																				
10								Vr 10%	10																				
12						GREY	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								
DWN: <i>TC</i>		FIELD ENG: <i>RID</i>		DATE DRILLED: <i>11/1/75</i>		AIRPHOTO NO: <i>A22934-102</i>		CHAINAGE: <i>5066+87</i>		OFFSET:		TEST HOLE				
CKD: <i>1</i>		TECH: <i>MD</i>		RIS: <i>FAHUNG 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 PEAT:</i>		<i>Vx 30%</i>								<i>MED DENSE SPRICE 10" to 20" HIGH 3" MAX. ϕ</i>
2						<i>CI (CLAY (FILL): SILTY SANDY STONES COBBLES MED PLASTIC BROWN POCKETS OF GRAVEL</i>		<i>Vx 20%</i>	2							
4								<i>Vx 15%</i>	4							
6									6							
8									8							
10						<i>--- VERY SANDY --- 9 LIGHT BROWN</i>		<i>Vx 5%</i>	10							
12						<i>--- GREY --- 11</i>			12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						<i>END OF HOLE 15</i>			24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: TC		FIELD ENG: B.J.D		DATE DRILLED: 17/5/73		AIRPHOTO NO: A2293A-10Z		CHAINAGE: 5055+25		OFFSET:		TEST HOLE				
CKD: 111		TECH: DIF		RIG: MANUEL 1000		SURFACE DRAINAGE: POOR		VEGETATION: SEE EMBLEM		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					OL	100% SILT: ORGANIC CLAYEY MED PLASTIC	1/2 F	100% 30%	2							SCARB SPRUCE 8' HIGH, 3" φ
4					ML	SILT (TILL): CLAYEY SANDY STONES LOW PLASTIC BROWN	2	Nbr	4							
6								10%	6							
8								<5%	8							
10					CL CI	CLAY (TILL): SILTY SANDY STONES LOW-MED. PLASTIC GREY	8	Nbr	10							
12							UF		12							
14					CH	SHALE INCLUSIONS	15		14							
16						END OF HOLE			16							
18									18							
20									20							
22									22							
24									24							

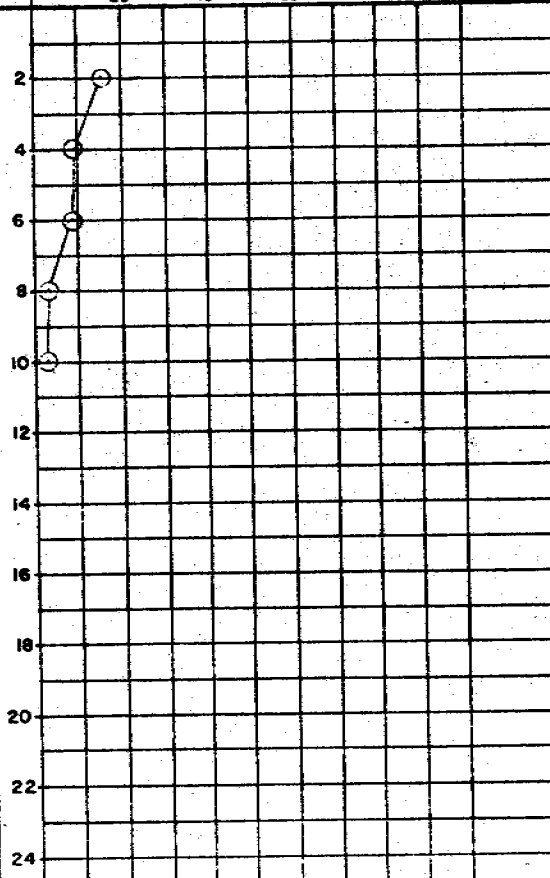
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT					DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: TC		FIELD ENG: RLD		DATE DRILLED: 10/4/75		AIRPHOTO NO: A22934 - 102		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE										
CKD:		TECH: DP		RIG: MAYHEM 1000		SURFACE DRAINAGE: 6000		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 %											
					OL	SILT: ORGANIC CLAYEY SANDY LOW PLASTIC		N/A																
2					CI	CLAY (FILL): SILTY SANDY STONES COBBLES MED. PLASTIC BROWN																		
4																								
6					GW	GRAVEL: WELL GRADED SILTY																		
8					SW	SAND: WELL GRADED FAIRLY CLEAN																		
10						END OF HOLE																		
12																								
14																								
16																								
18																								
20																								
22																								
24																								

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

PLASTIC LIMIT 40 60 80 100 100+



Low Density
 BROWN 20' to 30'
 HIGH 4" MAX φ

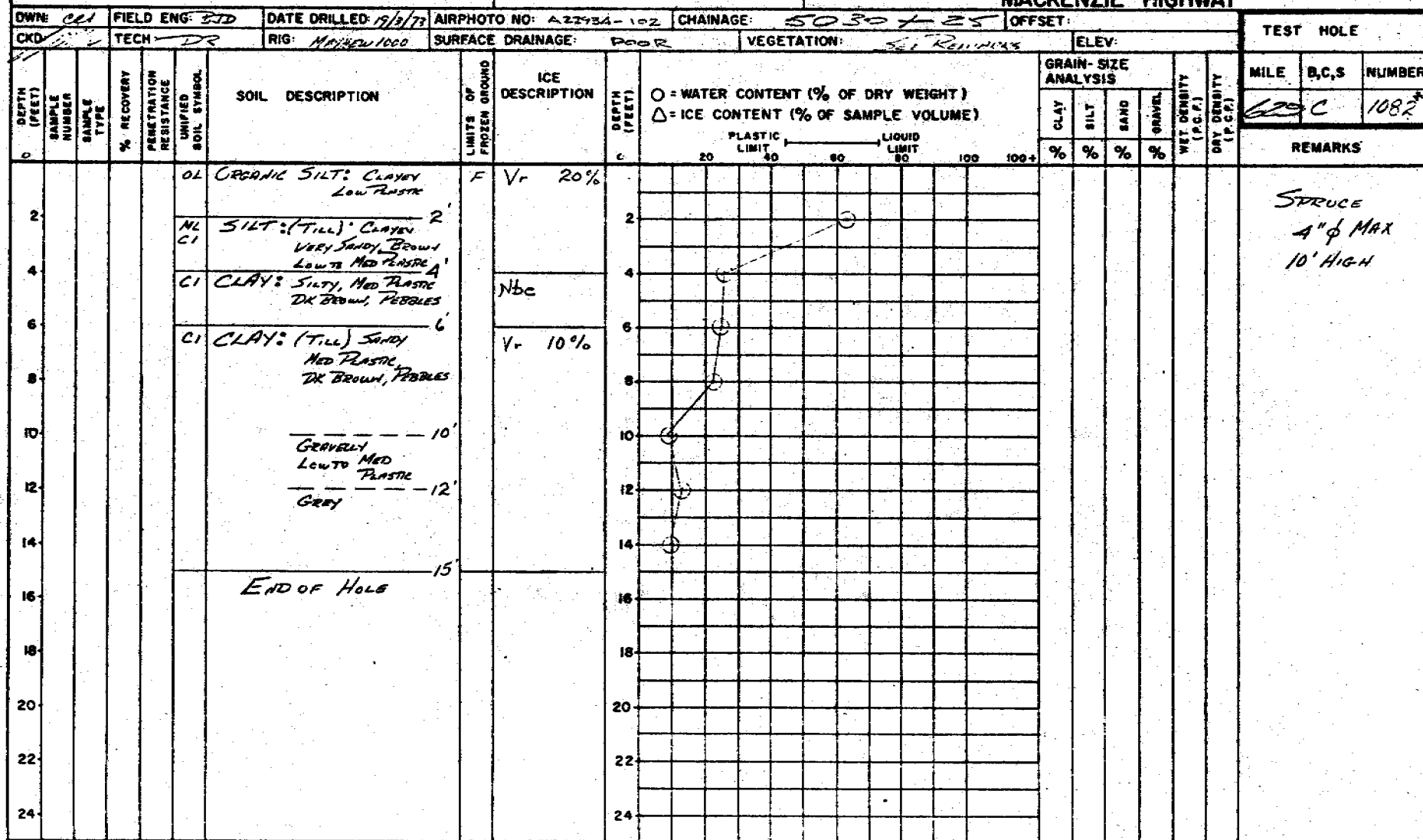
DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

[illegible]

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN		FIELD ENG		DATE DRILLED		AIRPHOTO NO		CHAINAGE		OFFSET		ELEV		TEST HOLE															
CKD		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 (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS													
										CLAY %	SILT %	SAND %	GRAVEL %																
0									0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)																			
										PLASTIC LIMIT ——— LIQUID LIMIT ——— 20 40 60 80 100 100+																			
2					SP	SAND: COARSE GRAINED FINELY CLEAN		11f	2							MODERATELY DENSE SPRUCE & PEPLEAR 10" MAX 30-40' HIGH													
4									4																				
6						FINER ——— 6'			6																				
8									8																				
10						MED TO COARSE GRAINED SLIGHTLY SILTY		11f	10																				
12					SN SU	COARSE GRAINED FINE GRAVELLY SILTY, TRACE OF CLAY		11f	12																				
14									14																				
16									16																				
18					SC	COARSE, SILTY GEM. FILL, MHT TO LOW PLASTIC, TRACE OF CLAY			18																				
20						ENTIRE HOLE			20																				
22									22																				
24									24																				

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>CM</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>11/3/73</i>		AIRPHOTO NO: <i>A2293A-102</i>		CHAINAGE: <i>5040+45</i>		OFFSET:		TEST HOLE				
CKD:		TECH: <i>DR</i>		RIG: <i>MINIHEU 1000</i>		SURFACE DRAINAGE: <i>DOOR</i>		VEGETATION: <i>See REMARKS</i>		ELEV:		MILE <i>120</i> B.C.S. <i>C</i> NUMBER <i>1081*</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 %			
0						<i>MOSS COVER</i>			0							
2					<i>SM</i>	<i>SAND: SILTY, FAIRLY WELL GRADED PEBBLES TO COBBLES 2'</i>		<i>HF</i>	2							<i>MODERATELY DENSE SPRUCE 6" f MAX 20' HIGH</i>
4					<i>CI</i>	<i>CLAY: (TILL) VERY SANDY, SILTY MED PLASTIC BROWN, PEBBLES</i>		<i>Vr 15%</i>	4							
6									6							
8						<i>GRAY, BROWN 8'</i>			8							
10									10							
12						<i>SANDIER 12'</i>			12							
14									14							
16									16							
18									18							
20									20							
22									22							
24						<i>END OF HOLE 15</i>			24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY



DRILL HOLE REPORT

MACKENZIE HIGHWAY

MILE	B,C,S	NUMBER
129	B- 1054	1054*
REMARKS		

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
DWN: <i>CU</i>		FIELD ENG: <i>RJD</i>		DATE DRILLED: <i>19/3/77</i>		AIRPHOTO NO: <i>A 22954-102</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>HAYHEW 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 %					
0						<i>MOSS COVER</i>			0									
2					<i>OL</i>	<i>ORGANIC SILT: CLAYEY Med Plastic, Brown Rootlets 2'</i>	<i>F</i>	<i>Vr 15%</i>	2							<i>MODERATELY DENSE SHRUB STRUCE</i>		
4					<i>CL</i>	<i>CLAY: (Till) Silty Low Plastic Brown - 4'</i>		<i>Non</i>	4									
6					<i>CI</i>	<i>SANDY Med Plastic</i>		<i>Vr 10%</i>	6									
8						<i>SANDIER - 8'</i>	<i>UF</i>		8									
10									10									
12									12									
14									14									
16									16									
18									18									
20						<i>END OF HOLE</i>			20									
22									22									
24									24									

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY							
DWN: <i>CH</i>		FIELD ENG: <i>RJD</i>		DATE DRILLED: <i>19/3/75</i>		AIRPHOTO NO: <i>A 22954-102</i>		CHAINAGE:		OFFSET:					
CKD: <i>11</i>		TECH: <i>DR</i>		RIG: <i>MAYHEW 1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:					
TEST HOLE															
MILE		B.C.S		NUMBER		REMARKS									
<i>129</i>		<i>543</i>		<i>1026</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.)
										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 60 80 100 100+					
2					OL	ORGANIC SILT: CLAYEY LOW PLASTIC BROWN - REDDISH	F	Vr 20%	2						
4					CL	CLAY: (TILL) SANDY, CLAYEY SILTY, LOW PLASTIC		NF	4						
6					ML	SILT: (TILL) CLAYEY LOW PLASTIC BROWN		Nbn	6						
8									8						
10						MORE CLAYEY			10						
12									12						
14					CL	CLAY: (TILL) SANDY, SILTY, CLAYEY LOW PLASTIC		NF	14						
16						GRAVELLY		Nbn	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: <i>021</i>		FIELD ENG: <i>RTD</i>		DATE DRILLED: <i>7/3/73</i>		AIRPHOTO NO: <i>AZ05A-102</i>		CHAINAGE: <i>5017+15</i>		OFFSET:		ELEV:		TEST HOLE										
CKD:		TECH: <i>DR</i>		RIG: <i>NAH-SW-1000</i>		SURFACE DRAINAGE: <i>POOR</i>		VEGETATION: <i>SSR REMAINS</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.)	MILE	B,C,S	NUMBER								
										CLAY %	SILT %						SAND %	GRAVEL %						
0						<i>MOSS COVER</i>			0	O = WATER CONTENT (% OF DRY WEIGHT) Δ = ICE CONTENT (% OF SAMPLE VOLUME)														
										PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+														
2					<i>ML</i>	<i>SILT: SANDY, CLAYEY (Till) Low Plastic Brown</i>	<i>F</i>	<i>10%</i>	2							<i>SCRUB SPRUCE</i>								
4					<i>SC SM</i>	<i>SAND: VERY SILTY TRACE OF CLAY Low to Med Plastic</i>		<i>Nbn</i>	4															
6					<i>CI</i>	<i>CLAY: (Till) Med Plastic</i>			6															
8					<i>SC SM</i>	<i>SAND: COARSE SILTY, TRACE OF CLAY Low to Med Plastic</i>		<i>HF</i>	8															
10						<i>----- 10' FINE VERY SILTY</i>			10															
12					<i>ML SM</i>	<i>----- 12' EXTREMELY SILTY MORE CLAYEY Low Plastic</i>			12															
14						<i>----- 14' LESS CLAY</i>			14															
16						<i>END OF HOLE</i>			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>CL</i>			FIELD ENG: <i>RJD</i>			DATE DRILLED: <i>9/9/73</i>			AIRPHOTO NO: <i>A 22934-102</i>			CHAINAGE: <i>5006+00</i>			OFFSET:			TEST HOLE											
CKD: <i>...</i>			TECH: <i>DR</i>			RIG: <i>MAHLEW 100</i>			SURFACE DRAINAGE: <i>POOR</i>			VEGETATION: <i>See Remarks</i>			ELEV:			MILE: <i>129</i> B,C,S: <i>C</i> NUMBER: <i>1088*</i>											
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 %														
0						<i>MOSS COVER</i>			0																				
2					<i>CL</i>	<i>CLAY: SILTY, SANDY LOW PLASTIC BROWN</i>	<i>F</i>	<i>Vr 10%</i>	2									<i>SPARSE SPRUCE 5-10' HIGH</i>											
4					<i>CH</i>	<i>CLAY: (TILL) SILTY, SANDY TRACE OF ORGANIC MED TO HIGH PLASTIC LIGHT BROWN TO GRAY</i>		<i>Vr 20%</i>	4																				
6								<i>Vr 10%</i>	6																				
8									8																				
10					<i>SC</i>	<i>SAND: VERY SILTY SLIGHTLY CLAYEY</i>		<i>HF</i>	10																				
12									12																				
14						<i>FINER</i>			14																				
15						<i>END OF HOLE</i>			15																				
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: CBI		FIELD ENG: RJD		DATE DRILLED: 19/3/73		AIRPHOTO NO: A2293A-102		CHAINAGE: 4985 + 50		OFFSET:		TEST HOLE									
CKD: 1		TECH: DR		RIG: MAYHEW 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 %								
0						MOSS COVER			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)											
						ORGANIC SILT & SANDY LOAM PLASTIC		Nbn		PLASTIC LIMIT ——— LIQUID LIMIT 20 40 60 80 100 100+											
2					CL	CLAY: SILTY SANDY		1/3 20%	2							SCRUB SPRUCE 10' HIGH					
4					CI	Low to Med Plastic Brown, Pebbles			4												
6								Up 40%	6												
8								Nbn	8												
10								1/3 20%	10												
12					SC	SAND: CLAYEY, SILTY			12												
14					CI	CLAY: (Till) SILTY SANDY Med Plastic			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										
OWN: CM		FIELD ENG: B-D		DATE DRILLED: 19/3/73		AIRPHOTO NO: A 22934-102		CHAINAGE: 4973+45		OFFSET:		TEST HOLE				
CKD: /		TECH: AR		RIG: MATHENIGO		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 %			
2					SM	SAND: SILTY Med to Low Plastic			2							MODERATELY DENSE SCRUB SPRUCE
4					CL CI	CLAY: (TILL) Silty Sandy Low to Med Plastic Brown, COBBLES			4							
6									6							
8									8							
10									10							
12					SM	SAND: SILTY Med to Low Plastic			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									
OWN: <i>ODA</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>19/3/73</i>		AERIAL PHOTO NO: <i>A22954-102</i>		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: <i>---</i>		TECH: <i>DR</i>		RIG: <i>HAYWARD 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>50% R. 10% P. 5% S.</i>		ELEV:		MILE <i>B-130/145</i> NUMBER <i>1091</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 %																		
0																													
2					ML	SILT: (Till) CLAYEY, SANDY MED TO LOW PLASTIC BROWN, PEBBLES		N/D						DENSE SPRUCE 6" d MAX 15-25' HIGH															
4																													
6								ICE 60%																					
8								V _r 30%																					
10								N/D																					
12																													
14																													
16																													
18	(1)				CL	CLAY: (Till) Silty Low Plastic Grey, FINE SAND LENSES																							
20																													
22																													
24						END OF HOLE																							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT				DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY											
DWN: <i>GH</i>		FIELD ENG: <i>BD</i>		DATE DRILLED: <i>19/3/78</i>		AIRPHOTO NO: <i>A2295A-102</i>		CHAINAGE:		OFFSET:		TEST HOLE							
CKD: <i>...</i>		TECH: <i>DR</i>		RIG: <i>HE/HW/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 %						
0									0	20 40 60 80 100 100+ PLASTIC LIMIT LIQUID LIMIT									
2					SC	SANDS SILTY, CLAYY TRACE OF ORGANIC LOW PLASTIC, BROWN		<i>1/2 bn</i>	2							DENSE SPRUCE 8" ϕ MAX 20-30' HIGH			
4					ML	SILT: (Till) TRACE OF ORGANIC LOW PLASTIC - 4' VERY SANDY			4										
6					SC SM	SANDS: (Till) VERY SILTY, CLAYY LOW PLASTIC			6										
8									8										
10					CL	CLAYS: (Till) SILTY, SANDY LOW 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										
OWNER: <i>OM</i>		FIELD ENG: <i>BDO</i>		DATE DRILLED: <i>7/8/73</i>		AERPHOTO NO: <i>A 22934-102</i>		CHAINAGE:		OFFSET:		TEST HOLE						
CKD: <i>111</i>		TECH: <i>DR</i>		RIG: <i>HAYHEM 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>630</i> B.C.S. <i>145</i> NUMBER <i>1093</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 %					
0									0									
2					OL	ORGANIC SILT: CLAYEY LOW PLASTIC BROWN, ROOTLETS	F	Vr 30%	2							MODERATELY DENSE SPRUCE 6" ϕ MAX 20' HIGH		
4					NL	SILT: SANDY, COARSE, CLAYEY LOW PLASTIC BROWN		Nbn	4									
6					SH	SAND: SILTY FINE GRAVELLY		Vx 10%	6									
8					CI	CLAY: (TILL) SILTY, SANDY MED PLASTIC PBBLES		Vx 20%	8									
10					SH	SAND: VERY SILTY LOW PLASTIC		Nbn	10									
12									12									
14					CI	CLAY: (TILL) SILTY, SANDY MED PLASTIC GREY			14									
16									16									
18									18									
20									20									
22									22									
24						END OF HOLE			24									

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: <i>061</i>		FIELD ENG: <i>RSD</i>	DATE DRILLED: <i>1973</i>	AIRPHOTO NO: <i>AZ273A-102</i>	CHAINAGE: <i>2258+92</i>	OFFSET:	ELEV:	TEST HOLE								
CKD	TECH: <i>DR</i>	RIG: <i>MAYHEW 1000</i>	SURFACE DRAINAGE: <i>POOR</i>	VEGETATION: <i>SPRUCE</i>				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 %			
0						<i>OL ORGANIC SILT; CLAYEY LOW PLASTIC BROWN</i>		<i>F Vx 20%</i>	0							
2						<i>NL SILT: (TILL) SANDY LOW PLASTIC</i>	<i>2</i>		2							
4						<i>CL CLAY: (TILL) SILTY, SANDY LOW PLASTIC BROWN, OCCASIONAL STAIN</i>	<i>3</i>	<i>n/bn.</i>	4							
6									6							
8									8							
10						<i>--- 10' SILTIER</i>			10							
12						<i>--- 12' MED PLASTIC GREY</i>			12							
14									14							
16						<i>END OF HOLE</i>	<i>15'</i>		16							
18									18							
20									20							
22									22							
24									24							

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

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R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
OWN: <i>CDI</i>			FIELD ENG: <i>RD</i>			DATE DRILLED: <i>24/3/77</i>			AIRPHOTO NO: <i>A-22934-102</i>			CHAINAGE:			OFFSET:			ELEV:			TEST HOLE								
CKD: <i>...</i>			TECH: <i>DR</i>			RIG: <i>MANHEDRILL</i>			SURFACE DRAINAGE: <i>POOR</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 %																
						<i>OL SILT: ORGANIC, CLAYY LOW PLASTIC BROWN, ROOTED</i>	<i>F</i>	<i>Vx 20%</i>																					
2						<i>CL CLAY: (TILL) SILTY, SANDY FINE GRAVEL LOW PLASTIC BROWN</i>		<i>Vx 30%</i>	2																				
4								<i>Ndn</i>	4																				
6						<i>SM SAND: VERY FINE CLEAN</i>		<i>Vr 20%</i>	6																				
8						<i>COARSER</i>		<i>H</i>	8																				
10						<i>CL CLAY: SILTY LOW PLASTIC GREY</i>		<i>Ndn</i>	10																				
12						<i>CI CLAY: (TILL) GRAVELLY, SANDY MOD PLASTIC GREY</i>			12																				
14									14																				
16									16																				
18									18																				
20						<i>END OF HOLE</i>			20																				
22									22																				
24									24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
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DWN: CH		FIELD ENG: BTD		DATE DRILLED: 9/3/73		AIRPHOTO NO: A2293A-102		CHAINAGE:		OFFSET:		ELEV:		TEST HOLE		
CKD		TECH: DR		RIS: MAYBEN 1000		SURFACE DRAINAGE: GOOD		VEGETATION: SET REDHICKS						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 %			
0						Mass COVER			0	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME)						
										20	40	60	80	100	100+	
2					GW	GRAVEL: FINE WELL GRADED ORGANIC Silt INCLUSIONS 2'	F	NF	2							MODERATELY DENSE SPRUCE 8" f MAX 30' HIGH
4					SW	SAND: COARSE FINE GRAVELLY			4							
6					SC	Silty, Low to non PLASTIC, TRACE OF CLAY,		NbN	6							
8									8							
10								NF	10							
12									12							
14									14							
16									16							
18									18							
20					NL	SILTSTONE: WEATHERED 14'			20							
22									22							
24						SHALE INCLUSIONS 20' END OF HOLE			24							

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY								
DWN: <i>CHA</i>		FIELD ENG: <i>RD</i>		DATE DRILLED:		AIRPHOTO NO: <i>A22934-102</i>		CHAINAGE:		OFFSET:		TEST HOLE		
CKD: <i>...</i>		TECH: <i>D.R.</i>		RIG: <i>McNEN 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 %			
0						<i>Moss Cover</i>			0	PLASTIC LIMIT LIQUID LIMIT				
2					SM	<i>SAND: SILTY (ORGANIC) WELL GRADED SILTSTONE INCLUSIONS</i>	F	<i>HF</i>	2					<i>MODERATELY DENSE SPRUCE 8" φ 30' HIGH.</i>
4					SC	<i>CLAYEY LOW PLASTIC</i>		<i>Vr 15%</i>	4					
6					SM	<i>SILTY, FINE</i>		<i>Hbn</i>	6					
8									8					
10						<i>COARSER NON-PLASTIC</i>		<i>HF</i>	10					
12								<i>Hbn</i>	12					
14					SC			<i>Vr 10%</i>	14					
16					SW			<i>HF</i>	16					
18						<i>SLIGHTLY PLASTIC FINER SAND</i>		<i>Vr 5%</i>	18					
20						<i>END OF HOLE</i>			20					
22									22					
24									24					

R.M. HARDY AND ASSOCIATES LTD.										DRILL HOLE REPORT										DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY									
DWN: CH		FIELD ENG: BTD		DATE DRILLED: 19/3/75		AIRPHOTO NO: A 22934-102		CHAINAGE:		OFFSET:		TEST HOLE																	
CKD: 111		TECH: DR		RIG: MAYHEW 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													
0									0	CLAY	SILT	SAND	GRAVEL																
										%	%	%	%																
						Moss Cover																							
2					OL	ORGANIC SILT: SANDY LOW PLASTIC		HF	2																				
4					SW	SAND: FAIRLY CLEAN SILTSTONE INCLUSIONS			4																				
6									6																				
8					SM	SAND: SILTY FINE GRAINED		Abn.	8																				
10					HL	SILT: VERY SANDY LOW PLASTIC, BROWN TRACE OF CLAY			10																				
12									12																				
14									14																				
16					CI	CLAY: (TILL) SANDY, SILTY LOW PLASTIC, GRAY FINE SAND FLOCKS GRAVELLY OCCASIONAL SHALE INCLUSIONS			16																				
18									18																				
20									20																				
22						END OF HOLE			22																				
24									24																				

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

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DRILL HOLE REPORT

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[illegible]

R.M. HARDY AND ASSOCIATES LTD.				DRILL HOLE REPORT		DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY										
OWN: <i>CP</i>		FIELD ENG: <i>RTD</i>		DATE DRILLED: <i>20/3/77</i>		AIRPHOTO NO: <i>A 2293A - 102</i>		CHAINAGE:		OFFSET:		TEST HOLE SHEET 2 of 2				
CKD: <i>1</i>		TECH: <i>DR</i>		RIG: <i>MAYNE 1000</i>		SURFACE DRAINAGE: <i>GOOD</i>		VEGETATION: <i>SEE REMARKS</i>		ELEV:		MILE: <i>S</i> NUMBER: <i>1103</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 %			
26						CH CLAY; HIGH PLASTIC GREY	UF		26							
28									28							
30									30							
32									32							
34						SC SAND: COARSE VERY SILTY, CLAYEY LOW PLASTIC	34' F Vr 10%		34							
36							NF		36							
38						SM VERY LITTLE CLAY LESS SILT SLIGHTLY PLASTIC	38' F Vr 10%		38							
40									40							
42									42							
44									44							
46									46							
48						MORE CLAYEY END OF HOLE	48' F Vr 10%		48							
50									50							