Dominion Soil Investigation Inc.
Consulting Engineers

SUMMARY REPORT - SEDIMENT SAMPLING SURPRISE LAKE, MATTABI MINES IGNACE, ONTARIO

April 1990
90-3-T6

Prepared For:
Centre de Technologie Norande

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DOMINION SOIL INVESTIGATION INC.

CONSULTING SOIL & FOUNDATION ENGINEERS

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April 13, 1990 Our Ref. No. 90-3-T6

Centre de Technologie Norande
240 Boulevard Hymns
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Attention: Luc St. Arnaud, P. Eng., M.Sc.
Hydrogeotechnical Group

Dear Sirs:

Re: Summary Report
Sediment Sampling
Surprise Lake
Mattabi Mines
Ignace, Ontario

Further to your request, Dominion Soil Investigation Inc. has carried out a lake sediment investigation at Surprise Lake and the swamp north of Surprise Lake. This letter provides a brief review of the results of the investigation.

The purpose of this investigation was to determine the existence and extent of marl in the lake and swamp. Marl is defined as a calcareous sediment and consists of precipitated calcium carbonate within a predominantly clay matrix. It's appearance is white to light brown and was found to be soft when penetrated. It is understood that the marl if abundant could be used at Mattabi Mines as a neutralizing material for their mine waste. Confirmation of the marl was tested by adding a few drops of 10% Hydrochloric acid to the material. A positive reaction was bubbling of the acid.

Testhole locations are shown on the Site Plan, Enclosure 1. Testholes were laid out by the prospector for the property in co-operation with Mattabi Mines. All testholes were advanced through the ice both on the lake and on the swamp.

Testholes 1 to 9 were completed by driving a 75 mm diameter thickwalled ABS plastic casing into the sediment. Split spoon samples were taken by driving a 50 mm diameter sampler inside the casing into the sediment and soil. Samples were taken at regular intervals and to identify the soil layers. Testhole logs have been prepared based upon this information and are attached.

Testholes 10 to 18 were sampled by driving a 75 mm diameter ABS casing into the sediment, letting the sediments stabilize and then removing the casing. Soil samples were enclosed in the casing. Confirmation of soil interfaces were performed by pushing a 5 cm^2 rod into the soil beside the testhole and noting penetration resistance changes at the soil interfaces.

Marl was found in all testholes except 17 and 18. Marl in Surprise Lake was found to be between 0.2 m and 1.5 m thick. Marl in the swamp was found between 25 mm and 1.5 m thick. Further testholes beyond the original layout for this project were put down in the swamp to obtain a better definition of the extent of the marl.

The soils were logged in the field and all samples were returned to our lab. An Atterberg test was performed in our lab on the Marl and it was found to be a highly plastic silt. Results are attached.

As requested by Noranda, Dominion Soil Investigation Inc. has estimated the quantities of Marl and organics found in the swamp and Surprise Lake.

The marl quantities have been estimated from the testhole obtained during this investigation. Prior to our fieldwork, the prospector for the property, Doug Parker had performed hand probe tests to the east of the swamp and had located Marl in this area. Our quantity calculations did not include his findings. Our calculations may be very conservative compared to actual quantities.

A further investigation is suggested for Surprise Lake. This would be quite feasible in the spring or summer when the ice has gone. By using a boat and using the hand probe it would be quite feasible to move up and down the shore and doing depth soundings and determining marl thicknesses. This procedure would provide more accurate information for your quantity calculations.

The quantity of Marl estimated in the swamp is about 800 m^3. The quantity of silty organic sediment over the Marl is estimated to be about 3,000 m^3. Cross sections of the swamp are included in the enclosures.

The quantity of Marl in the lake between Testholes 15 and 16 is estimated to be about 440 m long and 15 m wide and averaging 0.75 m thick totally 5,000 m^3. Determination of quantities from other areas in the lake were not taken into consideration due to the small quantities of Marl found and the depth to which it was found. The quantity of organics over the marl in the lake between Testhole 15 and 16 is estimated to be about 700 m^3.

We trust the above information satisfies your present requirements. If there are any questions, please do not hesitate to contact the undersigned at your convenience.

Yours truly,

For DOMINION SOIL INVESTIGATION INC.

Mike Hannusch, C.E.T.

MH/tr

APPENDIX

APPENDIX 'A'

LIMITATIONS OF REPORT

The conclusions and recommendations presented in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the specific locations tested, and conditions may become apparent during construction which were not detected and could not be anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

The comments given in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs, e.g. the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

ENCLOSURES

DOMINION SOIL INVESTIGATION
CONSULTING ENGINEERS

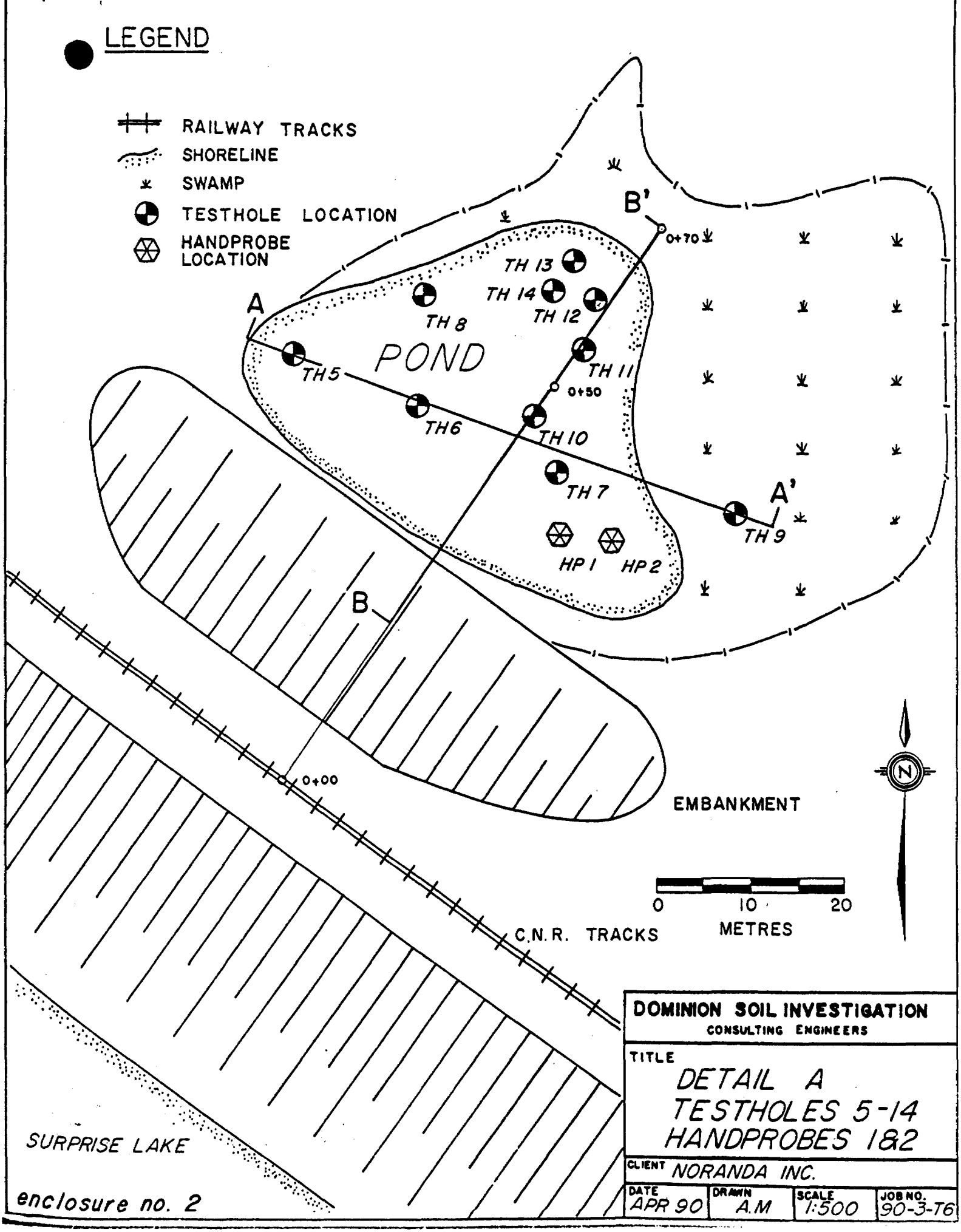
TITLE

TESTHOLE LOCATION PLAN

CLIENT NORANDA INC.

DATE	DRAWN	SCALE	JOB NO.
APR 90	A.M.	1:5000	90-3-T6

enclosure no. 1



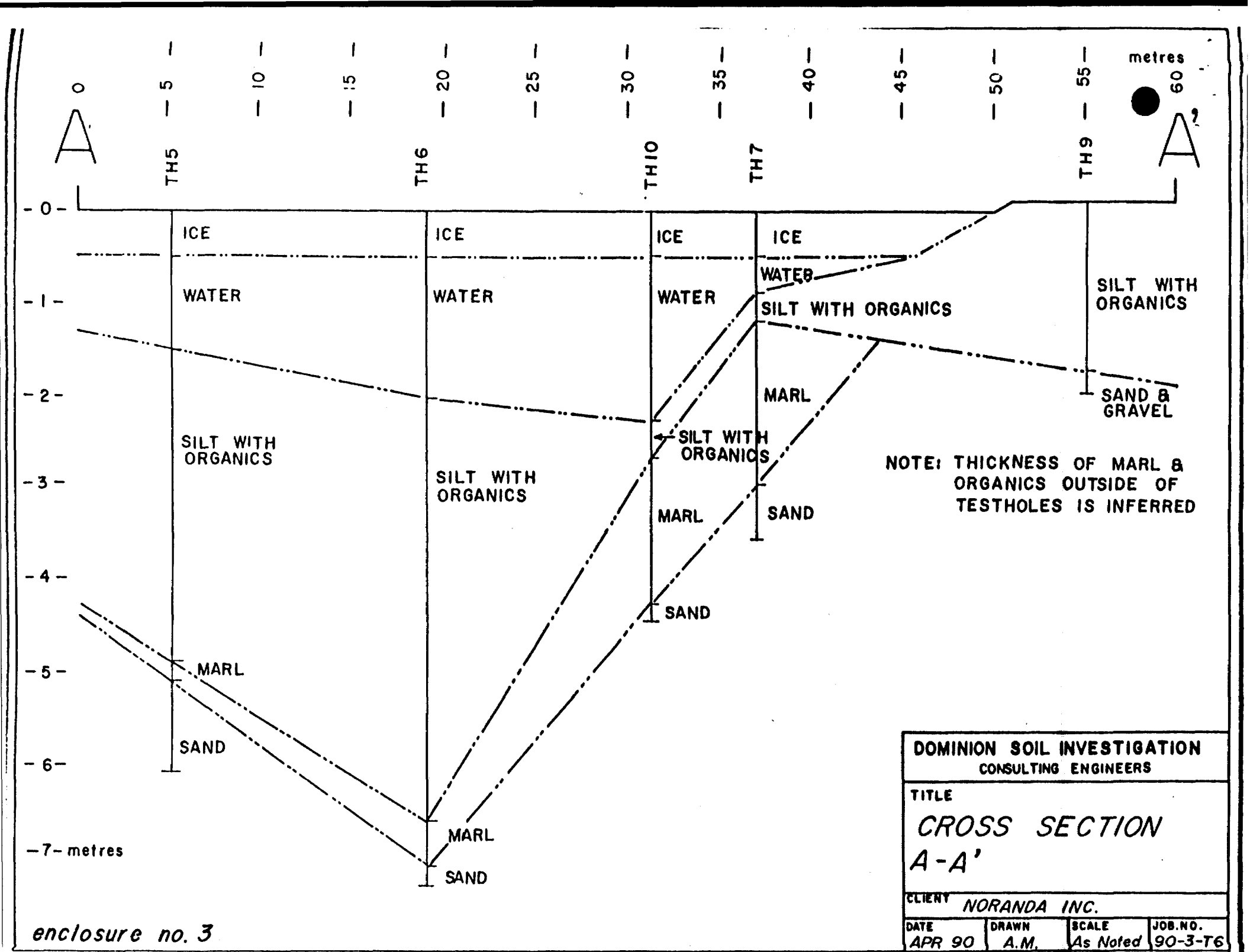
enclosure no. 2

DOMINION SOIL INVESTIGATION
CONSULTING ENGINEERS

TITLE
DETAIL A
TESTHOLES 5-14
HANDPROBES 1&2

CLIENT NORANDA INC.

DATE	DRAWN	SCALE	JOB NO.
APR 90	A.M	1:500	90-3-T6



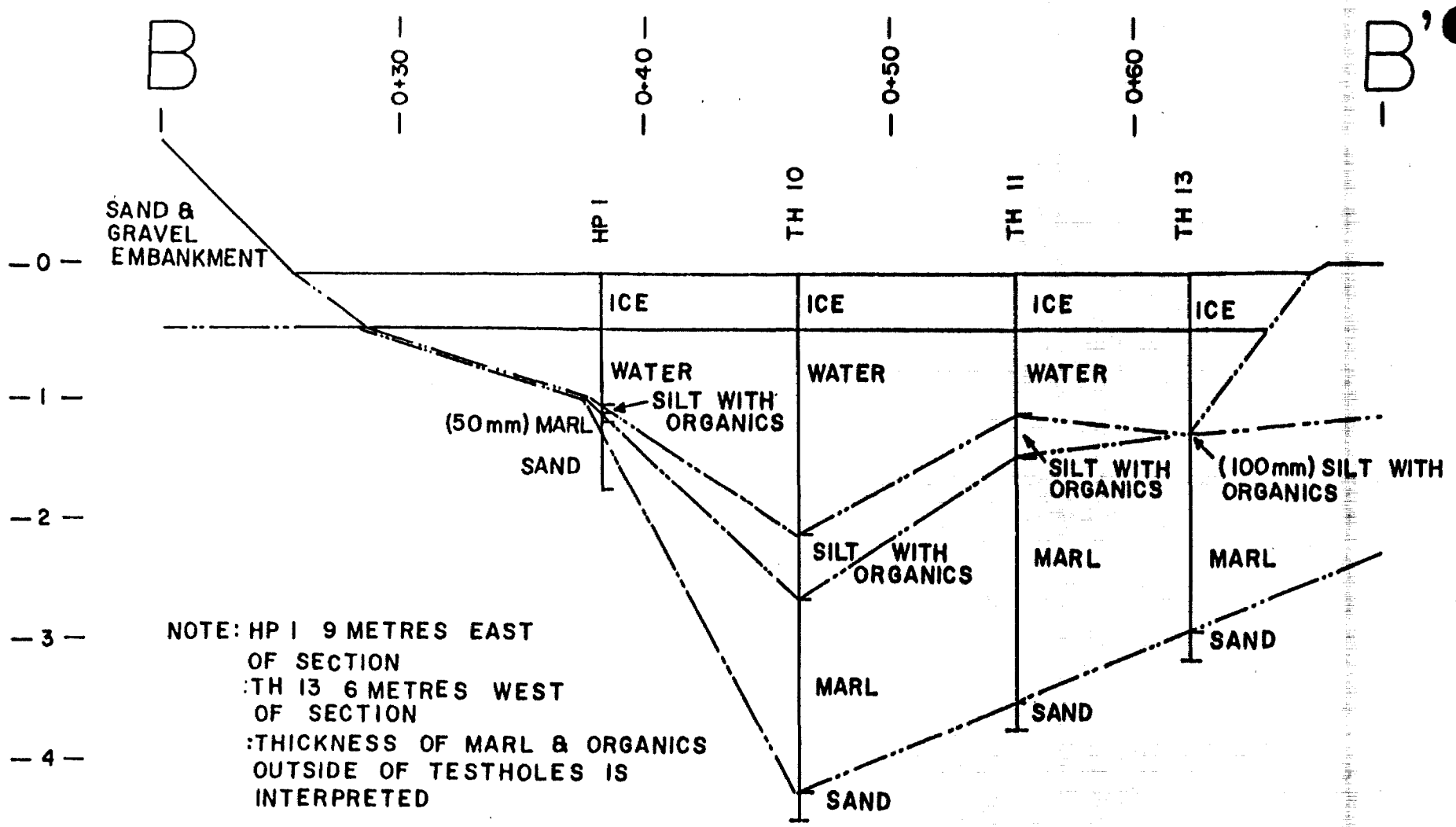
DOMINION SOIL INVESTIGATION
CONSULTING ENGINEERS

TITLE
CROSS SECTION
A-A'

CLIENT NORANDA INC.

DATE	DRAWN	SCALE	JOB.NO.
APR 90	A.M.	As Noted	90-3-T6

enclosure no. 3



NOTE: HP 1 9 METRES EAST OF SECTION
:TH 13 6 METRES WEST OF SECTION
:THICKNESS OF MARL & ORGANICS OUTSIDE OF TESTHOLES IS INTERPRETED

DOMINION SOIL INVESTIGATION
CONSULTING ENGINEERS

TITLE
CROSS SECTION
B-B'

CLIENT NORANDA INC.

DATE	DRAWN	SCALE	JOB.NO.
APR 90	A.R.M.	As Noted	90-3-T6

enclosure no. 4

LOG OF TESTHOLE 01

REF. No.: 90-3-T6	ENCLOSURE No. 5
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990

DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L (10 20 30 40)	SYMBL	MATERIAL DESCRIPTION	SAMPLES DEPTH (m)	SAMPLES TYPE	SAMPLES SPT (N)	VANE (kPa) ✖ (20 40 60 80) SPT (N)□ DCPT▲ Blows/0.3m (20 40 60 80)	REMARKS
8	-92-				WATER	8				0.5m Ice. Water to 8.4m.
9	-91-				ORGANICS - Clayey, brown/black, very soft	9				50mm Split Spoon Sampler used.
10	-90-					10				75mm casing installed and removed upon completion of Testhole.
11	-89-				25mm CLAY (Marl), light brown, soft SILT - trace fine sand, grey	11				
12	-88-					12				
13	-87-				End of Testhole at 12.5m	13				
14	-86-					14				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

LOG OF TESTHOLE 02

REF. No.: 90-3-T6	ENCLOSURE No. 6
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ×	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m	
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					50mm Split Spoon Sampler used.
					WATER					
1	-99-				CLAY (Marl) - Silty, brown/white, soft	1				75mm casing installed and removed upon completion of Testhole.
2	-98-				SAND - fine to medium, light brown	2				
					End of Testhole at 2.1m					
3	-97-					3				
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Hole No. 02

LOG OF TESTHOLE 03

REF. No.: 90-3-T6	ENCLOSURE No. 7
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)		
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					50mm Split Spoon Sampler used.
1	-99-					1				75mm casing installed and removed upon completion of Testhole.
2	-98-				WATER	2				
3	-97-					3				
4	-96-					4				Rods settled through the loose organic sediment under their own weight. Unable to sample organics.
5	-95-				ORGANICS - Silty, very loose	5				
					CLAY (Marl) - Silty, light brown, very soft					
6	-94-				SAND - fine to medium	6				
					End of Testhole at 6.7m					
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

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Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 03

LOG OF TESTHOLE 04

REF. No.: 90-3-T6 | ENCLOSURE No. 8

CLIENT: CENTRE DE TECHNOLOGIE NORANDA | DRILLING DATA

PROJECT: SEDIMENT SAMPLING | METHOD: HAND DRILLING

LOCATION: SURPRISE LAKE, ONTARIO

SURFACE ELEVATION: 100.0 metres | DATE: March 28th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)		
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					50mm Split Spoon Sampler used.
1	-99-					1				
										75mm casing installed and removed upon completion of Testhole.
2	-98-				WATER	2				
3	-97-					3				
4	-96-					4				
					SAND - Silty, some organics, brown/black, loose					
5	-95-					5				
					CLAY (Marl) - Silty, trace sand & shells, light brown, soft					
					SAND - fine, grey					
6	-94-				End of Testhole at 5.8m	6				
7	-93-					7				

Bulk Sample | Wash Sample
Split Spoon | Rock Core
50mm Thin Wall Tube

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Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 04

LOG OF TESTHOLE 05

REF. No.: 90-3-T6	ENCLOSURE No. 9
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990

SUBSURFACE PROFILE						SAMPLES	VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
		% MOISTURE W_P W W_L		MATERIAL DESCRIPTION				
	100 ▽	10 20 30 40					20 40 60 80	
				ICE				Located in swamp area North of CNR tracks.
1	99			WATER		1		
				SAND - Silty, some organics, brown/black, very loose				50mm Split Spoon Sampler used.
2	98					2		
3	97					3		75mm casing installed and removed upon completion of Testhole.
				Amorphous PEAT - some embedded wood				
4	96					4		
				SILT - Sandy, some organics & embedded wood				
5	95			CLAY (Marl) - Silty, light brown, soft		5		
				SAND - fine, becoming coarser with depth, grey				
6	94					6		
				End of Testhole at 6.1m				
7	93					7		

Bulk Sample Wash Sample
Split Spoon Rock Core
50mm Thin Wall Tube

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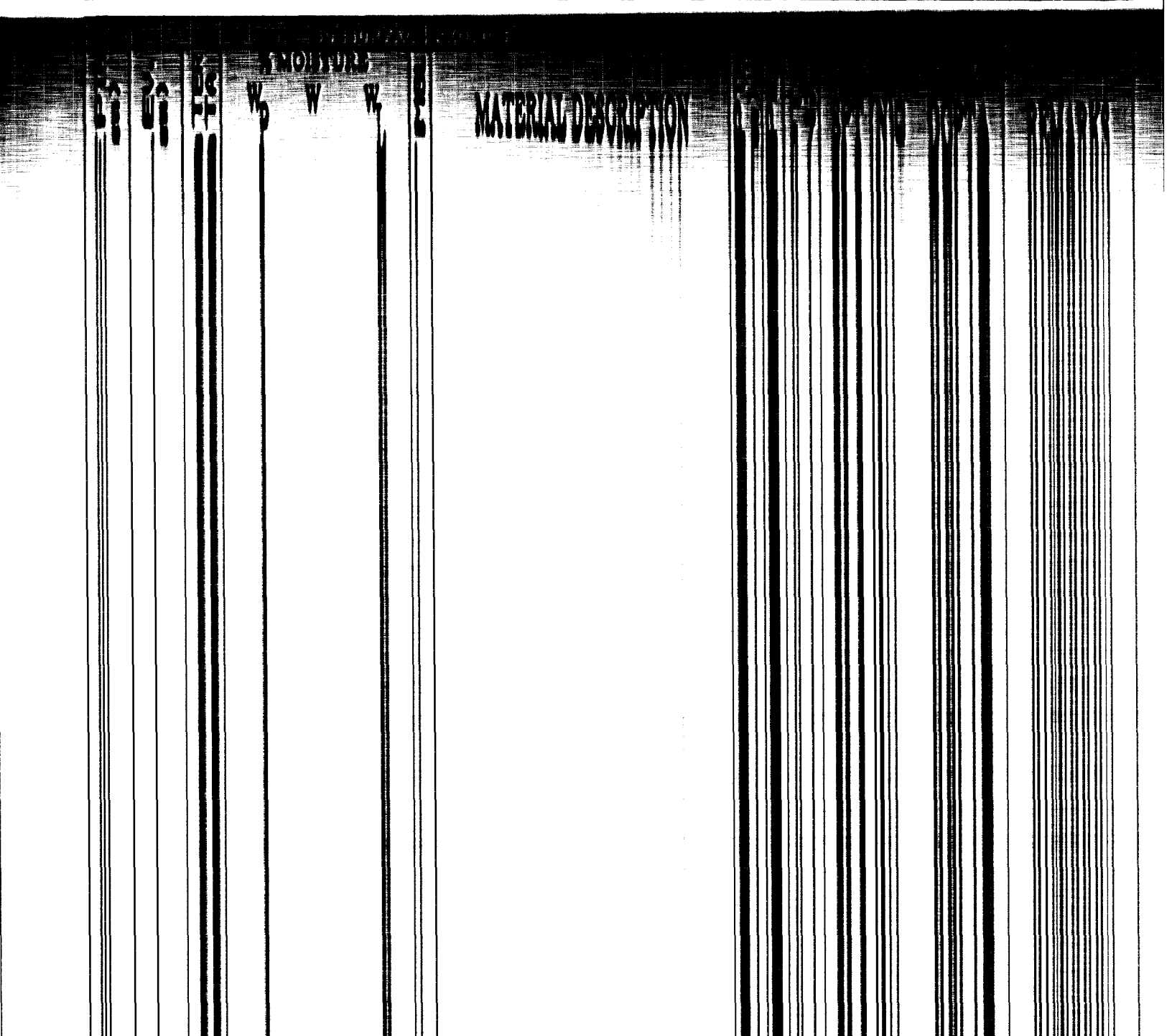
Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 05

LOG OF TESTHOLE 06

Job No.: 90-3-T6	ENCLOSURE No. 10
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990



LOG OF TESTHOLE 06

[redacted] No.: 90-3-T6	ENCLOSURE No. 10
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 28th, 1990

SUBSURFACE PROFILE							SAMPLES			VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L			SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	
	-100-	▽	10 20 30 40								20 40 60 80
							ICE				Located in swamp area North of CNR tracks.
1	-99-						WATER	1			
											50mm Split Spoon Sampler used.
2	-98-							2			
3	-97-							3			75mm casing installed and removed upon completion of Testhole.
4	-96-						SILT - some organics, trace sand, brown/black	4			
5	-95-							5			
6	-94-							6			
7	-93-						CLAY (Marl) - Silty, light brown, soft	7			End of Borehole at 7.4m.
							SAND - fine, grey				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

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Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 06

LOG OF TESTHOLE 07

REF. No.: 90-3-T6	ENCLOSURE No. 11
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	SAMPLES DEPTH (m)	SAMPLES TYPE	SAMPLES SPT (N)	VANE (kPa) × 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					50mm Split Spoon Sampler used.
					WATER					
1	-99-				SILT - some organics, dark brown, loose	1				
										75mm casing installed and removed upon completion of Testhole.
					CLAY (Marl) - Silty, trace sand, light brown, soft					
2	-98-					2				
					- - - -					
					- Sandy, some shells, firm					
3	-97-					3				
					SAND & GRAVEL - fine to coarse					
					End of Testhole at 3.6m					
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

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Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 07

LOG OF TESTHOLE 08

REF. No.: 90-3-T6

ENCLOSURE No. 12

CLIENT: CENTRE DE TECHNOLOGIE NORANDA

PROJECT: SEDIMENT SAMPLING

LOCATION: SURPRISE LAKE, ONTARIO

SURFACE ELEVATION: 100.0 metres

DRILLING DATA

METHOD: HAND DRILLING

DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES				
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L (10 20 30 40)	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	VANE (kPa) ✖ (20 40 60 80) SPT (N)□ DCPT▲ Blows/0.3m (20 40 60 80)	REMARKS
	-100-	▽			ICE					50mm Split Spoon Sampler used.
1	-99-				WATER	1				
2	-98-				SILT - some organics, brown/black, loose	2				75mm casing installed and removed upon completion of Testhole.
3	-97-					3				
4	-96-				CLAY (Marl) - Silty, trace embedded organics & sand, light brown, soft	4				
5	-95-				50mm Peaty ORGANICS SAND - fine to medium, grey	5				
					End of Testhole at 5.3m					
6	-94-					6				
7	-93-					7				

Bulk Sample | Wash Sample
Split Spoon | Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 08

LOG OF TESTHOLE 09

REF. No.: 90-3-T6	ENCLOSURE No. 13
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ×		
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	SPT (N)□ DCPT▲ Blows/0.3m		REMARKS
		▽	10 20 30 40						20 40 60 80		
1					Peaty ORGANICS/ROOTS	1					50mm Split Spoon Sampler used.
					25mm CLAY (Marl) @ 1.8m						
2					SAND & GRAVEL - grey	2					
					End of Testhole at 2.0m						
3						3					
4						4					
5						5					
6						6					
7						7					

Bulk Sample Wash Sample
Split Spoon Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 09

LOG OF TESTHOLE 10

REF. No.: 90-3-T6	ENCLOSURE No. 14
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES				
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	VANE (kPa) ✖ 20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					75mm Sampler used.
1	-99-				WATER	1				
2	-98-				SAND - Silty, some organics, brown/black	2				
3	-97-				CLAY (Marl) - Silty, light brown	3				
4	-96-				SAND - fine	4				
					End of Testhole at 4.5m					
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample | Wash Sample
Split Spoon | Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 10

LOG OF TESTHOLE 11

REF. No.: 90-3-T6	ENCLOSURE No. 15
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80	
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					75mm Sampler used.
					WATER					
1	-99-				SILT - Sandy, some organics, brown/black	1				
2	-98-				CLAY (Marl) - Silty, light brown	2				
3	-97-					3				
					SAND - fine					
4	-96-				End of Testhole at 3.7m	4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 11

LOG OF TESTHOLE 12

LOG OF TESTHOLE 12

REF. No.: 90-3-T6	ENCLOSURE No. 16
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES				
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	VANE (kPa) ✖ 20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					75mm Sampler used.
1	-99-				WATER	1				
					100mm Silty ORGANICS					
2	-98-				CLAY (Marl) - Silty, trace sand & roots, light brown	2				
3	-97-				SAND - fine	3				
					End of Testhole at 3.2m					
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

LOG OF TESTHOLE 13

REF. No.: 90-3-T6	ENCLOSURE No. 17
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80	
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L 10 20 30 40	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	SPT (N)□ DCPT▲ Blows/0.3m 20 40 60 80	REMARKS
	-100-	▽			ICE					75mm Sampler used.
1	-99-				WATER	1				
2	-98-				100mm Silty ORGANICS CLAY (Marl) - Silty, trace sand & roots, light brown	2				
3	-97-				SAND - fine	3				
					End of Testhole at 3.2m					
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 13

LOG OF TESTHOLE 14

REF. No.: 90-3-T6	ENCLOSURE No. 18
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L 10 20 30 40	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80	
	-100-	▽			ICE					75mm Sampler used.
1	-99-				WATER	1				
					100mm Silty ORGANICS					
2	-98-				CLAY (Marl) - Silty, trace sand & roots, light brown	2				
3	-97-				SAND - fine	3				
					End of Testhole at 3.2m					
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 14

LOG OF TESTHOLE 15

REF[illegible]: 90-3-T6	ENCLOSURE No. 19
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80	
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L 10 20 30 40	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	SPT (N)□ DCPT▲ Blows/0.3m 20 40 60 80	REMARKS
	100	▽			ICE					75mm Sampler used.
1	99				WATER	1				
2	98				ORGANICS - Silty, dark brown	2				
					SAND & ORGANICS - fine, grey					
3	97				CLAY (Marl) - Silty, trace sand & roots, light brown	3				
					SAND - fine					
					End of Testhole at 3.6m					
4	96					4				
5	95					5				
6	94					6				
7	93					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 15

LOG OF TESTHOLE 16

REF. No.: 90-3-T6	ENCLOSURE No. 20
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ×		REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m		
	-100-	▽	10 20 30 40						20 40 60 80		
					ICE						75mm Sampler used.
					WATER						
1	-99-				100mm Silty ORGANICS	1					
					CLAY (Marl) - Silty, trace sand & roots, light brown						
2	-98-				SAND - fine	2					
					End of Testhole at 2.3m						
3	-97-					3					
4	-96-					4					
5	-95-					5					
6	-94-					6					
7	-93-					7					

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 16

LOG OF TESTHOLE 17

REF. No.: 90-3-T6	ENCLOSURE No. 21
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES				
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	VANE (kPa) ✖ 20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					75mm Sampler used.
					WATER					
1	-99-				SAND - fine	1				
					End of Testhole at 1.5m					
2	-98-					2				
3	-97-					3				
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

LOG OF TESTHOLE 18

REF. No.: 90-3-T6	ENCLOSURE No. 22
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)		
	-100-	▽	10 20 30 40						20 40 60 80	
					ICE					75mm Sampler used.
1	-99-				WATER	1				
2	-98-				SILT - trace sand & organics, dark brown	2				
3	-97-					3				
					SAND - fine					
4	-96-				End of Testhole at 3.8m	4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample ▨ Wash Sample
Split Spoon ▩ Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1

Hole No. 18

LOG OF HANDPROBE 1

REF. No.: 90-3-T6	ENCLOSURE No. 23
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ✖ 20 40 60 80 / SPT (N)□ DCPT▲ Blows/0.3m	REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L 10 20 30 40	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80	
	-100-	▽			ICE					5 square cm rod pushed to depth.
					WATER					
1	-99-				50mm CLAY (Marl) SAND - fine	1				
2	-98-				End of Handprobe at 2.8m	2				
3	-97-					3				
4	-96-					4				
5	-95-					5				
6	-94-					6				
7	-93-					7				

Bulk Sample Wash Sample
Split Spoon Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

LOG OF HANDPROBE 2

REF. No.: 90-3-T6	ENCLOSURE No. 24
CLIENT: CENTRE DE TECHNOLOGIE NORANDA	DRILLING DATA
PROJECT: SEDIMENT SAMPLING	METHOD: HAND DRILLING
LOCATION: SURPRISE LAKE, ONTARIO	
SURFACE ELEVATION: 100.0 metres	DATE: March 29th, 1990

SUBSURFACE PROFILE						SAMPLES			VANE (kPa) ×		REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE W_P W W_L	SYMBL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80 SPT (N)□ DCPT▲ Blows/0.3m		
	-100-	▽	10 20 30 40						20 40 60 80		
					ICE						5 square cm rod pushed to depth.
					WATER						
1	-99-				50mm CLAY (Marl)	1					
					SAND - fine						
					End of Handprobe at 1.5m						
2	-98-					2					
3	-97-					3					
4	-96-					4					
5	-95-					5					
6	-94-					6					
7	-93-					7					

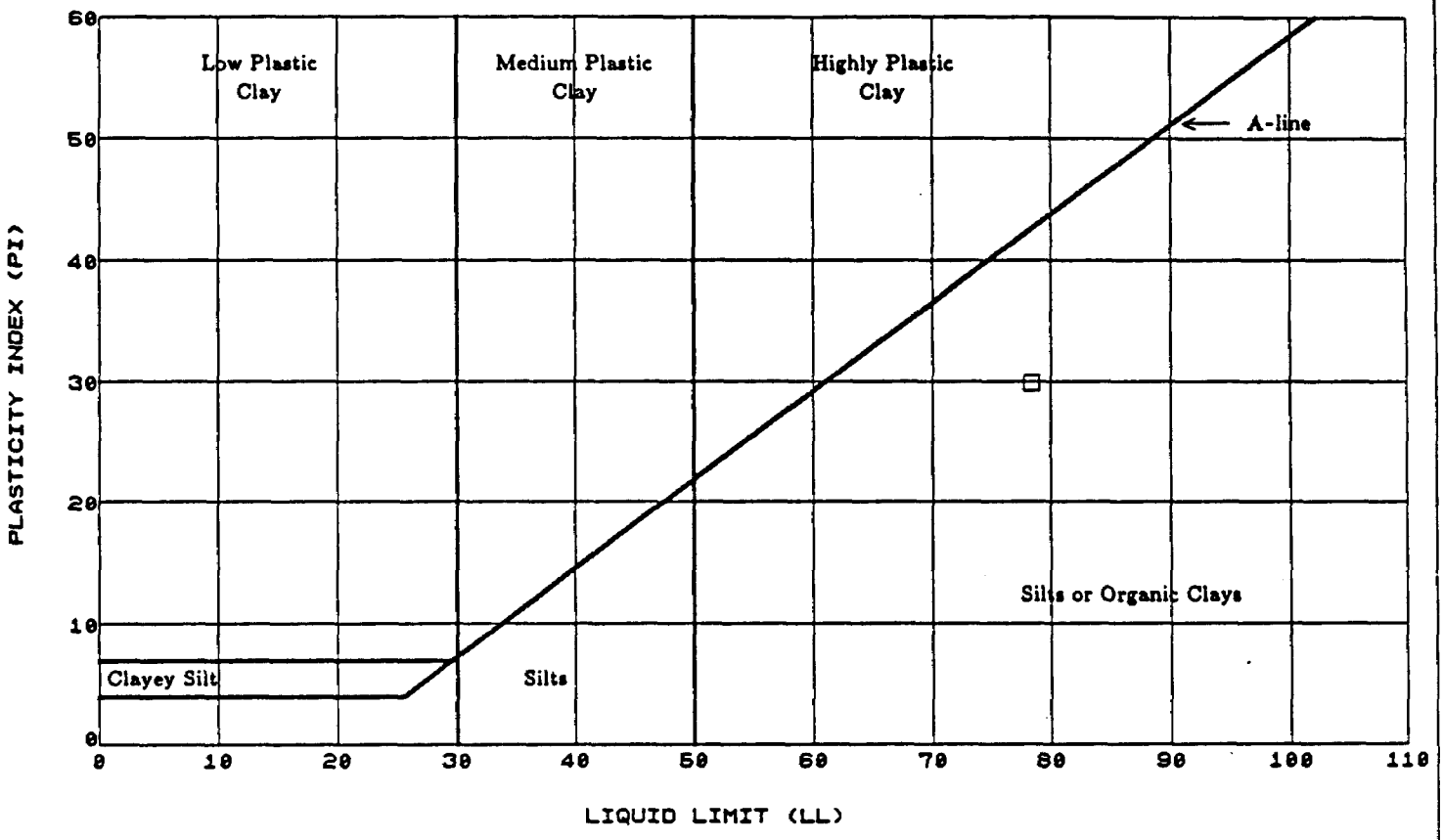
Bulk Sample Wash Sample
Split Spoon Rock Core
50mm Thin Wall Tube

DOMINION SOIL INVESTIGATION INC.

Vertical Scale: 1:40

Sheet 1 of 1 Hole No. 2

ATTERBERG LIMIT TEST RESULTS



LEGEND:		LL	PL	PI	NMC
□	TESTHOLE 08 MARL	76	49	30	117

April 1990

Reference No.: 90-3-T6

SEDIMENT SAMPLING - SURPRISE LAKE

DOMINION SOIL INVESTIGATION INC.

Enclosure 25

DOMINION SOIL INVESTIGATION INC.
CONSULTING SOIL & FOUNDATION ENGINEERS

THUNDER BAY
440 BALMORAL STREET, THUNDER BAY, ONTARIO P7C 5G8
TEL: (807) 623-2929
FAX: (807) 623-1782

HEAD OFFICE: Scarborough, Ontario
BRANCHES IN:
WATERLOO
LONDON
SARNIA
THUNDER BAY
WINDSOR

Mattabi Mines Limited
P.O. Box 190
Ignace, Ontario
P0T 1T0

INVOICE NO. 61757
INVOICE DATE 90 03 30
CLIENT NO 600191
JOB NO 90-3-T6
YOUR PURCHASE NO. 059575
TERMS: Payable On Presentation
Interest of 2% Per Month will be Charged on Overdue Accounts

SERVICES	
COPY-DO NOT PAY	
RECEIVED APR - 6 1990	
Re: Interim Invoice Sediment Sampling Surprise Lake Mattabi Mines	
TASK #1	
1.0 Project Organization, discussion with Noranda, MNR, Mattabi Mines and prospectors	
3 hrs @ $45.00/hr	$ 135.00
2.0 Fieldwork, including travel to site, daily travel to Ignace and sampling	
Manpower (2 persons) 88.5 hrs @ $45.00/hr	3,982.50
Truck Expense 938 kms @ $ .65/km	609.70
Equipment Rental 3 days @ $150.00/day	450.00
Meals & Accommodation 3.5 days @ $120.00/day	420.00
3.0 Materials	
75 mm ABS pipe, couplings and adhesive (receipt attached – no copy received.	
$483.40 + 15%	555.91
Total	$6,153.

Ministry of Northern Development and Mines
Ontario

Mining Act

2.13280

W9001-205

52G11NW0004 2.13280 ENGLISH LAKE

900

Report of Work
(Expenditures, Subsection 77(19))

should be submitted to Mining Lands Section, Mineral Development and Lands Branch.

(G2540) VALORA (G2565)

Type of Work Performed	Mining Division	Township or Area
SEDIMENT SAMPLING	KENORA	ENGLISH LAKE

Recorded Holder	Prospector's Licence No.
DOUG PARKER 2.13280	E 32324
Address	**Telephone No.**
365 LARK ST THUNDER BAY ONTARIO	807 345-3860

Work Performed By
DOMINION SOIL INVESTIGATION INC

Name and Address of Author (of Submission)	Date When Work was Performed
MIKE HANNUSCH 440 BALMORAL ST. THUNDER BAY P.Eng. 1648	From: 28 03 90 To: 02 03 90 (Day / Mo. / Yr.)

All the work was performed on Mining Claim(s): Indicate no. of days performed on each claim. *See Note No. 1 on reverse side

Mining Claim	No. of Days	Mining Claim	No. of Days	Mining Claim	No. of Days	Mining Claim	No. of Days	Mining Claim	No. of Days	Mining Claim	No. of Days
K1092548	40	1092550	80	1092551	110	1104222	180				

Instructions
Total days credits may be distributed at claim holder's choice. Enter number of days credits per claim in the expenditure days credit column (below).

Calculation of Expenditure Days Credits: Total Expenditures $ 6,153.11 ÷ 15 = Total Days Credits 410

Total Number of Mining Claims Covered by this Report of Work: 8

Mining Claims (List in numerical sequence). If space is insufficient, attach schedules with required information

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
K	1092547	20									
K	1092548	60									
K	1092549	60									
K	1092550	60									
K	1092551	60									
K	1104220	20									
K	1104221	60									
K	1084167	60									

RECEIVED
MAY 30 1990
MINING LANDS SECTION

Total Number of Days Performed	Total Number of Days Claimed	Total Number of Days to be Claimed at a Future Date
410	400	10

Certification of Beneficial Interest *See Note No. 2 on reverse side

I hereby certify that, at the time the work was performed, the claims covered in this report of work were recorded in the current recorded holder's name or held under a beneficial interest by the current recorded holder.	Date	Recorded Holder or Agent (Signature)
	25/04/90	D. Parker

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Address of Person Certifying	Telephone No.	Date	Certified By (Signature)
P.Eng. 1648	345-3860	25/04/90	D. Parker

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
400	May 3/90	Scott Rivett
	Date Approved as Recorded	Provincial Manager, Mining Lands
	See revised deed attached	

Received Stamp
KENORA MINING DIV.
RECEIVED
MAY 03 1990
AM ? PM
7 8 9 10 11 12 12 3 4 5 6

10541

87A (89/06)

Ontario

Ministry of Northern Development and Mines
Ministère du Développement du Nord et des Mines

880 Bay Street
3rd Floor
Toronto, Ontario
M5S 1Z8

(416) 965-4888

Your File: W9001-205
Our File : 2.13280

July 27, 1990

Mining Recorder
Ministry of Northern Development and Mines
808 Robertson Street
P.O. Box 5200
KENORA, Ontario
P9N 3X9

Dear Sir:

RE: Data for Expenditures submitted under Section 77(19) of the Mining Act R.S.O. 1980 on Mining Claims K 1092548 et al, in English Lake.

The enclosed statement of assessment work credits for Assaying has been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely

W.R. Cowan
Provincial Manager, Mining Lands
Mines & Minerals Division

DM/dvl
Enclosure

cc: Doug Parker
Thunder Bay, Ontario

Mike Hannusch
Thunder Bay, Ontario

Resident Geologist
Kenora, Ontario

Ministry of Northern Development and Mines

Technical Assessment Work Credits

File: 2.13280

Date: June 28, 1990

Mining Recorder's Report of Work No.: W9001-205

Recorded Holder: Doug Parker

Township or Area: English Lake

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	$4,800.91 SPENT ON SEDIMENT SAMPLING TAKEN FROM MINING CLAIMS:
Electromagnetic _____ days	K 1092548
Magnetometer _____ days	1092550
Radiometric _____ days	1092551
Induced polarization _____ days	1104221
Other _____ days	
Section 77 (19) See "Mining Claims Assessed" column	
Geological _____ days	
Geochemical _____ days	
Man days ☐ Airborne ☐	
Special provision ☐ Ground ☐	
☐ Credits have been reduced because of partial coverage of claims.	
☒ Credits have been reduced because of corrections to work dates and figures of applicant.	320.1 days credit allowed which may be grouped in accordance with Section 76(6) of the Mining Act R.S.O. 1980.

Special credits under section 77 (16) for the following mining claims

NOTE: Travel to and from work site as well as vehicle expenses are not applicable under Section 77(19)

No credits have been allowed for the following mining claims

☐ not sufficiently covered by the survey ☐ insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

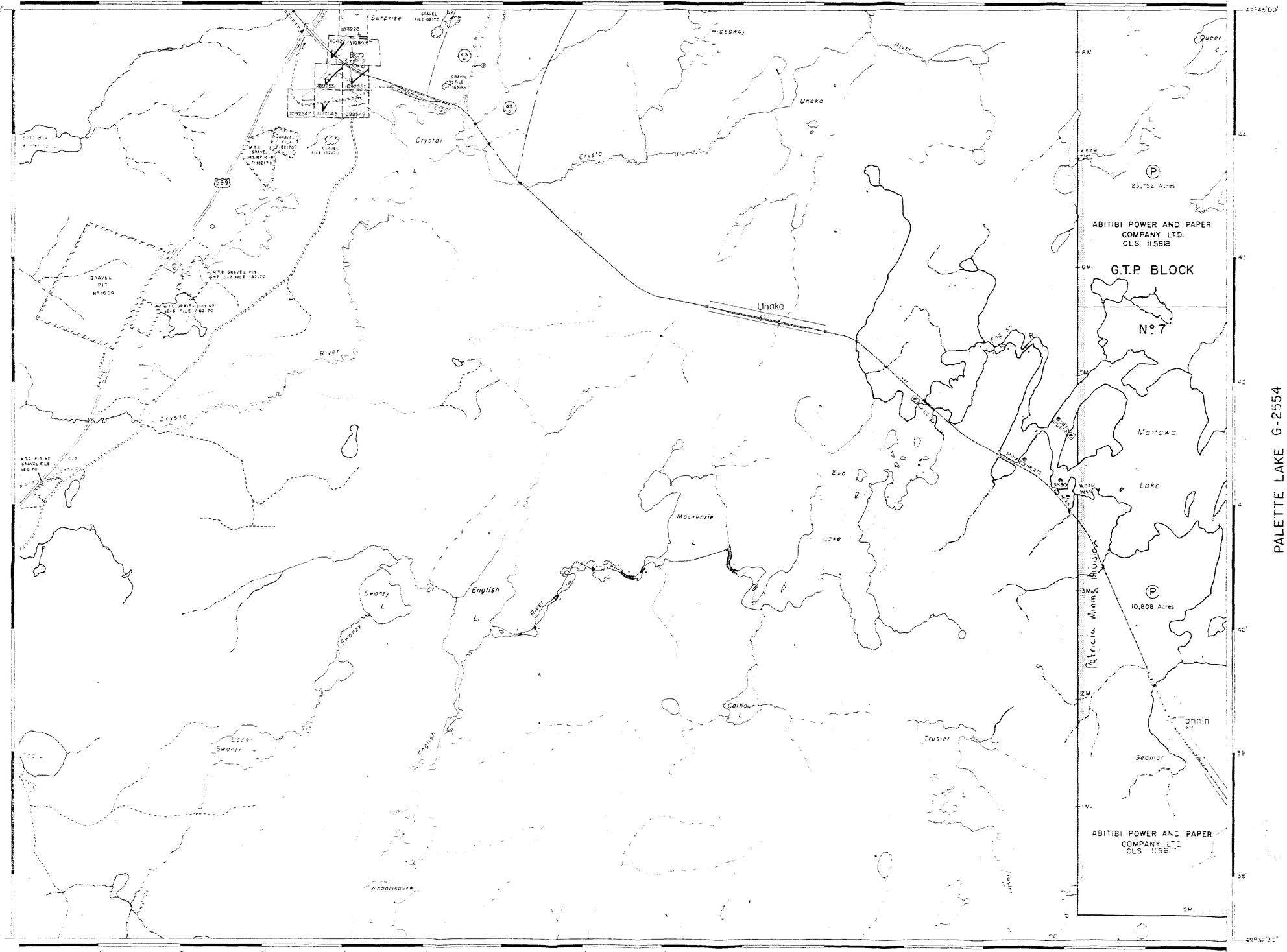
VALORA LAKE G-2565

2.13280

PASS LAKE G-2555

PALETTE LAKE G-2554

CAIRO LAKE G-2535



LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	(P) or ●
" SURFACE RIGHTS ONLY	●
" MINING RIGHTS ONLY	●
LEASE, SURFACE & MINING RIGHTS	(L) or ■
" SURFACE RIGHTS ONLY	■
" MINING RIGHTS ONLY	■
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	(R)
CANCELLED	(X)
SAND & GRAVEL	(G)

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913 VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1

REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.-S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
SECT 43E		19 /07	S.R.O.	182170

SAND AND GRAVEL

(G) QUARRY PERMIT

NOTE

SOUTH PART OF THE WEST PART OF G.T.P. BLOCK 7 ORIGINALLY IN THE DISTRICT OF RAINY RIVER PATENTED TO THE GRAND TRUNK PACIFIC Co., MARCH 31, 1909, REFERENCE 13928 AA, WAS AMENDED BY O.C. 2403/51 DATED NOVEMBER 1, 1951 (REFERENCE 13928 I) AND GRANTED BY QUIT CLAIM DEED DATED AUGUST 2, 1961, TO THE ABITIBI POWER AND PAPER Co. LTD. REFERENCE 115817 PARCELS PREVIOUSLY SOLD BY GRAND TRUNK (PACIFIC RAILWAY Co. AND EXCEPTED FROM THE QUIT CLAIM ARE UNDER THE ORIGINAL PATENT 13928AA

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 2000
1 KM. (2 KM.)

AREA
ENGLISH LAKE

M.N.R. ADMINISTRATIVE DISTRICT
IGNACE

MINING DIVISION
KENORA

LAND TITLES / REGISTRY DIVISION
KENORA

KENORA MINING DIV. RECEIVED MAY 19 1989 AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

Ministry of Natural Resources — Land Management Branch — Ontario

Date JANUARY, 1984

Number G-2540

M-3305

52G11NW0004 2.13280 ENGLISH LAKE

200

49691