



DOMINION SOIL
CONSULTING ENGINEERS

GEOCRES No:
52A-127

**INVESTIGATION OF TRACK MOVEMENT
MILE 28.3 KAMINISTQUIA SUBDIVISION
SUNSHINE, ONTARIO**

**February 1993
92-11-T13**

**Prepared For:
Canadian Pacific Limited
C.P. Rail
Lakehead Division
440 South Syndicate Avenue
Thunder Bay, Ontario
P7E 1E5**

Distribution

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February 17, 1993

Canadian Pacific Limited
C.P. Rail
Lakehead Division
440 South Syndicate Avenue
Thunder Bay, Ontario
P7E 1E5

Reference No.: 92-11-T13

Attention: P. Mauro, P. Eng.

Dear Sir:

Re: Investigation of Track Movement
Mile 28.3 Kaministiquia Subdivision
Sunshine, Ontario
Contract PLH-301

In accordance with the above noted contract Dominion Soil Investigation Inc. has completed the required investigation.

The south track at this location has experienced movements in the past. This extends over a distance (as reported to our field supervisor on site by Section Foreman Richard Daforge) from the Whistle Post west for 4 to 5 pole lengths. The area of most serious movement is located approximately 20 m west of the Whistle Post (at Boreholes 1, 2, 5).

The fieldwork, consisting of drilling and soil sampling of 7 boreholes, the installation of piezometers and the installation of 2 slope indicators, was conducted between January 19 and 28, 1993.

The locations of the boreholes and slope indicators are shown on the Borehole Location Plan, Enclosure 1. Ground surface elevations at the borehole locations were surveyed by Dominion Soil Investigation Inc. and referenced to the base of the north rail of the north track adjacent the Whistle Post (see Borehole Location Plan). The assigned elevation of the benchmark is 100.0 m.

The site plan attached is based on field sketching of the site features. It is understood that C.P. Rail will be carrying out an accurate survey at a later date.

The stratigraphy encountered at the borehole locations is shown on the individual Borehole Logs, Enclosures 4 to 10, Atterberg limit tests and grainsize analyses were conducted for classification purposes on a few soil samples and results are shown on Enclosures 11 and 12.

Casagrande type piezometers were installed in all boreholes and water levels taken January 28, 1993. The water levels and pertinent installation data are shown below in Table 1. Note where two piezometers are installed in one borehole, for identification the tip elevation is written on the piezometer tubing. Also a protective ABS casing (50 mm diameter X 1.2 m) with screw cap was installed around each piezometer tube near surface.

TABLE I
CASAGRANDE TYPE PIEZOMETER
INSTALLATION DATA AND WATER LEVEL

<u>LOCATION</u>	<u>TIP DEPTH</u> (m)	<u>SAND BACKFILL</u> (m)	<u>BENTONITE SEAL</u> (m)	<u>WATER LEVEL</u> 93 01 29	<u>REMARKS</u>
BH 1	11.3 8.1	9.7 - 11.3 7.6 - 8.1	9.3 - 9.7	7.3 Dry	Hole caved to 8.1 m Clay Backfill to Surface
1.2 m West of BH 2	10.7 6.4	9.1 - 10.7 4.6 - 6.4	8.7 - 9.1 4.1 - 4.6	7.4 7.3	Hole caved to 6.4 m
BH 3	9.3	8.4 - 9.3	8.1 - 8.4	7.6	Clay Backfill to Surface
BH 4	12.8 8.5	11.9 - 12.8 8.1 - 8.5	11.6 - 11.9	8.4 8.4	Hole caved to 8.5 m Clay Backfill to Surface
BH 5	6.6 2.1	5.8 - 6.6 1.5 - 2.1	5.5 - 5.8	1.2 1.2	Clay Backfill to 2.1 m Clay Backfill to Surface
BH 6	2.7	2.4 - 2.7	2.0 - 2.4	1.8	Hole caved to 27 m clay backfill to surface
BH 7	3.0	2.2 - 3.0	1.2 - 1.5	1.7	Clay Backfill 1.5 - 2.2 clay backfill 1.2 m to surface

Note: All measurements are taken from existing ground surface. See borehole logs for elevations.




Slope indicator casing was installed in Borehole 2 to a depth of 11.2 m and installed 1.2 m west of Borehole 5 to a depth of 7.1 m. Both slope indicator casings were installed beyond auger refusal, through boulders using washboring techniques and diamond tools. Casings were grouted from the bottom of the hole to surface with a sand/bentonite/cement grout.

A double set of initial readings was obtained for both slope indicators on January 28, 1993. We would be pleased to conduct further slope indicator and piezometer readings as required.

We trust the above satisfies the terms of our contract and ask you contact this office at your convenience should you require any further information.

Yours truly

For DOMINION SOIL INVESTIGATION INC.


Mike Fabius, P. Eng.
Branch Manager

MF:db



ENCLOSURES





FILE	DATE/STATE No. 1

MILE 28.3

KAMINISTUIQUIA SUB'D. ONTARIO

DATE	SCORE	APPROVED BY	OTHER USE
JAN. 1923	As Shown	R.C.	E.S.M.
PROJECT NO.	CLASS		
92-11-113	C.P. PAUL		

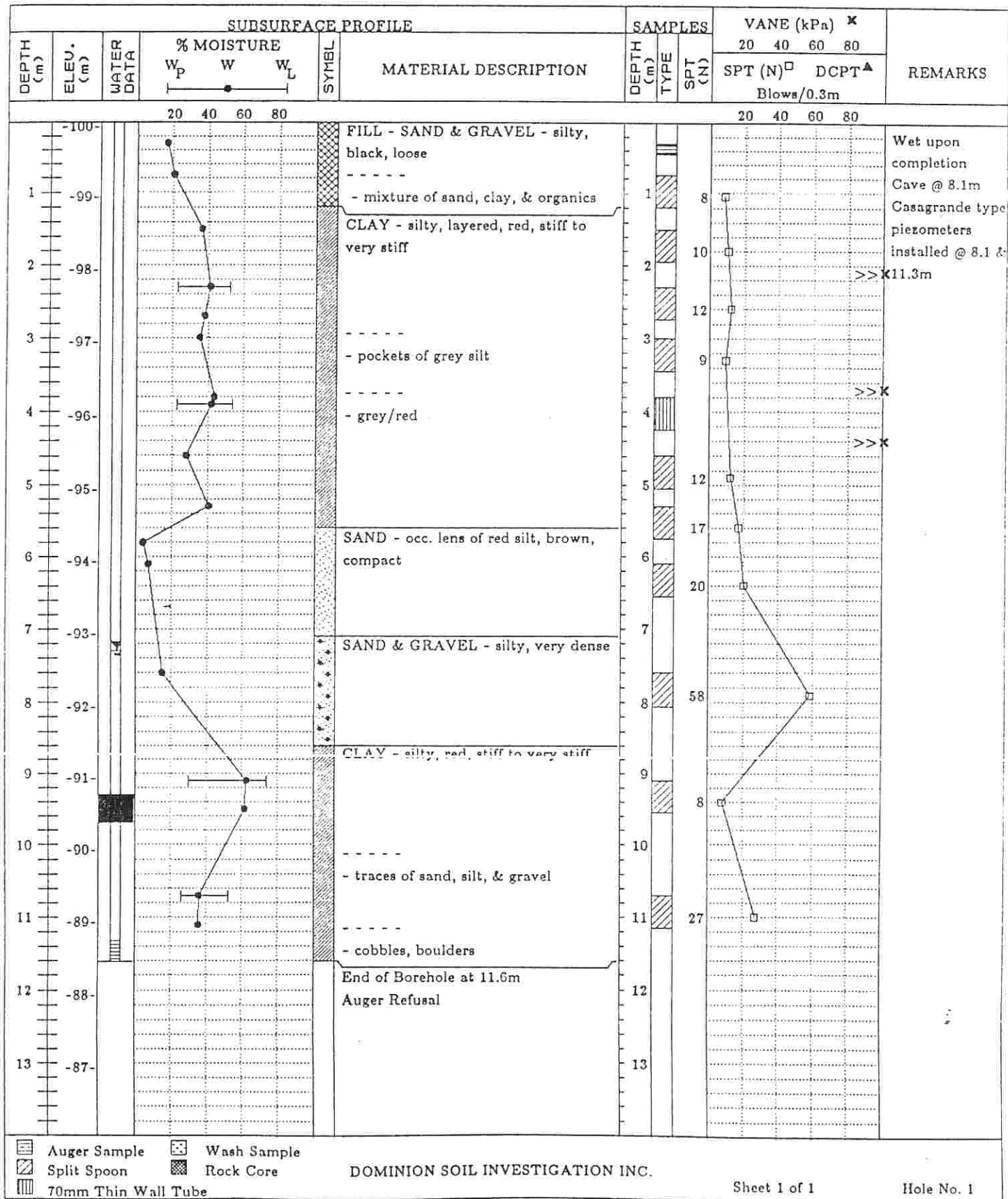
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SLOPE INDICATOR

APPROX. SCALE

LOG OF BOREHOLE 1

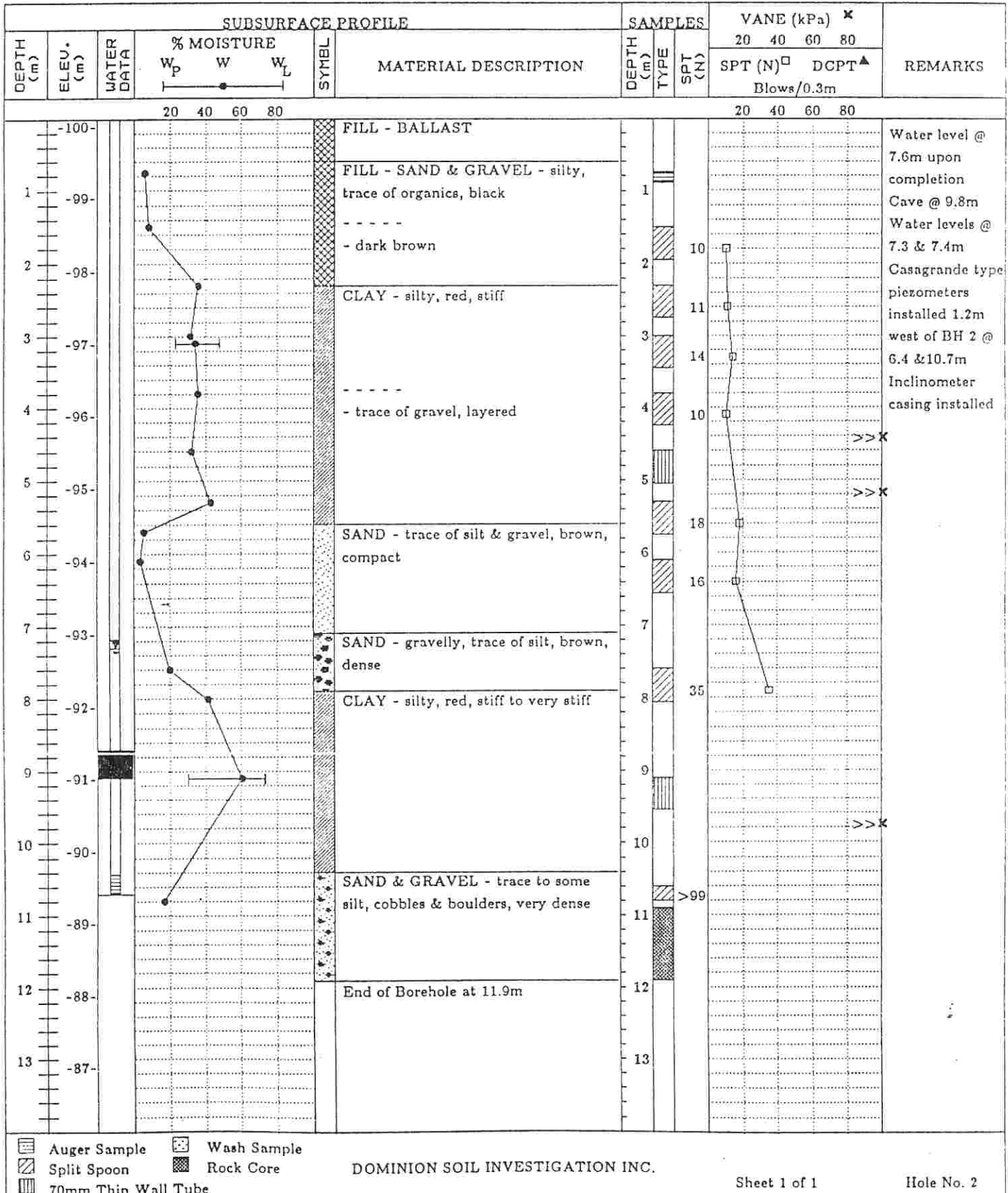
REF. No.: 92-11-T13	ENCLOSURE No. 2
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 100.1 metres	DATE: January 22nd, 1993



LOG OF BOREHOLE 2

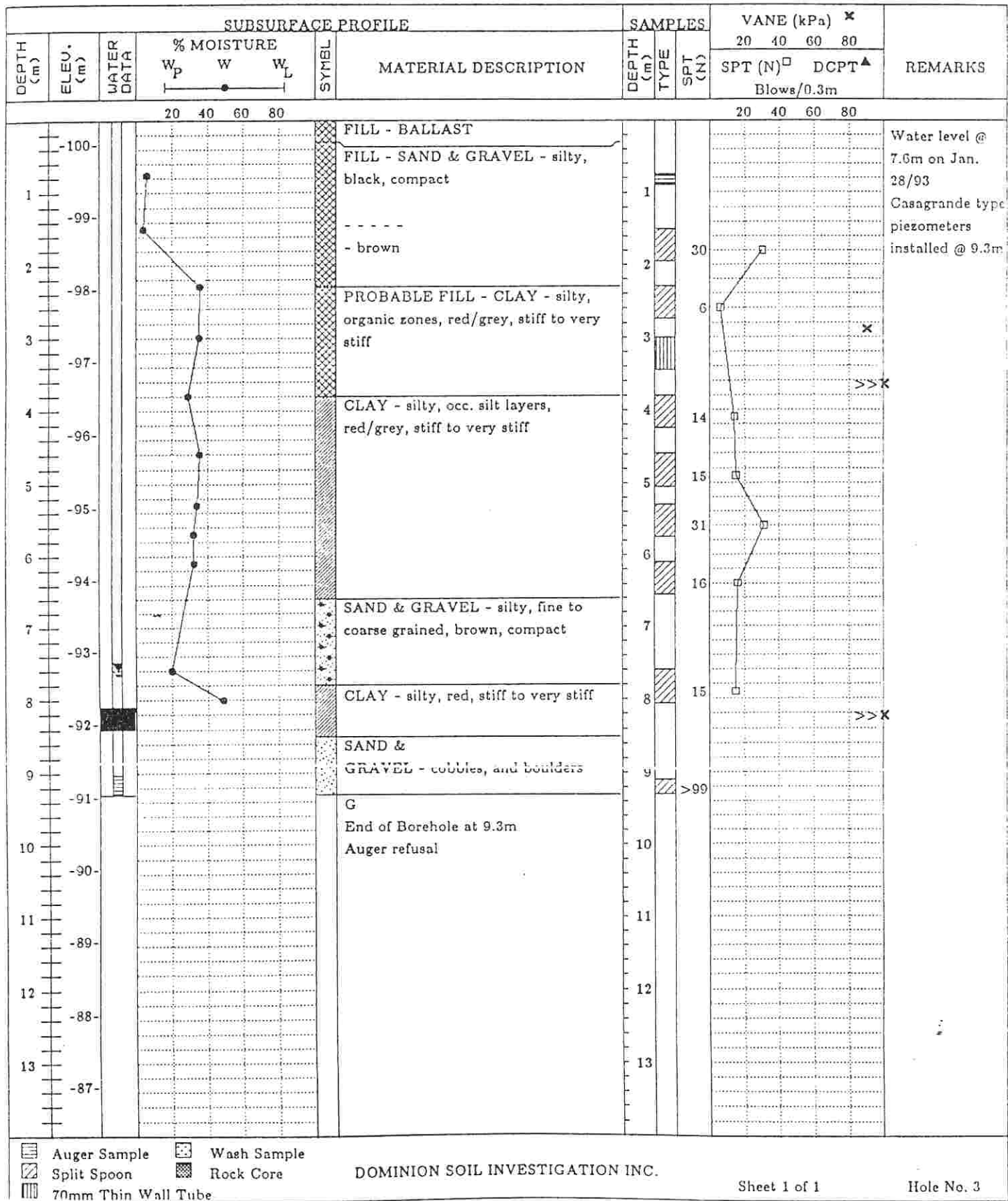
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REF. No.: 92-11-T13	ENCLOSURE No. 3
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTQUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 100.1 metres	DATE: January 19th, 1993



LOG OF BOREHOLE 3

REF. No.: 92-11-T13	ENCLOSURE No. 4
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIQUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 100.3 metres	DATE: January 21st, 1993



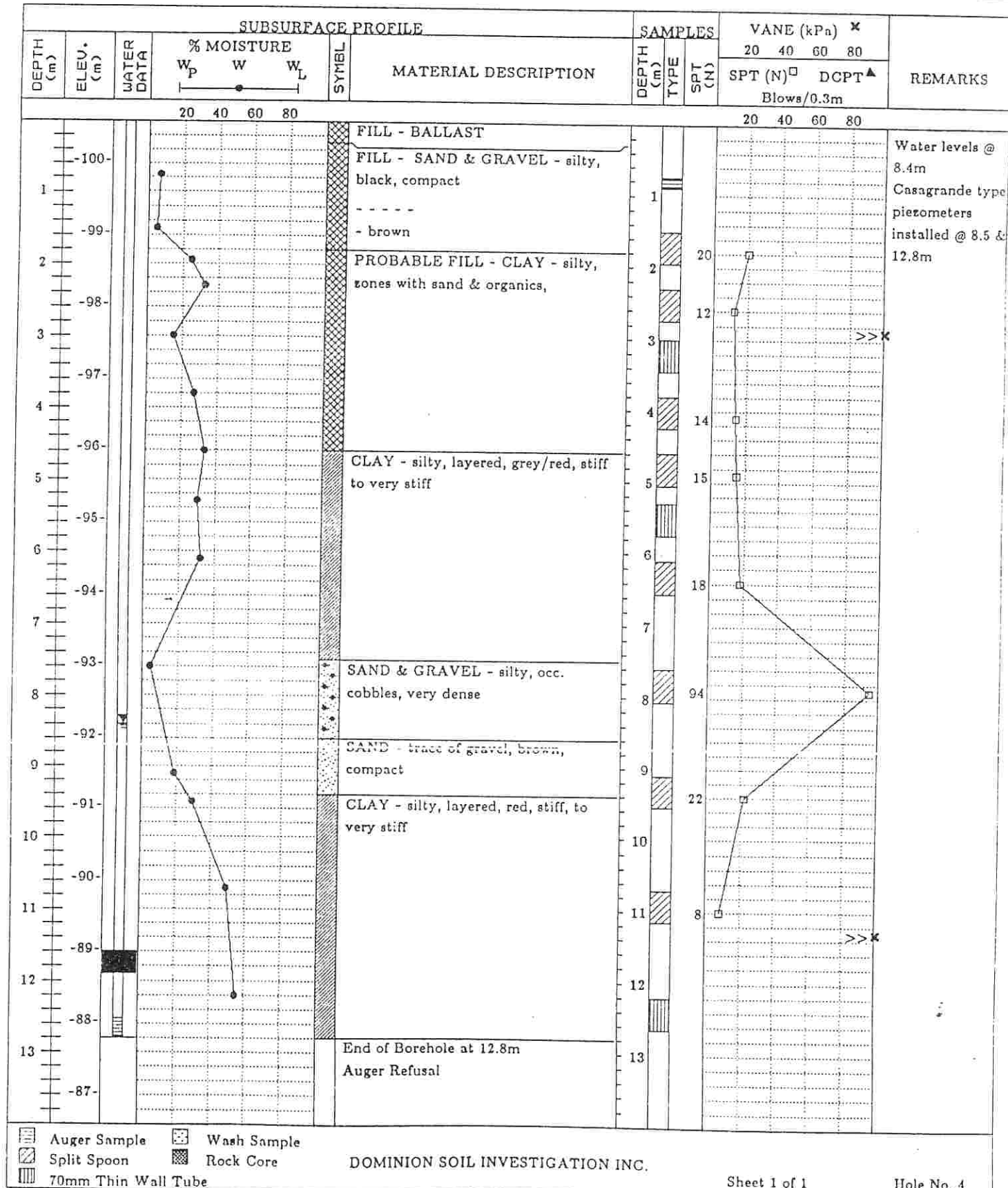
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Sheet 1 of 1

Hole No. 3

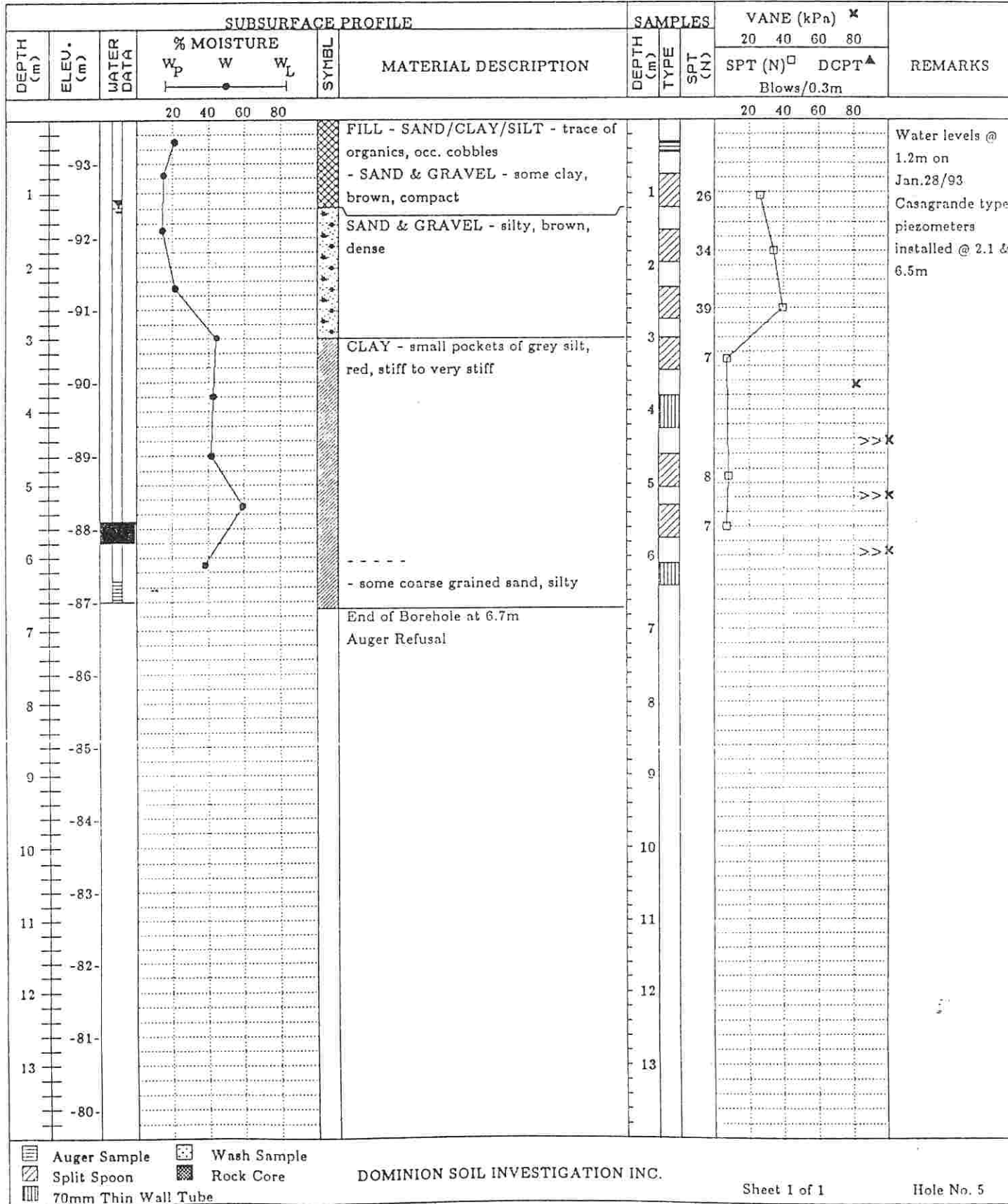
LOG OF BOREHOLE 4

REF. No.: 92-11-T13	ENCLOSURE No. 5
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 100.6 metres	DATE: January 22nd, 1993



LOG OF BOREHOLE 5

REF. No.: 92-11-T13	ENCLOSURE No. 6
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 93.6 metres	DATE: January 25th, 1993



LOG OF BOREHOLE 5A

REF. No.: 92-11-T13	ENCLOSURE No. 7
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 93.6 metres	DATE: January 25th, 1993

SUBSURFACE PROFILE								SAMPLES			VANE (kPa) ✕				REMARKS
DEPTH (m)	ELEV. (m)	WATER DATA	% MOISTURE			SYMBOL	MATERIAL DESCRIPTION	DEPTH (m)	TYPE	SPT (N)	20 40 60 80				
			W _P	W	W _L						SPT (N) □ DCPT ▲				
			20 40 60 80								Blows/0.3m				
								20 40 60 80							
1	-93						FILL - SAND/CLAY/SILT - trace of organics, occ. cobbles	1						Borehole 5A drilled 1.2m West of Borehole 5: Auger refusal @ 6.2m, hole advanced to 7.3m and inclinometer casing installed	
2	-92						- SAND & GRAVEL - some clay, brown, compact	2							
3	-91						SAND & GRAVEL - silty, brown, dense	3							
4	-90						CLAY - small pockets of grey silt, red, stiff to very stiff	4							
5	-89							5							
6	-88							6							
7	-87						- some coarse grained sand, silty	7							
8	-86						SAND & GRAVEL - cobbles & boulders	8							
9	-85						End of Borehole at 7.3m	9							
10	-84						Auger Refusal	10							
11	-83							11							
12	-82							12							
13	-81							13							
	-80														

Auger Sample
Split Spoon
70mm Thin Wall Tube

Wash Sample
Rock Core

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Sheet 1 of 1

Hole No. 5A

- Auger Sample
- Split Spoon
- 70mm Thin Wall Tube
- Wash Sample
- Rock Core

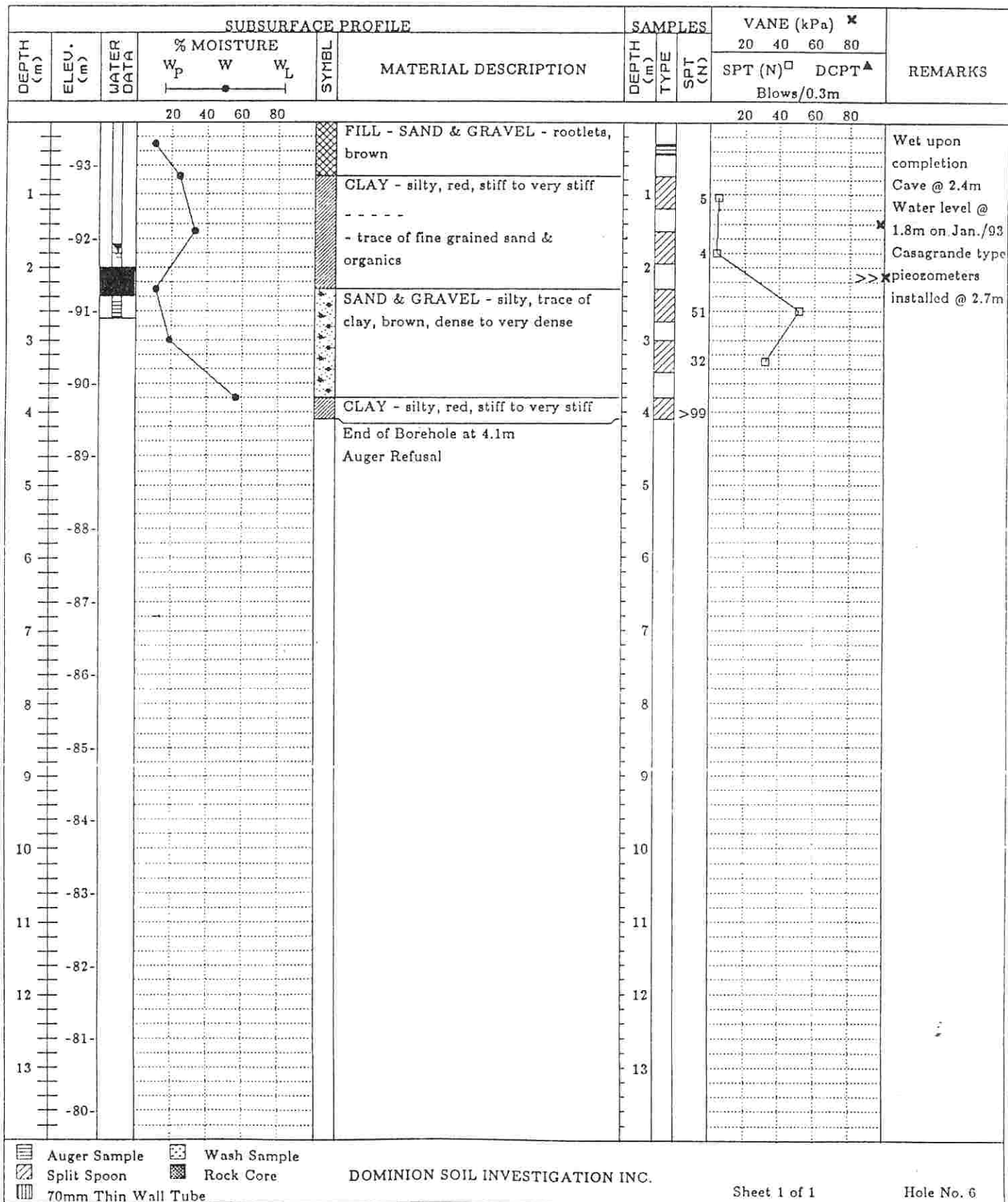
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Sheet 1 of 1

Hole No. 5A

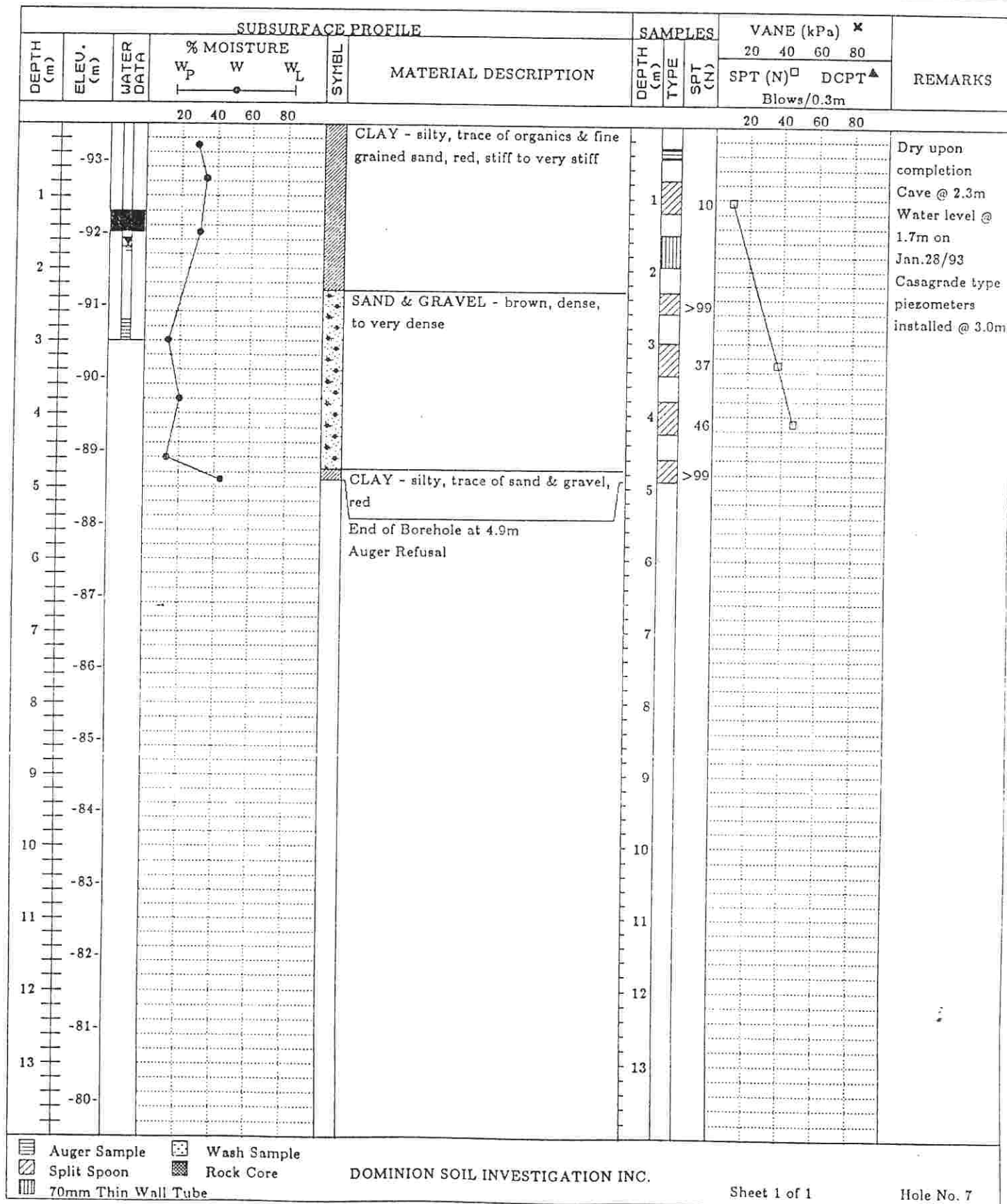
LOG OF BOREHOLE 6

REF. No.: 92-11-T13	ENCLOSURE No. 8
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 93.6 metres	DATE: January 27th, 1993

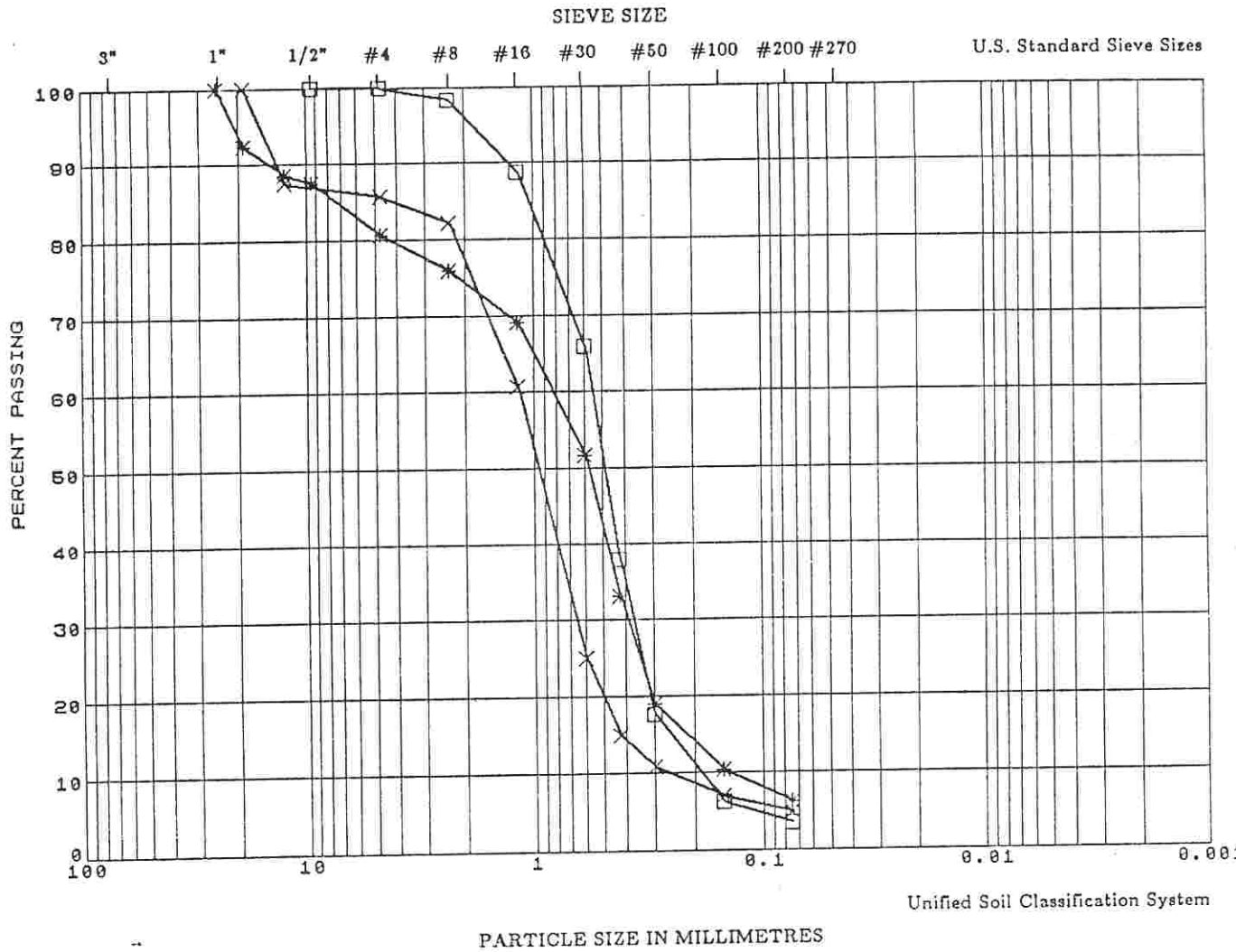


LOG OF BOREHOLE 7

REF. No.: 92-11-T13	ENCLOSURE No. 9
CLIENT: C. P. RAIL	DRILLING DATA
PROJECT: SLOPE STABILITY AT MILE 28.3	METHOD: HS AUGER
LOCATION: KAMINISTIGUIA SUB'D, ONTARIO	DIAMETER: 80mm id
SURFACE ELEVATION: 93.5 metres	DATE: January 27th, 1993



GRAINSIZE ANALYSIS



COBBLES	GRAVEL			SAND			SILT & CLAY
	coarse	medium	fine	coarse	medium	fine	

LEGEND: □ BOREHOLE 2 DEPTH 6.10
 * BOREHOLE 2 DEPTH 7.60
 X BOREHOLE 2 DEPTH 10.70

February 1993

Reference No. 92-11-T13

SLOPE STABILITY AT MILE 28.3 -



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ENCLOSURE 11