ORIGINAL LOGS WITH STRENGTH DATA

Dome Petroleum Ltd.

0306-34413

May, 1988

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2	SILT - grey to grey-brown, (mL) some clay, trace of fine sand, low plasticity		NF	
			Vx to Unfrozen	●
4			Vx to Unfrozen	
			NBE and Vx	▲ ●
6				
8			NBN to Unfrozen	
10	- as above			●
12	- wet to saturated		Not Frozen	
14				
16				
18				
20				
22	- as above			●
24				
26				
28				
30	Continued			

eda	ICE THICKNESS (ft.) 5	DATE 12/3/74 TECH. NR	HOLE Nº B-4
	WATER DEPTH (ft.) --	SEISMIC LINE 105	
	COMPLETION DEPTH (ft.) 37	SHOT HOLE Nº 190	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 / COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - as above (ML)		Not Frozen	
34				
36				
38	END OF HOLE			
40				
42				
44				
46				
48				
50				

eba	ICE THICKNESS (ft.) 5	DATE 12/3/74 TECH. NR	HOLE Nº B-4
	WATER DEPTH (ft.) --	SEISMIC LINE 105	
	COMPLETION DEPTH (ft.) 37	SHOT HOLE Nº 190	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4			Not Frozen	
6	SILT - medium grey, saturated, trace of clay, low plasticity organics (ml)			▲ ●
8				
10				
12	- wet, mottled brown			▲ ●
14				
16				
18				
20	- saturated, some organics			●
22				
24				
26	- 2" layer of organics			●
28				
30				
	Continued			

ICE THICKNESS (ft.)	6	DATE 6/4/74 TECH. NR	HOLE Nº D-1
WATER DEPTH (ft.)	8	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	111½	SHOT HOLE Nº 816	PAGE 1 OF 4

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - as above (ml)		Not Frozen	
34				
36				
38				
40	- medium grey, lenses of organics			
42				
44				
46				
48				
50				
52				
54	- clayey, low to medium plasticity, mottled brown			
56				
58				
60	Continued			

eba	ICE THICKNESS (ft.) 6	DATE 6/4/74 TECH. NR	HOLE Nº D-1
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 111½	SHOT HOLE Nº 816	PAGE 2 OF 4

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
62	- no returns			
64			Not Frozen	
66				
68				
70				
72				
74	CLAY - silty clay to clayey silt, well bedded, medium plasticity, grey (cl)			▲ ●
76				
78				
80				
82				
84				
86				
88				
90	Continued			

eba	ICE THICKNESS (ft.) 6	DATE 6/4/74 TECH. NR	HOLE Nº D-1
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 111½	SHOT HOLE Nº 816	PAGE 3 OF 4

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
92	- no returns		Not Frozen	
94				
96				
98				
100				
102				
104				
106				
108				
110	CLAY - moist, light grey, medium to high plasticity, (till) (cl)			▲ ●
112	END OF HOLE			
114				
116				
118				
120				

eba	ICE THICKNESS (ft.) 6	DATE 6/4/74 TECH. NR	HOLE Nº D-1
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 111½	SHOT HOLE Nº 816	PAGE 4 OF 4

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4				
6	SILT - saturated, dark grey (ml)		Not Frozen	▲ ●
8				
10				
12				
14				
16	- same			●
18				
20				
22				▲ ●
24				
26				
28				
30	Continued			

eba	ICE THICKNESS (ft.) 6½	DATE 7/4/74 TECH. NR	HOLE Nº D-2
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - wet to saturated medium grey		Not Frozen	
34				
36				
38				
40	- dark grey, trace of clay			
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

EGA	ICE THICKNESS (ft.) 6½	DATE 7/4/74 TECH. NR	HOLE Nº D-2
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4				
6	SILT - saturated, medium grey (ml)	X	Not Frozen	▲ ●
8				
10	- moist	X		▲ ●
12				
14				
16		X		▲ ●
18				
20	- wet			●
22				
24				
26				
28				
30				

ICE THICKNESS (ft.)	6	DATE 7/4/74 TECH. NR	HOLE Nº D-3
WATER DEPTH (ft.)	8	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	4½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - moist medium grey, fine bedding		Not Frozen	
34				
36				
38				
40	- some clay to clayey			
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

eba	ICE THICKNESS (ft.) 6	DATE 7/4/74 TECH. NR	HOLE Nº D-3
	WATER DEPTH (ft.) 8	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4	SILT - saturated, wet to saturated, loose (ml)		Not Frozen	
6				
8				
10	- same			
12				
14				
16	- medium grey, loose, wet, trace clay, low plasticity			
18				
20				
22				
24				
26				
28				
30				

ICE THICKNESS (ft.)	5	DATE 1/4/74 TECH. NR	HOLE Nº D-4
WATER DEPTH (ft.)	7	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - medium to dark grey, wet to moist, very loose (ml)		Not Frozen	
34				
36				
38				
40	- some organic layering			▲ ●
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

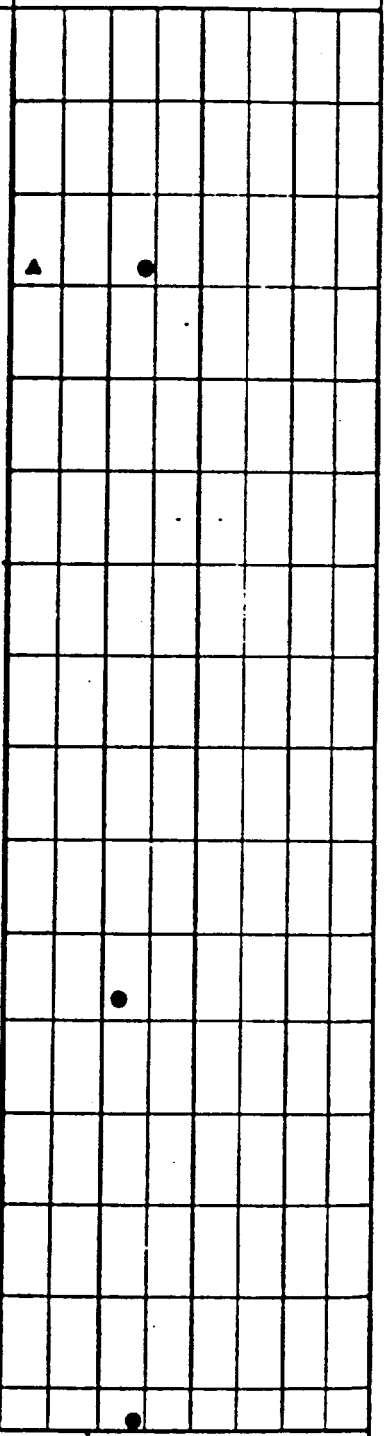
eoa	ICE THICKNESS (ft.) 5	DATE 1/4/74 TECH. NR	HOLE Nº D-4
	WATER DEPTH (ft.) 7	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION
	SEA BOTTOM		
2			Not Frozen
4			
6	SILT - light grey, very loose saturated, trace of clay, low plasticity, some organics (ml)		
8			
10			
12			
14			
16			
18			
20			
22	- wet, compact, medium brown, trace of clay, low plasticity		Possibly Some Frozen Material
24			
26			
28	- loose, wet		Not Frozen
30			

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3



eoa	ICE THICKNESS (ft.) 6	DATE 4/7/74 TECH. NR	HOLE Nº D-5
	WATER DEPTH (ft.) 7	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ● 1 2 3
	CONTINUED			
32	SILT - as above		Not Frozen	
34	(ml)			
36				
38				
40	- loose to compact, wet			▲ ●
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

eoa	ICE THICKNESS (ft.) 6	DATE 4/7/74 TECH. NR	HOLE Nº D-5
	WATER DEPTH (ft.) 7	SEISMIG LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ (10 20 30 40 50 60 70) COMP. STRENGTH T.S.F. ■ (1 2 3)
	SEA BOTTOM			
2				
4				
6	SILT - loose, wet to moist medium grey (ml)		Not Frozen	▲ ●
8				
10				▲ ⊢●
12				
14				
16	- loose to compact			●
18				
20	- loose			▲ ●
22				
24				
26				
28				
30	Continued			

ICE THICKNESS (ft.)	5½	DATE 7/4/74 TECH. NR	HOLE Nº D-6
WATER DEPTH (ft.)	7	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - loose, wet, medium grey		Not Frozen	
	(ml)			
34				
36				
38				
40				
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

eba	ICE THICKNESS (ft.)	5½	DATE 7/4/74 TECH.	NR
	WATER DEPTH (ft.)	7	SEISMIC LINE	106
	COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº	816

HOLE Nº D-6

PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4				
6	SILT - medium grey, loose saturated (ml)			▲ ●
8				
10				
12			Not Frozen	●
14				
16				
18				
20				
22				
24	- dark grey, same as above			●
26				
28				
30				

ICE THICKNESS (ft.)	5½	DATE 4/7/74 TECH.	NR
WATER DEPTH (ft.)	7½	SEISMIC LINE	106
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº	816

HOLE Nº D-7

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - moist to wet, dark grey		Not Frozen	
34				
36				
38				
40				
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

ICE THICKNESS (ft.)	5½	DATE 4/7/74 TECH. NR	HOLE Nº
WATER DEPTH (ft.)	7½	SEISMIC LINE 106	D-7
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2			Not Frozen	
4				
6	SILT - light grey, wet to saturated (ML)			▲ ●
8				
10	- layers of organics			▲ ●
12				
14				
16				
18				
20				▲ ●
22	- medium grey, saturated			
24				
26	- loose			
28				
30				

ICE THICKNESS (ft.)	6	DATE 5/4/74 TECH. NR	HOLE Nº
WATER DEPTH (ft.)	7	SEISMIC LINE 106	D-8
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - dark grey, some organic layers, saturated (ml)		Not Frozen	
34				
36				
38				
40				
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

ICE THICKNESS (ft.)	6	DATE 5/4/74 TECH. NR	HOLE Nº D-8
WATER DEPTH (ft.)	7	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4	SILT - medium grey,			
6	- moist to wet, loose, trace of clay, low plasticity (ml)			
8				
10			Not Frozen	
12				
14				
16				
18				
20	- wet to saturated			
22				
24				
26				
28				
30				

eoa	ICE THICKNESS (ft.)	6½	DATE 5/4/74 TECH. NR	HOLE Nº D-9
	WATER DEPTH (ft.)	7	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - layers of organics, moist, dark grey, trace of clay, low plasticity (ml)		Not Frozen	▲
34				
36				●
38				
40	- medium brown, trace of clay, some very fine sand			▲ ●
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

eba	ICE THICKNESS (ft.) 6½	DATE 5/4/74 TECH. NR	HOLE Nº D-9
	WATER DEPTH (ft.) 7	SEISMIC LINE 106	
	COMPLETION DEPTH (ft) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4				
6	SILT - dark grey, trace of clay saturated, low plasticity (ml)		Not Frozen	▲ ●
8				
10	- light grey, moist to wet, trace fine sand			●
12				
14				
16				
18				
20				
22				
24	- dark grey, trace of clay, low plasticity			
26				▲ ●
28				
30				●

ICE THICKNESS (ft.)	6½	DATE 5/4/74 TECH. NR	HOLE Nº D-10
WATER DEPTH (ft.)	7½	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - medium grey, wet to saturated, trace of clay, low plasticity (ml)		Not Frozen	
34				
36				
38				
40	- some organics, compact, sandy	X		▲ ●
42	END OF HOLE			
44				
46				
48				
50				
52				
54				
56				
58				
60				

eba	ICE THICKNESS (ft.) 6½	DATE 5/4/74 TECH. NR	HOLE Nº D-10
	WATER DEPTH (ft.) 7½	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2	SILT - wet to saturated, dark grey, trace of clay and fine sand, loose, low plasticity (ml)		Not Frozen	
4				
6				
8				
10	- medium brown			
12				
14				
16				
18				
20	- saturated, medium to dark grey			
22				
24				
26				
28				
30				

ICE THICKNESS (ft.)	5	DATE 5/4/74 TECH.	NR
WATER DEPTH (ft.)	6½	SEISMIC LINE	106
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº	816

HOLE Nº D-11

PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - as above, compact (ml)		Not Frozen	
34				
36				
38				
40	SAND - silty, compact, organics (sm)			
42	END OF HOLE			
44				
46				
48				
50				
52				

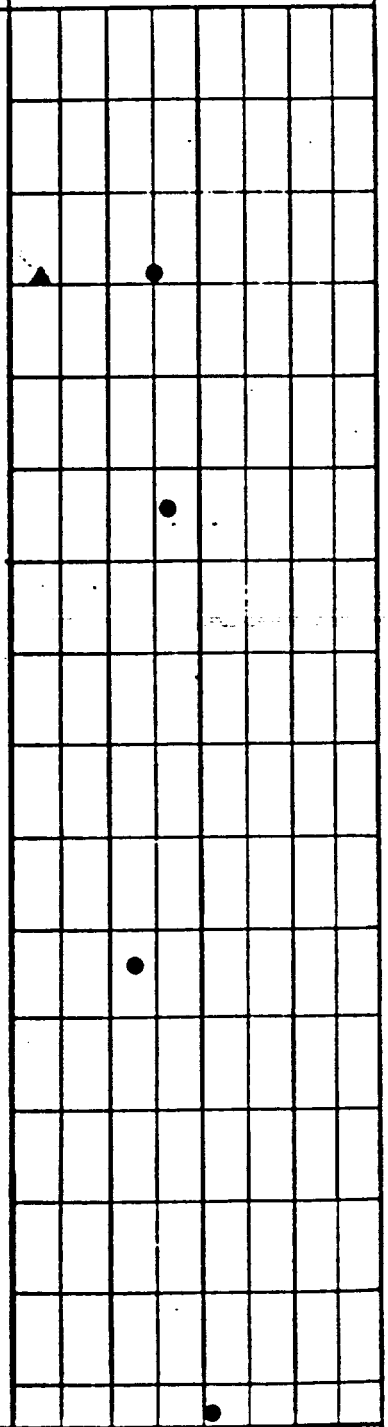
eba	ICE THICKNESS (ft.) 5	DATE 5/4/74 TECH. NR	HOLE Nº D-11
	WATER DEPTH (ft.) 6½	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

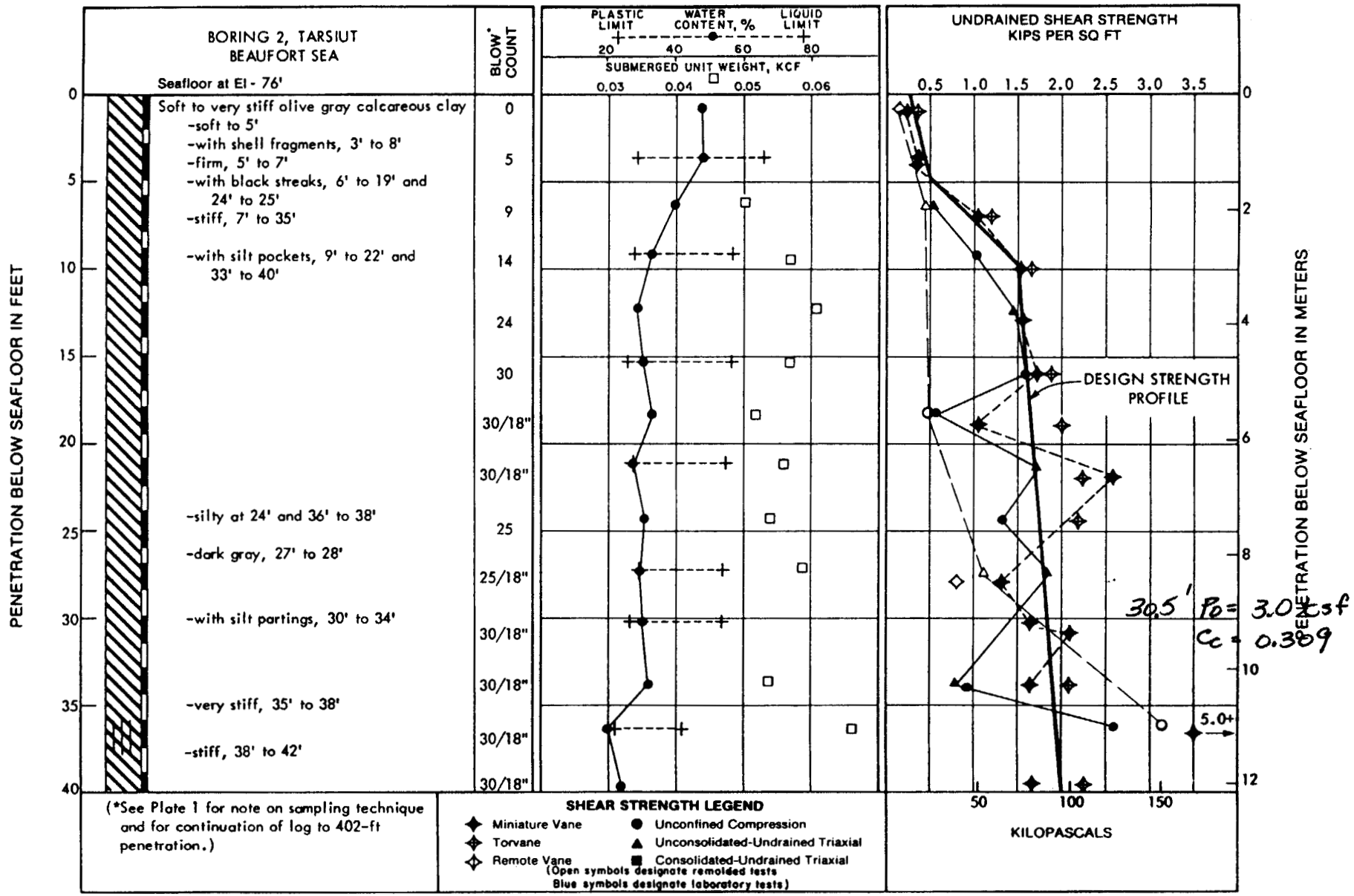
TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION
	SEA BOTTOM		
2	SILT - dark grey, loose, wet, low plasticity, trace of clay, organics (ml)		Not Frozen
4			
6			
8			
10			
12			
14			
16			
18			
20	- light grey		
22			
24			
26			
28			
30			

MOISTURE CONTENT % ●
SPT RESISTANCE ▲
10 20 30 40 50 60 70
COMP. STRENGTH T.S.F. ■
1 2 3

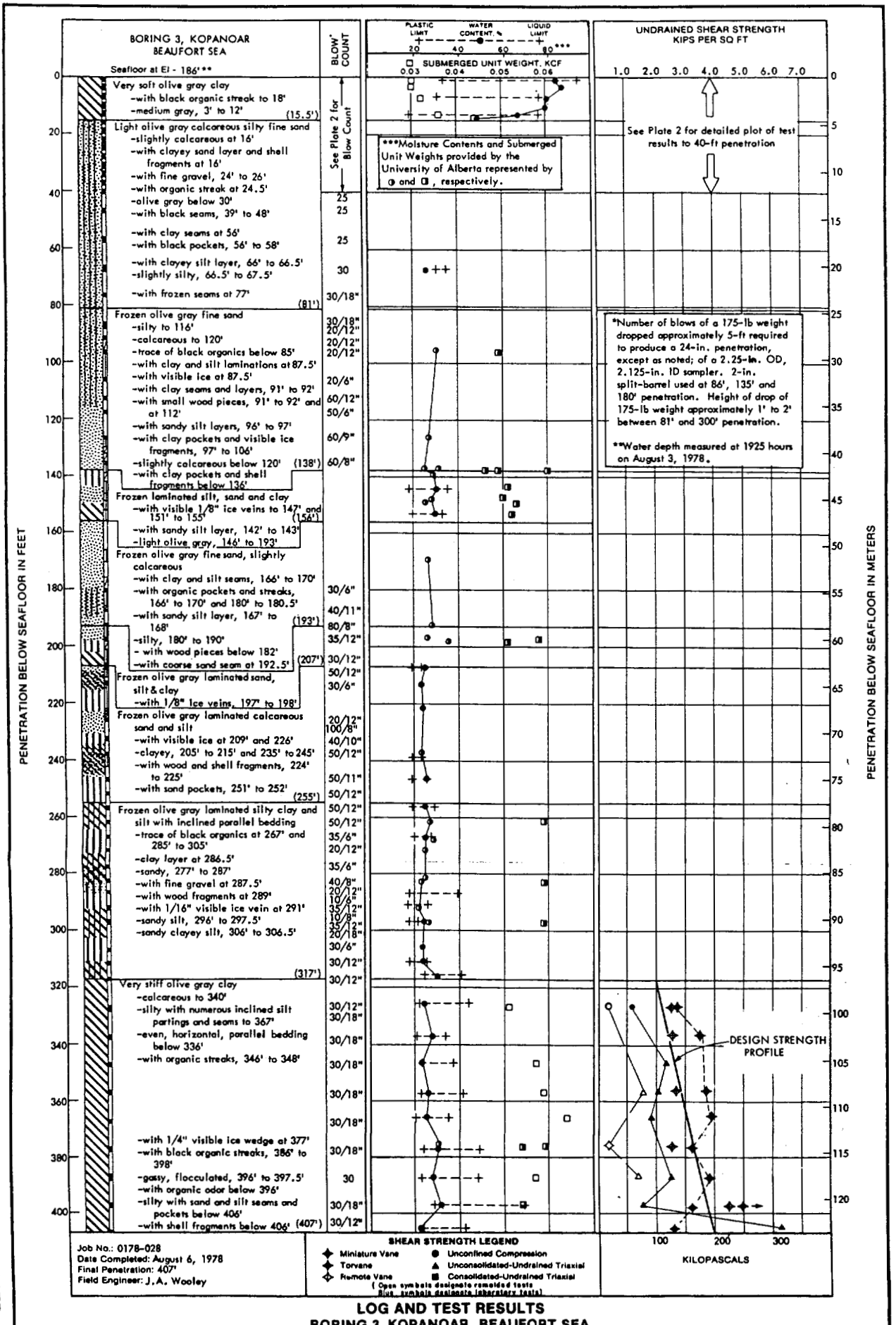


eoa	ICE THICKNESS (ft.)	6	DATE 3/4/74 TECH.	NR	HOLE Nº
	WATER DEPTH (ft.)	7	SEISMIC. LINE	106	D-12
	COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº	816	PAGE 1 OF 2



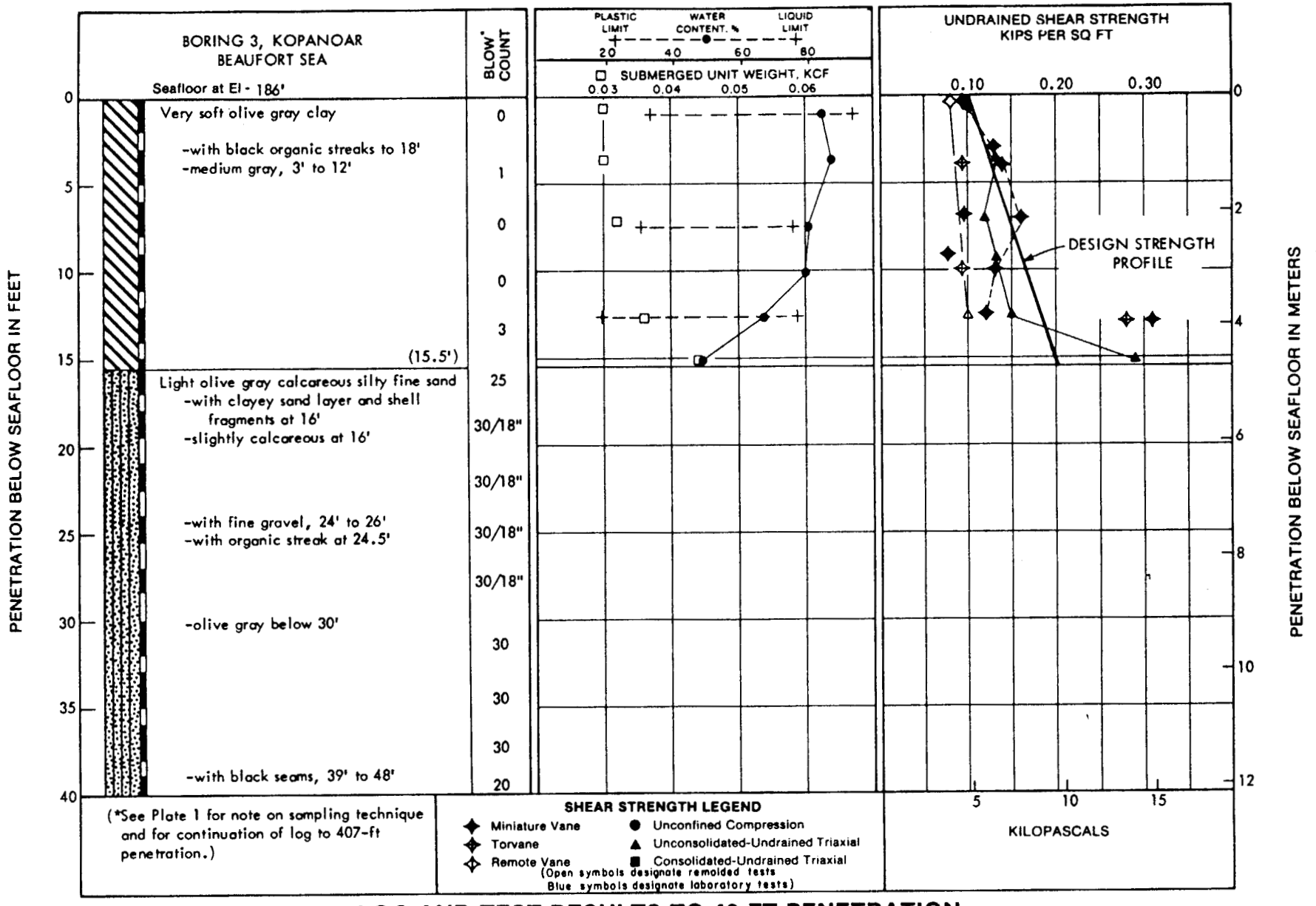
LOG AND TEST RESULTS TO 40-FT PENETRATION
BORING 2, TARSIUT
BEAUFORT SEA

PLATE 2



LOG AND TEST RESULTS
BORING 3, KOPANOAR, BEAUFORT SEA

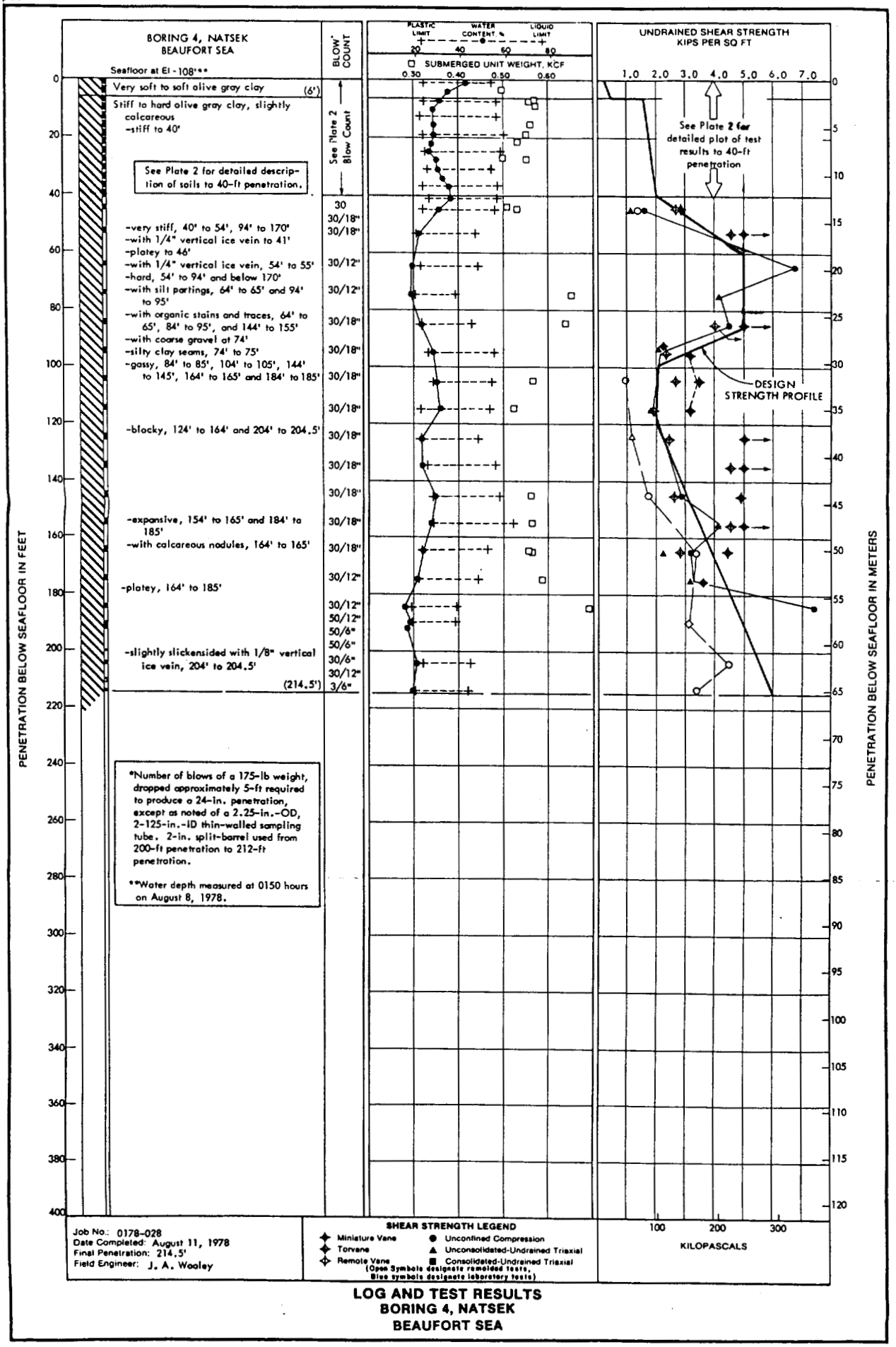
PLATE 1



LOG AND TEST RESULTS TO 40-FT PENETRATION

BORING 3, KOPANOAR
BEAUFORT SEA

PLATE 2



LOG AND TEST RESULTS
BORING 4, NATSEK
BEAUFORT SEA

MacClelland

PLATE 1

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - loose, wet, low plasticity, dark grey, trace of clay (ml)		Not Frozen	
34				
36				
38				
40	- medium brown, sandy			▲ ●
42	END OF HOLE			
44				
46				
48				
50				

eoa	ICE THICKNESS (ft.) 6	DATE 3/4/74 TECH. NR	HOLE Nº D-12
	WATER DEPTH (ft.) 7	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4	SILT - loose, medium to dark grey, trace of clay, low plasticity, organics (ml)		Not Frozen	
6				
8				
10				
12	- compact			
14				
16	- loose wet			
18				
20				
22				
24				
26				
28				
30				

eda	ICE THICKNESS (ft.) 5	DATE 3/4/74 TECH. NR	HOLE Nº D-13
	WATER DEPTH (ft.) 5½	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - medium to dark grey, wet to saturated, low plasticity, organics, trace of clay (ml)		Not Frozen	
34				
36				
38				
40	- compact			▲ ●
42	END OF HOLE			
44				
46				
48				
50				

eda	ICE THICKNESS (ft.) 5	DATE 3/4/74 TECH. NR	HOLE Nº D-13
	WATER DEPTH (ft.) 5½	SEISMIC LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	SEA BOTTOM			
2				
4	SILT - medium to dark grey, loose, wet, trace of clay and fine sand, low plasticity (ml)		Not Frozen	▲ ●
6				
8				
10				
12				
14				
16				
18				
20	- as above			
22				●
24				
26				
28				
30				

ICE THICKNESS (ft.)	5½	DATE 3/4/74 TECH. NR	HOLE Nº D-14
WATER DEPTH (ft.)	7	SEISMIC LINE 106	
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

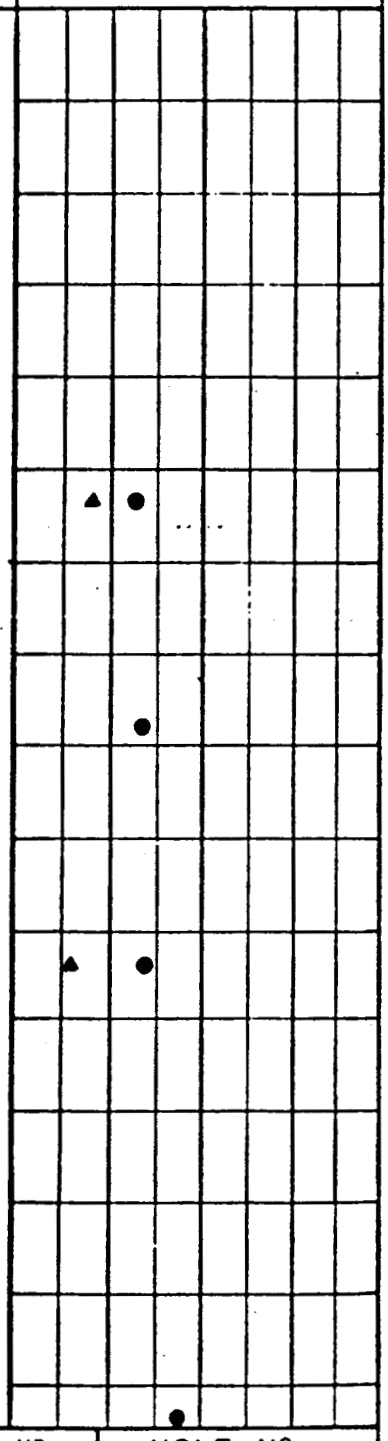
DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 / COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32			Not Frozen	
34				
36				
38	SILT - dark grey, loose, low plasticity, wet to saturated, trace of (ml) clay and fine sand			
40		X		▲ ●
42	END OF HOLE			
44				
46				
48				
50				

eoa	ICE THICKNESS (ft.) 5½	DATE 3/4/74 TECH. NR	HOLE Nº D-14
	WATER DEPTH (ft.) 7	SEISMIC · LINE 106	
	COMPLETION DEPTH (ft.) 41½	SHOT HOLE Nº 816	PAGE 2 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION
	SEA BOTTOM		
2			Not Frozen
4	SILT - dark grey, wet, loose, trace of fine sand, trace of clay, low plasticity (ml)		
6			
8			
10			
12			
14	- wet to saturated		
16			
18			
20			
22			
24			
26			
28			
30			



EGA	ICE THICKNESS (ft.)	6	DATE 4/4/74 TECH.	NR	HOLE Nº D-15
	WATER DEPTH (ft.)	7	SEISMIC LINE	106	
	COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº	816	PAGE 1 OF 2

HUDSON'S BAY OIL AND GAS

TENT ISLAND DRILLING PROGRAM — 1974

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE	GROUND ICE CONDITION	MOISTURE CONTENT % ● SPT RESISTANCE ▲ 10 20 30 40 50 60 70 COMP. STRENGTH T.S.F. ■ 1 2 3
	CONTINUED			
32	SILT - medium to dark grey, (ml)		Not Frozen	
34	- moist to wet, loose to compact, organic layers			
36				
38				
40	- organic rich layers	X		▲ ●
42	END OF HOLE			
44				
46				
48				
50				

ICE THICKNESS (ft.)	6	DATE 4/4/74 TECH. NR	HOLE Nº
WATER DEPTH (ft.)	7	SEISMIC LINE 106	D-15
COMPLETION DEPTH (ft.)	41½	SHOT HOLE Nº 816	PAGE 2 OF 2

[GEOCON]

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT: Y3 2.17 — BORING #: 1 — DATUM: SEA LEVEL — CASING: 6" & HW
BORING DATE: JULY 18-25/75 — REPORT DATE: AUG. 5, 1975 — COMPILED BY: AEL — CHECKED BY:
SAMPLER HAMMER WT.: 140 LBS. — DROP: 30 INCHES — CASING HAMMER WT.: — LBS — DROP: — INCHES

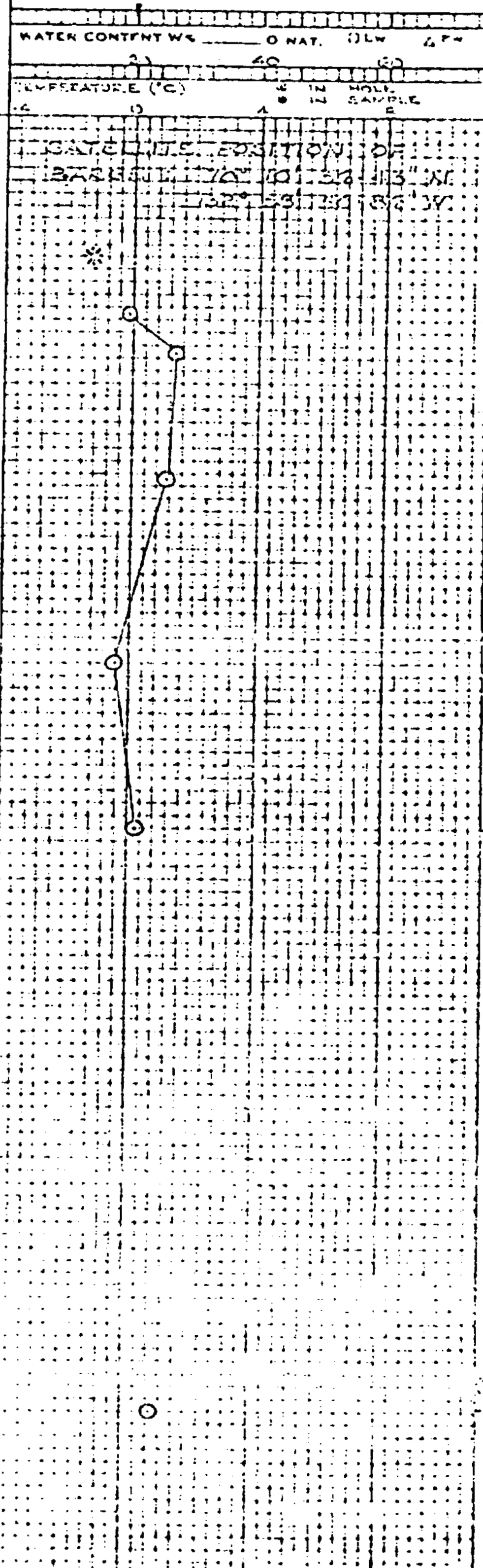
SAMPLE CONDITION
- DISTURBED
- FAIR
- GOOD
- LOST

SAMPLE TYPES
- A.S. - AUGER SAMPLE
- S.T. - SLOTTED TUBE
- W.S. - WASHED SAMPLE
- D.O. - DRIVE-OPEN
- D.F. - DRIVE FOOT VALVE
- C.S. - CHUNK SAMPLE
- F.S. - FOIL SAMPLE
- S.O. - SLEEVE-OPEN
- S.F. - SLEEVE FOOT VALVE
- T.O. - THIN WALLED OPEN
- R.C. - ROCK CORE

ABBREVIATIONS
- V - IN-SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
- CC - TRIAXIAL CONSOLIDATED QUICK
- Q - TRIAXIAL QUICK
- S - DEGREE OF ICE SATURATION
- G. - SPECIFIC GRAVITY
- FROZEN UNIT WEIGHT
- K - PERMEABILITY
- C - CONSOLIDATION
- WET UNIT WEIGHT
- WL - WATER LEVEL IN CASING
- WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEVN. DEPTH	WATER CONDITIONS	SOIL DESCRIPTION	SYMBOL	ICE DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
	▽	SEA		LEVEL		
0.0		⸗		⸗		
		SEA		BOTTOM		
95.0		VERY DENSE GREY BROWN FINE TO MEDIUM SILTY SAND TO FINE TO MEDIUM SAND (SM - SP) (Occas layers of Silty Sand with trace of clay near sea bottom)		UNFROZEN		
143.0		(Continued on Page 2)				



SAMPLES

OTHER TESTS — % CORE REC	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
SALINITY (‰)				
M		2" DF	1	70
M(23)		DF	2	>100
M		DF	3	>100
(Gs=2.72) M(37)		DF	4	>100
M		DF	5	95
		DF	6	-
		DF	7	84
		DF	9	-
		DF	8	-
(Gs=2.69) M(24)		DF	10	>100

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT V8217 BORING # 1 (continued) DATUM SEA LEVEL CASING 3" & HW
BORING DATE JULY 18-25/75 REPORT DATE AUG. 5, 1975 COMPILED BY AEL CHECKED BY
SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES CASING HAMMER WT — LBS. DROP — INCHES

SAMPLE CONDITION: DISTURBED, FAIR, GOOD, LOST

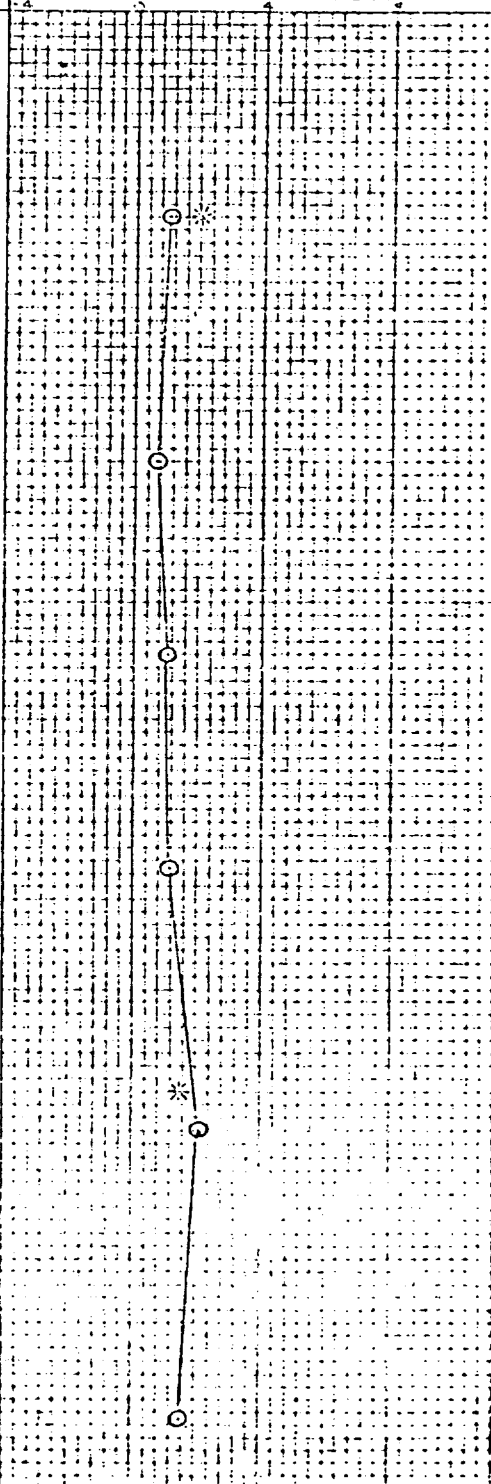
SAMPLE TYPES: A.S. - AUGER SAMPLE; S.T. - SLOTTED TUBE; W.S. - WASHED SAMPLE; D.O. - DRIVE-OPEN; D.F. - DRIVE-FOOT VALVE; C.S. - CHUNK SAMPLE; F.S. - FOIL SAMPLE; S.O. - SLEEVE-OPEN; S.F. - SLEEVE-FOOT VALVE; T.O. - THIN WALLED OPEN; R.C. - ROCK CORE

ABBREVIATIONS: V - IN-SITU VANE TEST; M - MECHANICAL ANALYSIS; U - UNCONFINED COMPRESSION; QC - TRIAXIAL CONSOLIDATED QUICK; Q - TRIAXIAL QUICK; S - DEGREE OF ICE SATURATION; G_s - SPECIFIC GRAVITY; γ_f - FROZEN UNIT WEIGHT; K - PERMEABILITY; C - CONSOLIDATION; γ - WET UNIT WEIGHT; WL - WATER LEVEL IN CASING; WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEVN. DEPTH	WATER CONDITIONS	SOIL DESCRIPTION	SYMBOL	ICE DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
		(continued	from	Page 1)		
145.0		DENSE TO VERY DENSE GREY BROWN FINE TO MEDIUM SAND TO SILTY SAND (SP - SM) (Layer of grey black (fine to medium) sand at 170' then grey to 206')		UNFROZEN		
200.0		(continued	on	Page 3)		

WATER CONTENT W% — O NAT, W_L, W_P — 20 40 60; TEMPERATURE (°C) * IN HOLE, * IN SAMPLE



OTHER TESTS / % CORE REC	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
SALINITY (‰)				
		DF	11	>100
M (4.5)		DF	12	—
		DF	13	>100
(G_s=2.63) M (17)		DF	14	97
		DF	15	—
M (17)		DF	16	—
		DF	17	50

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT V8217 BORING # 1 (continued) DATUM SEA LEVEL CASING 5" & HW
BORING DATE JULY 18-25/75 REPORT DATE AUG. 5, 1975 COMPILED BY AEL CHECKED BY
SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES CASING HAMMER WT. — LBS. DROP — INCHES

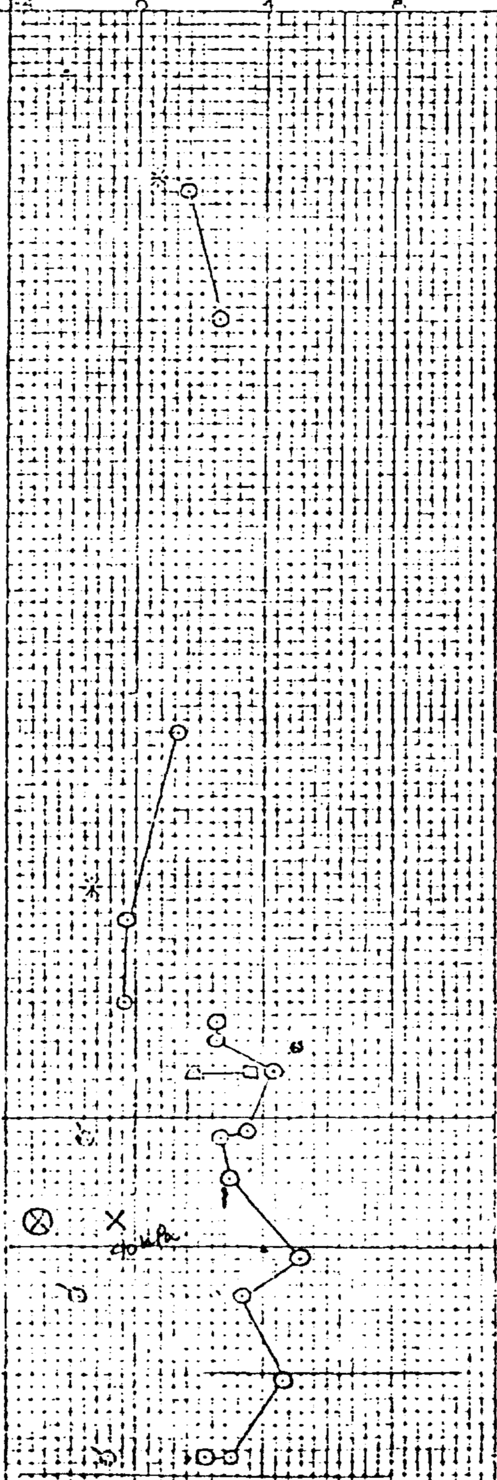
SAMPLE CONDITION
- DISTURBED
- FAIR
- GOOD
- LOST

SAMPLE TYPES
- A.S. - AUGER SAMPLE
- S.T. - SLOTTED TUBE
- W.S. - WASHED SAMPLE
- D.O. - DRIVE-OPEN
- D.F. - DRIVE-FOOT VALVE
- C.S. - CHUNK SAMPLE
- F.S. - FOIL SAMPLE
- S.O. - SLEEVE-OPEN
- S.F. - SLEEVE-FOOT VALVE
- T.O. - THIN WALLED OPEN
- R.C. - ROCK CORE

ABBREVIATIONS
- V - IN SITU VANE TEST
- M - MECHANICAL ANALYSIS
- U - UNCONFINED COMPRESSION
- Qc - TRIAXIAL CONSOLIDATED QUICK
- Q - TRIAXIAL QUICK
- S - DEGREE OF ICE SATURATION
- Gs - SPECIFIC GRAVITY
- γ_f - FROZEN UNIT WEIGHT
- K - PERMEABILITY
- C - CONSOLIDATION
- γ - WET UNIT WEIGHT - PCF
- WL - WATER LEVEL IN CASING
- WT - WATER TABLE IN SOIL

SHEAR STRENGTH - PSF: MIN. VANE X (NAT.) ⊗ (REM.) Q TEST; 1000, 2000, 3000
WATER CONTENT W% ○ NAT. LW, PW; 20, 40, 60
TEMPERATURE (°C) IN HOLE, IN SAMPLE

ELEVN. DEPTH	WATER CONDITIONS	SOIL DESCRIPTION	SYMBOL	ICE DESCRIPTION	OTHER TESTS — CORE REC.	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
200.0		(continued	from Page 2)	UNFROZEN	SALINITY (°/oo)				
					Gs=2.69, M(21)	LOST	2"DF	18	>100
206.0					M(35)	LOST	2"DF	19	—
		GREY BROWN FINE TO MEDIUM SAND TO SILTY SAND (SP-SM)	Nf	FROZEN WITH BARELY VISIBLE ICE CRYSTALS LESS THAN 7% EXCESS ICE FRIABLE			3"CS	20	—
					(11) M(7) (Gs=2.65)		3"CS	21	—
230.0			Nbe	FROZEN WELL BONDED BARELY VISIBLE ICE CRYSTALS	(3)		3"CS	22	—
237.0		FIRM TO STIFF DARK GREY ORGANIC CLAYEY SILT WITH OCCAS. ORGANIC SILT LAYERS (OL-CL)		UNFROZEN	M(15) (Gs=2.70) γ=113 M(33)		3"CS	23A, 23	—
					γ=117		3"CS	24	—
					γ=106		3"CS	25	—
					γ=113		3"CS	26	—
250.0		(continued	on	Page 4)					



Elevation scale: 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 255

GEOCON

OFFICE REPORT ON SOIL EXPLORATION

CONTRACT Y8217 BORING # 1 (continued) DATUM SEA LEVEL CASING 2" & HW
BORING DATE JULY 18-25/75 REPORT DATE AUG. 5, 1975 COMPILED BY A.E.L. CHECKED BY
SAMPLER HAMMER WT. 140 LBS DROP 30 INCHES CASING HAMMER WT — LBS DROP — INCHES

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

SAMPLE TYPES

- A.S. - AUGER SAMPLE
- S.T. - SLOTTED TUBE
- W.S. - WASHED SAMPLE
- D.O. - DRIVE-OPEN
- D.V. - DRIVE-FOOT VALVE
- C.S. - CHUNK SAMPLE
- F.S. - FOIL SAMPLE
- S.O. - SLEEVE-OPEN
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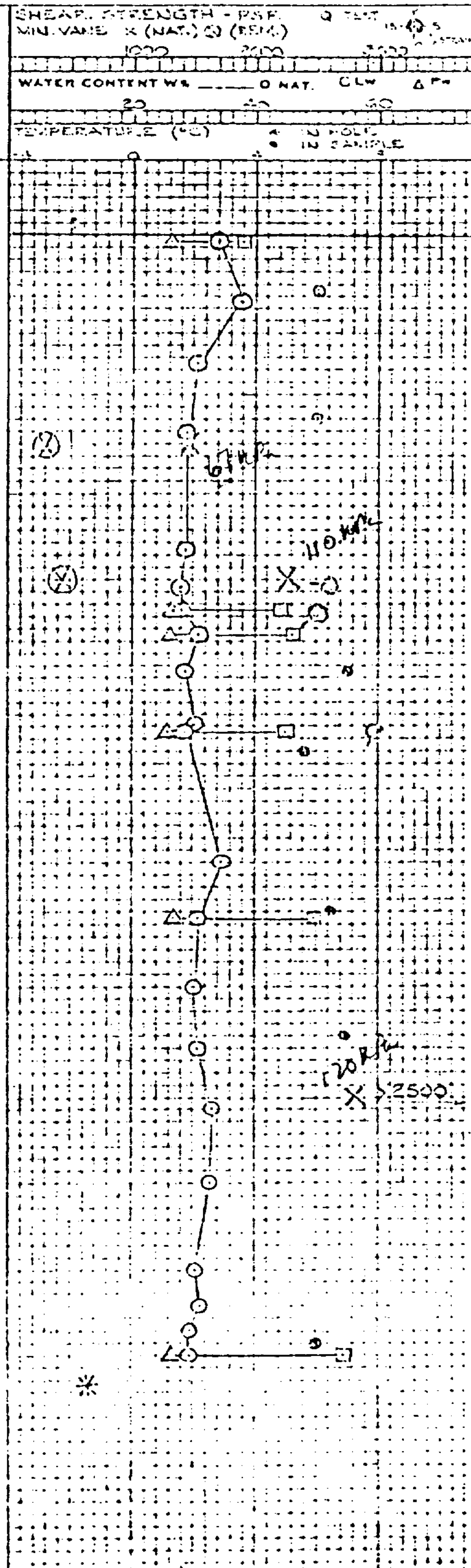
- S - DEGREE OF ICE SATURATION
- G_s - SPECIFIC GRAVITY
- γ_f - FROZEN UNIT WEIGHT
- P - PERMEABILITY
- C - CONSOLIDATION
- γ - WET UNIT WEIGHT - PCF
- WL - WATER LEVEL IN CASING
- WT - WATER TABLE IN SOIL

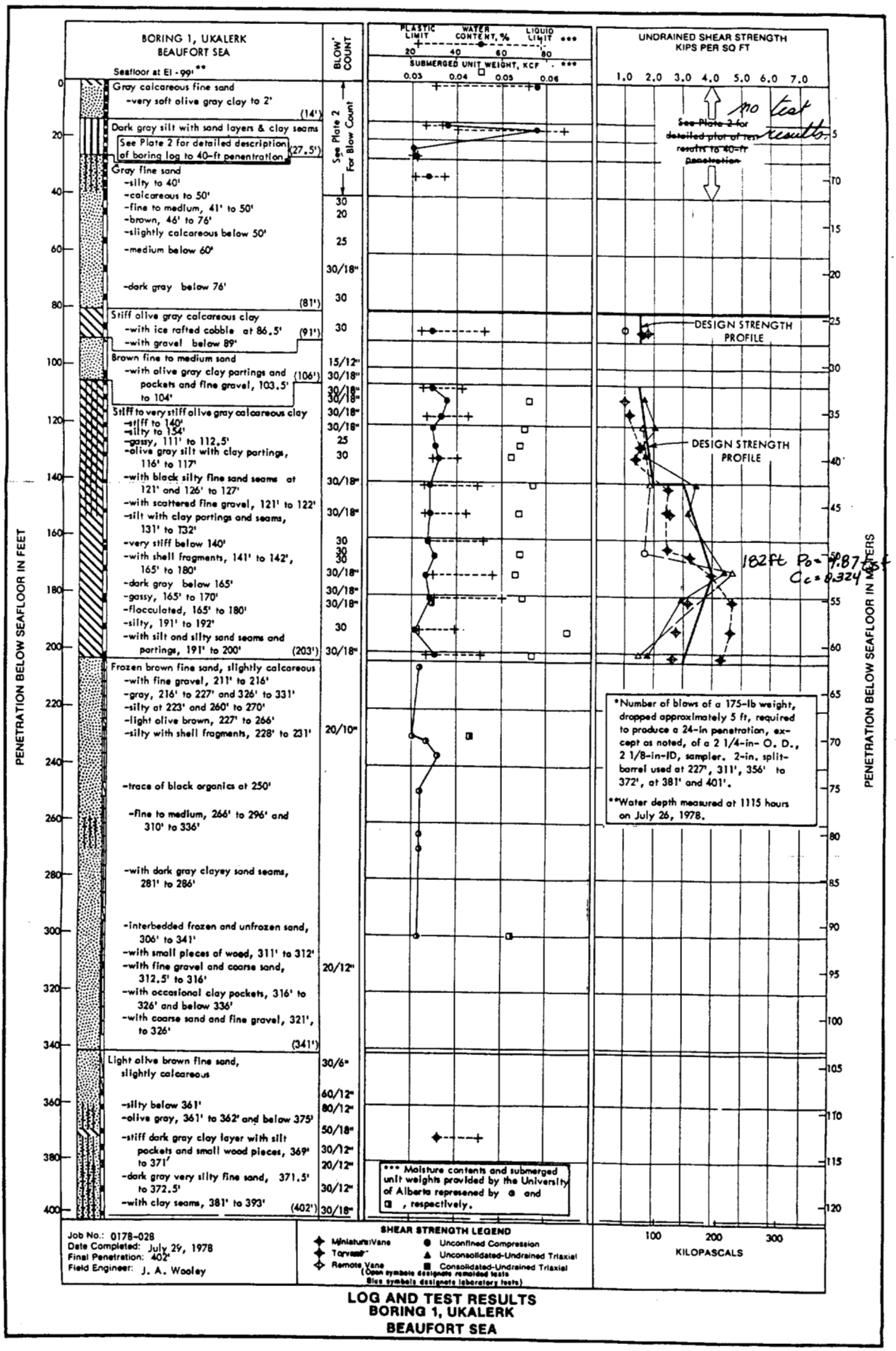
SOIL PROFILE

ELEVN. DEPTH	WATER CONDITIONS	SOIL DESCRIPTION	SYMBOL	ICE DESCRIPTION	STRAT PLOT	ELEVATION SCALE
		(continued from Page 3)				
255.0						
258.0		VERY STIFF DARK GREY SILTY CLAY WITH OCCAS. CLAYEY SILT LAYERS AND SHELLS TRACE OF ORGANICS THROUGHOUT (CL - CH)		UNFROZEN		
303.0		END	OF	HOLE.		

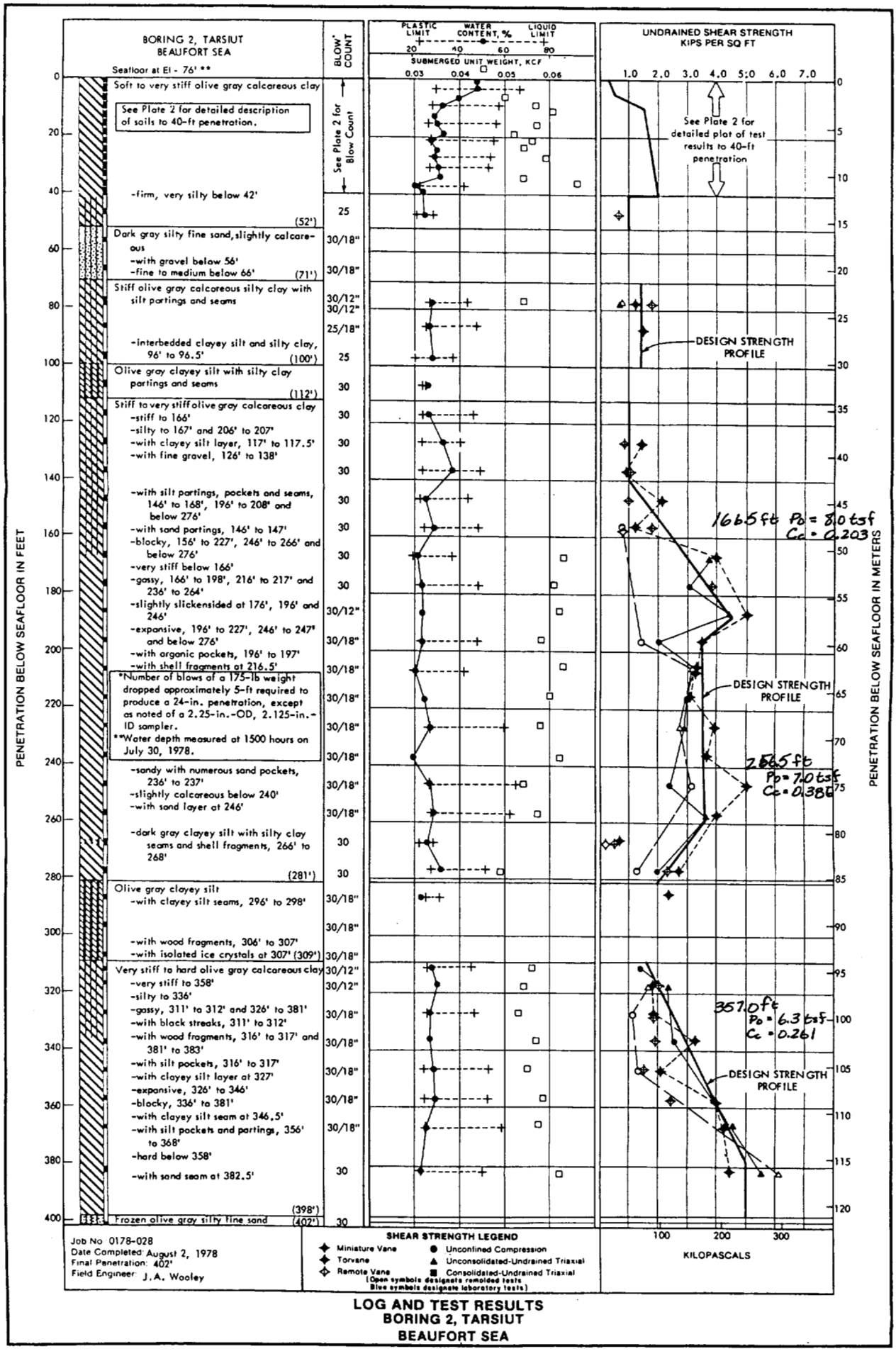


OTHER TESTS — % CORE REC	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS FT.
-M(??) G_s=2.70		HQ 3	27	—
		HQ 3	28	—
		HQ 3	29	—
γ=123 G_s=2.7 C γ=122 M(??)		2"TO	30	HQ/WL
		HQ 3	31	—
C γ=122 γ=120		2"TO	32	HQ/WL
		HQ 3	33	—
M(??)		HQ 3	34	—
		HQ 3	35	—
		HQ 3	36	—
		HQ 3	37	—
M(25) γ=122 G_s=2.7		HQ 3	38	—

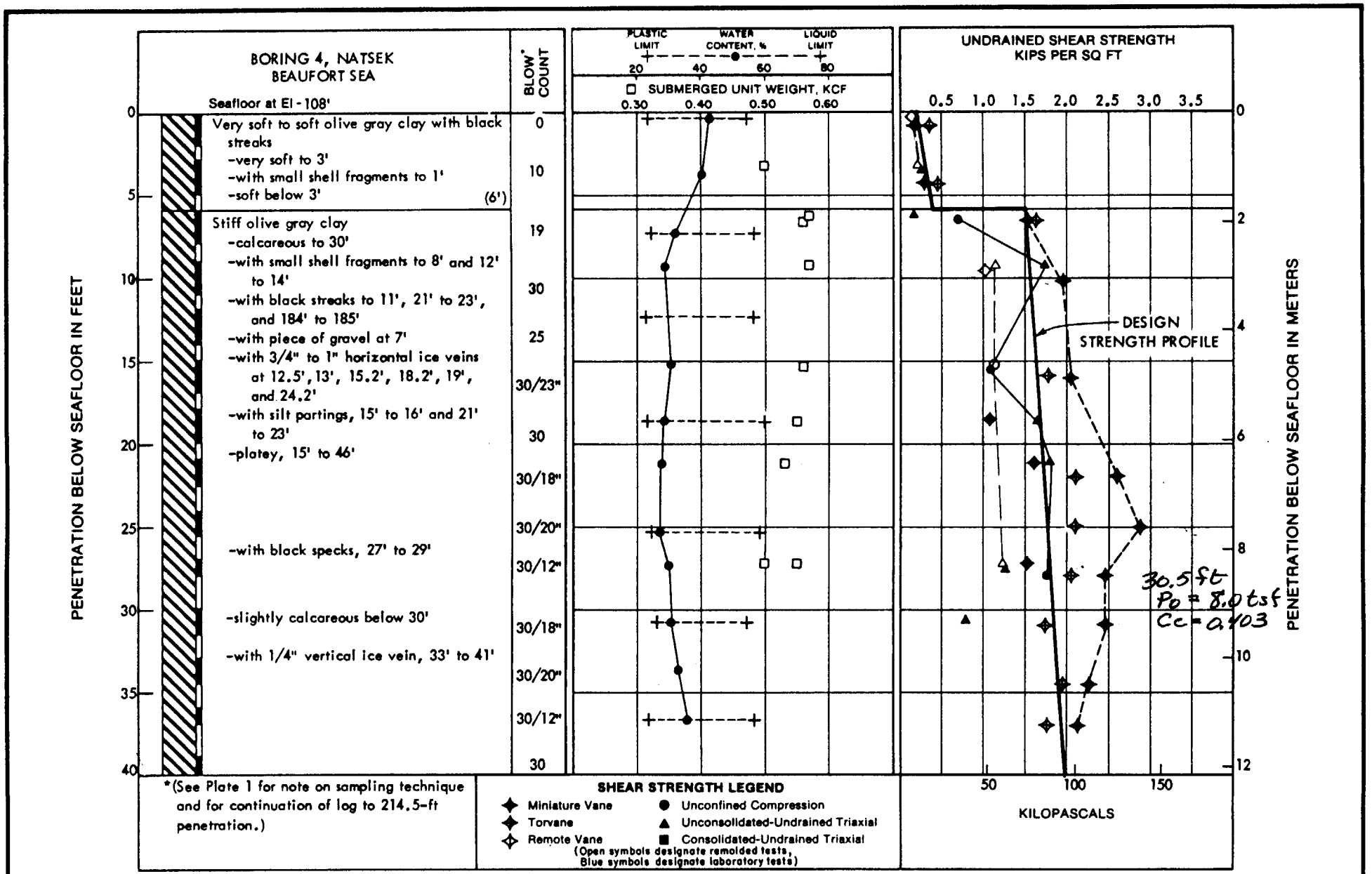
Mcc # 0178-028



LOG AND TEST RESULTS
BORING 1, UKALERK
BEAUFORT SEA



LOG AND TEST RESULTS
BORING 2, TARSIUT
BEAUFORT SEA



LOG AND TEST RESULTS TO 40-FT PENETRATION
BORING 4, NATSEK
BEAUFORT SEA

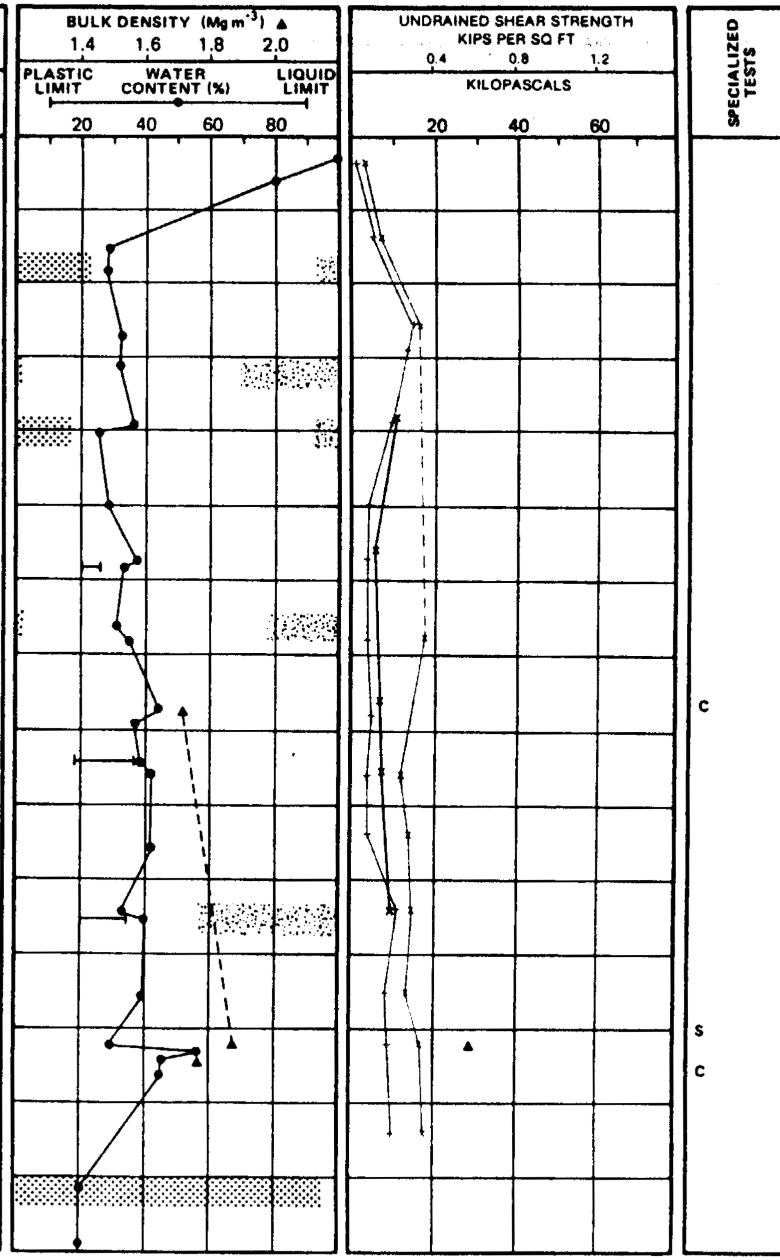
PLATE 2

McCLELLAND

LOCATION: BORING 6, KENALOOAK J-94
LAT. 13° 43′ 36.48″ N LONG. 133° 58′ 09.96″ W WATER DEPTH: 67.4 m**

USC	SOIL DESCRIPTION	*BLOW COUNT	GROUND ICE
CL	CLAY - silty, trace organics, shell fragments, grey (3.5′)	0	NOT FROZEN
ML	SILT - clayey, trace to some sand, sandy silt interbedded with soft clay, grey - dark olive grey 5Y 3/2 - 6.5% organic content (20.5′)	0 0 0 9/24″ 10/24″ 11/24″ 7/24″	
CL	CLAY - silty, trace sand, some silt seams and pockets, soft, medium plasticity, very dark grey, 5Y 3/1, grey 5Y 5/1, organic streaks in top 0.6 m - some organics from 10.5 m to 11.1 m - dark olive grey 5Y 3/2 - 11.1% organic content - olive grey, 5Y 4/2, olive grey 5Y 5/2 (45′)	7/24″ 7/24″ 7/24″ 5/24″ 7/24″ 7/24″ 8/24″ 8/24″	
SP	SAND - trace silt, fine-grained, uniform, olive 5Y 4/3	30/20″ 30/12″	

PENETRATION BELOW SEAFLOOR, METRES: 0–15



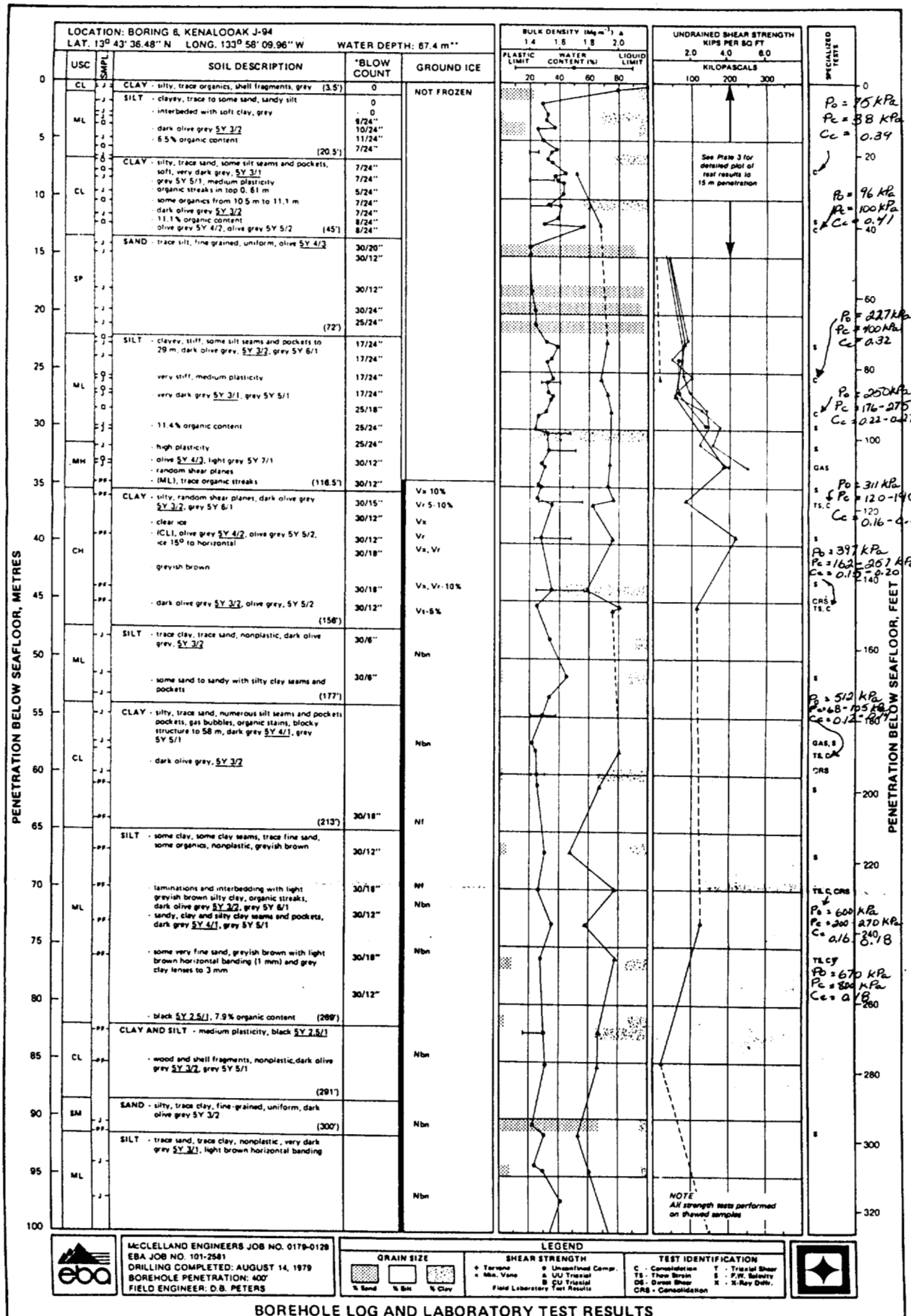
McCLELLAND ENGINEERS JOB NO. 0179-0128
EBA JOB NO. 101-2581
DRILLING COMPLETED: AUGUST 14, 1979
BOREHOLE PENETRATION: 400′
FIELD ENGINEER: D.B. PETERS

eba

LEGEND

GRAIN SIZE	SHEAR STRENGTH	TEST IDENTIFICATION
% Sand, % Silt, % Clay	+ Torvane x Min. Vane ● Unconfined Compr. ▲ UU Triaxial ■ CU Triaxial Field Laboratory Test Results	C - Consolidation TS - Thaw Strain DS - Direct Shear CRS - Consolidation T - Triaxial Shear S - P.W. Salinity X - X-Ray Diffr.

BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS

PLATE 1

McCLELLAND ENGINEERS

LOCATION: BORING 6, KENALOOAK J-94
LAT. 13° 43' 36.48" N LONG. 133° 58' 09.96" W WATER DEPTH: 84.7 m**

USC	SMPL	SOIL DESCRIPTION	*BLOW COUNT	GROUND ICE
CL	J PP PP Q J J PP J Q PP	CLAY AND SILT - medium plasticity, stiff, numerous silt seams, dark olive grey 5Y 3/2, light grey 5Y 6/1 - laminations at 25° to horizontal, some organic streaks, very stiff, dark grey 5Y 4/1, grey 5Y 5/1 - some horizontal partings - dark olive grey 5Y 3/2, olive grey 5Y 5/2 (400')		Nbn Nbn Nbn Nbn Nbn
		END OF BOREHOLE		

*Number of blows of a 175-lb weight dropped approximately 5-ft as required to produce a 24-in. penetration, except as noted, of a 2.25-in.-OD, 2.125-in.-ID thin-wall tube sampler. A 2.5-in.-OD, 2.125-in.-ID liner sampler was used to 5-ft penetration.

**Water depth measured at 1130 hours on July 30, 1979

BULK DENSITY (Mg m⁻³) 1.4 1.6 1.8 2.0 △
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH
KIPS PER SQ FT 2.0 4.0 6.0
KILOPASCALS 100 200 300

SPECIALIZED TESTS

P_o = 898 kPa
P_c = 100-151 kPa
C Cc = 340
C_c = 0.15-0.17
DS
360
380
C, S 400
P_o = 1053 kPa
P_c = 103-148 kPa
C_c = 0.12-0.13

NOTE
All strength tests performed on thawed samples

PENETRATION BELOW SEAFLOOR, METRES

PENETRATION BELOW SEAFLOOR, FEET

McCLELLAND ENGINEERS JOB NO. 0178-0128
EBA JOB NO. 101-2581
DRILLING COMPLETED: AUGUST 14, 1979
BOREHOLE PENETRATION: 400'
FIELD ENGINEER: D.B. PETERS

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH (Field Laboratory Test Results)
+ Torvane, • Min. Vane, ○ Unconfined Compr., △ UU Triaxial, ⊠ CU Triaxial

TEST IDENTIFICATION
C - Consolidation, CRS - Consolidation, T - Triaxial Shear, TS - Theor Strain, S - P.W. Salinity, DS - Direct Shear, X - X-Ray Diffr.

BOREHOLE LOG AND LABORATORY TEST RESULTS

PLATE 2

KENALOOAK

DIRECT SHEAR TESTS

SAMPLE NUMBER	DEPTH	USC	MOISTURE CONTENT INITIAL	MOISTURE CONTENT FINAL	INITIAL BULK DENSITY	NORMAL STRESS (σ_v)	PEAK SHEAR STRESS (τ_p)	RESIDUAL SHEAR STRESS	VOLUMETRIC STRAIN ($\frac{\Delta v}{v}$) AT τ_p	c'_p	ϕ'_p	ϕ'_r
	(metres)		(%)	(%)	(Mg/m^3)	(kPa)	(kPa)	(kPa)	(%)	(kPa)	(degrees)	(degrees)
S-98	106.1	CL	27.2	27.7	1.96	80	53	46	0.3			
			23.2	22.3	2.00	160	108	90	0.2	12	29	23
			27.4	29.2	1.97	240	141	114	0.4			

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KENALOOAK

THAW STRAIN TESTS

$(\epsilon_v = A + \sigma_v a_o)$

SAMPLE NUMBER	DEPTH (metres)	USC	MOISTURE CONTENT INITIAL (%)	MOISTURE CONTENT FINAL (%)	DENSITY FROZEN BULK (Mg/m^3)	DENSITY INITIAL DRY (Mg/m^3)	A	a_o	EFFECTIVE NORMAL STRESS (σ_v) (kPa)	C_v (m^2/yr)	k[1] (m/s)
S-62	36.3	CH	34.5	31.7	1.85	1.55	2.4	0.05	50		(9.1E-06)
										450	1.3E-07
									100		
										1.9	2.1E-10
									200		
S-67	45.4	CH	25.5	27.0	1.98	1.62	2.4	0.01	50		
										0.69	2.7E-11
									100		
										0.87	4.3E-11
									200		
S-74	57.9	CL	23.8	22.2	1.99	1.75	5.3	0.02	50		(3.5E-09)
										6.4	6.2E-10
									100		(2.0E-09)
										8.4	4.7E-10
									200		(1.2E-09)
S-79	69.8	ML	24.3	23.7	2.01	1.70	3.6	0.01	50		
										5.8	3.7E-10
									100		
										4.3	1.8E-10
									200		
S-81	75.9	ML	30.0	30.7	1.94	1.56	3.7	0.02	50		(3.3E-10)
										1.3	8.6E-11
									100		
										1.4	6.9E-11
									200		

[1] Permeabilities shown in parentheses represent direct permeability readings; the remainder have been calculated.

EBA Engineering Consultants Ltd.

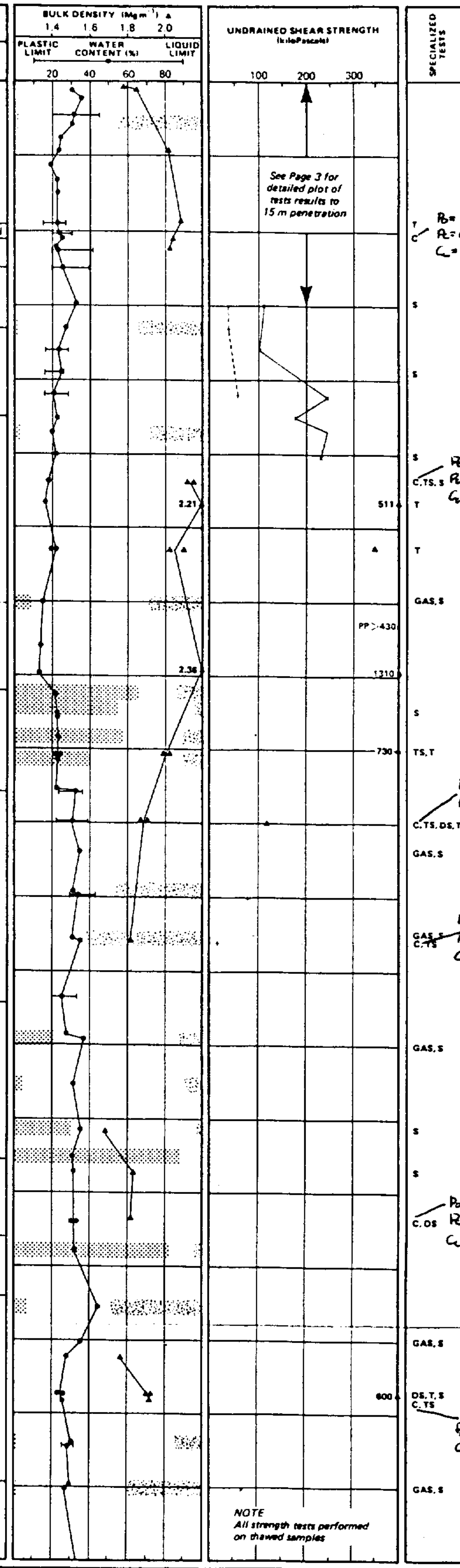
McCLELLAND ENGINEERS

PLATE A-29

LOCATION: KILANNAK A-77
LAT. 70° 46' 15.12" N LONG. 129° 21' 26.94" W WATER DEPTH: 25.6 m

DEPTH BELOW SEABED (metres)

Depth (m)	USC	SOIL DESCRIPTION	Blows	GROUND ICE
0	CL	CLAY - grey, very soft - silt pockets at 0.7 m - organics between 1.0 m and 1.5 m	WOH/24" 3/24" 9/24"	NOT FROZEN
	ML	SILT - clayey, trace sand - interbedded silt and clay, silt pockets - numerous silt laminations and pockets - sandy silt and clay interbeds	4/24" 20/18" 30/12" 30/18" 30/12" 30/20" 30/12"	
10	CL	CLAY - silty, trace to some sand, - grey 5Y 5/1, dark grey 5Y 4/2 - stratified	30/18" 30/18" 30/12"	POSSIBLY FROZEN NOT FROZEN ? FROZEN, Vr
15	ML	SILT - clayey to some clay - grey, 3 mm vertical ice veins - seams and pockets of silt and clay - trace sand below 16 m, curved bedding	30/14" 30/12"	NOT FROZEN ?
20	CL	CLAY - silty - grey to olive grey - some seams and pockets of silts and clays - curved, nonparallel bedding, discontinuous	30/12" 30/14" 30/12"	
25	ML	SILT - clayey - grey to olive grey - some silt and clay pockets - trace sand at 23.6 m - hard, trace calcareous deposits at 25.5 m, 3 mm vertical ice veins - light olive grey 5Y 6/2 to grey 5Y 6/1, dark olive grey 5Y 3/2, 5 mm lenses 45° to horizontal - 3 mm lenses 10° to horizontal - grey 2.5Y N6/very dark grey 5Y 3/1 - silt seams, 5 mm ice lenses - 3-5 mm ice veins 45° to horizontal - trace sand - trace of organics	30/12" 30/14" 30/12" 30/12" 30/12" 30/10" 30/12" 30/12" 30/10" 15/6"	FROZEN Vx-10% NOT FROZEN ?
40	SM	SAND - silty, trace to some clay - fine-grained sand, laminated - olive grey - trace organics at top - scattered shell fragments to 41.2 m - sandy silt layers below 41 m		FROZEN Nbn Nbn
45	ML	SILT - sandy, trace to some clay - olive 5Y 4/4, 5Y 4/3 - slight cementation		Nbn
50	CL	CLAY - silty - grey 5Y 6/1 to light olive grey 5Y 6/2, dark olive grey 5Y 3/2 - some silt below 50 m, grey brown, few organic streaks, some laminations, 3-5 mm ice lenses		Vx trace Vs, Vr trace
55	ML	SILT AND CLAY - olive grey - organic streaks to 58 m - clayey silt lens, laminated - olive-grey 5Y 5/2, dark olive grey 5Y 3/2		Vx-5% Vs, Vx-5-25%, lenses to 20 mm
60	CL	CLAY - some silt - silty - sandy pockets	10/6"	Vs, Vx trace Nbn
65	ML	SILT - clayey, sandy, olive grey - some silty clay seams - trace clay and sand - sandy, trace clay		Nbn Nbn Nbn
	SM	SAND - some silt to trace silt, greyish-brown - fine-grained, horizontal partings		
75	ML	SILT - clayey - grey 5Y 5/1, dark grey 5Y 4/1 - laminated - trace sand, grey 5Y 6/1, dark olive grey 5Y 3/2		Vx trace Vx trace
80	SM	SAND - some silt, trace clay - dark olive grey - fine to medium-grained at top - fine-grained below 80 m		Nbn
	CL	CLAY AND SILT - trace sand - dark olive grey, 3 mm ice lenses		Vs, Vx
85	ML	SILT - clayey, trace sand - olive grey - some silt and sand seams and pockets - very fine sand, few quartz grains below 85 m, greyish brown - grey 5Y 5/1 to light olive grey 5Y 6/2, dark olive-grey 5Y 3/2 to dark grey 5Y 4/1		Vs-trace (Nbn) Vs trace Vs, Vr trace Vr trace
95	CL	SILT AND CLAY - trace sand - dark olive grey - blocky structure to 104.3 m - no recovery from 95 m to 98 m - grey - trace organics to 101 m		Nbn
100				



Pc= 96 kPa, Pc= 94-136 kPa, Cc= 0.16-0.18; Pc= 259 kPa, Pc= 150-200 kPa, Cc= 0.11-0.12; Pc= 503 kPa, Pc= 170-225 kPa, Cc= 0.19-0.2; Pc= 575 kPa, Pc= 53-82 kPa, Cc= 0.23-0.26; Pc= 718 kPa, Pc= 70-95 kPa, Cc= 0.20-0.22; Pc= 814 kPa, Pc= 90-125 kPa, Cc= 0.19-0.22

eba

JOB No.: 101-2581
DRILLING COMPLETED: July 29, 1979
BOREHOLE DEPTH: 122.6 m
DRILLING RIG: FAILING 1500
LOG COMPILED BY: D.B. PETERS

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH: + Torvane; × Min. Vane; ● Unconfined Compr.; ▲ UU Triaxial; ■ CU Triaxial

Field Laboratory Test Results

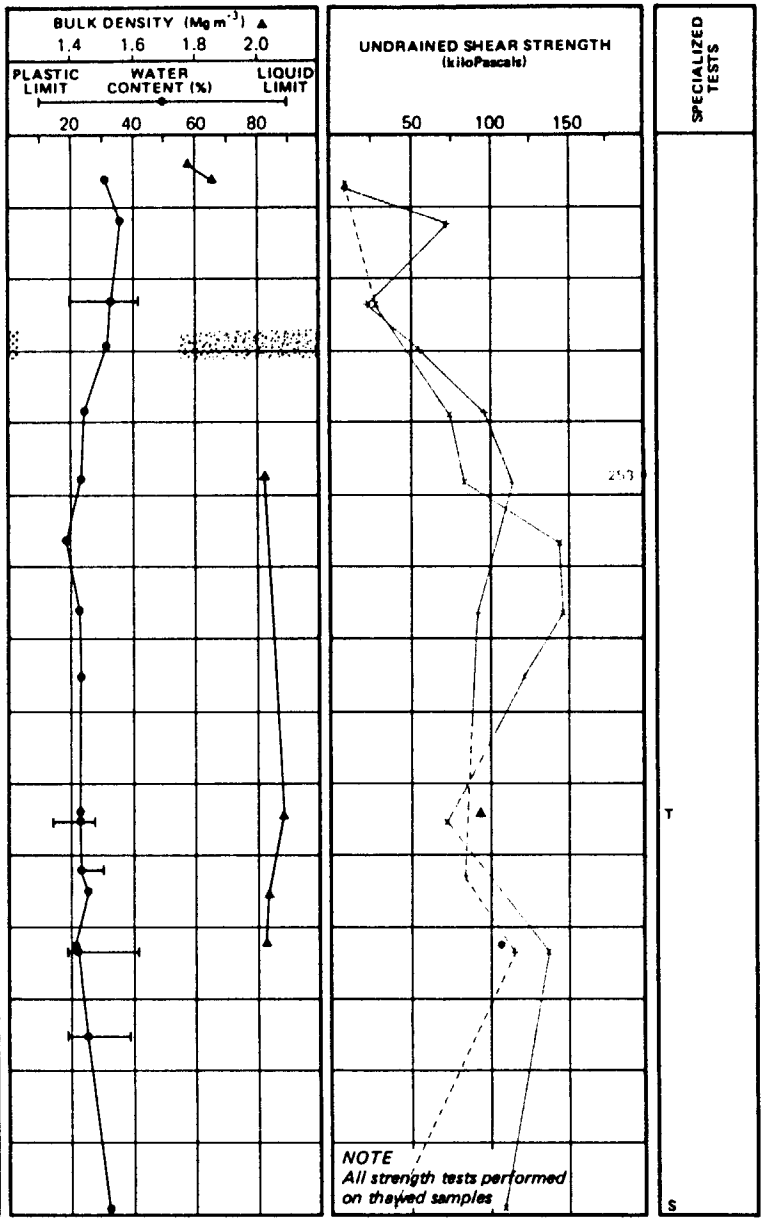
TEST IDENTIFICATION: C - Consolidation; TS - Thaw Strain; DS - Direct Shear; T - Triaxial Shear; S - P.W. Salinity; X - X-Ray Diffr.

BOREHOLE NUMBER 5

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KILANNAK A-77
LAT. 70° 46' 15.12" N LONG. 129° 21' 26.94" W WATER DEPTH: 25.6 m

DEPTH BELOW SEABED (metres)	USC	SMPL.	SOIL DESCRIPTION		GROUND ICE
0	CL	J	CLAY - grey, very soft	WOH/24"	NOT FROZEN
1		J	- silt pockets at 0.7 m		
			- organics between 1.0 m and 1.5 m	3/24"	
2		J	- some silt pockets	9/24"	
3	ML	J	SILT - clayey, trace sand	4/24"	
			- laminated, interbedded silt and clay		
4		J	- silt pockets	20/18"	
5		J	- stiffer	30/12"	
6		J	- numerous silt laminations and pockets	30/18"	
7		J		30/12"	
		J	- sandy silt and clay interbeds	30/20"	
8					
9				30/12"	
10	CL	J	CLAY - silty, trace to some sand	30/18"	POSSIBLY FROZEN
		J	- grey 5Y 5/1, dark grey 5Y 4/2		
11		J	- stratified	30/18"	NOT FROZEN ?
12		J		30/12"	
13					FROZEN Vr
14	ML	J	SILT - clayey	30/14"	
15			- grey to olive grey, 3 mm vertical ice veins		
			- seams and pockets of silt and clay		



eba

JOB No.: 101 - 2581
DRILLING COMPLETED: JULY 29, 1979
BOREHOLE DEPTH: 122.6 m
DRILLING RIG: FAILING 1500
LOG COMPILED BY: D.B. PETERS

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial
Field Laboratory Test Results

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 5

BOREHOLE LOG AND LABORATORY TEST RESULTS

KILANNAK

DIRECT SHEAR TESTS

SAMPLE NUMBER	DEPTH	USC	MOISTURE CONTENT INITIAL	MOISTURE CONTENT FINAL	INITIAL BULK DENSITY	NORMAL STRESS (σ_v)	PEAK SHEAR STRESS (τ_p)	RESIDUAL SHEAR STRESS	VOLUMETRIC STRAIN ($\frac{\Delta v}{v}$) AT τ_p	c'_p	ϕ'_p	ϕ'_r
	(metres)		(%)	(%)	(Mg/m^3)	(kPa)	(kPa)	(kPa)	(%)	(kPa)	(degrees)	(degrees)
S-54A	49.0	CL	28.5	29.1	1.90	80	48	45	0			
			28.3	28.0	1.90	160	86	80	0.6	0	28	23
			28.8	26.7	1.90	240	132	114	0.9			
S-72	76.8	ML	31.1	29.4	1.83	80	59	44	0.4			
			31.9	29.6	1.83	160	84	56	0.4	31	19	16
			34.1	29.6	1.79	240	113	88	0.6			
S-81	88.6	ML	25.5	27.0	1.95	80	65	59	0.1			
			26.9	27.7	1.90	160	101	85	0.4	48	17	17
			29.1	28.3	1.90	240	132	109	0.6			

KILANNAK

THAW STRAIN TESTS

$(\epsilon_v = A + \sigma_v a_o)$

SAMPLE NUMBER	DEPTH (metres)	USC	MOISTURE CONTENT INITIAL (%)	MOISTURE CONTENT FINAL (%)	DENSITY FROZEN BULK (Mg/m^3)	DENSITY DRY (Mg/m^3)	A	a_o	EFFECTIVE NORMAL STRESS (σ_v) (kPa)	c_v (m^2/yr)	k[1] (m/s)
S-32	26.8	ML	18.2	18.9	2.12	1.85	1.9	0.01	50		
										2.9	1.0E-10
									100		
										1.5	5.3E-11
									200		
S-50	45.6	ML	23.6	25.0	1.98	1.65	2.1	0.01	50		
										1000	3.0E-08
									100		(9.5E-08)
										1000	1.6E-08
									150		
S-54A	48.8	CL	31.2	31.0	1.87	1.51	3.0	0.03	50		
										2.1	4.1E-10
									100		
										4.9	2.8E-10
									200		
S-60	57.9	CL	53.9	34.7	1.58	1.43	20	0.04	50		(3.7E-10)
										0.51	1.5E-10
									100		(2.3E-10)
										0.78	9.8E-11
									200		(1.5E-10)
S-82	89.0	ML	25.5	27.3	1.91	1.57	1.9	0.02	50		(1.4E-09)
										2.6	1.5E-10
									100		(7.2E-10)
										0.96	5.0E-10
									200		(4.7E-10)
S-89	104.0	ML	32.4	37.2	1.83	1.39	2.0	0.01	50		
										1.1	1.5E-11
									100		
										1.6	3.8E-11
									200		
S-94	107.0	ML	30.6	34.9	1.80	1.40	1.7	0.02	50		
										2.0	1.5E-10
									100		
										1.7	1.4E-10
									200		

[1] Permeabilities shown in parentheses represent direct permeability readings; the remainder have been calculated.

LOCATION: KILANNAK A-77
LAT. 70° 46' 15.12" N LONG. 129° 21' 26.94" W WATER DEPTH: 25.6 m

SEABED (metres)	USC	SMPL	SOIL DESCRIPTION	GROUND ICE
100	CL	J	CLAY - as above	FROZEN Nbn
			SILT - clayey, trace sand - grey 5Y 5/1 to light olive grey 5Y 6/2, dark grey 5Y 4/1 to dark olive grey 5Y 3/2	Nbn
105	ML	PF		
	CH	J	CLAY - silty, highly plastic, expansive, gas bubbles - 3-5 mm ice veins 45° to horizontal	Vx, Vr trace
	ML	PF	SILT - clayey, blocky structure - grey 5Y 5/1, dark grey 5Y 4/1	Vs, Vx-5%
110	CH	J	CLAY - some silt, 3-5 mm ice lenses - grey 5Y 6/1, olive grey 5Y 4/2 - foliated - trace organics, 1 mm diam. worm tube, trace shell fragments, 5-20 mm ice lenses	
		PF		
		PF		
		PF	- 5-20 mm ice veins	Vr, Vx
		J		
115	ML		SILT - clayey, trace sand, grey and dark grey - blocky structure - silt pockets to 116.5 m	
		J	- grey to olive grey below 116.5 m	Nbn
		J	- sandy silt seam	
120	CL	G	CLAY - some silt, organic pockets, 5 mm diam. wood fragment - olive grey 5Y 5/2 and dark olive grey 5Y 3/2, mottled - sandy silt seam at 120.5 m	Nbn
		PF		
	CH	PF	- foliated, shear plane at 45° to horizontal	Nbn
		J		
125			END OF BOREHOLE	

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT WATER CONTENT (%) LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

C, TS
GAS, S
P_o = 934 kPa
P_c = 200-300 kPa
C_c = 0.25-0.31

T
C, TS
P_o = 958 kPa
P_c = 50-76 kPa
C_c = 0.20-0.22

S, T, S
S, C
P_o = 990 kPa
P_c = 135-211 kPa
C_c = 0.22-0.26

GAS, S
C, T, S
P_o = 1060 kPa
P_c = 40-67 kPa
C_c = 0.20-0.23

LOCATION: NEKTORALIK H-28
LAT. 70° 27' 27.33" N LONG. 136° 06' 12.32" W WATER DEPTH: 58.8 m

USC	SMPL	SOIL DESCRIPTION		GROUND ICE
MH	J	SILT - clayey, some organic streaks and pockets, very soft, high plasticity, olive grey	WOH/24"	NOT FROZEN
CH	J	CLAY - some silt, organic odour, high plasticity, olive grey 5Y 4/2, olive grey 5Y 5/2 (MH), clayey silt, dark olive grey 5Y 3/2	WOH/24"	FROZEN
MH	J		WOH/24"	NOT FROZEN
CH	J	- dark grey 5Y 4/1, grey 5Y 5/1	4/24"	FROZEN
	J	- 12.2% organic content		NOT FROZEN
CL	J	- clay and silt, high plasticity, shell fragments	4/24"	
	J		4/24"	
CH	J	- 9.6% organic content	4/24"	
	J	- dark olive grey 5Y 3/2, olive grey 5Y 5/2	3/24"	
MH	J	SILT - clayey, soft, high plasticity, very dark grey 5Y 3/1	3/24"	
	J		5/24"	
ML	J	- dark olive grey 5Y 3/2, light grey 5Y 7/1	6/24"	
	J		6/24"	
CH	J	- clay and silt, platy, very stiff	10/12"	
	J	- 10.8% organic content, dark olive grey, 5Y 3/2		
	J	- fine sand layer, silty, very dark grey 2.5Y N3/, 17.8 - 18.0 m	30/8"	FROZEN
ML	J	- shell fragments	30/16"	NOT FROZEN?
	J	- silt seams and pockets to 29 m	30/18"	
	J	- dark olive grey, 5Y 3/2, light grey 5Y 7/1	30/18"	FROZEN
	J	- silt and clay, stiff, olive grey 5Y 4/2, grey 5Y 6/1	30/20"	NOT FROZEN
	J	- dark olive grey 5Y 3/2, light grey 5Y 7/1	30/24"	FROZEN?
CL	J	CLAY AND SILT - very stiff, dark olive grey, 5Y 3/2, light grey 5Y 7/1, 12.9% organic content	30/18"	
	J		30/18"	
CL-ML	PF	- blocky structure,		
	J	- dark olive grey 5Y 3/2, grey 5Y 6/1	30/16"	
CL	PF	- dark grey 5Y 4/1, grey 5Y 5/1	30/16"	Vx-trace
CL-ML	PF	- horizontal ice veins - thinly laminated, few dark grey streaks - vertical ice vein 32.9-33.1 m	30/16"	
CH-MH	J	- hard, medium to high plasticity - shell fragments	30/16"	NOT FROZEN
CL	J	CLAY - silty, fissured	30/16"	
MH	PF	SILT - clayey, dark grey, 5Y 4/1, grey 5Y 5/1, 25 mm ice vein 30° from vertical at 37.5-37.8 m	40/18"	Vr-20%
	J		50/15"	
	PF	- very dark grey 5Y 3/1, grey 5Y 6/1	40/16"	Vr<5%
	PF	- olive grey 5Y 4/2, olive grey 5Y 5/2	50/18"	Vr-40-50%
CH	PF	- (CH), ice + clay, few inclusions of clay in ice		
MH	J	- fissured, stiff, 9.1% organic content - clay and silt, high plasticity	50/18"	Vr-5%
	PF	- 25 mm vertical ice vein 45.1-46.0 m	40/24"	Vr-40%
ML	J	- nonplastic, shell fragments, foliated with thin ice lenses (0.1-0.3 mm), occasional particles of coarse sand	40/24"	Vr-20%
	J	- stiff		
	J	- silty clay, nonplastic	40/24"	Vr-20-25%
	J		40/24"	
CL-ML	J	CLAY AND SILT - blocky structure, medium plasticity	40/24"	Nbn
CL	J	CLAY - silty, trace very fine sand, dark olive grey, 5Y 3/2, grey 5Y 6/1 low plasticity	50/18"	
	PF		50/14"	Nbn
ML	J	SILT - trace to some clay, trace sand, laminations at 30° to horizontal, nonplastic, few thin beds of fine sand (1-3 mm), dark grey 5Y 4/1, grey 5Y 5/1, 12.9% organic content	50/14"	Nbn
	PF		50/12"	
	PF	- dark olive grey 5Y 3/2, grey 5Y 5/1	50/12"	Nf-Nbn
	PF	- olive grey 5Y 4/2, olive grey 5Y 5/2	50/12"	Nbn
	J	- dark grey 5Y 4/1, grey 5Y 5/1 - nonplastic	50/18"	Nbn
	PF	- interbedded greyish brown silty clay with light brown silt, trace very fine sand, some dark grey organic streaks and shell fragment, (interbeds 1 mm thick) black 5Y 3/1	50/18"	
	PF		50/18"	Nbn
CL	J	CLAY - silty, few streaks of very fine light brown sand, stiff, medium plasticity, grey	50/18"	
ML	J			
	PF	- dark grey 5Y 4/1, grey 5Y 5/1 - very dark grey 5Y 3/1, olive grey 5Y 5/2	50/15"	Nbn
CL	PF	- olive grey 5Y 4/2, olive grey 5Y 5/2	50/14"	Nbn
	J	- occasional organic seam	50/14"	Nbn
		END OF BOREHOLE		

DEPTH BELOW SEABED (metres)

BULK DENSITY (Mg m⁻³) 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

See Page 2 for detailed plot of tests results to 15 m penetration

NOTE
All strength tests performed on thawed samples

SPECIALIZED TESTS

S,GAS
T,S
T,S,GAS P_o = 36 kPa
C,S P_c = 24 kPa
T C_c = 0.50
T
T
C P_o = 60 kPa
S,GAS P_c = 27 kPa
C_c = 0.60
T P_o = 96 kPa
C,S P_c = 60 kPa
T C_c = 0.36
T,S,GAS
T
T,S,GAS
T
C,T P_o = 203 kPa
P_c = 430 kPa
T,S,GAS C_c = 0.31
S
T
TS
S,GAS
S
TS,C P_o = 287 kPa
P_c = 405-538 kPa
S C_c = 0.21-0.27
S,GAS
OS
TS
T
C,S P_o = 502 kPa
P_c = 467 kPa
C_c = 0.09
TS,S,GAS
DS,S,GAS
TS,C A) P_o = 600 kPa
P_c = 400 kPa
T,S C_c = 0.17
B) P_o = 600 kPa
P_c = 537 kPa
S C_c = 0.28
S,GAS
T,S
TS,C A) P_o = 766 kPa
P_c = 800 kPa
C_c = 0.21
B) P_o = 766 kPa
P_c = 355 kPa
C_c = 0.23

JOB No.: 101 - 2581
DRILLING COMPLETED: JULY 27, 1979
BOREHOLE DEPTH: 96.9 m
DRILLING RIG: FAILING 1500
LOG COMPILED BY: J.A. WOOLEY

LEGEND
GRAIN SIZE: % Sand, % Silt, % Clay
SHEAR STRENGTH: + Torvane, • Unconfined Compr, × Min Vane, Δ UU Triaxial, ■ CU Triaxial — Field Laboratory Test Results
TEST IDENTIFICATION: C - Consolidation, T - Triaxial Shear, TS - Thaw Strain, S - P.W. Salinity, DS - Direct Shear, X - X-Ray Diffr.

BOREHOLE NUMBER 8
PAGE 1 OF 2

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NEKTORALIK H-28
LAT. 70° 27' 27.33" N LONG. 136° 06' 12.32" W WATER DEPTH: 58.8 m

DEPTH BELOW SEABED (metres)

USC	SMPL.	SOIL DESCRIPTION		GROUND ICE
MH		SILT - clayey, some organic streaks and pockets, very soft, high plasticity, olive grey	WOH/24"	NOT FROZEN
			WOH/24"	FROZEN
CH		CLAY - some silt, organic odour, high plasticity, olive grey 5Y 4/2, olive grey 5Y 5/2	WOH/24"	NOT FROZEN
			WOH/24"	FROZEN
MH		SILT - clayey, dark olive grey 5Y 3/2		NOT FROZEN
CH		CLAY - silty, high plasticity, dark grey 5Y 4/1, grey 5Y 5/1	WOH/24"	
		- 12.2% organic content	WOH/24"	
			4/24"	
MH			4/24"	
CL		- clay and silt, high plasticity, shell fragments		
			4/24"	
CH		- 9.6% organic content		
		- dark olive grey 5Y 3/2, olive grey 5Y 5/2		
MH		SILT - clayey, soft, high plasticity, very dark grey, 5Y 3/1	3/24"	
			3/24"	
			5/24"	
			6/24"	
ML		- dark olive grey 5Y 3/2, light grey, 5Y 7/1		
			6/24"	
		- (CH) clay and silt, platy, very stiff	4/24"	

BULK DENSITY ($Mg\ m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
20 40 60

NOTE
All strength tests performed on thawed samples
84
136

SPECIALIZED TESTS
S, GAS
T
T, S, GAS
C
T
T
T
C
S, GAS
T
S
C
T

JOB No.: 101 - 2581
DRILLING COMPLETED: JULY 27, 1979
BOREHOLE DEPTH: 96.9 m
DRILLING RIG: FAILING 1500
LOG COMPILED BY: J.A. WOOLEY

LEGEND

GRAIN SIZE
% Sand % Silt % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial
Field Laboratory Test Results

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 8

BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT: Tuktoyaktuk Channel	HOLE NO.: 1	PROJECT NO.: 101-2622.3
LOCATION: KP 1.21	SURFACE ELEVATION: -5.5m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ⊠ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY ⊏ CORE G GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT - some clay, some thin silty sand layers, grey, organic specks to some organics, soft	ML	G	1
	- clayey with thin sand and silty sand layers, grey, soft		G	2
	- grey brown, fewer fine sand layers, higher organic content, laminations from 25 to 75mm			3 4
	- good structure, no breaks or discontinuities evident			5
2	CLAY AND SILT - trace sand, wet, soft, low plasticity, thin organic banding, laminated, brownish grey	ML		6 7
	- trace gravel, vertically fissured, moist to wet, dark grey to black, mottled with some dark grey, organic rich		G	8 9
3	SAND - some gravel, trace to some silt, trace clay, organic rich, gradational contact above 25-50mm, damp, woody, peat layers	SP-SM	G	10
	SAND AND SILT - some clay, moist, to wet, greyish brown, thin organic layer, thin sand strata	SM	G	11
	SAND - uniform, fine, trace to some silt, brown, grey at top	SM		
	CLAY - silty matrix with gravel to 100mm cobble, locally sand, almost till-like	ML	G	12
	CLAY - organic rich, black, some thin dark grey vertical lenses, some silt, trace gravel moist to wet	OL		
4	END OF HOLE			13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

▲ <0.2

116%

WET UNIT WEIGHT-O kN/m³ 16 18 20 22
P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 3.8 m	DATE DRILLED: 79/8/11
LOGGED BY: NRM	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

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PROJECT: Tuktoyaktuk Channel	HOLE NO.: 2	PROJECT NO.: 101-2622.3
LOCATION: KP 1.98	SURFACE ELEVATION: -7.3 m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT - clayey, some sand, grey-brown, very soft, saturated	CL	G	0
			C	1
	SILT - clayey, trace fine sand and organics, laminated, brownish grey, some 50mm zones of organic silt, wet to saturated	ML	G	2
			C	3
	SILT - organic, interlaminated dark grey silt and black organic (fine fibrous layers - 25 to 50mm), moist to wet - structure of fine chunky pieces as seen in frozen soil that has been allowed to thaw	OL	G	4
2				5
	SILT - clayey, trace sand, brownish grey, thinly laminated with many fine fibrous black peaty layers, blocky structure, low plasticity	ML	G	6
	- fewer peaty layers			7
	- fine sandy strata, lowplasticity			
			C	8
			C	9
3	- peaty strata from 2.9m to 3.05m, one 40mm pebble		G	10
			C	11
	CLAY - silty, greyish brown, more massive, some organics, very soft, wet, no obvious blocky structure	MH	G	12
	END OF HOLE			13
4				

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ▲
Pocket Penetrometer △
TSF 1 2 3 4 5
kPa 100 200 300 400

0.044
0.036
0.04
0.064
0.04
0.05
0.05
0.064

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 3.8m	DATE DRILLED: 79/8/11
LOGGED BY: NRM	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

EBA Engineering Consultants Ltd.

PROJECT: Tuktoyaktuk Channel	**HOLE NO.:** 3	**PROJECT NO.:** 101-2622.3
LOCATION: KP 2.84, O/S 0.20 km	**SURFACE ELEVATION:** -4.9m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ⊠ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SILT AND CLAY - trace sand, grey, uniform, very soft, wet, no organics or stratification apparent	ML	G	0
	- sandy layers in top 15cm		C	1
	- brownish grey, uniform, some organic specks		G	2
1				3
			G	4
			C	5
	- brownish grey, fine organic rich clayey silt layers		G	6
2			G	7
			C	
	CLAY - silty, brownish grey, some organic specks, uniform, massive	MH		8
			G	9
	- increasing organic content, one shell fragment, horizontal bedding with some organic rich strata, soft, wet			10
3	- few thin sand strata below 3.05m		G	11
	SILT - organic, clayey, wet, soft, mottled or disturbed organic rich sample, black to dark grey brown	OL	C	12
	GRAVEL - silty, some sand, trace to some clay, organic, black, rounded gravel to 40mm, shell fragments, moist to wet, coal-like	GM	G	13
4	END OF HOLE			

WATER CONTENT-% : ● PLASTIC LIMIT (W_p) — LIQUID LIMIT (W_L) 20 40 60 80

COMPRESSIVE STRENGTH Torvane ▲ Pocket Penetrometer △ TSF 1 2 3 4 5 kPa 100 200 300 400

0.016 0.03 0.03 0.04 0.048 0.064 0.02 0.022

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ P.C.F. 16 18 20 22 / 100 110 120 130 140 150

STANDARD PENETRATION: N- ■ 20 40 60 80

DEPTH TO WATER: ▼

DEPTH TO SLOUGH: —

COMPLETION DEPTH: 4.1m	DATE DRILLED: 79/8/11
LOGGED BY: NRM	DRAWING NO.:

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PROJECT: Tuktoyaktuk Channel	HOLE NO.: 5	PROJECT NO.: 101-2622.3
LOCATION: KP 4.90	SURFACE ELEVATION: -4.6m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
	SILT - infrequent layers of organics, clayey, trace sand, trace gravel, dry to moist, low plasticity	OL	C	
	- sandy, clayey, some gravel, saturated to wet, very soft, low plasticity, brownish grey	ML	G	1
				2
	SAND - gravelly, silty, trace to some clay, no structure, brownish grey	SM	G	3
1	SAND - fine grained, trace silt, trace clay, trace gravel, no bedding structure, brown	SP-SM		4
	- 1cm silty clay strata dipping at 45°		G	5
				6
2	- fine grained, trace silt, trace clay, brown		G	7
	- 50mm organic layer			
	- medium grained sand, trace silt, brown		G	8
				9
3	- fine grained, trace silt		G	10
	- 50mm layer of coal chips			11
	- silty sand banding occurring every 50mm		G	12
4	END OF HOLE			13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400
▲ 0.098
▲ 0.034

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

STANDARD PENETRATION: N- ■ 20 40 60 80

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 4.0 m	DATE DRILLED: 79/8/11
LOGGED BY: NRM	DRAWING NO.:

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PROJECT: Tuktoyaktuk Channel	HOLE NO.: 6	PROJECT NO.: 101-2622.3
LOCATION: KP 7.00	SURFACE ELEVATION: -4.0m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SAND - fine to medium grained, some silt, dark brown	SM	G	1
	SILT - some clay, some sand, no bedding, wet, very soft	ML		
	- thin sandy silt layer		G	2
	SILT - clayey, trace sand, brownish grey, trace of organic specks, no structure, appears disturbed	ML		3
	- 25mm organic layer		G	4
	- low plasticity, wet, very soft			5
	- more clayey			
2	SAND - fine grained, some gravel, trace silt, grey brown - gravel size to 75mm - moist - medium to coarse grained	SW-SM	G	6
	GRAVEL- 50 to 75mm, sandy, trace silt	GP		7
	- finer gravel, subangular to subrounded, clean to trace silt		G	8
	SAND - fine grained, some silt, trace medium to fine gravel	SP-SM		9
3			G	10
	END OF HOLE			11
				12
4				13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

H 0.068

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 3.4 m	DATE DRILLED: 79/8/12
LOGGED BY: NRM	DRAWING NO.:

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EBA Engineering Consultants Ltd. eba

PROJECT: Tuktoyaktuk Channel	HOLE NO.: 7	PROJECT NO.: 101-2622.3
LOCATION: KP 8.88	SURFACE ELEVATION: -4.3m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ⊠ SPLIT SPOON ▤ DISTURBED ▧ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SILT - clayey, brownish grey, wet, very soft, not much disturbance	ML	G	0
				1
			C	
	- considerable distortion		G	2
				3
1			G	4
			C	
				5
			G	6
2	SAND - fine grained, trace to some silt, trace shell fragments	SM		
				7
	- considerable disturbance, some gravel to 40mm, brown			8
	- fine to medium grained, brownish grey, trace silt			9
3	- 25mm soft silty clay layer		G	10
	- trace gravel			11
	- cleaner sandy gravel layer		C	12
	- fine grained, trace to some silt, medium brown, no structure		G	
4				13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

0.06
0.036
0.046
0.054
0.06
0.048
0.042

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

eba

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 4.9m	DATE DRILLED: 79/8/12
LOGGED BY: NRM	DRAWING NO.:

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EBA Engineering Consultants Ltd. eba

PROJECT: Tuktoyaktuk Channel	HOLE NO.: 7	PROJECT NO.: 101-2622.3
LOCATION: KP 8.88	SURFACE ELEVATION: -4.3m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ⊠ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
	SAND (cont'd)	SM	G	14
	- trace organics, trace fine gravel			15
			G	16
5	END OF HOLE			17
				18
				19
6				20
				21
				22
				23
7				24
				25
				26
8				

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

eba

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 4.9m	DATE DRILLED: 79/8/12
LOGGED BY: NRM	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Tuktoyaktuk	HOLE NO.: 9A	PROJECT NO.: 101-2622.3
LOCATION: KP 14.03, O/S 0.38 km	SURFACE ELEVATION: -4.9m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY [C] CORE [G] GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT - clayey, trace sand, wet, brownish grey, some to little distortion	ML	G	
			C	1
	- moist to wet		G	2
				3
	SILT AND CLAY - trace sand	CL		
	- moist, distortion oscillations to 25 cm in height, 1 cm cracks penetrating half of core every 50mm.		G	4
				5
			G	6
2	SAND - trace silt, trace clay, grey, moist	SP-SM		7
	- organic laminations in silty sand, dark grey, horizontal bedding			
	- finer grained sand		G	8
	- 20cm fibrous organic layer, silty, 25mm dark grey lens of silty sand in middle, moist			9
3	- sand with some silt, grey, oxidized to brown for 40cm, damp to moist, fairly dense, top oxidization boundary follows a steep grade		G	10
				11
	- trace to some silt, grey, damp, fairly dense.		G	12
4	END OF HOLE			13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

0.036
0.035
0.042

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 3.8m	DATE DRILLED: 79/8/12
LOGGED BY: DCC	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Tuktoyaktuk Channel	**HOLE NO.:** 11	**PROJECT NO.:** 101-2622.3
LOCATION: KP 17.06	**SURFACE ELEVATION:** -4.9m	
	DRILL: Vibra - Core	

SAMPLE TYPE: ■ THIN WALLED TUBE ⊠ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY C CORE G GRAB

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT AND CLAY - trace sand, grey, wet, few shell fragments, some disturbance	ML	G	1
			G	2
			C	3
			G	4
2	SILT - clayey, trace sand, damp to moist, considerable distortion, dark grey, few shell fragments, organic specks throughout	CL		5
			G	6
	- 15mm organic lens at 1.75m			7
	- 25mm organic layer at 2.75m		G	8
3	END OF HOLE			9
				10
				11
				12
4				13

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

▲ 0.046

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
STANDARD PENETRATION: N- ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 2.9m	DATE DRILLED: 79/8/10
LOGGED BY: DCC	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Tuktoyaktuk Channel	HOLE NO.: CH1	PROJECT NO.: 101-2622.3
LOCATION: KP 3.67, O/S 0.29 km	SURFACE ELEVATION: -4.6m	
	DRILL: Failing 1500	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▨ NO RECOVERY ▦ CORE ⊏ OTHER Liner

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
	SILT AND CLAY - olive grey, very soft - with gravel	ML	L	2
1	SAND - CLAY - with gravel - interlayered silty fine sands, and silty, sandy clays with trace of gravel throughout, grey to olive-grey, moist.	SM		4
2	- beds approximately 30cm thick			6
				8
	SAND - fine to medium grained, olive grey	SP		10
3	- with organics, 2.7 to 3.0m - with gravel, 2.7 to 4.3m			12
4				14
5				16
	- with organics, 5.5 to 6.1 m			18
6				20
	- brownish grey, 6.4 to 16.8m			22
7				24
	- with gravel, 7.3m			26
8				28
9				30
				32
10				34
11				36
	- fine sand, 11.0 to 18.0m - with gravel			38
12				40

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Unconfined..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

(46 cm)
(51 cm)
(46 cm)
(46 cm)

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

20 40 60 80
Blow Counts ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 22.6m	DATE DRILLED: 79/7/17
LOGGED BY: DBP/TM/RJG	DRAWING NO.:

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EBA Engineering Consultants Ltd.

PROJECT: Tuktoyaktuk Channel	HOLE NO.: CH1	PROJECT NO.: 101-2622.3
LOCATION: KP 3.67 O/S 0.29 km	SURFACE ELEVATION: -4.6m	
	DRILL: Failing 1500	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON ▤ DISTURBED ▧ NO RECOVERY ⊞ CORE [L] OTHER Liner

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
13	Sand (Continued)			40
				42
				44
14	- silty, 13.7 to 15.2 m			46
				48
15				50
				52
16				54
				56
17				58
18	- olive grey, 17.7 o 18.0 m			60
				62
19				64
	- brownish grey			66
20				68
	- fine sand, 20.7 to 21.0m			70
21				72
				74
22	- silty			76
				78
23	END OF BOREHOLE			
24				

WATER CONTENT-% : ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Unconfined..... ▲
Pocket Penetrometer..... △
TSF 1 2 3 4 5
kPa 100 200 300 400

(46 cm)
(46 cm)
(46 cm)
(46 cm)

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150
20 40 60 80
Blow Counts : ■

DEPTH TO WATER: ▼
DEPTH TO SLOUGH: —

COMPLETION DEPTH: 22.6 m	DATE DRILLED: 79/7/17
LOGGED BY: DBP/TM/RJG	DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

EBA Engineering Consultants Ltd.

LOG OF BORING NO. MB-A

McKINLEY BAY

LOCATION : 69° 57' 39.159" N
131° 10' 12.796" W
7762811
419016

WATER DEPTH: 24"**

PEN., FT	Description	BLOW COUNT*	% PASSING NO. 200 SIEVE	UNIT DRY WT. LB PER CU FT	PEN., M
	Very soft olive gray and dark gray clay with organic deposits (2')	0	92		
	Brownish gray fine to medium sand -silty to 2.5'	22	32 9 5		1
5		23	10		2
10		14	2		3
	-fine to coarse sand, 12' to 13' -with scattered gravel and clay pockets at 12.5' -with clay seams, 14' to 15'	11	31		4
15		11	3		5
	(19')	22	3 6		6
20					7
25					8
30					9
					10
35					11
40					12
					13
45					14
					15
50					16

WATER CONTENT, %: Plastic Limit — Natural — Liquid Limit; 20 40 60

UNDRAINED SHEAR STRENGTH: KIPS PER SQ FT 1.0 2.0; KILOPASCALS 50 100

JOB NO. : 0179-0128
FINAL PENETRATION: 19'
DATE : July 25, 1979

**Water depth measured at 2000 hours on July 25, 1979.

*Number of blows of a 175-lb weight dropped approximately 5 ft required to produce a 24-in. penetration of a 2.25-in.-OD, 2.125-in.-ID thin-wall tube sampler. A 2.5-in.-OD, 2.125-in.-ID liner sampler was used to 2-ft penetration.

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(Open symbols above indicate remolded tests)
- ✦ Torvane
- ⊠ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 5

LOG OF BORING NO. MB-C
McKINLEY BAY

LOCATION : 69° 57' 45.854" N
131° 11' 23.887" W
7763045
416268
WATER DEPTH: 22**

PEN., FT	Description	*BLOW COUNT	% PASSING NO. 200 SIEVE	UNIT DRY WT. LB PER CU FT	WATER CONTENT, % (Plastic Limit / Natural / Liquid Limit; 20 40 60)	UNDRAINED SHEAR STRENGTH (KIPS PER SQ FT 1.0 2.0; KILOPASCALS 50 100)	PEN., M
0	Very soft olive gray and dark gray clay (2')	0	97		●	✦	0
5	Brownish gray fine to medium sand	15					1
		20					2
10	(11')	15	7				3
15							4
							5
20							6
							7
25							8
							9
30							10
							11
35							12
							13
40							14
							15
45							16
50							

JOB NO. : 0179-0128
FINAL PENETRATION: 11'
DATE : July 26, 1979

**Water depth measured at 0300 hours on July 26, 1979.

*Number of blows of a 175-lb weight dropped approximately 5 ft required to produce a 24-in. penetration, of a 2.25-in.-OD, 2.125-in.-ID thin-wall tube sampler. A 2.5-in.-OD, 2.125-in.-ID liner sampler was used to 2-ft penetration.

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(Open symbols above indicate remolded tests)

- ✦ Torvane
- ⊞ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 7

LOG OF BORING NO. MB-D
McKINLEY BAY

LOCATION : 69° 57' 37.675" N
131° 11' 35.664" W
7762797
416135
WATER DEPTH: 23'**

PEN., FT	SYMBOL	SAMPLES		*BLOW COUNT	% PASSING NO. 200 SIEVE	UNIT DRY WT. LB PER CU FT	WATER CONTENT, % (Plastic Limit / Natural / Liquid Limit; 20, 40, 60)	UNDRAINED SHEAR STRENGTH (KIPS PER SQ FT: 1.0, 2.0; KILOPASCALS: 50, 100)	PEN., M
			Very soft olive gray and dark gray clay (2')	0					
5			Gray fine to medium sand	7					1
				10					2
10			(11')	11	3				3
15									4
									5
20									6
									7
25									8
									9
30									10
35									11
									12
40									13
									14
45									15
50									16

JOB NO. : 0179-0128
FINAL PENETRATION: 11'
DATE : July 26, 1979

**Water depth measured at 0615 hours on July 26, 1979.

*Number of blows of a 175-lb weight dropped approximately 5 ft required to produce a 24-in. penetration, of a 2.25-in.-OD, 2.125-in.-ID thin-wall tube sampler. A 2.5-in.-OD, 2.125-in.-ID liner sampler was used to 2-ft penetration.

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(Open symbols above indicate remolded tests)

- ✦ Torvane
- ▣ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 8

LOG OF BORING NO. MB-E

McKINLEY BAY

LOCATION : 69° 58' 13.949" N
131° 10' 53.203" W
7763904
416625

WATER DEPTH: 24'**

PEN., FT	SYMBOL	SAMPLES		*BLOW COUNT	% PASSING NO. 200 SIEVE	UNIT DRY WT. LB PER CU FT	WATER CONTENT, % (Plastic Limit / Natural / Liquid Limit; 20, 40, 60)	UNDRAINED SHEAR STRENGTH (KIPS PER SQ FT: 1.0, 2.0; KILOPASCALS: 50, 100)	PEN., M
0			Very soft dark gray clay -sand at 2'	0					0
5									1
10									3
15									4
20									6
25									7
30									9
35									10
40									12
45									13
50									15
									16

(2')

JOB NO. : 0179-0128
FINAL PENETRATION: 2'
DATE : July 26, 1979

**Water depth measured at 0945 hours on July 26, 1979.

*Sample obtained with a 2.5-in.-OD, 2.125-in.-ID liner sampler attached to a 175-lb weight.

STRENGTH LEGEND
- ● Unconfined Compression
- ▲ Unconsolidated-Undrained Triaxial Compression
- ✦ Miniature Vane

(Open symbols above indicate remolded tests)

- ✦ Torvane
- ▣ Hand Penetrometer

McCLELLAND ENGINEERS

PLATE 9

PROJECT: BAY DRILLING PROGRAM		**HOLE NO.:** 1A	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY, N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ▦ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SAND - black organic, some silt, wet		G	2
	- brownish grey, fine to medium, uniform, trace of silt			4
1			G	6
2	- medium, trace of silt			8
3			G	10
				12
4	- brownish grey, fine to medium, uniform, trace of silt, wet			14
			G	16
5				18
6	- same as above		G	20
				22
7				24
			G	26
8	- trace of silt, trace of gravel - 15mm			28
9	- fine, uniform, trace of silt, moist		G	30
				32
10				
	- greyish brown, fine, uniform, trace of silt and gravel, moist		G	34
11				36
				38
12	END OF BOREHOLE (12.2 metre)		G	40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ♦
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 3.4

COMPLETION DEPTH: (m) 12.2	DATE DRILLED: 01/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806 1-A-2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM		**HOLE NO.:** 1B	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SAND - black, organic, fine, some silt, wet		G	0
1	- brownish grey, uniform, medium, some silt, wet			2
			G	4
2				6
3			G	8
				10
4	- trace of silt			12
			G	14
5	- brownish grey, coarse, uniform, trace of silt and gravel (19mm)			16
				18
6	- greyish brown, fine to medium, uniform, trace of silt		G	20
7				22
				24
8				26
9				28
				30
10				32
11				34
				36
				38
12	END OF BOREHOLE @ 12.8 metres			40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ♦
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 3.7

COMPLETION DEPTH: (m) 12.8	DATE DRILLED: 01/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT:	BAY DRILLING PROGRAM	HOLE NO.: 1C	PROJECT NO.: 101-2806.1
LOCATION:	McKINLEY BAY N.W.T.	SURFACE ELEVATION: Seabed	
		DRILL: SONIC	

SAMPLE TYPE: THIN WALLED TUBE | SPLIT SPOON | GRAB | NO RECOVERY | CORE | OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SILT - dark grey, some clay and organics, wet		G	2
1	SAND - dark grey, fine, uniform, trace of silt, moist - light grey, fine, uniform, trace of silt, moist		G	4
2	- brownish grey, coarse, uniform, trace of silt and gravel, moist			6
3				8
4				10
5	- brownish grey, coarse, some silt, trace of organics and gravel, moist		G	12 14 16
6	- brownish grey, medium, some silt, trace of gravel, moist		G	18 20
7				22
8			G	24 26
9				28
10				30 32
11	END OF BOREHOLE (10.7 metres)			34 36
12				38 40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ♦
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5.8

COMPLETION DEPTH: (m) 10.7	DATE DRILLED: 04/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-4

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM	**HOLE NO.:** 1D	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY, N.W.T.	**SURFACE ELEVATION:** Seabed	
	DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SAND - light grey, fine, silty, trace of clay, wet		G	2
1	- organic silt, wet			4
	- brownish grey, fine, uniform, some silt, wet		G	6
2	- brownish grey, fine to medium, uniform, trace of silt, moist			8
3			G	10
4				12
	- brownish grey, medium to coarse, uniform, trace of silt, moist		G	14
5	- trace of gravel			16
6			G	18
				20
7			G	22
	- as above			24
8	- 0.2m layer of fine sand			26
9				28
				30
10				32
				34
11	END OF BOREHOLE(10.7 metres)			36
				38
12				40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ◆
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m)
5.8 metres

COMPLETION DEPTH: (m) 10.7	DATE DRILLED: 04/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGARM		**HOLE NO.:** 7	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT - dark grey, clayey, foul odour, wet, medium plastic		G	2
	- some organics			
2	- dark grey, sandy, foul odour		G	4
				6
3	SAND - light grey, fine, uniform, some silt, wet		G	8
	- dark grey, fine to medium, silty, moist			10
4				12
	- grey, fine, uniform, some silt, moist to wet		G	14
5				16
	- medium, uniform, trace of silt			18
6	- brownish grey, medium, uniform, some silt		G	20
				22
7				24
	- trace of silt and pebbles		G	26
8				
	- trace of silt and clayey silt lumps		G	28
9				30
				32
10				34
				36
11				38
12	END OF BOREHOLE @ 13.7 metres			40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ◆
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5.8

COMPLETION DEPTH: (m) 13.7	DATE DRILLED: 02/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-11

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM		**HOLE NO.:** 8	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY, N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
	SILT - dark grey, clayey, wet		G	
	SAND - grey, fine, uniform, some silt, moist			2
1	- organic, slight odour, some silt			4
			G	6
2	- greyish brown, medium, uniform, moist			8
3			G	10
				12
4	- as above			14
			G	16
5				18
6	- brownish grey, fine, uniform, silty, wet, lamination of clay at 5.5m			20
			G	22
7	- silt layer, grey, non-plastic, 0.3m thick			24
	- greyish brown, medium, some silt		G	26
8				28
	- some organics from 8.0 metres to 9.0 metres			30
9			G	
	- brown, fine, uniform, silty, moist			32
10				34
11				36
				38
12				40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ◆
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5

COMPLETION DEPTH: (m)	14.2	DATE DRILLED:	03/04/80
LOGGED BY:	JPB/PMR	DRAWING NO.:	2806.1-A-12a

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM	HOLE NO.: 8	PROJECT NO.: 101-2806.1
LOCATION: McKINLEY BAY N.W.T.	SURFACE ELEVATION: Seabed	
	DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
13	SAND - continued - brownish grey, fine, uniform, some silt			40
				42
	- trace of silt			44
14	- black organic, 0.3 metres thick			46
	END OF BOREHOLE (14.2 metres)			48
15				50
16				52
				54
17				56
				58
18				60
				62
19				64
20				66
				68
21				70
				72
22				74
23				76
				78
24				

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ◆
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5

COMPLETION DEPTH: (m) 14.2	DATE DRILLED: 03/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-12b

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM	**HOLE NO.:** 9	**PROJECT NO.:** 101-2806.1
LOCATION: McKinley Bay N.W.T.	**SURFACE ELEVATION:** Seabed	
	DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SILT - dark grey, trace of clay, medium plastic		G	0
1	SAND - greyish brown, fine, uniform, trace to to some silt, moist			2
			G	4
2	- medium to coarse, uniform, trace of silt, moist			6
				8
3			G	10
				12
4				14
5				16
	- greyish brown, medium, trace of silt, moist			18
6			G	20
	- trace of gravel at 6.5 metres			22
7	- greyish brown, medium to coarse, trace of silt, moist			24
			G	26
8				28
9	- some gravel, trace of clay		G	30
				32
10	- some gravel, maximum size 25mm			34
11				36
				38
12	END OF BOREHOLE (11.5 metres)			40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ◆
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5.2

COMPLETION DEPTH: (m) 11.5	DATE DRILLED: 03/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-13

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM		**HOLE NO.:** 10	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY, N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE □ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
0	SILT - dark grey, some clay, low plastic, trace of organics, wet		G	2
1	SAND - dark grey, fine, uniform, some silt and organics, moist		G	4
	- yellowish brown, fine to medium, some silt, moist		G	6
2				8
	- as above		G	10
3				12
4				14
	- brownish grey, medium to coarse, trace of silt, moist		G	16
5				18
	- trace of gravel		G	20
6				22
7			G	24
				26
8				28
9	- trace of gravel, 20mm		G	30
				32
10				34
11	END OF BOREHOLE (11.0 metres)			36
				38
12				40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ♦
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT WEIGHT-O $\frac{kN}{m^3}$ 16 18 20 22
P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 5.5

COMPLETION DEPTH: (m) 11.0	DATE DRILLED: 03/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-14

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: BAY DRILLING PROGRAM		**HOLE NO.:** 11	**PROJECT NO.:** 101-2806.1
LOCATION: McKINLEY BAY N.W.T.		**SURFACE ELEVATION:** Seabed	
		DRILL: SONIC	

SAMPLE TYPE: ■ THIN WALLED TUBE ☒ SPLIT SPOON [G] GRAB ▨ NO RECOVERY ⊞ CORE ☐ OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE	DEPTH (ft.)
1	SILT - dark grey, trace of clay, medium plastic, wet		G	2
	- black organics			4
2	SAND - dark grey-black, trace to some silt, wet at 1.5 metres		G	6
	- light brownish grey, fine to medium, uniform, some silt, wet			8
3			G	10
4				12
				14
5	- light, brownish grey, medium, uniform, some silt, wet		G	16
				18
6			G	20
	- light brownish grey, medium to coarse, some silt and gravel, moist			22
7			G	24
8				26
	- dark grey, fine, uniform, trace of organics, moist		G	28
9	END OF BOREHOLE (8.5 metres)			30
				32
10				34
11				36
				38
12				40

WATER CONTENT-% ●
PLASTIC LIMIT (W_P) — LIQUID LIMIT (W_L)
20 40 60 80

COMPRESSIVE STRENGTH
Torvane ♦
Unconfined ▲
Pocket Penetrometer △
TSF .1 .2 .3 .4 .5
kPa 10 20 30 40

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22
WEIGHT-O P.C.F. 100 110 120 130 140 150

10 20 30 40
Dynamic Cone: Nc - □
Standard Penetration: N - ■

eba

THICKNESS OF ICE: (m)

THICKNESS OF ICE AND WATER: (m) 6.1

COMPLETION DEPTH: (m) 8.5	DATE DRILLED: 04/04/80
LOGGED BY: JPB/PMR	DRAWING NO.: 2806.1-A-15

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

2941

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Consulting Engineers and Geologists

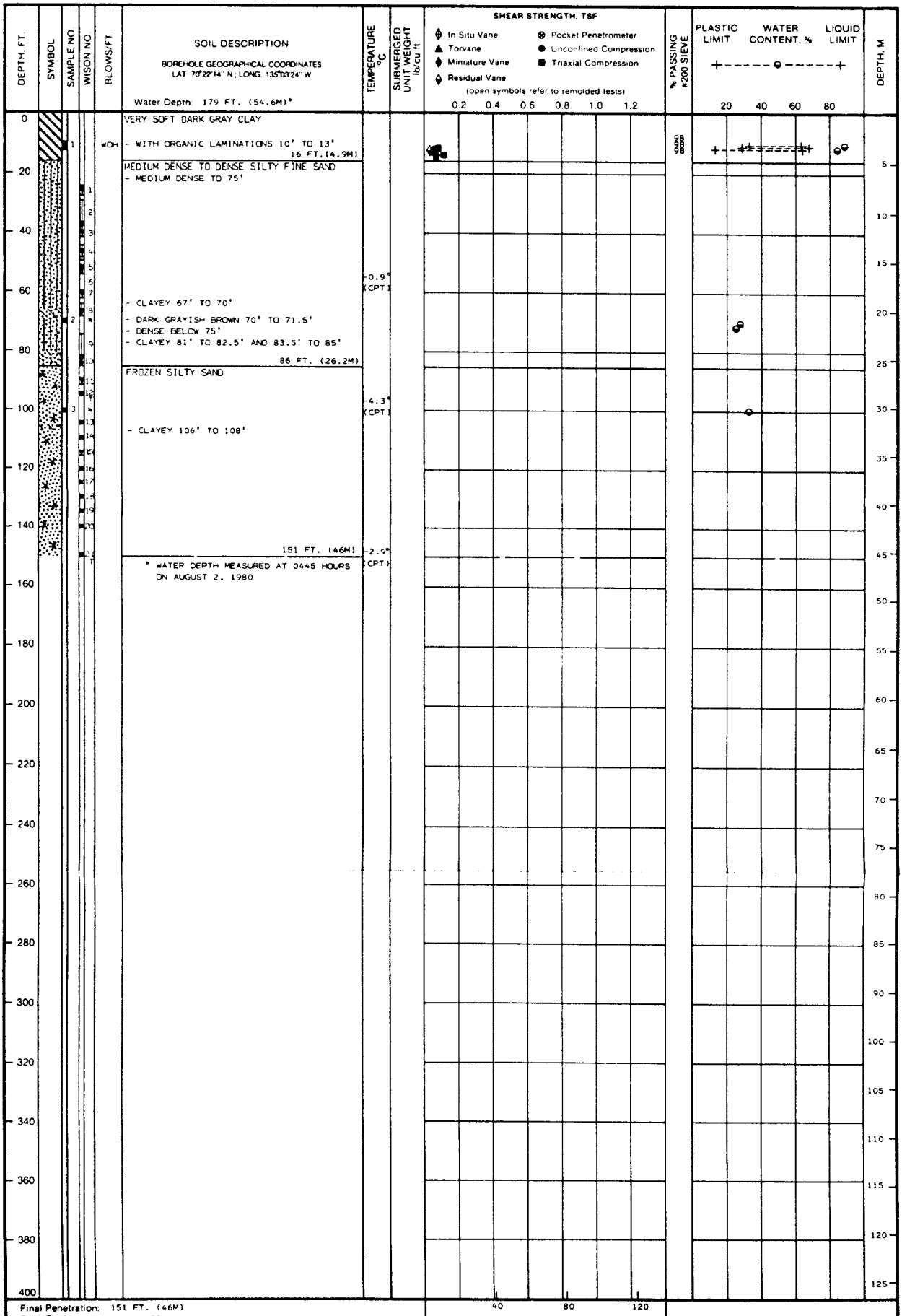


PLATE 2

LOG OF BORING AND TEST RESULTS

BORING 1, KOPANOAR M-13
BEAUFORT SEA, OFFSHORE CANADA

FUGRO GULF, INC
Consulting Engineers and Geologists

Water Depth 186' AT 1925 HRS, AUG 3, 1978

DEPTH, FT	SAMPLE NO	BLOWS/FT * *	SOIL DESCRIPTION	ϕ, DEGREES	SUBMERGED UNIT WEIGHT lb/cu ft
0	1	USH	VERY SOFT OLIVE GRAY CLAY		30
	2	1	- WITH BLACK ORGANIC STREAK TO 18'		30
	3	PUSH	MEDIUM GRAY, 3' TO 12'		32
	4	PUSH	15.5'(4.7M)		36
	5	1			44
20	6	16	LIGHT OLIVE GRAY CALCAREOUS SILTY FINE SAND		
	7	9			
	8	20	- SLIGHTLY CALCAREOUS AT 16'		
	9	4	- WITH CLAYEY SAND LAYER AND SHELL FRAGMENTS AT 18'		
	10	5			
	11	15			
	12	15	- WITH FINE GRAVEL, 24' TO 26'		
40	13	15	- WITH ORGANIC STREAK AT 24.5'		
	14	13	- OLIVE GRAY BELOW 30'		
	15	13	- WITH BLACK SEAMS, 39' TO 48'		
60	16	13	- WITH CLAY SEAMS AT 56'		
			- WITH BLACK POCKETS, 56' TO 58'		
	17	15	- WITH CLAYEY SILT LAYER, 66' TO 66.5' SLIGHTLY SILTY, 66.5' TO 67.5'		
80	18	17	- WITH FROZEN SEAMS AT 77' 81'(24.7M)		
	19	17	FROZEN OLIVE GRAY FINE SAND		
	20	37	- SILTY TO 116'		
	21	20	- CALCAREOUS TO 120'		
100	22	20	- TRACE OF BLACK ORGANICS BELOW 85' WITH CLAY AND SILT LAMINATIONS AT 87.5'		49*
	23		- WITH VISIBLE ICE AT 87.5'		
	24	44	- WITH CLAY SEAMS AND LAYERS, 91' TO 92'		
	25	A	- WITH SMALL WOOD PIECES, 91' TO 92' AND AT 112'		
120	26	104	- WITH SANDY SILT LAYERS, 96' TO 97'		
	27	44	- WITH CLAY POCKETS AND VISIBLE ICE FRAGMENTS 97' TO 106'		
	28	56	- SLIGHTLY CALCAREOUS BELOW 120'		
	29	NR	- WITH CLAY POCKETS AND SHELL FRAGMENTS BELOW 136' 138'(42.0M)		
140	30	56	FROZEN LAMINATED SILT, SAND AND CLAY		46%*
	31		- WITH VISIBLE 1/8" ICE VEINS TO 147' AND 151' TO 155'		60*
	32		- WITH SANDY SILT LAYER, 142' TO 143' 146'		51*
	33		- LIGHT OLIVE GRAY, 146' TO 193' (47.6M)		50*
	34				53*
					52*
160			FROZEN OLIVE GRAY FINE SAND, SLIGHTLY CALCAREOUS		
	35		- WITH CLAY AND SILT SEAMS, 166' TO 170'		
			- WITH ORGANIC POCKETS AND STREAKS, 166' TO 170' AND 180' TO 180.5'		
180	36	60	- WITH SANDY SILT LAYER, 167' TO 168'		
	37		- SILTY, 180' TO 190'		
	38	44	- WITH WOOD PIECES BELOW 182'		
	39	120	- WITH COARSE SAND SEAM AT 192.5' 193'(58.8M)		
	40				
200	41	35	FROZEN OLIVE GRAY LAMINATED SAND, SILT & CLAY		58*
	NR		- WITH 1/8" ICE VEINS, 197' TO 198' 207' (63.1M)		51*
	42				
	43	30			
	44	50	FROZEN OLIVE GRAY LAMINATED CALCAREOUS		
	45	60	SAND AND SILT		
220	46		- WITH VISIBLE ICE AT 209' AND 226'		
			- CLAYEY, 205' TO 215' AND 235' TO 245'		
	NR	20	- WITH WOOD AND SHELL FRAGMENTS, 224' TO 225'		
	47	150			
240	48	48			
	49	56			
	50				
	51	55	- WITH SAND POCKETS, 251' TO 252'		
	52	50	255'(77.7M)		
260	53	57	FROZEN OLIVE GRAY LAMINATED SILTY CLAY AND SILT WITH INCLINED PARALLEL BEDDING		
	54	5			59*
	55	70	- TRACE OF BLACK ORGANICS AT 267' AND 265' TO 335'		
	56	2			
	57	7	- CLAY LAYER AT 286.5'		
280	58		- SANDY, 277' TO 287'		59*
			- WITH FINE GRAVEL AT 287.5'		
			- WITH WOOD FRAGMENTS AT 289'		
	61	13	- WITH 1/16" VISIBLE ICE VEIN AT 291'		59*
300			- SANDY SILT, 296' TO 297.5'		
			- SANDY CLAYEY SILT, 306' TO 306.5'		
			317'(96.6M)		
320			VERY STIFF OLIVE GRAY CLAY		
			- CALCAREOUS TO 342'		
	65		- SILTY WITH NUMEROUS INCLINED SILT PARTINGS AND SEAMS TO 367'		51
			- EVEN, HORIZONTAL, PARALLEL BEDDING BELOW 336'		
340			- WITH ORGANIC STREAKS, 346' TO 348'		58
					59
360					64
			- WITH 1/4" VISIBLE ICE WEDGE AT 377'		
380			- WITH BLACK ORGANIC STREAKS, 386' TO 398'		58
			- GASSY, FLOCCULATED, 396' TO 397.5'		
			- WITH ORGANIC ODOR BELOW 396'		
			- SILTY WITH SAND AND SILT SEAMS AND POCKETS BELOW 406' 407'		54
400			- WITH SHELL FRAGMENTS BELOW 406' (124.0M)		
420					
440					
460					
480					
500					
520					

Final Penetration 407' (124M)
Field Engineer J. A. ADAMS

* SUBMERGED UNIT WEIGHTS PROVIDED BY THE UNIVERSITY OF ALBERTA.

**NUMBER OF BLOWS OF A 175-LB WEIGHT DROPPED APPROXIMATELY 5 FT REQUIRED TO PRODUCE A 12-IN. PENETRATION, EXCEPT AS NOTED; OF A 2.29-IN. OD, 2.125-IN. ID SAMPLER, 2-IN. SPLIT-BARREL USED AT 86', 135' AND 180' PENETRATION. HEIGHT OF DROP OF 175-LB WEIGHT APPROXIMATELY 1' TO 2' BETWEEN 81' AND 300' PENETRATION.

SHEAR STRENGTH, KSF
♦ In Situ Vane ● Pocket Penetrometer
▲ Torvane ● Unconfined Compression
♦ Miniature Vane ■ Triaxial Compression
(open symbols refer to remolded tests)
0.1 1.0 2.0 3.0 4.0 5.0 6.0

% PASSING #200 SIEVE

PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
(open symbol refers to moisture contents provided by the University of Alberta)
20 40 60 80

DEPTH, M

NOTE:
THIS BOREHOLE WAS DRILLED BY MCCLELLAND ENGINEERS IN AUGUST, 1978. DOME REQUESTED FUGRO TO REPRODUCE THE LOG IN THIS REPORT IN ORDER TO COMPARE WITH FUGRO CONE PENETROMETER (CPT) DATA. FUGRO CPT DATA IS PRESENTED ON PLATE 2 AND IN APPENDIX C.

KILOPASCALS

LOG OF BORING AND TEST RESULTS

PLATE 3

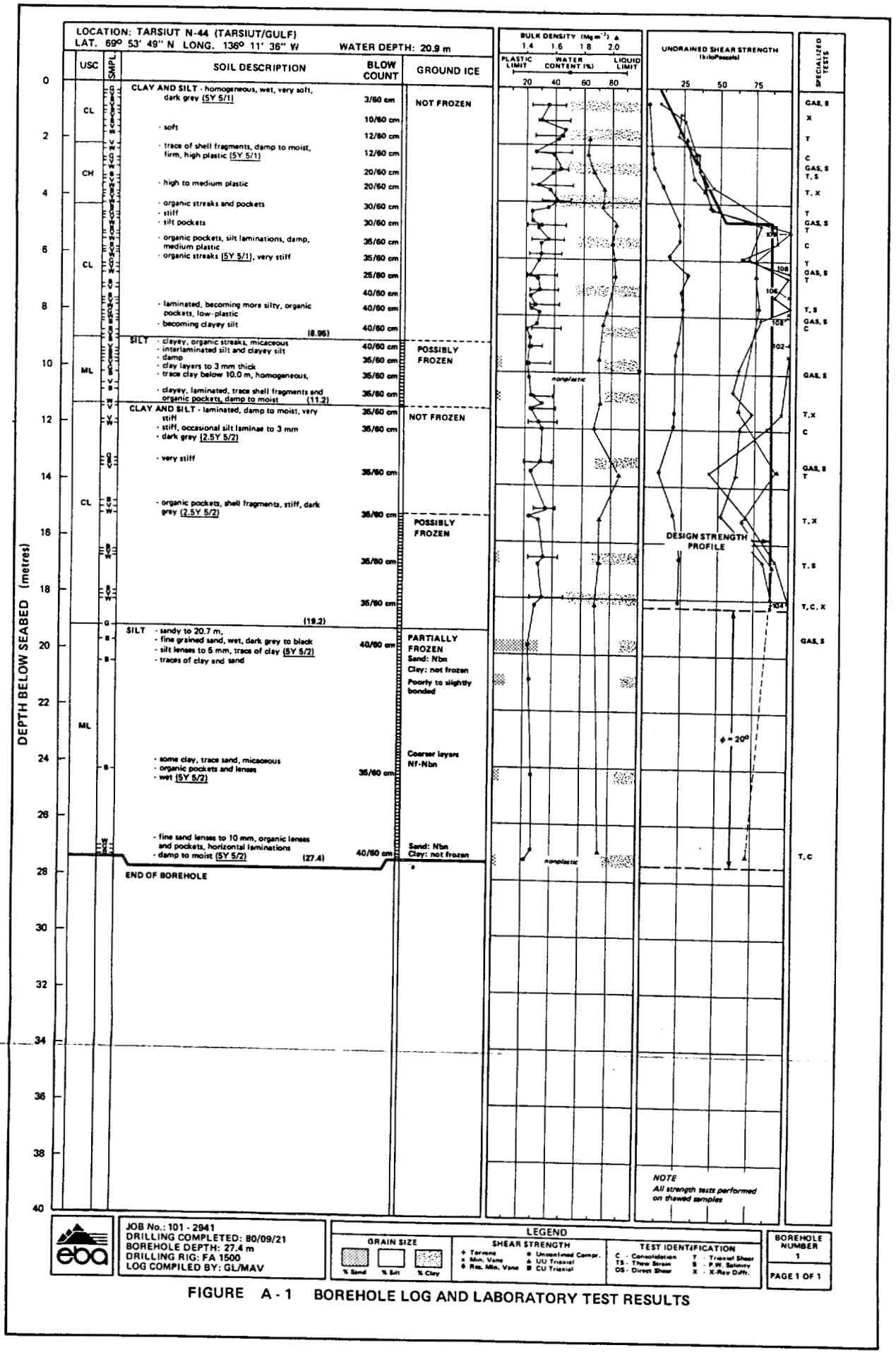


FIGURE A - 1 BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE B-2 SUMMARY OF CONSOLIDATION TEST RESULTS, TARSIUT N-44 (TARSIUT/GULF)

SAMPLE NUMBER	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
4B	2.25- 2.40	CH	21	130	6.2	0.30
9C	5.35- 5.50	CL	49	480	9.8	0.23
14C	8.20- 8.35	CL	75	140	1.9	0.16
20C	11.95-12.10	CL	109	160	1.5	0.30
24C	18.15-18.30	CL	165	290	1.8	0.25
28A	26.95-27.40	ML	247	700	2.8	0.13

LOCATION: TARSIUT N-44
LAT. 69° 53' 49" N, LONG. 136° 11' 36" W WATER DEPTH: 23.8 m

DEPTH BELOW SEABED (metres)	USC	SMPL	SOIL DESCRIPTION		GROUND ICE
0	CH	B	CLAY AND SILT - damp, firm, high plastic, dark grey	10/60 cm	NOT FROZEN
1	CH	W	- trace of shell fragments, damp, stiff	15/60 cm	
	CH	B		25/60 cm	
2	CH	B	- trace of organics and shell fragments, faintly laminated, damp, stiff, dark grey	25/60 cm	
	CL	B		25/60 cm	
3	CL	B	- trace of sand, damp to moist, stiff, low plastic, very dark grey (5Y 5/1)	25/60 cm	
	CL	B		25/60 cm	
4	CL	W		25/60 cm	
	CL	B		25/60 cm	PARTIALLY FROZEN Pockets of slightly bonded material
5	CL	B	- trace of sand and organics, moist	25/60 cm	
	CL	B		25/60 cm	
6	CL	W		25/60 cm	
	CL	B	(6.7)		
7	ML	B	SILT - trace of sand, faintly laminated, damp, nonplastic, dark grey, (5Y 5/1)	25/60 cm	NOT FROZEN
	ML	B	(7.9)	25/60 cm	
8	CL	W	CLAY AND SILT - trace of shell fragments and organics, silt lenses, damp, stiff, very dark grey (5Y 3/1)	25/60 cm	
	CL	B	(9.1)	25/60 cm	
9			END OF BOREHOLE		
10					
11					
12					
13					
14					
15					

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
T
T
T
T

NOTE
All strength tests performed on thawed samples

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/10/11
BOREHOLE DEPTH: 9.1 m
DRILLING RIG: FA 1500
LOG COMPILED BY: GL

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
♦ Res. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 2

PAGE 1 OF 1

FIGURE A-3 BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44
LAT. 69° 53' 49" N, LONG. 136° 11' 36" W WATER DEPTH: 23.8 m

USC	SMPL	SOIL DESCRIPTION		GROUND ICE
CL	B	CLAY AND SILT - trace of sand, shell fragments - organics, moist, firm to stiff, low plastic, dark grey (5Y 3/1)	10/60 cm	NOT FROZEN
	B		20/60 cm	
	B	- trace of organic pockets, homogeneous, very stiff	20/60 cm	
	B	- faintly laminated	20/60 cm	
	B		20/60 cm	
	B	- occasional shell fragments, damp	20/60 cm	
	B		20/60 cm	
	B	- laminated, horizontal silt laminae, moist, stiff to very stiff	20/60 cm	POSSIBLY FROZEN Pockets of slightly bonded material, no visible ice
	B	- some fine grained sand	25/60 cm	
	B	(5.5)	25/60 cm	
ML	B	SILT - some clay, trace sand and organics, laminated, damp	25/60 cm	
	B		25/60 cm	
	B		25/60 cm	
	B	- trace of shell fragments, sandy laminations, wavy, nonparallel	25/60 cm	
	W		25/60 cm	NOT FROZEN
	W	(9.1)	25/60 cm	
		END OF BOREHOLE		

DEPTH BELOW SEABED (metres)

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
T
C

NOTE
All strength tests performed on thawed samples

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/10/12
BOREHOLE DEPTH: 9.1 m
DRILLING RIG: FA 1500
LOG COMPILED BY: MAV/GL

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
♦ Res. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 3

PAGE 1 OF 1

FIGURE A-4 BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44
LAT. 69° 53' 49" N, LONG. 136° 11' 36" W WATER DEPTH: 23.5 m

DEPTH BELOW SEABED (metres)	USC	SMPL	SOIL DESCRIPTION		GROUND ICE
0	CL	B	CLAY AND SILT - laminated, damp, stiff, low plastic, dark grey (5Y 3/1)	15/60 cm	NOT FROZEN
1		B	- trace of shell fragments	20/60 cm	
		W	- very stiff		
2		B	- trace of fine grained uniform sand	20/60 cm	
		B	- black organic specks	20/60 cm	
3		B		20/60 cm	
		B		25/60 cm	
4		W		25/60 cm	
		B			
5		B	- some fine grained, uniform sand, trace of shell fragments and organics, laminations of silt and silt pockets	25/60 cm	
		B		25/60 cm	
6		B	- sand and organic laminae to 7 mm thick, very stiff	25/60 cm	POSSIBLY FROZEN Pockets of slightly bonded material, no visible ice
		B	- trace of sand and organics, laminated	25/60 cm	
7		B	- trace of shell fragments and organics, laminated, damp to moist, firm, low plastic, dark grey (5Y 3/1)	25/60 cm	
		W		25/60 cm	
8		B		25/60 cm	NOT FROZEN
		W		25/60 cm	
9			(9.1)	25/60 cm	
10			END OF BOREHOLE		
11					
12					
13					
14					
15					

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
C
C
C

NOTE
All strength tests performed on thawed samples

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/10/12
BOREHOLE DEPTH: 9.1 m
DRILLING RIG: FA 1500
LOG COMPILED BY: MAV/GL

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
♦ Res. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 4

PAGE 1 OF 1

FIGURE A-5 BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44
LAT. 69° 53' 49" N, LONG. 136° 11' 36" W WATER DEPTH: 23.8 m

USC	SMPL	SOIL DESCRIPTION		GROUND ICE
CL	B	CLAY AND SILT - trace of sand and shell fragments, moist, firm, low plastic, dark grey (5Y 3/2)	15/60 cm	NOT FROZEN
	B		20/60 cm	
	B	- laminated	20/60 cm	
	B	- trace of organics, occasional silt pockets, stiff	20/60 cm	
	W		20/60 cm	
	B		20/60 cm	
	B	- trace of sand and organics, damp, very stiff	25/60 cm	POSSIBLY FROZEN Slightly bonded silt laminae, no visible ice
	B	- sand and organic laminae	25/60 cm	
	B	- trace of organics and oxides, laminated	25/60 cm	NOT FROZEN
		(6.7)	25/60 cm	
ML	W	SILT - trace of sand, micaceous, homogeneous, black (7.5YR 2.5/0)	25/60 cm	
	W	- trace of sand and organics, faintly laminated, very dark grey (5Y 2.5/1) (8.5)	25/60 cm	
		END OF BOREHOLE		

DEPTH BELOW SEABED (metres)

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
T
T
T

NOTE
All strength tests performed on thawed samples

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/10/12
BOREHOLE DEPTH: 8.5 m
DRILLING RIG: FA 1500
LOG COMPILED BY: GL/MAV

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
♦ Res. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 5

PAGE 1 OF 1

FIGURE A-6 BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44
LAT. 69° 53' 49" N, LONG. 136° 11' 36" W WATER DEPTH: 24.1 m

USC	SMPL	SOIL DESCRIPTION		GROUND ICE
CH	B	CLAY AND SILT - trace of organics, laminated, wet, firm, high plastic, grey (5Y 4/1)	15/60 cm	NOT FROZEN
	B		20/60 cm	
CL	B	- trace of shell fragments, damp, stiff to very stiff, low plastic	20/60 cm	
	B		20/60 cm	
	B		25/60 cm	
	W	- trace of organics, occasional silt lenses and organic streaks, very stiff	25/60 cm	
	B	- laminated, damp, stiff	25/60 cm	
	B		25/60 cm	
	W	- laminated, very stiff, alternating black and grey	25/60 cm	POSSIBLY FROZEN Slightly bonded silt laminae, no visible ice
	B	- thin laminae, less than 2 mm thick	25/60 cm	
	B	(6.7)	25/60 cm	
ML	B	SILT - some clay, trace of sand, laminated, damp, nonplastic, alternating black and brown	25/60 cm	NOT FROZEN
	B	(7.9)		
CL	W	CLAY AND SILT - trace of shell fragments and organics, laminated, damp to wet, stiff, low plastic	25/60 cm	
	B	(9.1)	25/60 cm	
		END OF BOREHOLE		

DEPTH BELOW SEABED (metres)

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
C
C
C

NOTE
All strength tests performed on thawed samples

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/10/80
BOREHOLE DEPTH: 9.1 m
DRILLING RIG: FA 1500
LOG COMPILED BY: GL/MAV

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
× Min. Vane
♦ Res. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 6

PAGE 1 OF 1

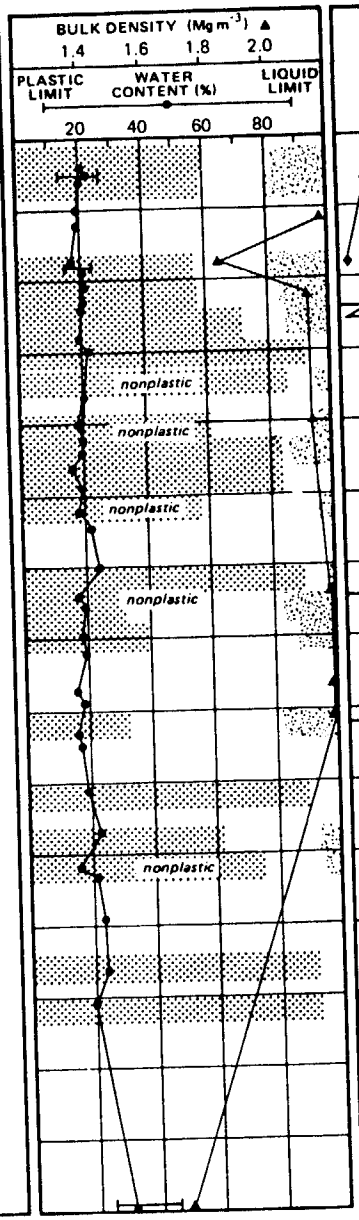
FIGURE A-7 BOREHOLE LOG AND LABORATORY TEST RESULTS

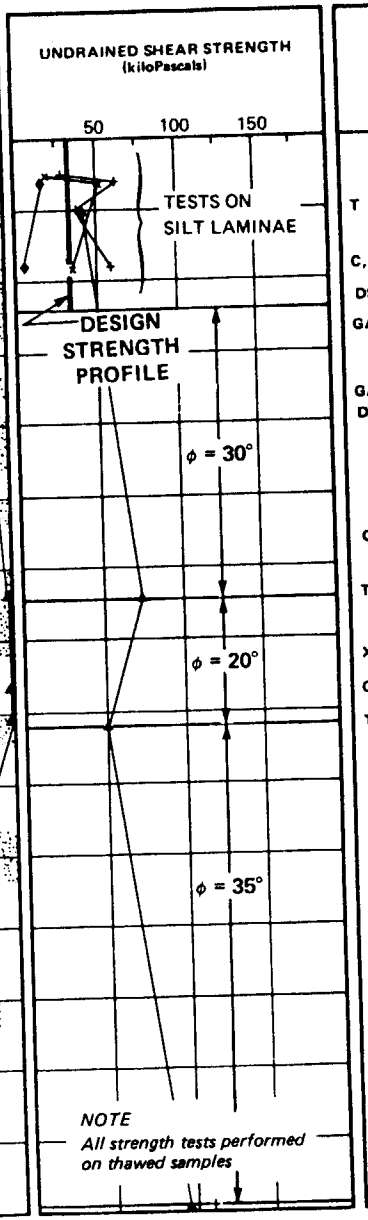
TABLE E-3 SUMMARY OF CONSOLIDATION TEST RESULTS, TARSIUT N-44, (TARSIUT/GULF) BOREHOLES 2 - 6

SAMPLE NUMBER	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
3	8.50-9.10	ML	103	280	2.7	0.25
4	1.20-1.80	CL	43	350	8.1	0.25
4	3.70-4.30	CL	60	350	5.8	0.23
4	7.30-7.90	CL	93	370	4.0	0.22
6	3.00-3.70	CL	55	410	7.5	0.21
6	4.90-5.50	CL	71	590	8.3	0.11
6	7.90-8.50	CL	98	350	3.6	0.24

LOCATION: KAGLULIK P-74
LAT. 70° 33' 51" N, LONG. 130° 51' 40" W
WATER DEPTH: 25.9 m

DEPTH BELOW SEABED (metres)	USC	SMPL	SOIL DESCRIPTION		GROUND ICE
0	SC	B V	SAND - silty, some clay, trace organics and shell fragments, moist, very dark grey (5Y 3/1), (5Y 5.5/1)	3/60 cm	NOT FROZEN
1		V W B	- some silty clay laminae; very soft to firm, low plastic	8/60 cm	
		W V		18/60 cm	
2		B B	- some silt and clay; few clay pockets - firm to stiff, low plastic	20/60 cm	
		G B	- trace silt, dark greyish-brown (2.5Y 4/2), (2.5Y 5.5/2)	20/60 cm	
3	SP-SM	B	- fine-grained sand, homogeneous (2.5Y 5/4)	20/60 cm	
4	SM	B B B B	- some sand, trace to some clay, trace organics dark greyish-brown (2.5Y 3.5/2), (2.5Y 6/2)	20/60 cm	
5		B	- trace silt and clay - 10 mm diameter quartz clast at 5.3 m	20/60 cm 25/60 cm	
6	SM-SP	B G B	(6.45)	25/60 cm	
		B W B	SILT - sandy, to and SAND, some clay	20/60 cm	
7	ML	B B	- mottled-sandy silt and silty clay, moist, very dark greyish-brown (2.5Y 3/2), (2.5Y 5/1.5)	20/60 cm	
		B		25/60 cm	
8		W B	(8.35)		
		W B	SAND - some silt, trace to some clay,	25/60 cm	
9	SM/SC	B	- fine-grained sand, moist, dark-greyish-brown (2.5Y 3.5/2), (2.5Y 5/2)	25/60 cm	
	SM-SP	B	- trace silt	25/60 cm	
10	SM	B B B B	- some silt to silty, trace clay (2.5Y 6/2)	25/60 cm	
		B		25/60 cm	
11		B	- trace silt	25/60 cm	
12	SP-SM	B	- trace silt and clay	25/60 cm	
13					
14					
15		V	(14.95)		





SPECIALIZED TESTS
T
C, S
DS
GAS, S
GAS
DS
GAS, S
T
X, S
C
T
GAS, S
T

JOB No.: 101 - 2941
DRILLING COMPLETED: 80/08/21
BOREHOLE DEPTH: 121.9 m
DRILLING RIG: FA 1500
LOG COMPILED BY: DCC/MAV/LSM

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
x Min. Vane
♦ Kes. Min. Vane
● Unconfined Compr.
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

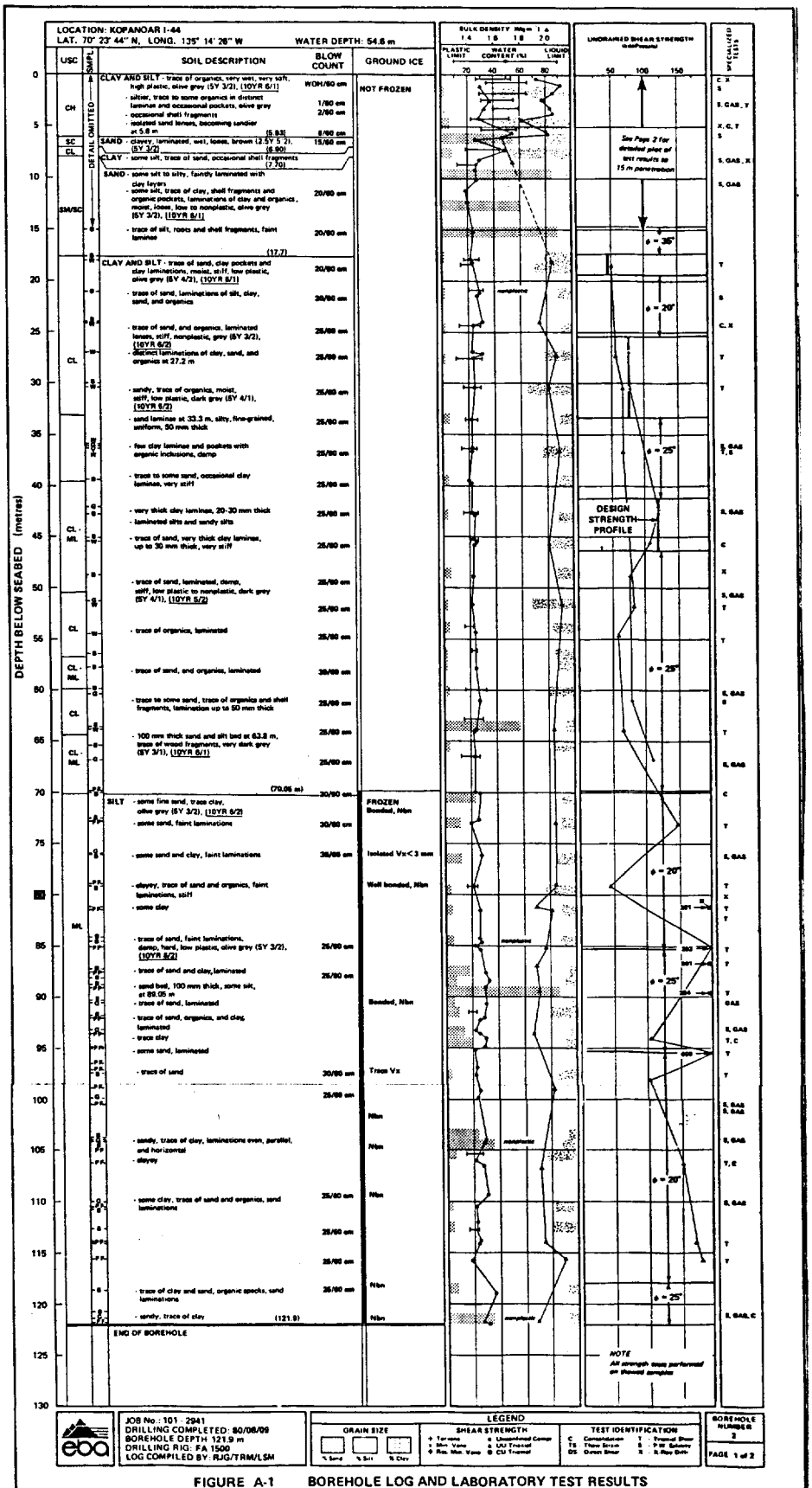
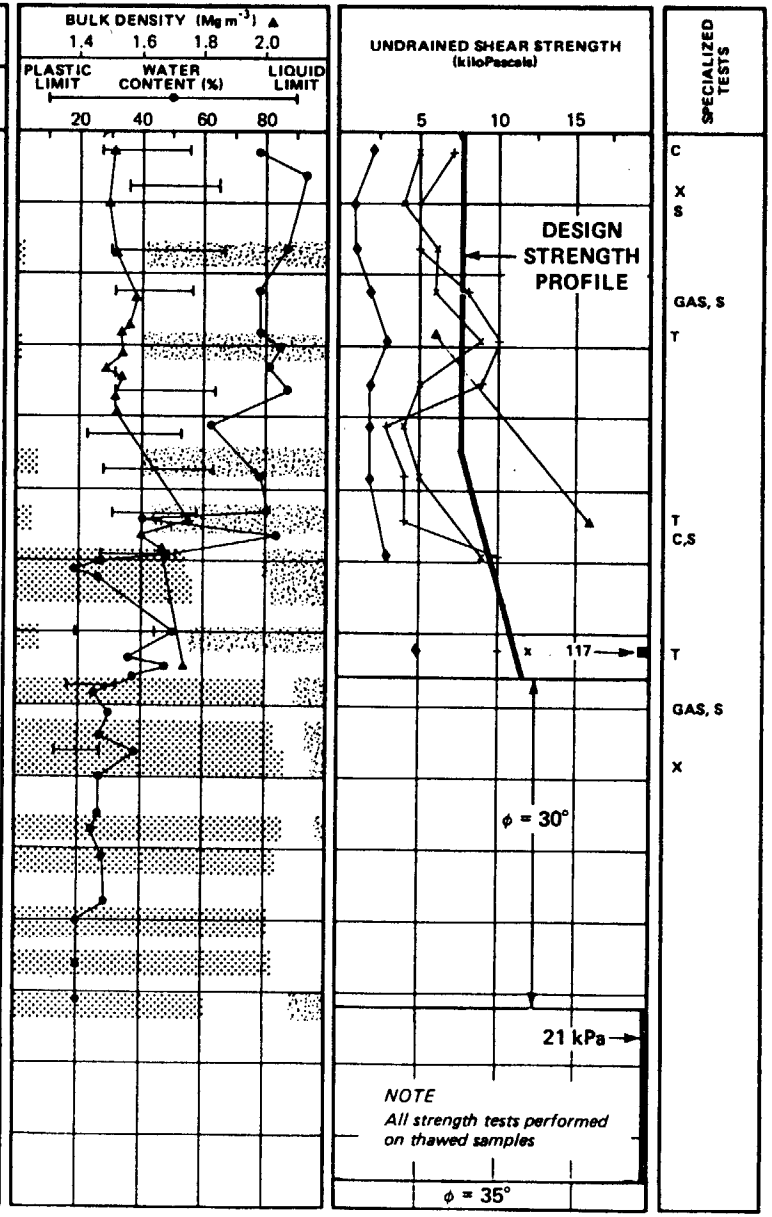


FIGURE A-1 BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOPANOAR I-44
LAT. 70° 23' 44" N, LONG. 135° 14' 26" W WATER DEPTH: 54.6 m

DEPTH BELOW SEABED (metres)	USC	SMPL	SOIL DESCRIPTION		GROUND ICE
0	CH	V	CLAY AND SILT - trace of organics, very wet, very soft, - high plastic, olive grey, (5Y 3/2), (10YR 6/1)	WOH/60 cm	NOT FROZEN
1				WOH/60 cm	
2		V	- few organic seams and pockets	WOH/60 cm	
		V	- silty, trace to some organic, distinct organic laminae and pockets	1/60 cm	
3		V	- occasional silt laminations	1/60 cm	
		V		2/60 cm	
4		V	- occasional shell fragments	2/60 cm	
		V	- silt seams and occasional shell fragments	2/60 cm	
5		B	- isolated sand lenses	6/60 cm	
6		V	- becoming sandier (5.93)		
	SC	B	SAND - silty and clayey, fine-grained, uniform, laminated, moist, greyish brown (2.5Y 3/2), (10YR 6/1) (6.90)	10/60 cm	
7		B		15/60 cm	
	CL	B	CLAY - silty to some silt, trace of sand, occasional shell fragments, wet, soft, low plastic	15/60 cm	
		B	- numerous sand lenses and pockets (7.70)		
8	SM/SC	B	SAND - some silt to trace of silt, with interbedded clay layers	15/60 cm	
		B	- silty clay layer 8.6 - 8.8 m	15/60 cm	
9		B	- trace of silt and clay, occasional shell	15/60 cm	
		B	- fine-grained sand, homogeneous (2.5Y 5/4) uniform, laminated, moist, olive grey (5Y 3/2), (10YR 6/1)	15/60 cm	
10		B	- some silt, trace of clay, faint horizontal, laminae of clay and organics	20/60 cm	
		B		20/60 cm	
11		B		20/60 cm	
12		B	- silty, some clay, faint horizontal laminae of clay and organics	20/60 cm	
13					
14					
15		B	- trace of silt, occasional root and shell fragments, faint laminations		



JOB No.: 101 - 2941
DRILLING COMPLETED: 80/08/09
BOREHOLE DEPTH: 121.9 m
DRILLING RIG: FA 1500
LOG COMPILED BY: RJG/TRM/LSM

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH: + Torvane, x Min. Vane, ♦ Res. Min. Vane, ● Unconfined Compr., ▲ UU Triaxial, ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation, TS - Thaw Strain, DS - Direct Shear, T - Triaxial Shear, S - P.W. Salinity, X - X-Ray Diffr.

BOREHOLE NUMBER 2

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E-1 SUMMARY OF CONSOLIDATION TEST RESULTS, KOPANOAR I-44

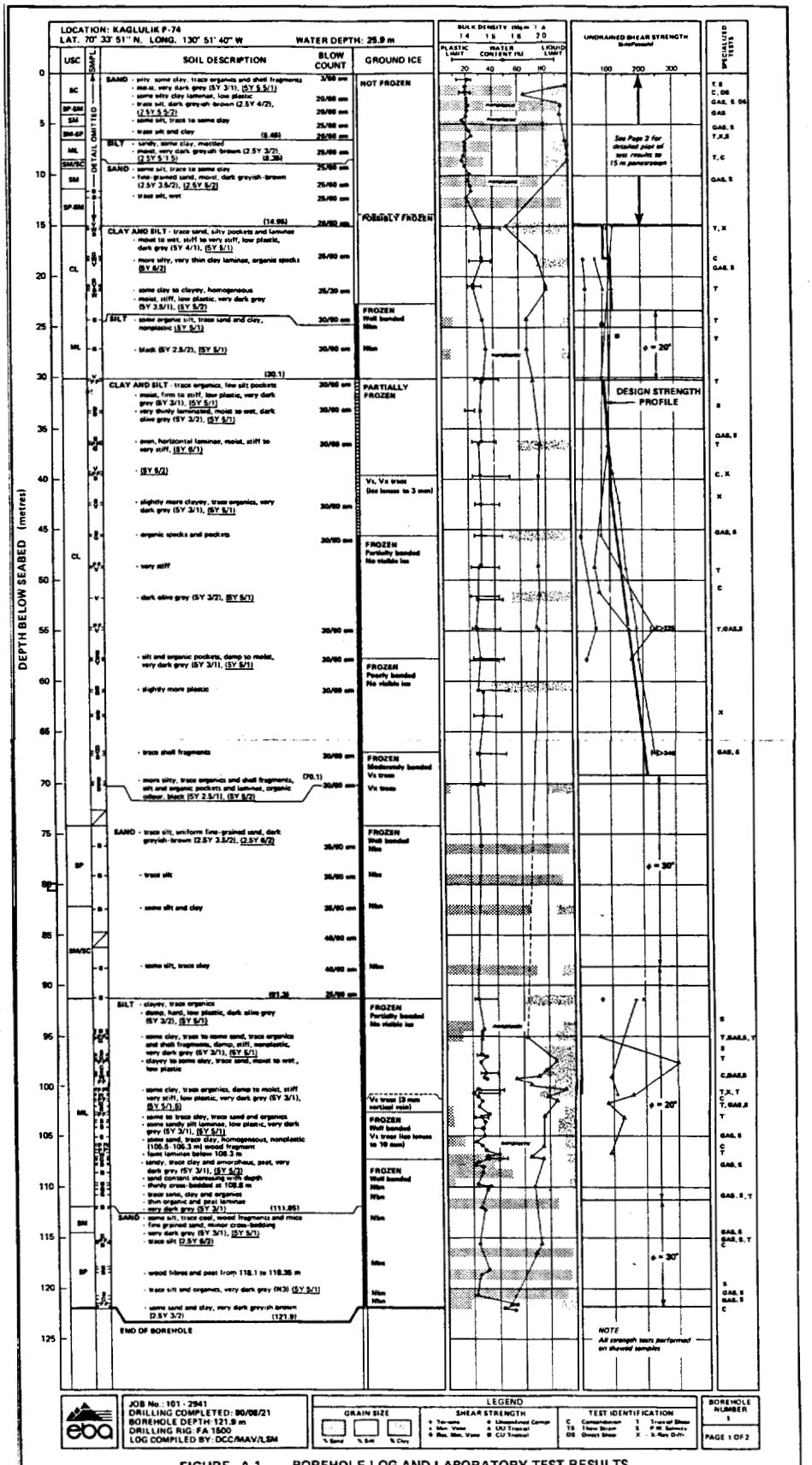
SAMPLE	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
1B	0.13 - 0.25	CH	1	15	15.0	0.58
10A	5.55 - 5.67	CL	27	-	-	-
25A	24.00 - 24.15	ML	169	280	1.7	0.21
32C	45.50 - 45.65	ML	363	175	0.5	0.19
40B*	69.90 - 70.05	ML	584	1300	2.2	0.17
52A*	93.65 - 93.90	ML	798	1600	2.0	0.19
59A*	106.30 - 106.70	ML	913	800	0.9	0.15
67B*	121.75 - 121.85	ML	1051	1300	1.2	0.15

NOTE: 1. Samples marked by asterisk were returned frozen from the field. These samples were thawed as a first stage in the testing.

TABLE B-3 SUMMARY OF SALINITY TEST RESULTS, KOPANOAR I-44

SAMPLE NUMBER	DEPTH INTERVAL (m)	USC	SALINITY (ppt)	ESTIMATED CLAY FRACTION (%)
● 2C	0.85 - 1.0	CH	26	50
▲ 5A	2.50 - 2.62	CH	34	60
● 10B	5.67 - 5.80	CH	44	21
▲ 14A	7.95 - 8.05	SM/SC	34	6
▲ 17B	10.10 - 10.25	SM/SC	32	3
● 24B	21.15 - 21.25	CL	39	11
▲ 29A	36.00 - 36.10	CL	36	23
● 29C	36.25 - 36.40	CL	38	23
▲ 31A	42.25 - 42.35	CL	37	20
▲ 34A	51.55 - 51.60	ML/CL	36	10
▲ 37A	60.45 - 60.60	ML/CL	36	10
● 37B	60.60 - 60.75	ML/CL	43	10
▲ 39D	66.95 - 67.05	ML	41	5
▲ 42A	75.98 - 76.10	ML/CL	32	14
▲ 52C	93.25 - 93.40	ML/CL	25	10
● 57A	100.15 -100.6	ML/CL	45	10
▲ 57B	100.00 -100.15	ML/CL	7	10
▲ 58C	104.00 -104.20	ML	10	7
● 61C	110.15 -110.25	ML/CL	29	18
▲ 67D	121.45 -121.55	ML	23	7

NOTE: 1. Testing performed by EBA (●) and Carbon Systems Inc. (▲).



JOB No.: 101 - 2941
DRILLING COMPLETED: 90/08/21
BOREHOLE DEPTH: 121.9 m
DRILLING RIG: FA 1500
LOG COMPILED BY: DCC/MAV/LSM

LEGEND

GRAIN SIZE — % Sand, % Silt, % Clay

SHEAR STRENGTH

TEST IDENTIFICATION

BOREHOLE NUMBER 1

PAGE 1 OF 2

FIGURE A-1 BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE D-6 DIRECT SHEAR TEST RESULTS, KAGLULIK P-74

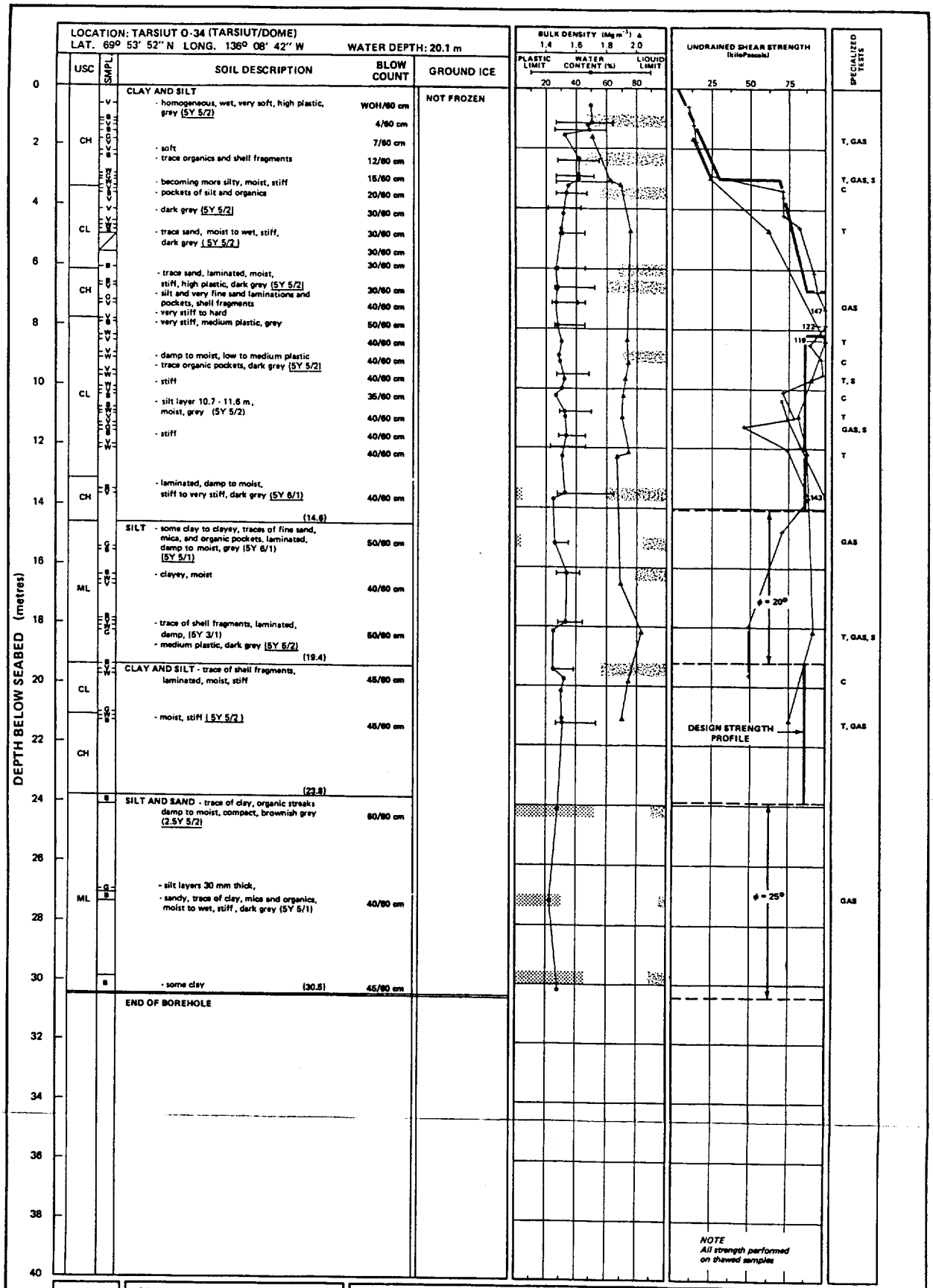
SAMPLE NUMBER	DEPTH INTERVAL	USC	MOISTURE CONTENT		INITIAL BULK DENSITY	NORMAL STRESS	FAILURE CONDITIONS			SHEAR STRENGTH PARAMETERS			REMARKS
			INITIAL	FINAL			SHEAR STRESS		VOLUMETRIC STRAIN AT PEAK	COHESION INTERCEPT	FRICTION ANGLES		
							PEAK	RESHEARED			PEAK	RESHEARED	
	(metres)		(%)	(%)	(Mg/m^3)	(kPa)	(kPa)	(kPa)	(%)	(kPa)	(degrees)	(degrees)	
5A	2.15-2.25	SC	20	20	2.15	29	35	31	0.07	3	42	37	
5A	2.15-2.25	SC	20	18	2.15	60	50	51	0.44				
8A	4.0 -4.1	SM	18	19	2.14	120	115	98	0.46				

NOTE: 1. Direct shear tests performed on sand reconstituted from bag samples.

TABLE B-2 SUMMARY OF CONSOLIDATION TEST RESULTS, KAGLULIK P-74

SAMPLE	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
4B	1.70 - 1.80	CL	13	85	6.5	0.10
14A	7.65 - 7.75	ML	57	190	3.3	0.09
23B	18.10 - 18.25	CL	134	250	1.9	0.18
1C(CPT)	32.50 - 32.65	CL	260	510	2.0	0.25
30B*	39.40 - 39.50	CL	323	360	1.1	0.20
2D(CPT)	49.25 - 49.40	CL	412	1000	2.4	0.25
34A*	51.60 - 51.75	CL	433	610	1.4	0.23
50D	98.75 - 98.90	ML	859	145	0.2	0.19
52C	100.90 - 101.05	ML	878	290	0.3	0.17
55D*	105.90 - 106.10	CL	924	505	0.6	0.19
60D*	115.30 - 115.45	SP-SM	1008	--	--	--
62E*	121.60 - 121.80	ML	1065	180	0.2	0.40

NOTE: 1. Samples marked by asterisk were returned frozen from the field. These samples were thawed as a first stage in the testing.



JOB No.: 101 - 2941
DRILLING COMPLETED: 80/09/15
BOREHOLE DEPTH: 30.5 m
DRILLING RIG: FA 1500
LOG COMPILED BY: GL/MAV

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Res. Min. Vane
⊕ Unconfined Compr.
Δ UU Triaxial
⊞ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
TS - Thaw Strain
DS - Direct Shear
T - Triaxial Shear
S - P.W. Salinity
X - X-Ray Diffr.

BOREHOLE NUMBER 1

PAGE 1 OF 1

FIGURE A - 1 BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E-1 SUMMARY OF CONSOLIDATION TEST RESULTS, TARSIUT O-34 (TARSIUT/DOME)

SAMPLE NUMBER	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
6B	3.10- 3.25	CH	27	180	6.7	0.28
15B	8.95- 9.10	CL	75	400	5.3	0.22
17B	10.10-10.25	CL	85	500	5.9	0.23
25C	19.65-19.80	CL	165	500	3.0	0.22

TABLE D-3 SUMMARY OF POCKET PENETROMETER TEST RESULTS, TARSIUT O-34 (TARSIUT/DOME)

SAMPLE NUMBER	DEPTH INTERVAL (m)	WATER CONTENT (%)	POCKET PENETROMETER (kPa)	CONSISTENCY
1A	0.45 - 0.6	50	5	Very soft
2B	1.1 - 1.2	47	24	Very Soft-Soft
3E	1.7 - 1.8	-	19	Very Soft
4A	2.1 - 2.2	-	43	Soft
6C	3.25 - 3.35	-	124	Stiff
6E	3.5 - 3.6	-	163	Stiff
7A	4.05 - 4.2	31	153	Stiff
8A	4.45 - 4.55	-	163	Stiff
11B	6.6 - 6.7	27	182	Stiff
12B	7.2 - 7.3	26	383	Very stiff-Hard
13A	7.7 - 7.8	-	345	Very Stiff
14B	8.4 - 8.5	-	335	Very Stiff
15A	8.8 - 8.95	30	287	Very Stiff
16A	9.4 - 9.55	-	239	Very Stiff
17A	9.95 -10.1	-	134	Stiff
17C	10.35 -10.3	-	172	Stiff
18C	10.9 -11.0	-	239	Very Stiff
19A	11.15 -11.3	-	163	Stiff
19C	11.45 -11.6	33	172	Stiff
20A	11.95 -12.05	-	182	Stiff
21B	13.55 -13.7	25	239	Very Stiff
23C	16.65 -16.8	-	172	Stiff
24B	17.9 -18.05	-	192	Stiff-Very Stiff
25B	19.5 -19.65	-	163	Stiff

Note: 1. Test performed in field laboratory.

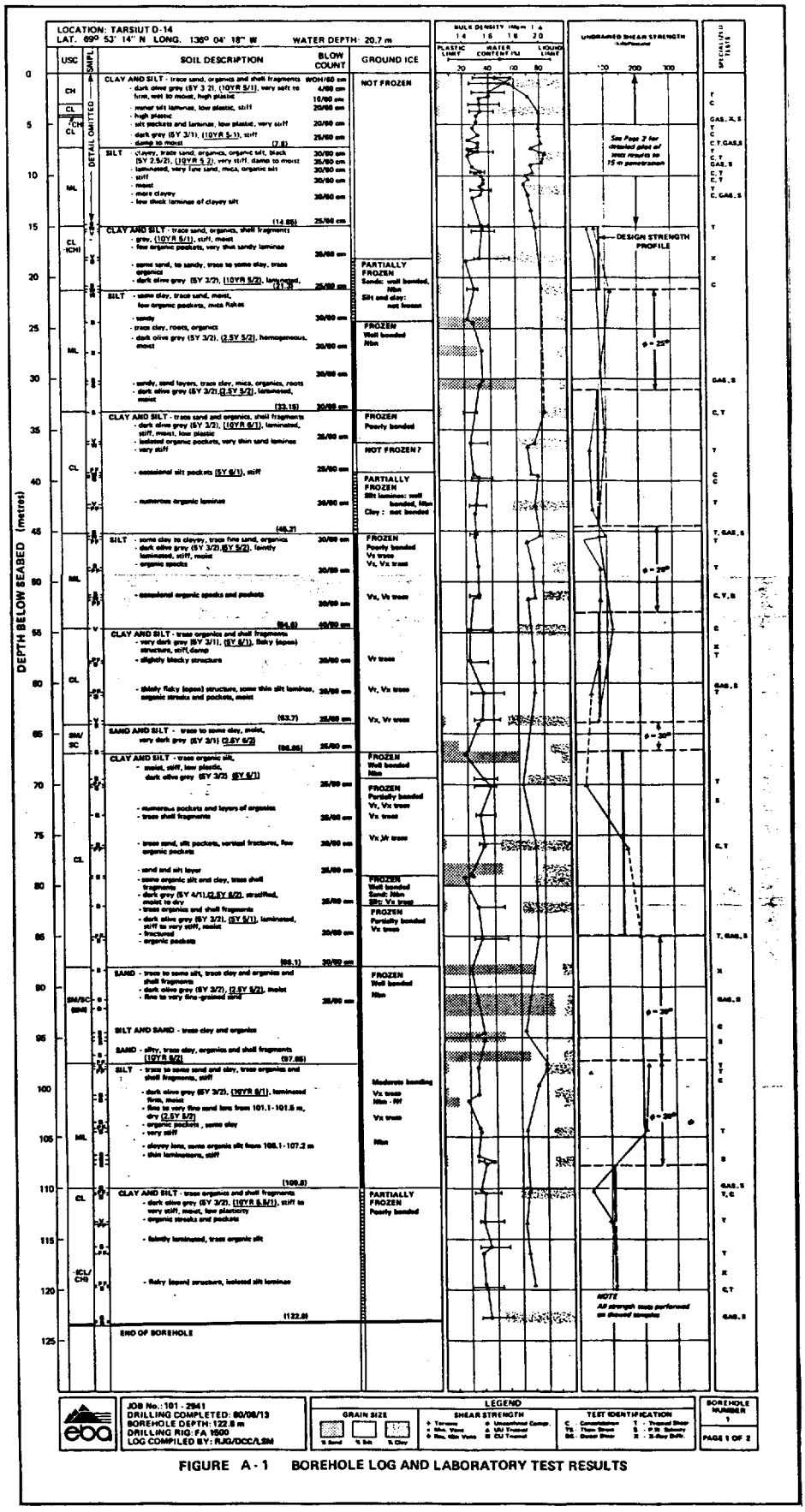


FIGURE A - 1 BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE D-5 DIRECT SHEAR TEST RESULTS, TARSIUT D-14

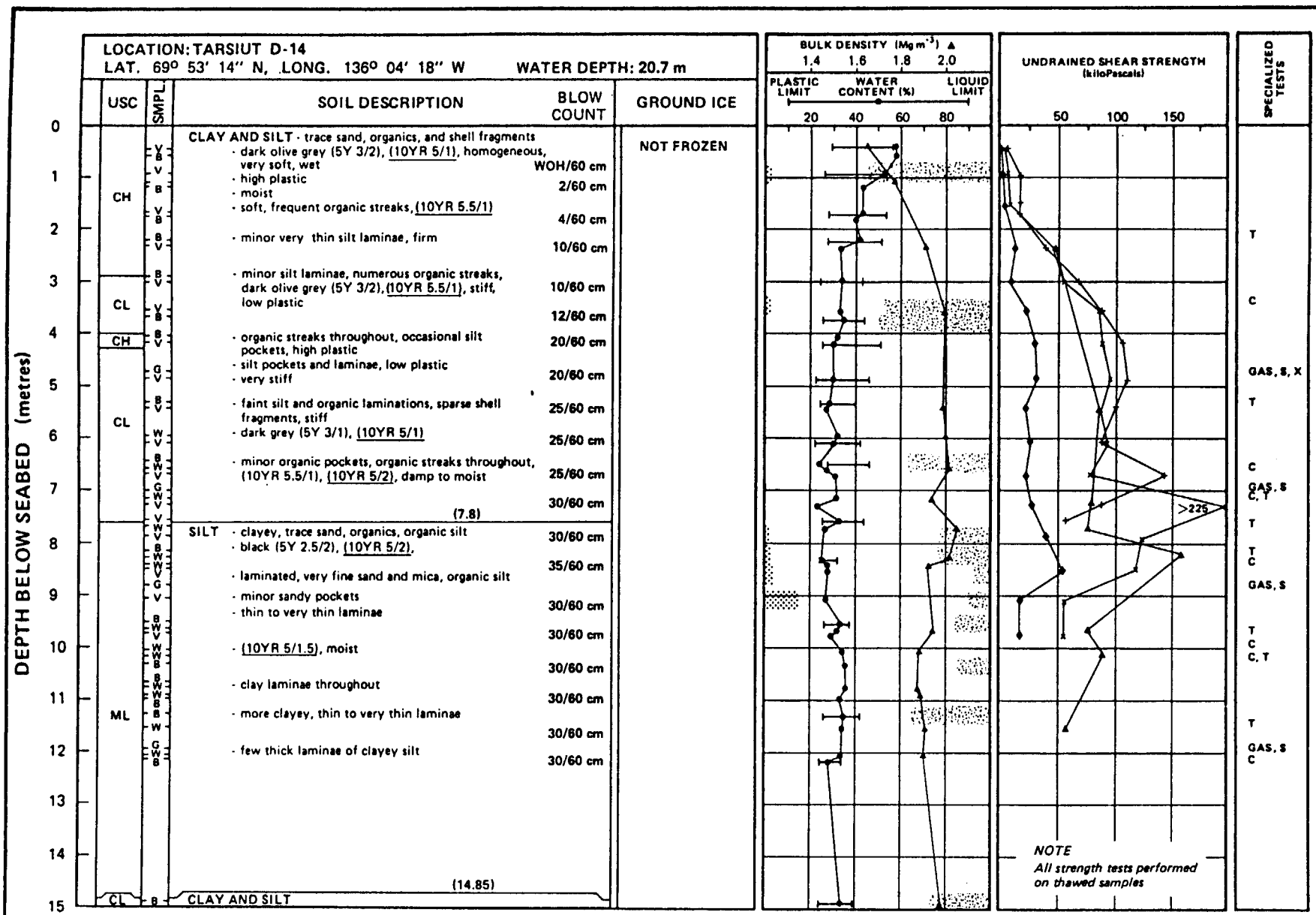
SAMPLE NUMBER	DEPTH INTERVAL	USC	MOISTURE CONTENT		FROZEN BULK DENSITY	NORMAL STRESS	FAILURE CONDITIONS			SHEAR STRENGTH PARAMETERS			REMARKS
			INITIAL	FINAL			SHEAR STRESS		VOLUMETRIC STRAIN AT	COHESION INTERCEPT	FRICTION ANGLES		
							PEAK	RESHEARED	PEAK		PEAK	RESHEARED	
	(metres)		(%)	(%)	(Mg/m^3)	(kPa)	(kPa)	(kPa)	(%)	(kPa)	(degrees)	(degrees)	
50C	94.7-94.8	SM/SC	28	25	1.82	150	126	116	2.2				
			28	25	1.78	300	216	218	4.1	25	33	32	
			31	27	1.78	450	323	303	5.7				

Note: 1. Samples were originally frozen.

TABLE B-2 SUMMARY OF CONSOLIDATION TEST RESULTS, TARSIUT D-14

SAMPLE NUMBER	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa)	ESTIMATED PRECONSOLIDATION PRESSURE (kPa)	OVERCONSOLIDATION RATIO	COMPRESSION INDEX
6A	3.48- 3.63	CL	25	300	12	0.27
11A	6.50- 6.65	CL	50	270	5.4	0.22
13B	7.05- 7.20	CL	55	180	3.3	0.23
15C	8.35- 8.45	ML	65	350	5.4	0.16
18A	9.95-10.10	ML	75	330	4.4	0.23
19B	10.10-10.23	ML	85	290	3.4	0.25
21C	12.00-12.10	ML	95	700	7.4	0.25
24B	21.00-21.15	ML	170	420	2.5	0.17
*28B	33.25-33.50	CL	275	560	2.0	0.15
*30B	39.25-39.40	CL	330	500	1.5	0.23
30C	39.40-39.55	CL	330	330	1.0	0.20
34C	51.45-51.60	ML	435	570	1.3	0.19
*35B	54.70-54.90	CL	465	370	0.8	0.16
*43B	76.00-76.20	CL	650	560	0.9	0.18
*50A	94.40-94.55	SM/SC	810	-	-	-
*53B	99.80-100.00	ML	885	600	0.8	0.14
*57C	110.30-110.50	CL	945	300	0.3	0.20
*60B	119.40-119.55	CL	1025	420	0.4	0.21

Note: 1. Samples marked by asterisk were returned frozen from the field. These samples were thawed as a first stage in the testing.



JOB No.: 101 - 2941
DRILLING COMPLETED: 80/08/13
BOREHOLE DEPTH: 122.8 m
DRILLING RIG: FA 1500
LOG COMPILED BY: RJG/DCC/LSM

LEGEND

GRAIN SIZE: % Sand, % Silt, % Clay

SHEAR STRENGTH: + Torvane; x Min. Vane; ♦ Rec. Min. Vane; ● Unconfined Compr.; ▲ UU Triaxial; ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation; TS - Thaw Strain; DS - Direct Shear; T - Triaxial Shear; S - P.W. Salinity; X - X-Ray Diffr.

BOREHOLE NUMBER 1

PAGE 2 OF 2

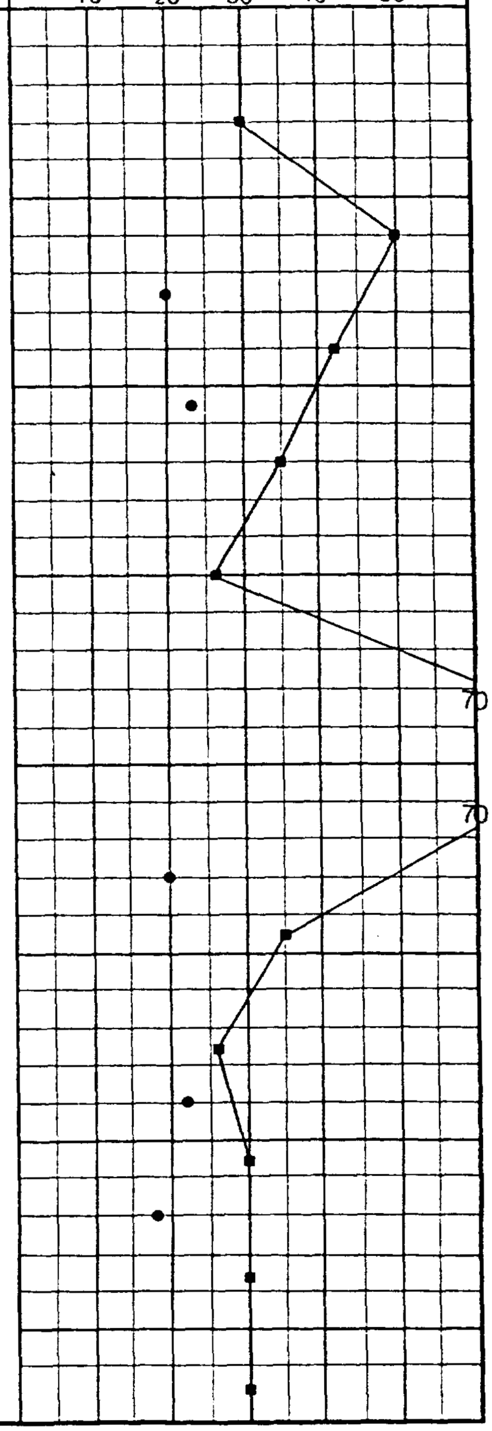
FIGURE A - 1 BOREHOLE LOG AND LABORATORY TEST RESULTS (continued)

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND (SP-SM)- trace clay (in lenses), medium grained, dense, saturated, greyish brown	G	UNFROZEN (not bonded)
	- trace of shell fragments	G	
1			
		G	
	- moist		C&M = 2% S = 98% (SP)
2		G	
	- medium grained, some fine grained, trace silt, trace shell fragments, dark grey	G	D50= 340μm
3	- predominantly fine grained, dense, moist, grey	G	
	- brownish grey		
4		G	
	- wet	G	
5		G	
	- trace silt, trace clay pockets (<5mm) predominantly fine grained, homogeneous, moist to wet, brownish grey	G	C&M = 11% S = 89% (SP-SM) D50=200 μm
6		G	
7		G	

BLOW COUNT/0.3 m ■ 10 20 30 40 50

MOISTURE CONTENT 10 20 30 40 50



SFC. ELEVATION (m) -29.6	DATE DRILLED 02/10/80	BOREHOLE No. BH# 80-55
COMPLETION DEPTH (m) 30.6	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Uviluk #1	PAGE 1 OF 5

eba

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory test ... log, may be ... and approximate ... conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SM) - trace silt, medium grained, predominantly fine grained with occasional clay lenses to 5mm, homogeneous, dense. moist, dark brownish grey	G	UNFROZEN (not bonded)
		G	
		G	
		G	C&M = 23% S = 77% (SM) D50=160 μm
9			
10	- trace silt, trace shell fragments, trace organic pockets, fine grained, dense, wet, dark, brownish grey	G	
11			
12	- as above	G	
13	- occasional clay lenses 3mm thick, sub-horizontal and undulating	G	C&M = 8% S = 92% (SP-SM) D50=200 μm
14			

BLOW COUNT/0.3 m ■ 10 20 30 40 50

MOISTURE CONTENT 10 20 30 40 50

eba

SFC. ELEVATION (m) -29.6	DATE DRILLED 02/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.6	LOGGED BY GL	BH# 80-55
DRILLING RIG FA 1500	LOCATION Uviluk #1	PAGE 2 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
15	- SAND (SP-SM) - medium grained, homogeneous, dense, moist to wet, dark greyish brown	G	UNFROZEN (not bonded)
16	- uniform, homogeneous, dense, moist to wet, greyish brown	G	C&M = 7% S = 93% (SP-SM) D50= 200 μm
17			
18	- medium grained (sample disturbed)	G	
19			
20	- wet	G	
21	- as before	G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

70

70

SFC. ELEVATION (m) -29.6	DATE DRILLED 02/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.6	LOGGED BY GL	BH# 80-55
DRILLING RIG FA 1500	LOCATION Uviluk #1	PAGE 3 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
22	- SAND (SM) medium grained, trace fine grained, homogeneous (disturbed) greyish brown	G	UNFROZEN (not bonded) M = 13% S = 87% (SM) D50=180 μm
23			
24	- grey	G	
25			
26	- medium grained, trace fine grained, micaceous with occasional black organic streaks, dense, moist, grey	G	
27	- trace shell fragments, moist to wet, brownish grey	G	
28			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

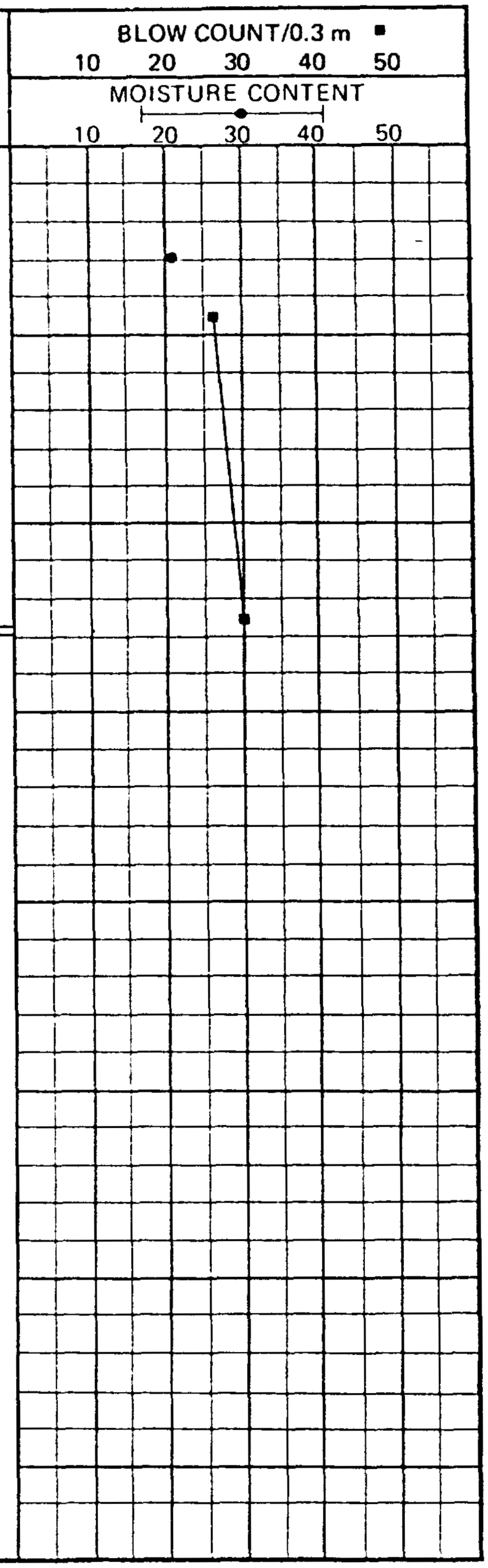
SFC. ELEVATION (m) -29.6	DATE DRILLED 02/10/80
COMPLETION DEPTH (m) 30.6	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Uviluk #1

BOREHOLE No.
BH# 80-55
PAGE 4 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
29	- SAND (SP-SM) - medium grained, trace fine grained, trace shell fragments, micaceous, dense, wet, brownish grey	G	UNFROZEN (not bonded) M = 8% S = 92% (SP-SM) D50=210 µm
30	- as above	G	
31	END OF HOLE		



SFC. ELEVATION (m) -29.6	DATE DRILLED 02/10/80	BOREHOLE No. BH# 80-55
COMPLETION DEPTH (m) 30.6	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Uviluk #1	PAGE 5 OF 5

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This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. [illegible]

2067

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP) - trace silt, fine grained, compact, saturated, greyish brown	G	UNFROZEN
1		G	
	- shell fragments inter-bedded with horizontal medium grained and fine grained sand	G	
2	- wet, medium grained, predominantly fine grained	G	
		G	
3		G	M = 3% S = 97% (SP) D50=340 μm
4		G	
		G	
5	- as before	G	
		G	
6	- occasional thin silt laminations, trace clay	G	
		G	
7		G	

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -30.5	DATE DRILLED 04/10/80
COMPLETION DEPTH (m) 30.4	LOGGED BY MAV/GL
DRILLING RIG FA 1500	LOCATION Uviluk #2

BOREHOLE No. BH# 80-56
PAGE 1 OF 5

...according to commonly accepted practice. The change from ... indicated on the log, may be transitional ... and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated ... may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	- SAND (SP) , trace silt, fine grained, compact, saturated, greyish brown	G	UNFROZEN
8		G	
		G	
	- as before	G	M = 4% S = 96% (SP) D50= 200 μm
9			
10	- uniform, greyish brown	G	
11			
12		G	
13	- as before	G	
14			

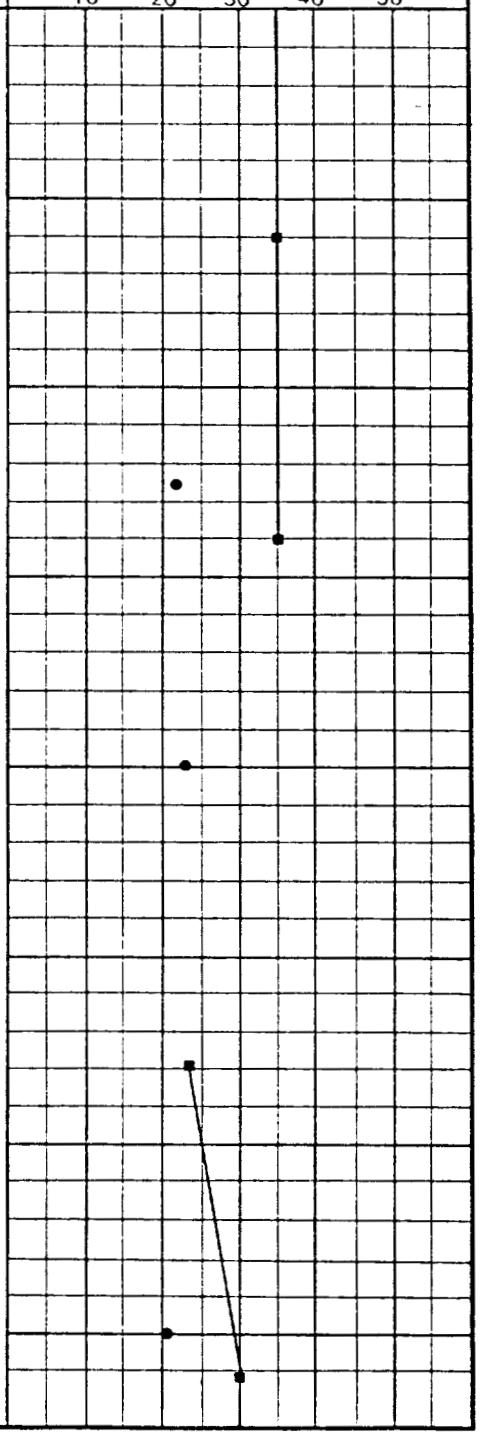
BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

SFC. ELEVATION (m) -30.5	DATE DRILLED 04/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.4	LOGGED BY MAV/GL	BH# 80-56
DRILLING RIG FA 1500	LOCATION Uviluk #2	PAGE 2 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another may be gradual. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
			UNFROZEN
15	- SAND (SP-SM) trace silt, fine grained, uniform, saturated, brownish grey	G	
16	- as above	G	
17			
18	- as before	G	M = 11% S = 89% (SP-SM) D50=160 μm
19	- trace shell fragments, faintly laminated, occasional black horizontal organic streaks	G	
20			
21	- trace shell fragments, micaceous, medium grained, homogeneous, uniform, compact, saturated, greyish brown	G	

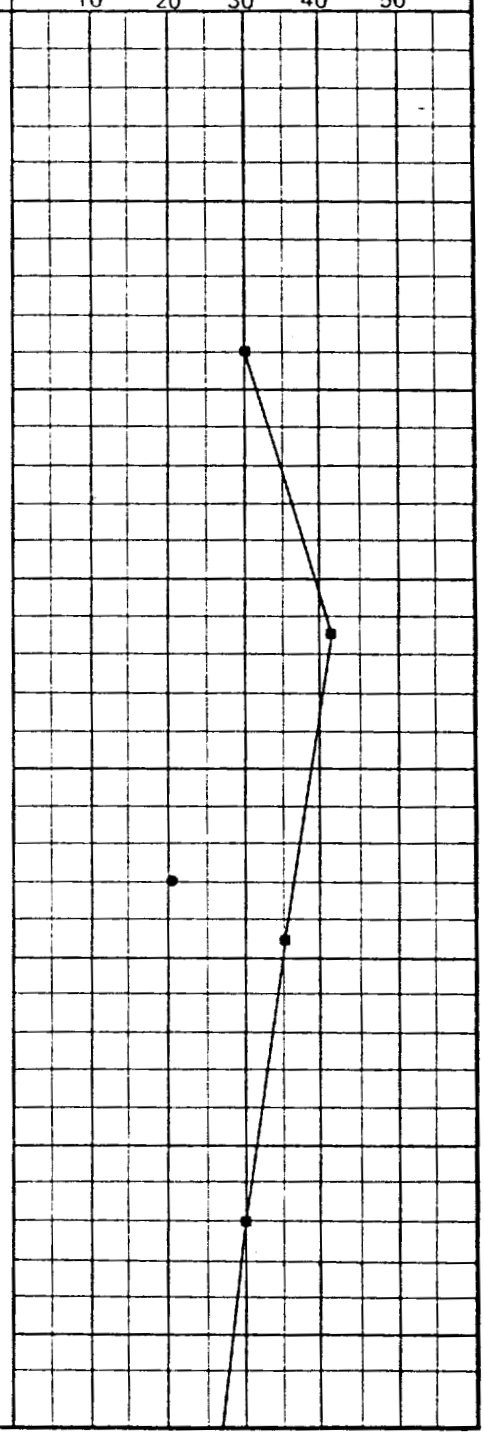


SFC. ELEVATION (m) ~30.5	DATE DRILLED 04/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.4	LOGGED BY MAV/GL	BH# 80-56
DRILLING RIG FA 1500	LOCATION Uviluk #2	PAGE3 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
22	- micaceous, medium grained, homogeneous, compact, moist to wet, medium greyish brown	G	UNFROZEN
23			
24	- as before	G	
25			
26	- as before	G	
27	- trace organics, trace shell fragments, medium grained, trace of fine grained, micaceous, homogeneous, compact, moist, dark greyish brown	G	
28			



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SFC. ELEVATION (m) -30.5	DATE DRILLED 04/10/80
COMPLETION DEPTH (m) 30.4	LOGGED BY MAV/GL
DRILLING RIG FA 1500	LOCATION Uviluk #2

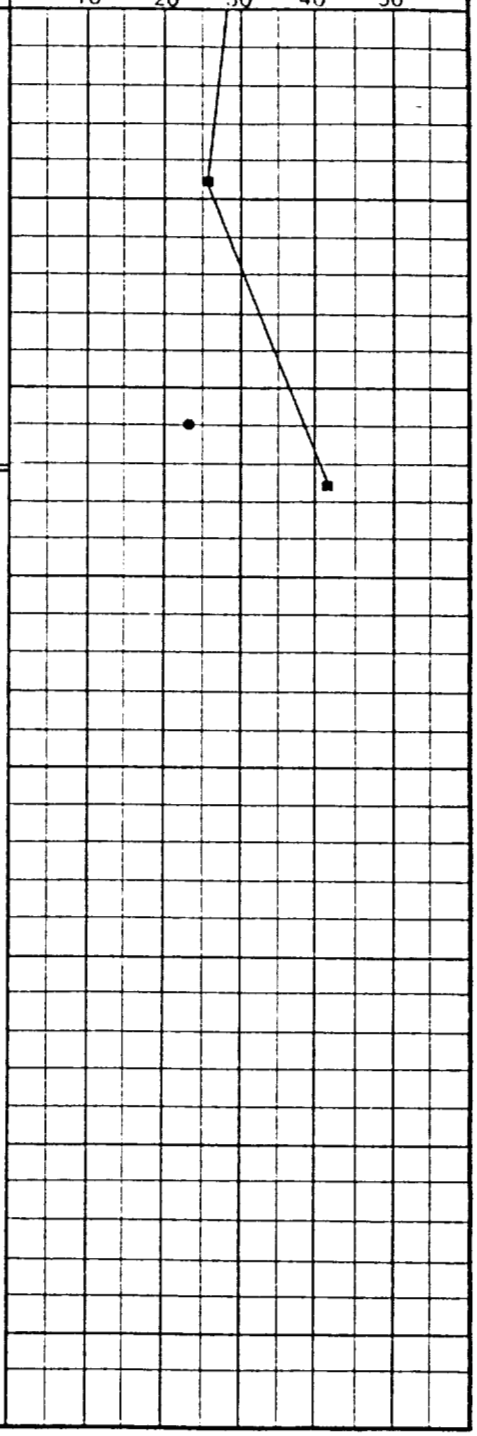
BOREHOLE No. BH# 80-56

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil lines have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and appr... Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
29	- SAND (SP-SM) trace of shell fragments, micaceous, medium grained, homogeneous, compact, saturated, dark greyish brown	G	UNFROZEN
30		G	M = 7% S = 93% (SP-SM)
31	END OF HOLE		D50=190 μm

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



SFC. ELEVATION (m) -30.5	DATE DRILLED 04/10/80	BOREHOLE No. BH# 80-56
COMPLETION DEPTH (m) 30.4	LOGGED BY MAV/GL	
DRILLING RIG FA 1500	LOCATION Uviluk #2	PAGE 5 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been [illegible]. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - traces of silt, organics and shell fragments, medium grained to fine grained, saturated, compact, grey	G	UNFROZEN (not bonded)
1	predominantly fine grained, wet	G	
	silty, some clay lenses to 50mm	G	
2	- homogeneous, moist to wet, compact, medium brown	G	
	- grey	G	M = 3% S = 97% (SP) D50=200 μm
3		G	
4	- brownish grey	G	
		G	
5		G	M = 10% S = 90% (SP-SM) D50=190 μm
	- as before	G	
6		G	
	- same as above, uniform	G	
7		G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -29.3	DATE DRILLED 03/10/80
COMPLETION DEPTH (m) 25.9	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Uviluk #3

BOREHOLE No.
BH# 80-57
PAGE1 OF 4

[illegible] have been interpreted according to commonly accepted practice. The change from [illegible] as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SP-SM) - trace silt, medium to fine grained, predominantly fine grained, dense, moist to wet, brownish grey	G	UNFROZEN (not bonded)
		G	
		G	
9	- trace of silt, fine grained, homogeneous, uniform, dense, moist to wet, brownish grey	G	M = 7% S = 93% (SP-SM) D50=200 μm
10		G	
11			
12	- as before	G	
13	- same as above	G	
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

70

70

SFC. ELEVATION (m) -29.3	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 25.9	LOGGED BY MAV	BH# 80-57
DRILLING RIG FA 1500	LOCATION Uviluk #3	PAGE 2 OF 4

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change [illegible] on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
15	SAND (SP-SM) - trace of silt, fine grained, trace of medium grained, dense, moist to wet, brownish grey	G	UNFROZEN (not bonded)
16			
17	- same as above, uniform	G	M = 10% S = 90% (SP-SM) D50=180 μm
18		G	
19	- as before	G	
20			
21	- same as above	G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

100

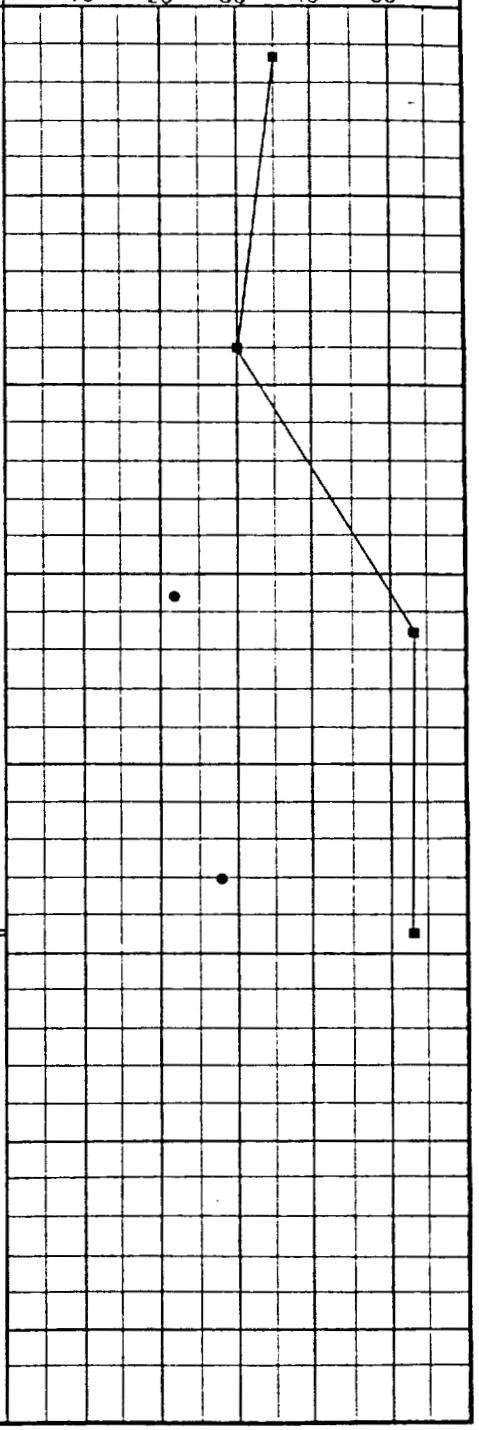
SFC. ELEVATION (m) -29.3	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 25.9	LOGGED BY MAV	BH# 80-57
DRILLING RIG FA 1500	LOCATION Uviluk #3	PAGE 3 OF 4

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
22	SAND (SP-SM) - trace silt, fine grained, trace of medium grained, dense, moist to wet, brownish grey	G	UNFROZEN (not bonded)
	- trace of shell fragments	G	
23			
24		G	
25			
	- same as above	G	M = 9% S = 91% (SP-SM)
26	END OF HOLE Termination due to lost drill string as a result of ice on starboard side of vessel		D50=170 μm

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

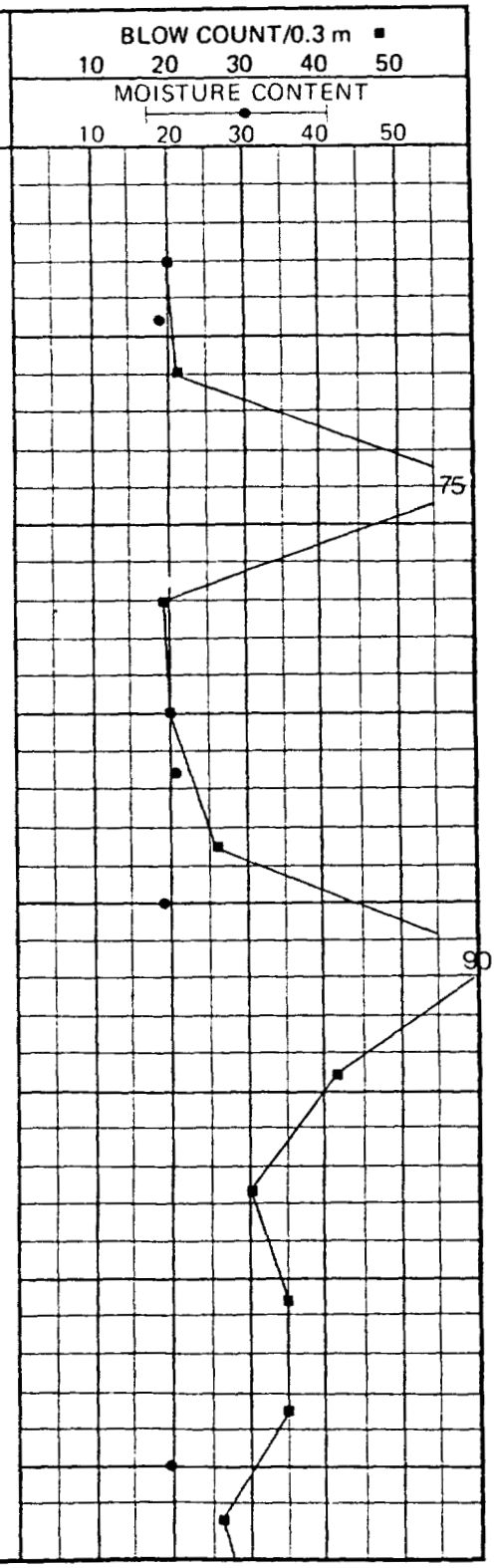


SFC. ELEVATION (m) -29.3	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 25.9	LOGGED BY MAV	BH# 80-57
DRILLING RIG FA 1500	LOCATION Uviluk #3	PAGE 4 OF 4

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - traces of black organics, shell fragments and clay (especially in top 150mm), medium grained, trace fine grained, compact, wet, grey	G	UNFROZEN (not bonded)
1	light greyish brown medium grained, clean, moist, light brown	G	M = 4% S = 96% (SP)
		G	D50=240 μm
	- trace silt, medium to fine grained, moist to damp, compact, dark brownish grey		
2		G	
	- predominantly medium, micaceous, dense, damp, dark greyish brown	G	
3	- trace coarse grained and trace of fine grained GRAVEL particles, sub-rounded and smooth, micaceous, damp to moist	G	M = 6% S = 94% (SP-SM)
4	- homogeneous, no coarse grained or fine grained GRAVEL, light greyish brown	G	D50=260 μm
		G	
5	- indication of lenses of CLAY	G	
		G	
6	- medium grained, micaceous, dense, damp, light brown	G	
		G	
7		G	M = 5% S = 95% (SP-SM) D50=265 μm

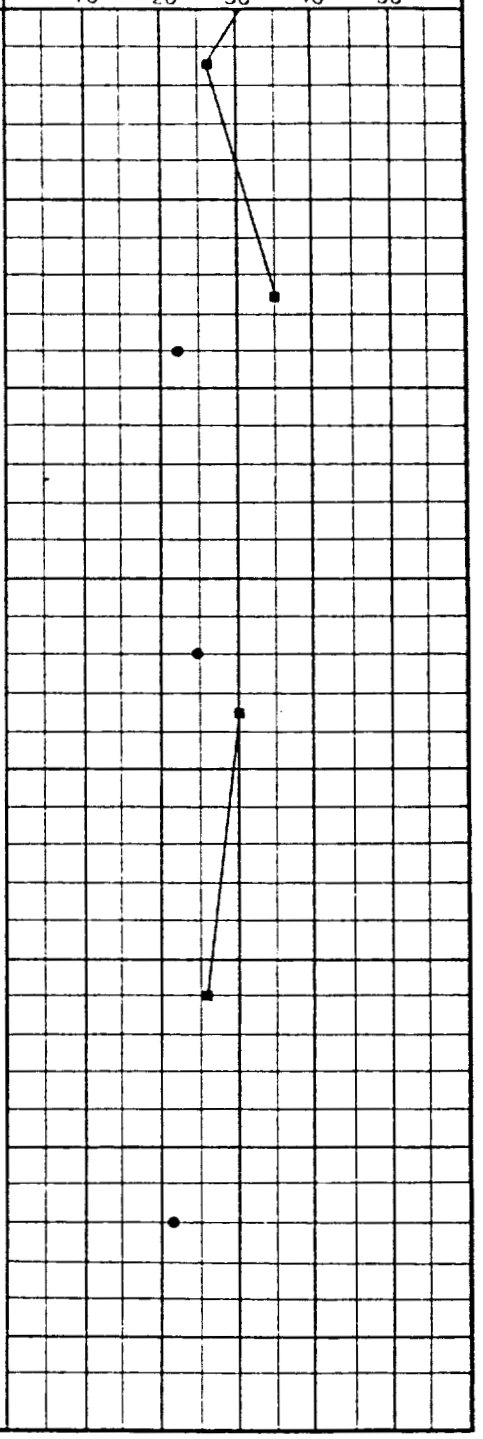


SFC. ELEVATION (m) -30.2	DATE DRILLED 03/10/80	BOREHOLE No. BH# 80-58
COMPLETION DEPTH (m) 30.5	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Uviluk #4	PAGE 1 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND (SP-SM) - traces of mica, shell fragments, dense, damp, light brown	G	UNFROZEN (not bonded)
		G	
8		G	
	- medium grained	G	
9			
10	- medium grained, clean, homogeneous, dense, moist	G	M = 5% S = 95% (SP-SM) D50=210 μm
11			
	- trace of silt, medium and fine grained, dense, dark brownish grey	G	
12			
13			
	- trace of silt, trace of shell fragments, medium grained, compact, moist, dark greyish brown	G	trace of ice bonding in sample Nbn
14			



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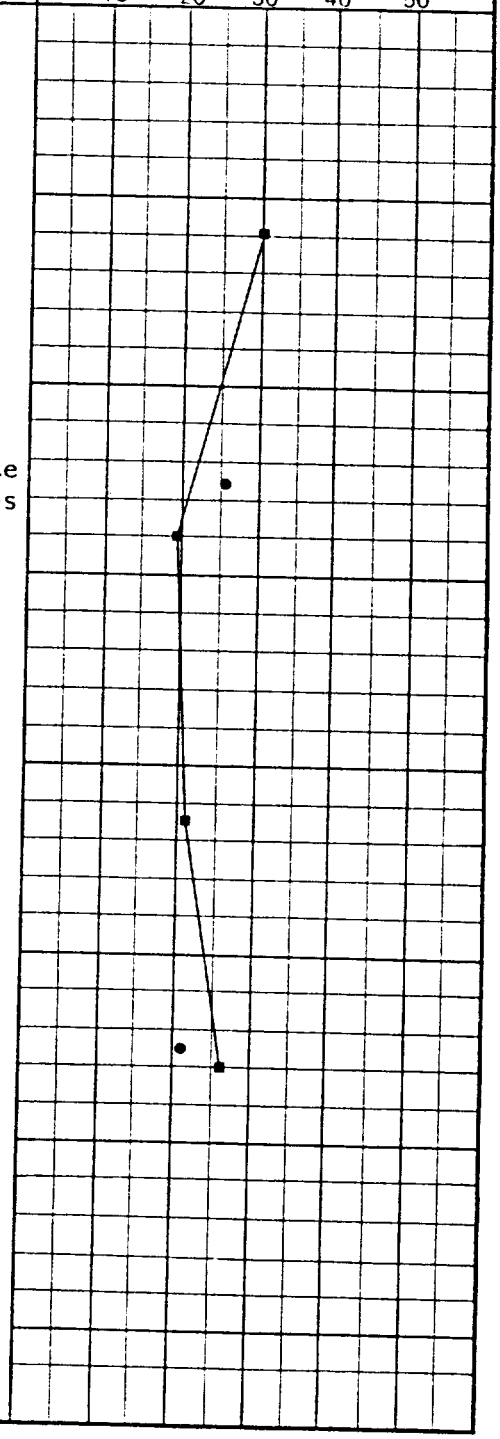
SFC. ELEVATION (m) -30.2	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.5	LOGGED BY GL	BH# 80-58
DRILLING RIG FA 1500	LOCATION Uviluk #4	PAGE 2 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
15	- SAND (SP-SM) trace of clay (in lenses), medium grained, traces of fine grained, homogeneous, micaceous, wet (due to drilling)	G	
16	- traces of silt, black organics, wood and rootlets inter-laminated with medium grained and fine grained sand, dense, damp, medium greyish brown	G	trace of ice bonded lumps Nf/Nbn M = 12% S = 88% (SM) D50=160 μm
17		G	
18	- trace of mica, trace of silt, fine grained, trace of medium grained, homo-geneous, moist, dense, dark greyish brown	G	
19	- medium grained and fine grained	G	
20			
21	- moist to wet, medium greyish brown	G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



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SFC. ELEVATION (m) -30.2	DATE DRILLED 03/10/80
COMPLETION DEPTH (m) 30.5	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Uviluk #4

BOREHOLE No.
BH# 80-58
PAGE 3 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be ... Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
22	- SAND (SP-SM) trace of shell fragments, micaceous, medium grained, trace of fine grained, homogeneous, compact, wet, medium greyish brown		UNFROZEN (not bonded)
23		G	M = 5% S = 95% (SP-SM) D50= 210 μm
24	- damp to moist	G	
25		G	
26	- as before		
27		G	
28			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

75

70

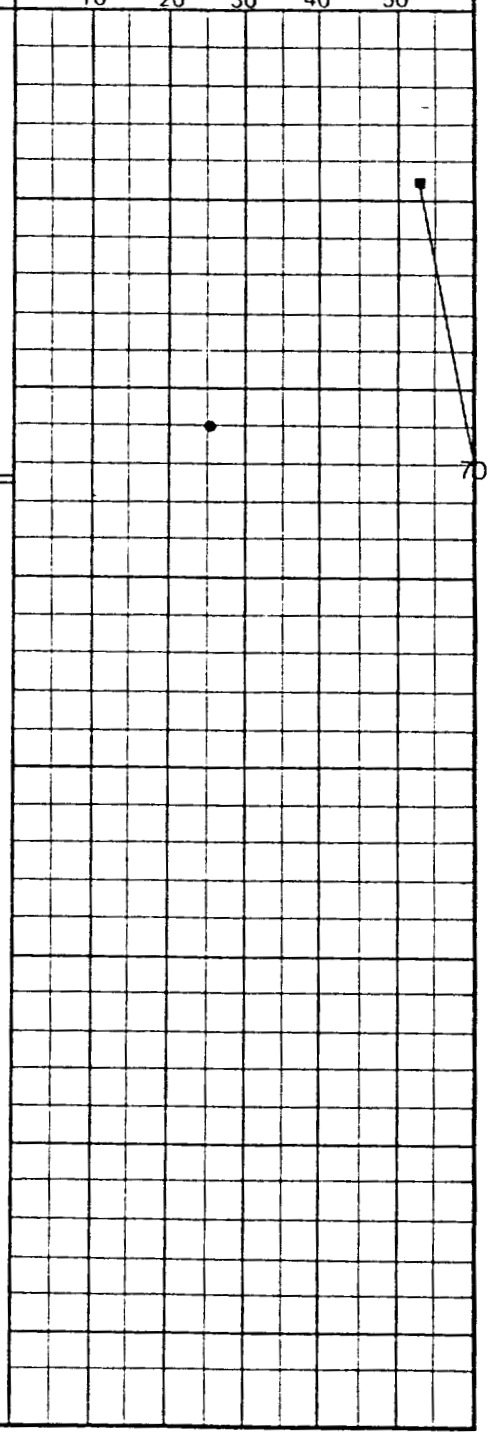
SFC. ELEVATION (m) -30.2	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.5	LOGGED BY GL	BH# 80-58
DRILLING RIG FA 1500	LOCATION Uviluk #4	PAGE 4 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
29	- SAND (SP-SM) trace of shell fragments, trace of coarse grained, micaceous, uniform, compact, wet, medium greyish brown	G	UNFROZEN (not bonded)
30	- as above	G	
31	END OF HOLE		

BLOW COUNT/0.3 m ■ ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



SFC. ELEVATION (m) -30.2	DATE DRILLED 03/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 30.5	LOGGED BY GL	BH#80-58
DRILLING RIG FA 1500	LOCATION Uviluk #4	PAGE 5 OF 5

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	CLAY - and SILT, dark grey, high plasticity, very wet, very soft, few organic (black) streaks	G	UNFROZEN
1		G	C & M = 99% S = 1%(CH)
2		G	
3	- homogeneous, very wet, very soft	G	
4	- wet, soft	G	
5		G	
6	SAND - silty, uniform, fine grained, moist - brown, some silt	G	M=13% S=87% (SM)
7	CLAY - and SILT, some fine sand, very stiff, low plasticity, brown, moist	G	D50 = 200 μm C & M = 70% S = 30% (CL) p.p.=2.3tsf

BULK DENSITY (Mg/m^3) ▲
1.4 1.6 1.8 2.0 2.2
MOISTURE CONTENT
10 20 30 40 50

61%
63%
74%

eba

SFC. ELEVATION (m) -29.3	DATE DRILLED 01/07/80
COMPLETION DEPTH (m) 7.5	LOGGED BY JPB
DRILLING RIG SONIC	LOCATION Dogleg S-1

BOREHOLE No. 80-59

PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	GRAVEL (GW), some sand, maximum 25mm coarse to medium grained, subrounded to subangular, smooth, saturated; particles up to 40mm Ø below 0.6m, angular (poor recovery)	G	UNFROZEN
		G	M=1%, S=15%
1	NO RECOVERY		G=84% (GP)
			D50=6200 µm
2	CLAY (CL) AND SILT (ML) some organics, horizontal laminations, moist, black	G	
	- Low plasticity, some organic streaks, moist, very stiff, very dark grey (5Y 3/1)	G	p.p.=1.5 tsf
3			t.v.=1.3 tsf
	- trace fine grained sand, low plasticity, few organic pockets, horizontal laminations, moist, very dark grey	G	C&M=90%
			S=10% (CL)
4	- traces wood and shell fragments	G	
		G	
5	- Increasing plastic, some organic streaks and pockets, medium plasticity laminated, firm, moist to wet	G	C&M=97%
			S=3% (ML)
		G	
6	- black organic streaks parallel to laminated dark grey (5Y 3/1)	G	p.p.=1.5 tsf
			t.v.=0.5 tsf
	- becoming lighter grey	G	p.p.=2.0 tsf
7			t.v.=0.8 tsf

BLOW COUNT/0.3 m ● 10 20 30 40 50

MOISTURE CONTENT 10 20 30 40 50

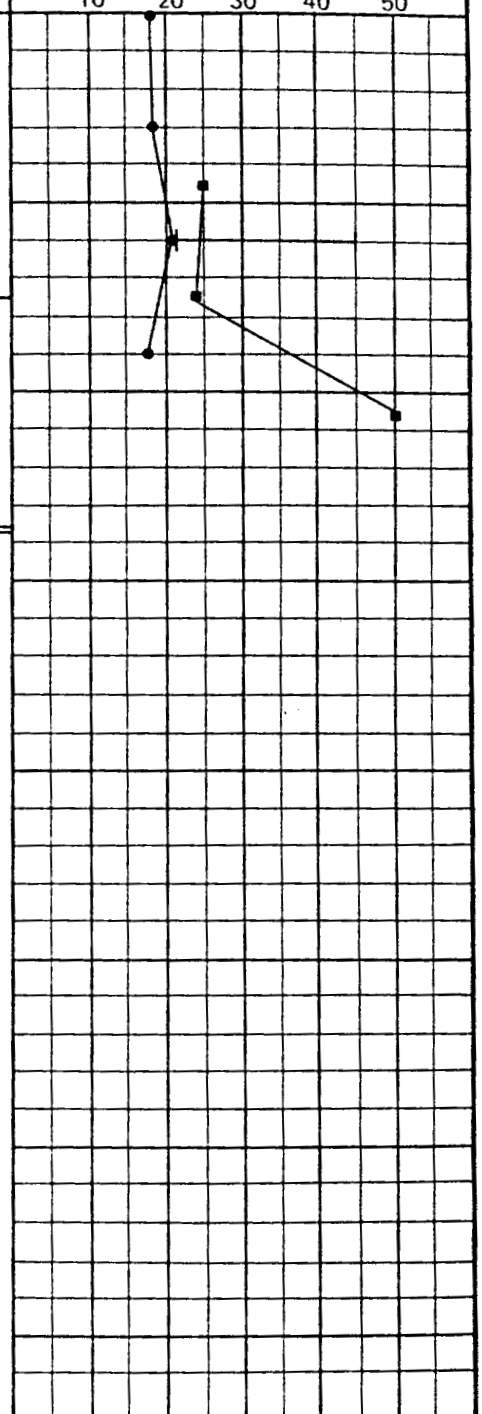
SFC. ELEVATION (m) -7.6	DATE DRILLED 08/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.7	LOGGED BY MAV/GL	BH# 80-74
DRILLING RIG FA 1500	LOCATION Tarsiut S #10	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory [illegible] have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	CLAY AND SILT - organics, pebbles to 20mm, rounded and smooth, dark grey		(UNFROZEN)
		G	p.p.=3.0 tsf t.v.=1.3 tsf
8	- pebbles to 15mm, rounded, organic pockets to 7mm, firm, moist, dark grey	G	p.p.=1.5 tsf t.v.=0.8 tsf C&M=84% G=1% S=15% (CL)
	- stiff, moist, pebbles to 5mm	G	FROZEN trace Vr <3% clay not bonded
9	NO RECOVERY ON 3ATTEMPTS		p.p.=4.5 tsf t.v.=2.0 tsf
10	END OF HOLE		
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

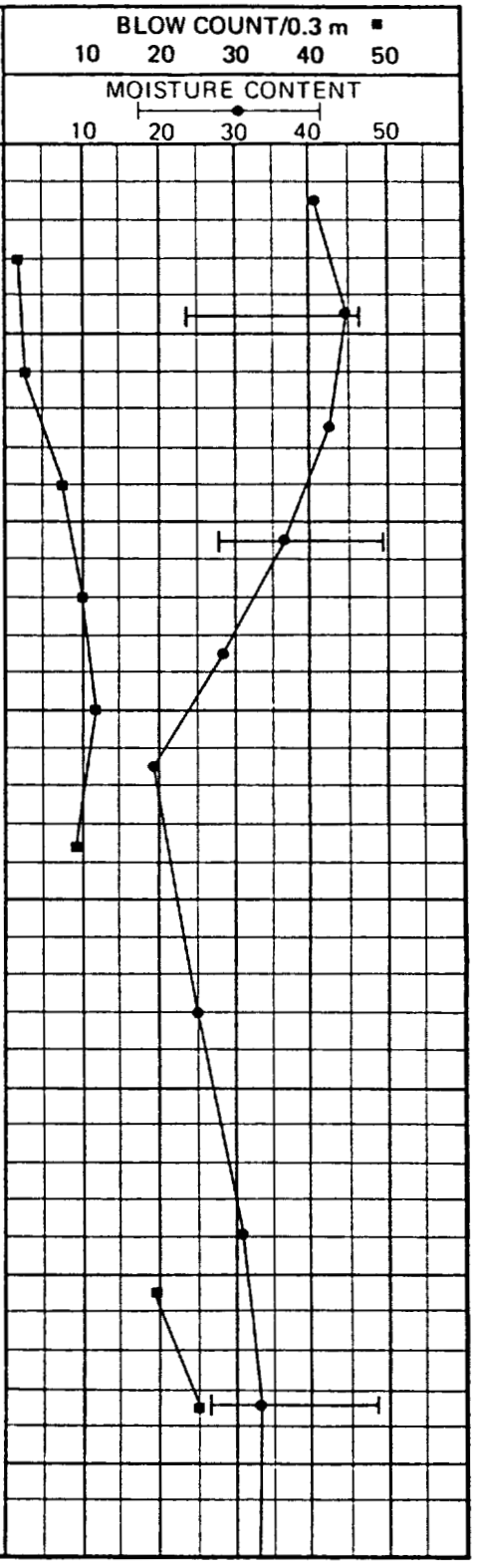


SFC. ELEVATION (m)-7.6	DATE DRILLED 08/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.7	LOGGED BY MAV/GL	BH# 80-74
DRILLING RIG FA 1500	LOCATION Tarsiut S #10	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from [illegible] samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	CLAY (CL) AND SILT trace shell fragments, homogeneous, low plastic, wet, dark grey	G	UNFROZEN
		G	p.p.=0.6 tsf
1	- organic pockets, moist	G	p.p.=0.6 tsf t.v.=0.4 tsf
	- silty, laminated, medium plastic, dark grey	G	p.p.=0.6 tsf t.v.=0.4 tsf
2	- trace pebbles to 4mm (angular), trace organic pockets, medium plastic, damp	G	p.p.=1.0 tsf t.v.=0.6 tsf
	- occasional pebble to 9mm, rounded and polished	G	p.p.=0.9 tsf t.v.=0.5 tsf
3	- silty, trace of coarse grained sand, low plastic	G	p.p.=2.8 tsf t.v.=1.3 tsf
4	NO RECOVERY AFTER 4 ATTEMPTS		
	- very stiff, Low plasticity	G	p.p.=3.0 tsf t.v.=1.5 tsf
5		G	
		G	p.p.=2.6 tsf t.v.=1.2 tsf
6	- slickensides along organic planes, medium plastic		
		G	p.p.=3.0 tsf t.v.=1.1 tsf C&M=100% (CL)
7			



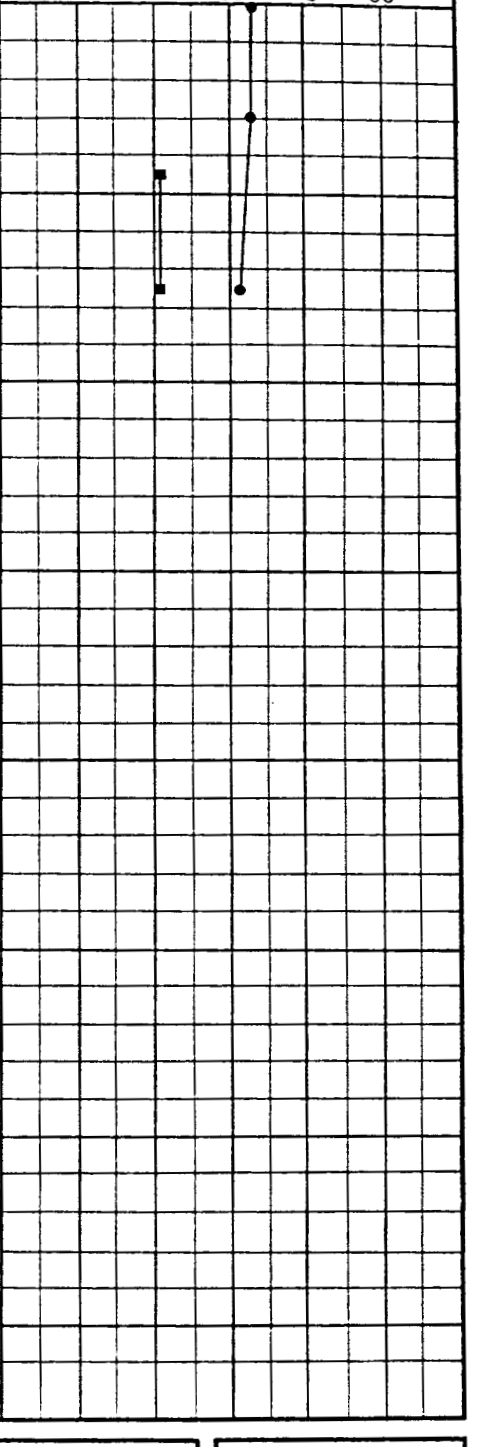
SFC. ELEVATION (m) -16.2	DATE DRILLED 26/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 8.8	LOGGED BY GL	BH# 80-75
DRILLING RIG FA 1500	LOCATION Tarsiut S #12	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL), AND SILT trace shell fragments, laminated and cross laminated, medium to low plastic, very stiff, damp		(FROZEN)
		G	Vs+Vx <3% clay not bonded lenses to 3mm p.p.=3.6 tsf t.v.=1.4 tsf
	- silty, trace shell fragments, laminated, uniform, damp, dark grey	G	Vs up to 9mm thick, slight bonding of clay
9	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



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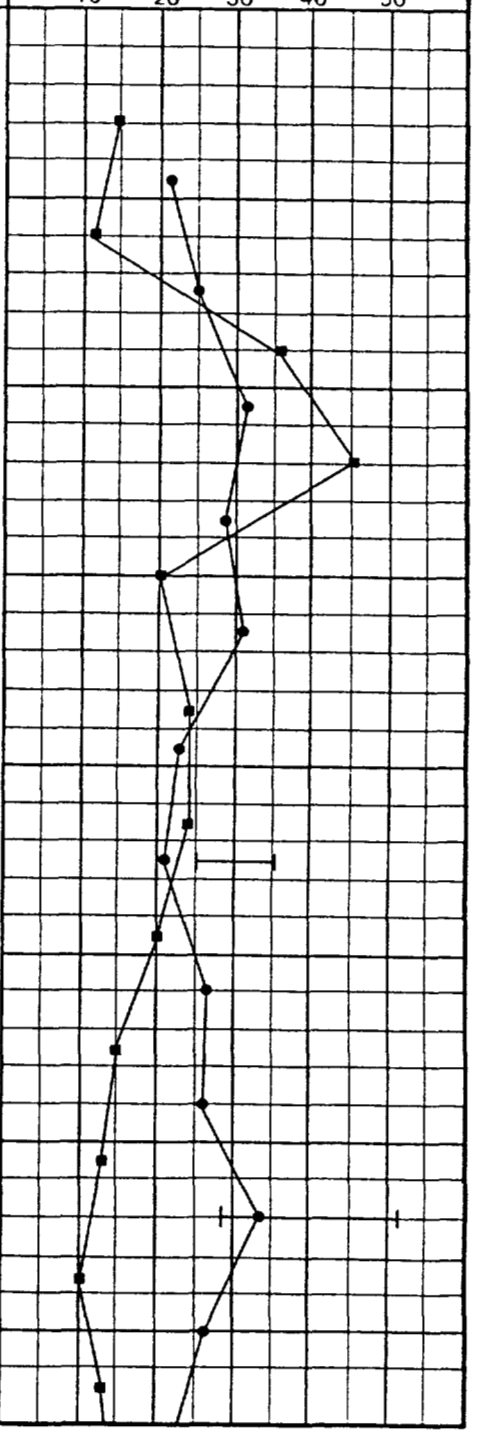
SFC. ELEVATION (m) -16.2	DATE DRILLED 26/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 8.8	LOGGED BY GL	BH# 80-75
DRILLING RIG FA 1500	LOCATION Tarsiut S #12	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND and GRAVEL trace silt, trace clay interbedded, maximum 25mm grain size, compact, wet	G	UNFROZEN
	- Trace to some silt, with trace interbedded clay laminae to 2mm thick, trace organic streaks and pockets, fine grained, uniform, moist to wet, very dark grey	G	M=14%, S=85% G=1% (SM) D50=160 μm
1		G	
2	CLAY (AND SILT) trace organic streaks and pockets, homogeneous, medium plasticity, moist, very stiff, very dark grey	G	p.p.=2.0 tsf
		G	p.p.=2.2 tsf
3	- organic streaks and pockets	G	p.p.=2.0 tsf
	- silt content increasing, stiff (ML)	G	p.p.=1.5 tsf
4		G	p.p.=1.4 tsf C&M =99% S=1% (ML)
	- moist to wet, low to medium plasticity	G	p.p.=1.2 tsf
5	- trace of shell fragments, less silt	G	p.p.=1.4 tsf
		G	FROZEN Vs <3% C&M=99% S=1% (CH)
6	- (CH) medium to high plasticity	G	Vx+Vr <5% clay not bonded
	- very dark grey to black		
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



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SFC. ELEVATION (m) -9.5	DATE DRILLED 08/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Tarsiut S #12B

BOREHOLE No.
BH#80-76
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
			FROZEN
	CLAY AND SILT, trace shell fragments and organics, earthy smell, moist to wet, black	G	Vs <3% Vs to 10mm
8	PEAT and ORGANIC SILT - greyish brown - wood fragments	G	Nbn well bonded
9		G	Nbn well bonded
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

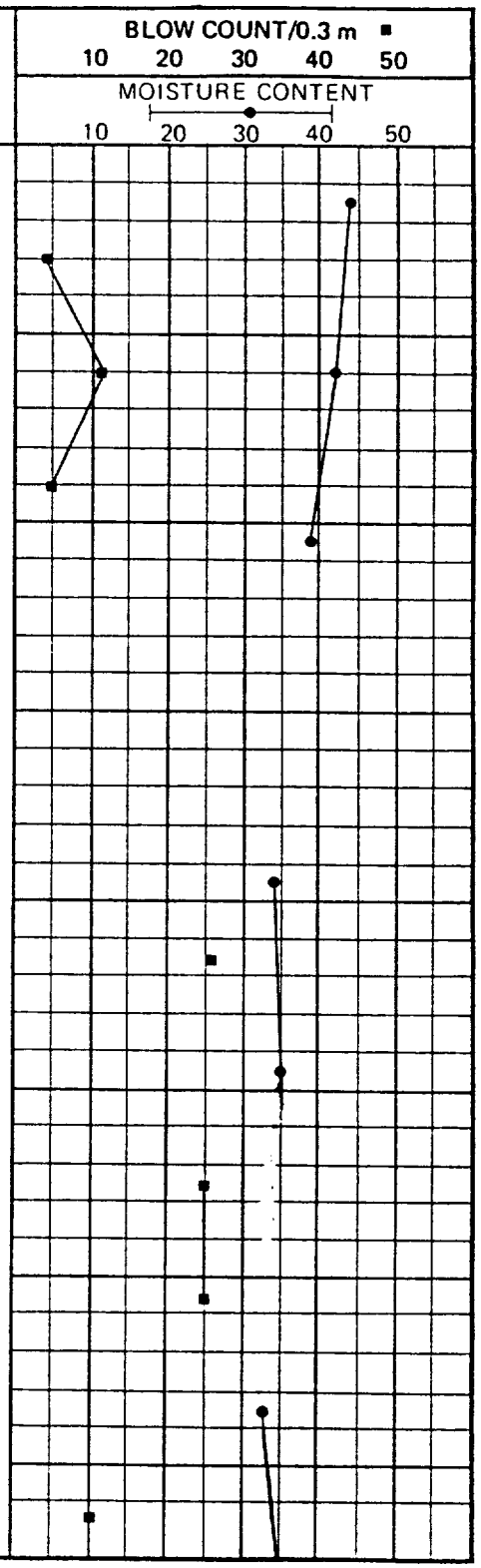
eba

SFC. ELEVATION (m) -9.5	DATE DRILLED 08/10/80	BOREHOLE No. BH# 80-76
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	
DRILLING RIG FA 1500	LOCATION Tarsiut S #12B	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil [illegible] obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	CLAY, SILTY - homogeneous, medium plastic, firm, saturated, dark grey	G	UNFROZEN
			p.p.=0.5 tsf
			t.v.=0.2 tsf
1	- some silt	G	p.p.=0.8 tsf
			t.v.=0.4 tsf
2	- some silt, trace of organic streaks, homogeneous, medium plastic wet, firm, dark grey	G	
3	NO RECOVERY - clay adhered to side of tube		
4	- stiff	G	p.p.=1.7 tsf
			t.v.=0.8 tsf
5		G	p.p.=1.7 tsf
			t.v.=0.7 tsf
6	NO RECOVERY		
7	- very stiff	G	p.p.=2.0 tsf
			t.v.=1.0 tsf



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SFC. ELEVATION (m) -22.6	DATE DRILLED 26/09/80
COMPLETION DEPTH (m) 8.8	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Tarsiut S #13

BOREHOLE No. BH# 80-77

PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY - some silt trace of organic streaks and pockets, medium plastic, stiff, moist to wet, dark grey	G	UNFROZEN p.p.=1.4 tsf t.v.=0.7 tsf
		G	p.p.=1.7 tsf t.v.=0.9 tsf
9	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -22.6	DATE DRILLED 26/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 8.8	LOGGED BY MAV	BH# 80-77
DRILLING RIG Fa 1500	LOCATION Tarsiut S #13	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - trace silt and gravel (maximum 20mm) coarse to fine grained, subrounded to subangular, smooth, compact, wet, grey	G	UNFROZEN
		G	M=6%, S=88% G=6% (SP-SM) D50=320 μm
1		G	
2	CLAY (CL) AND SILT trace organic streaks and pockets, homogeneous, low plasticity, stiff, moist, dark grey	G	p.p.=1.4 tsf
	- very stiff	G	p.p.=2.5 tsf
3			
4	- silty, trace organic streaks and pockets, low plastic, moist, very stiff, very dark grey	G	p.p.=2.4 tsf C&M=93% S=7% (CL)
	SILT - clayey, trace organic streaks, homogeneous, low plastic, moist to wet, stiff, very dark grey	G	p.p.=1.4 tsf
5			
6	CLAY (CL) AND SILT - trace organic streaks and pockets, low plasticity, homogeneous, moist to wet, stiff, very dark grey	G	p.p.=1.1 tsf
		G	p.p.=1.4 tsf (CL)
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

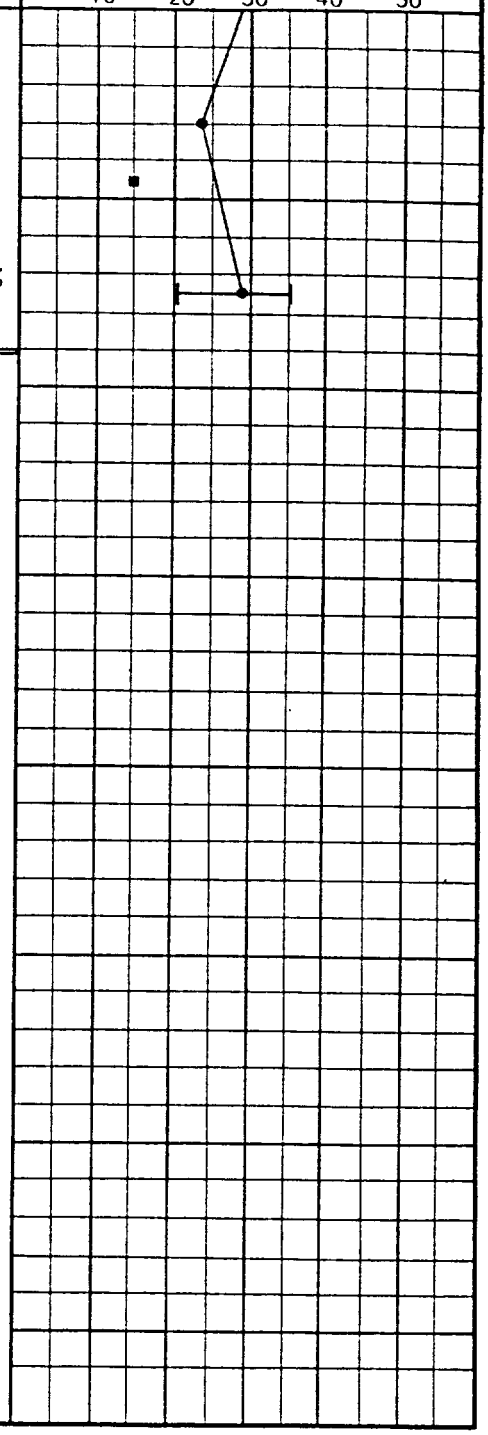
SFC. ELEVATION (m) -9.1	DATE DRILLED 08/10/80	BOREHOLE No. BH# 80-78
COMPLETION DEPTH (m) 8.8	LOGGED BY MAV	
DRILLING RIG FA 1500	LOCATION Tarsiut S #13B	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater condition

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL) AND SILT - trace fine grained sand, low plastic, homogeneous, moist to wet, very dark grey	G	UNFROZEN
	- gravelly, trace to some fine grained sand with interbedded organics (2mm lenses) maximum grain size to 20mm, smooth, angular	G	C&M=74% S=11%, G=15% (CL)
9	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



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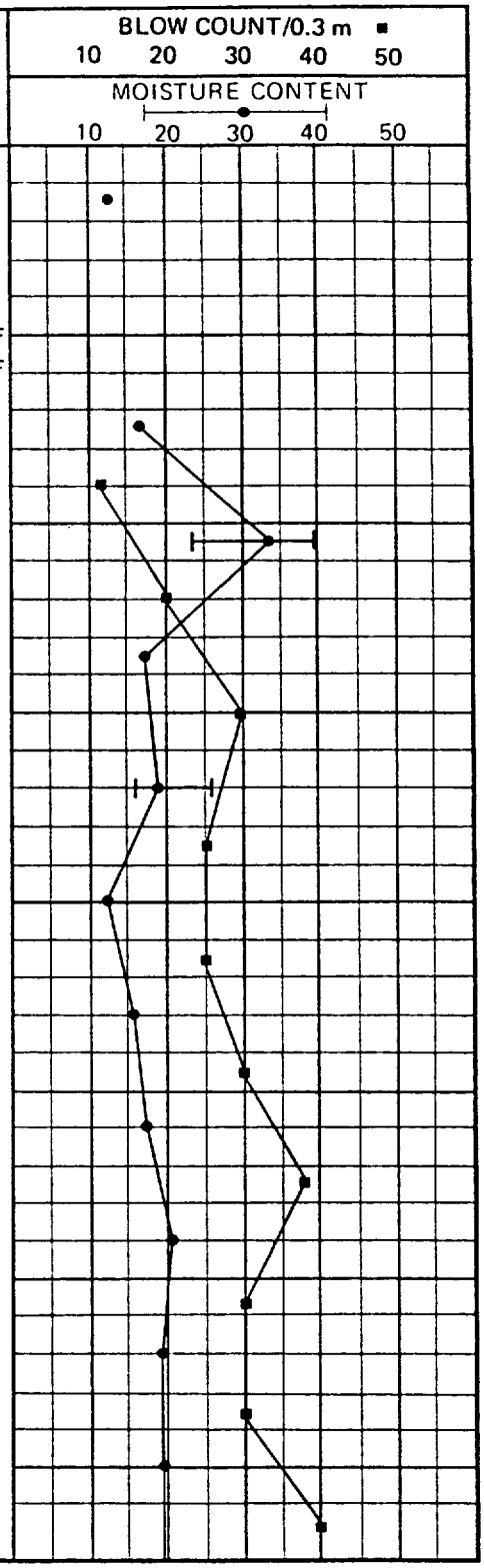
SFC. ELEVATION (m) -9.1	DATE DRILLED 08/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 8.8	LOGGED BY MAV	BH# 80-78
DRILLING RIG FA 1500	LOCATION Tarsiut S #13B	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND and GRAVEL (SP) medium grained, clean, rounded & smooth particles (most of sample washed out)		UNFROZEN
	- gravel to 60mm, rounded and rough		
1	- Gravelly, trace silt, rounded & smoothed medium grained, trace coarse grained, homogeneous, compact, moist		p.p.=1.2 tsf t.v.=0.5 tsf M=4%, S=74% G=22% (SP) D50=4.00 μm
		G	
2	CLAY (CL) AND SILT occasional organic pockets, laminated, stiff, damp, dark grey	G	p.p.=1.0 tsf C&M =94% S=6% (CL)
	trace medium grained sand and gravel in lenses	G	p.p.=4.5 tsf t.v.=1.9 tsf
3	Low plasticity, hard		
	- sandy, trace gravel particles, horizontally oriented, subrounded to subangular	G	p.p.=2.0 tsf t.v.=1.1 tsf C&M=78% (CL) S=20% G=2%
	- flat pebble to 100mm	G	p.p.=4.0 tsf t.v.=1.9 tsf
4			
	- trace coal chips, trace coarse grained sand and gravel laminated, medium to low plastic, hard, damp	G	p.p.=3.7 tsf t.v.=1.5 tsf
5	- less sand and gravel	G	p.p.=3.9 tsf t.v.=1.8 tsf
	- trace sand, no gravel, laminated, medium plastic, very stiff, damp	G	p.p.=2.8 tsf t.v.=1.6 tsf
6	- trace of organic pockets	G	p.p.=3.3 tsf t.v.=1.9 tsf
		G	p.p.=3.3 tsf t.v.=1.6 tsf
7			

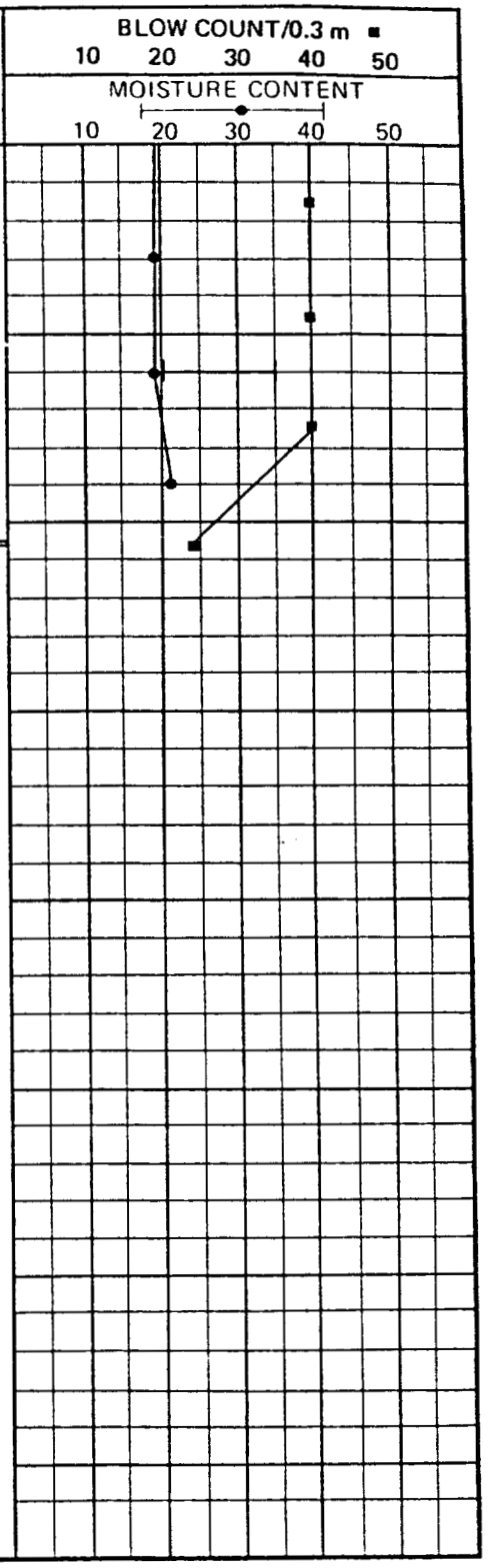


SFC. ELEVATION (m) -8.5	DATE DRILLED 08/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH# 80-79
DRILLING RIG FA 1500	LOCATION Tarsiut S #14	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL) AND SILT - trace sand, medium plasticity, laminated, very stiff, damp, dark grey	G	UNFROZEN
		G	p.p.=2.4 tsf t.v.=1.6 tsf
		G	p.p.=3.8 tsf t.v.=1.9 tsf C&M=90% (CL) S=8%, G=2%
9		G	p.p.=2.7 tsf t.v.=1.3 tsf
	END OF HOLE		
10			
11			
12			
13			
14			

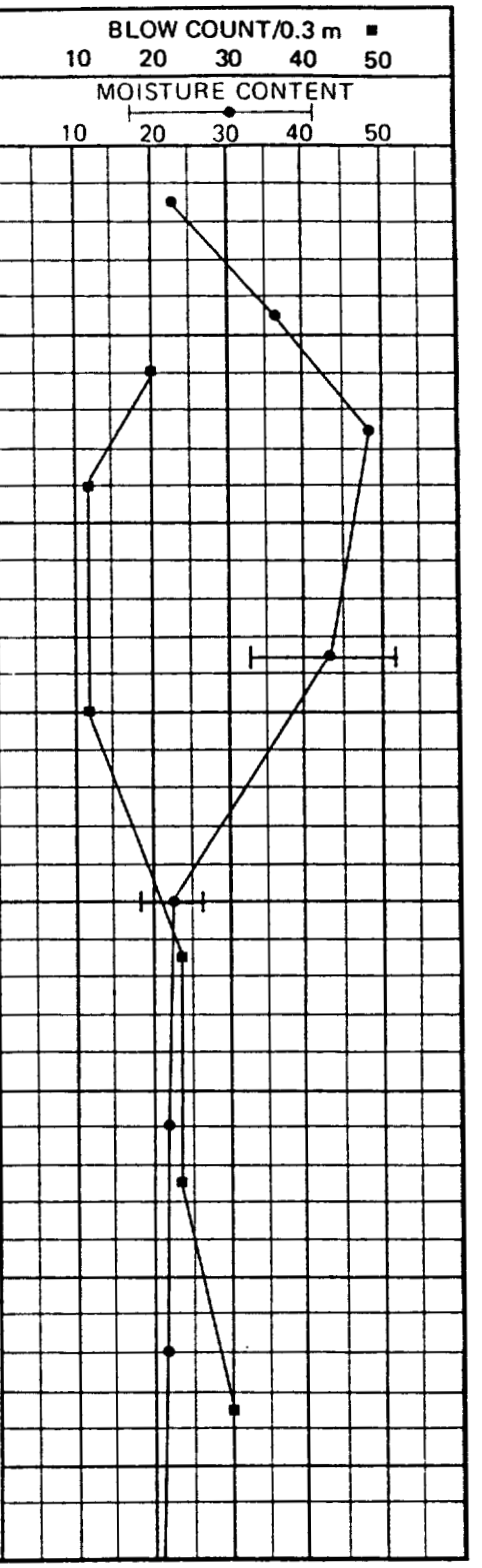


SFC. ELEVATION (m) -8.5	DATE DRILLED 08/10/80	BOREHOLE No. BH# 80-79
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Tarsiut S #14	PAGE 2 OF 2

This log ... subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP) - medium to coarse grained, clean, rounded & smoothed particles, wet, loose, brownish	G	UNFROZEN p.p.=1.0 tsf M=3%, S=97% (SP)
1	CLAY (CH) - silty, medium plastic, stiff to firm, moist, grey -some organics, some silt, laminated, high plastic, stiff, moist, black	G G	D50=460 μm p.p.=0.4 tsf p.p.=1.3 tsf
2			
3	- traces of peat lenses (brown & spongy) medium to high plastic, stiff to firm	G	p.p.=1.0 tsf (CH)
4	- trace organics, trace coarse grained sand pebbles to 40mm, subangular and rough, laminated, uniform, damp, light grey, low plastic	G	p.p.=1.3 tsf (CL)
5	- very stiff, dark grey	G	p.p.=2.5 tsf t.v.=1.3 tsf
6	- trace of coarse grained sand, subangular to subrounded, very stiff, damp, dark grey	G	p.p.=2.5 tsf t.v.=1.1 tsf Vr+Vs <5% (clay not bonded)
7			



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SFC. ELEVATION (m) -9.1	DATE DRILLED 08/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Tarsiut S #15

BOREHOLE No.
BH# 80-80
PAGE 1 OF 2

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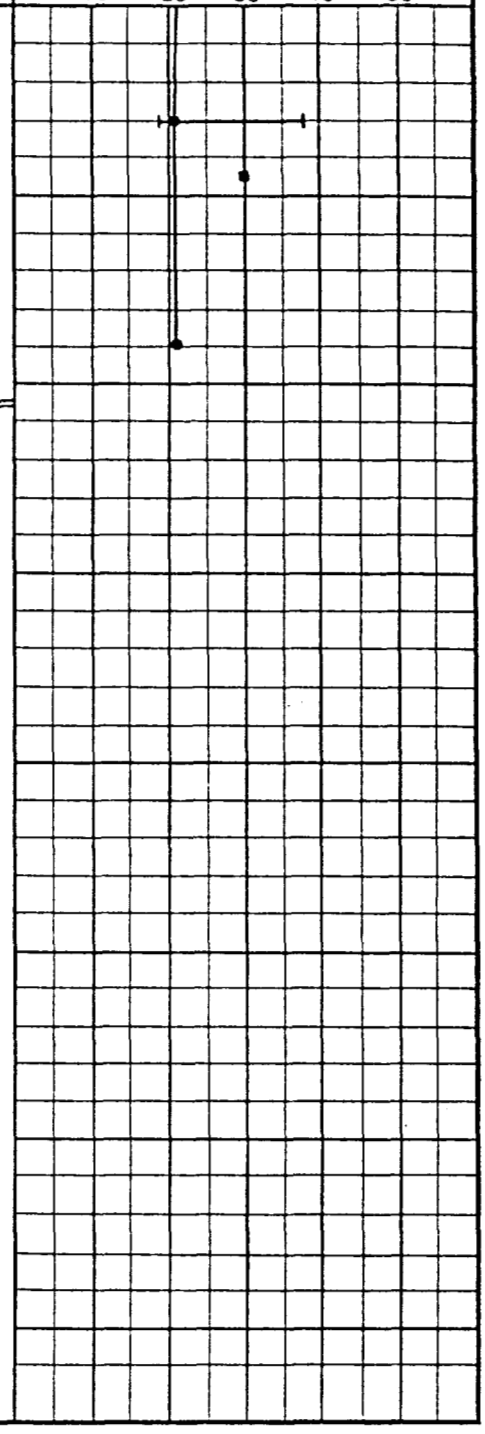
BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
			FROZEN
8	CLAY (CL) - silty, trace coarse grained sand, rounded & smoothed, very stiff, damp, dark grey low plastic	G	Vx+Vr <5% clay not bonded p.p.=2.0 tsf t.v.=1.4 tsf
9	- homogeneous, damp, dark grey/black	G	p.p.=2.6 tsf t.v.=1.3 tsf
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



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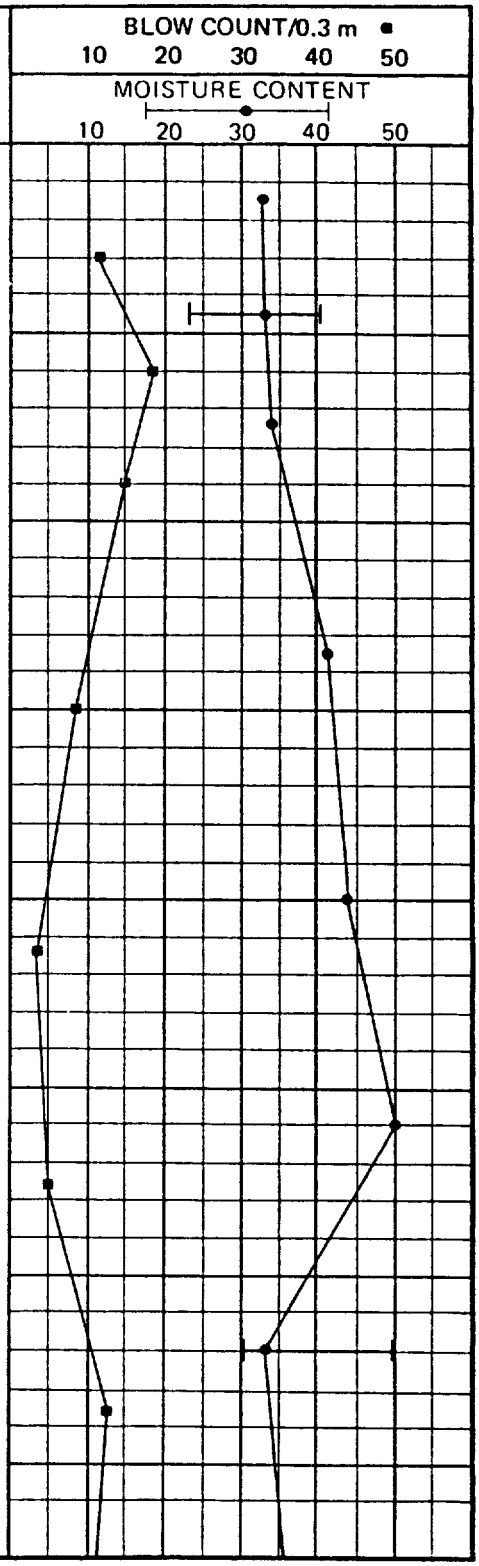
SFC. ELEVATION (m) -9.1	DATE DRILLED 08/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH#80-80
DRILLING RIG FA 1500	LOCATION Tarsiut S #15	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND, fine to medium grained, loose, wet, dark brown	G	UNFROZEN
	CLAY (CL) AND SILT trace shell fragments, low plastic, laminated, moist, stiff, dark grey trace organic streaks, damp	G	p.p.=1.0 tsf
1		G	p.p.=1.0 tsf (CL)
		G	p.p.=0.8 tsf
2		G	
	- trace black organic streaks, medium plastic, firm, moist	G	p.p.=0.6 tsf
3			
	- moist, soft	G	p.p.=0.3 tsf
4			
5	- occasional organic sand lenses (<10mm), very soft, moist	G	p.p.=0.2 tsf
6	- trace fine grained sand, trace black organics, homogeneous, firm to stiff, medium plastic, damp to moist	G	(CL)
7			



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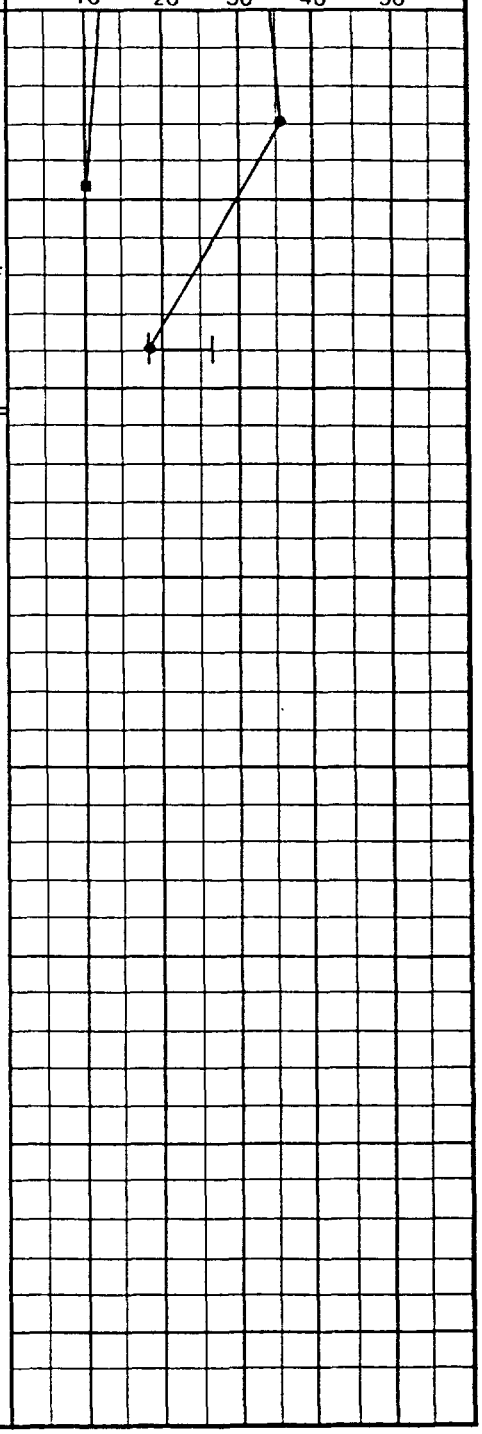
SFC. ELEVATION (m) -8.8	DATE DRILLED 13/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH# 80-81
DRILLING RIG FA 1500	LOCATION Tarsiut S #16	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL) - silty with some black organic lenses and streaks, medium to high plastic, firm to moist - trace of mica, homogeneous, dark grey	G	UNFROZEN
9		G	p.p.=2.0 tsf (CL)
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba	SFC. ELEVATION (m) -8.8	DATE DRILLED 13/10/80
	COMPLETION DEPTH (m) 9.1	LOGGED BY GL
	DRILLING RIG FA 1500	LOCATION Tarsiut S #16

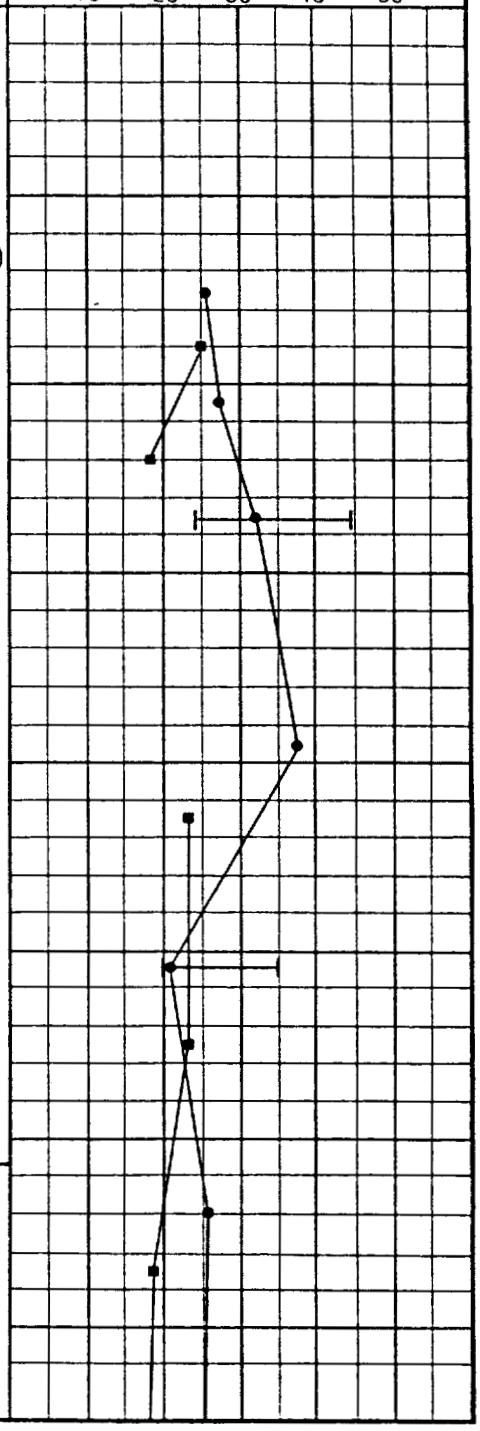
BOREHOLE No.
BH# 80-81
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	NO RECOVERY (SAMPLE WASHING OUT)		UNFROZEN
1	NO RECOVERY (SAMPLE WASHING OUT)		
	SAND (SP-SM) - trace silt, fine grained, uniform, wet to saturated, compact to dense, very dark grey	G	C&M = 10% S=90% (SP-SM) D50=165 μm
2	CLAY (CL) AND SILT with interbedded sand - some silt, trace of shell fragments, moist to wet, very dark grey (5Y 3/1)	G	
	- homogeneous, low plasticity, stiff, moist to wet, very dark grey organic streaks & pockets below 3.0m	G	p.p.=1.2 tsf C&M=99% S=1% (CL)
3			
	- wet, firm	G	p.p.=0.9 tsf
4			
5	- trace silt, trace sand, trace gravel, trace organic streaks, homogeneous, low plastic, very stiff, very dark grey	G	p.p.=2.3 tsf C&M=93% S=7%, (CL)
6			
	- stiff	G	FROZEN (not bonded) Vx=5% p.p.=1.5 tsf
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



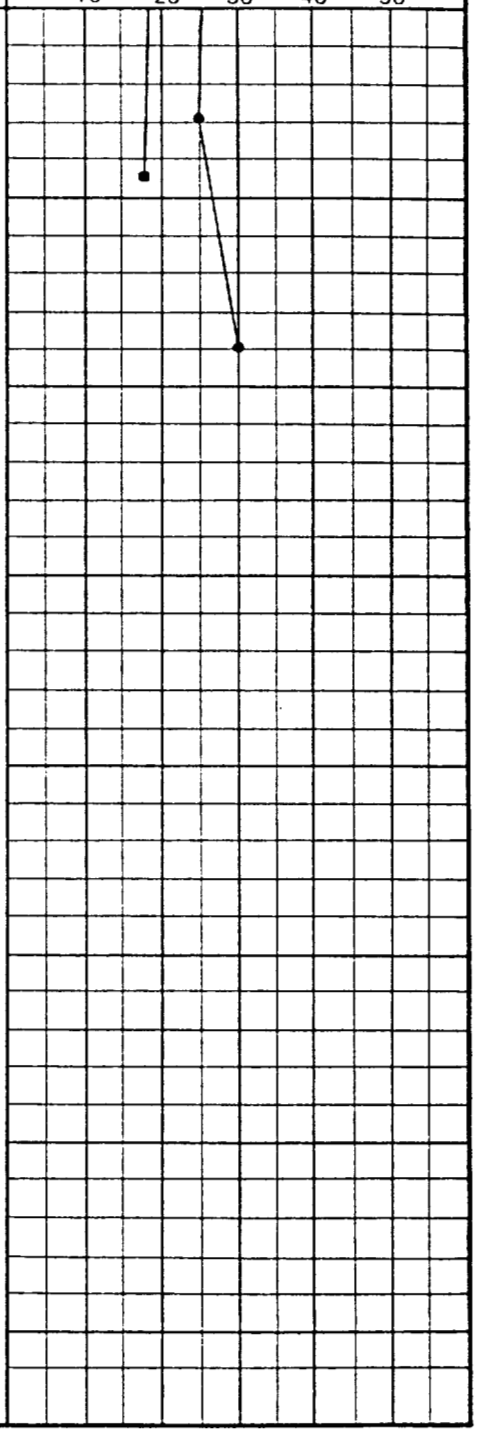
eba	SFC. ELEVATION (m) -7.6	DATE DRILLED 13/10/80	BOREHOLE No.
	COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	BH# 80-82
	DRILLING RIG FA 1500	LOCATION Tarsiut S #17	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the limited soil sampling and laboratory testing of samples from the borehole. Soil zones have been interpreted accordin[illegible] practice. The zones from one hole to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL) AND SILT, traces of sand, gravel and organics, homogeneous, low plasticity, stiff moist, very dark grey		FROZEN
		G	p.p.=1.6 tsf Vx 3% ice lens to 30mm (not bonded)
9		G	p.p.=1.6 tsf Vr+Vr 3% ice lens to 20mm (not bonded)
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

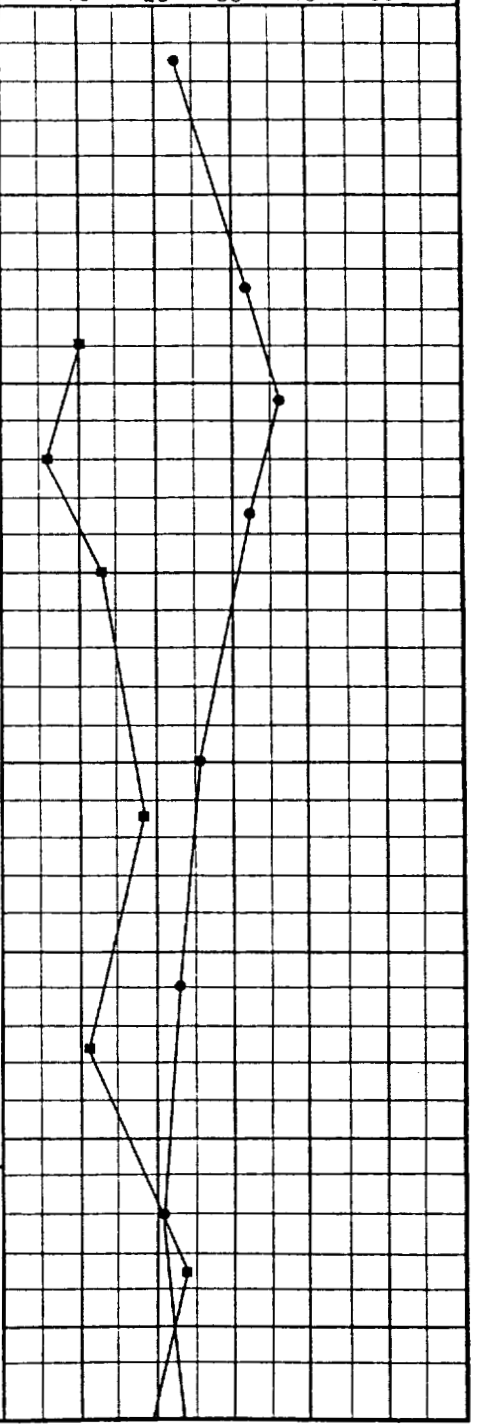
SFC. ELEVATION (m) -7.6	DATE DRILLED 13/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	BH#80-82
DRILLING RIG FA 1500	LOCATION Tarsiut S #17	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND and GRAVEL angular & polished, clean, loose, wet	G	UNFROZEN p.p.=0.5 tsf
1	- clay lens, some silt, trace shell fragments, low plastic, soft		
1	CLAY AND SILT trace shell fragments, trace organics, medium plastic, moist, soft	G	p.p.=0.4 tsf
2		G	
2	- sand lens medium grained to fine grained with occasional angular and smooth coarse grained sand, micaceous	G	p.p.=0.6 tsf
3	- some organics, some silt, laminated, high plastic, firm, dark grey		
3	- some organics and some silt interlaminated, medium to low plastic, damp, stiff, dark grey	G	p.p.=1.7 tsf
4			
5	- trace of interlaminated sand, with some organics and silt, fine grained and micaceous, lenses undulate stiff to very stiff	G	p.p.=2.0 tsf
6			
6	- some silt, trace coarse grained sand (subangular to subrounded) - medium plastic, dark grey	G	clay not bonded but sand lenses frozen Nbn Vx+Vs 10%
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -8.5	DATE DRILLED 13/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Tarsiut S #18

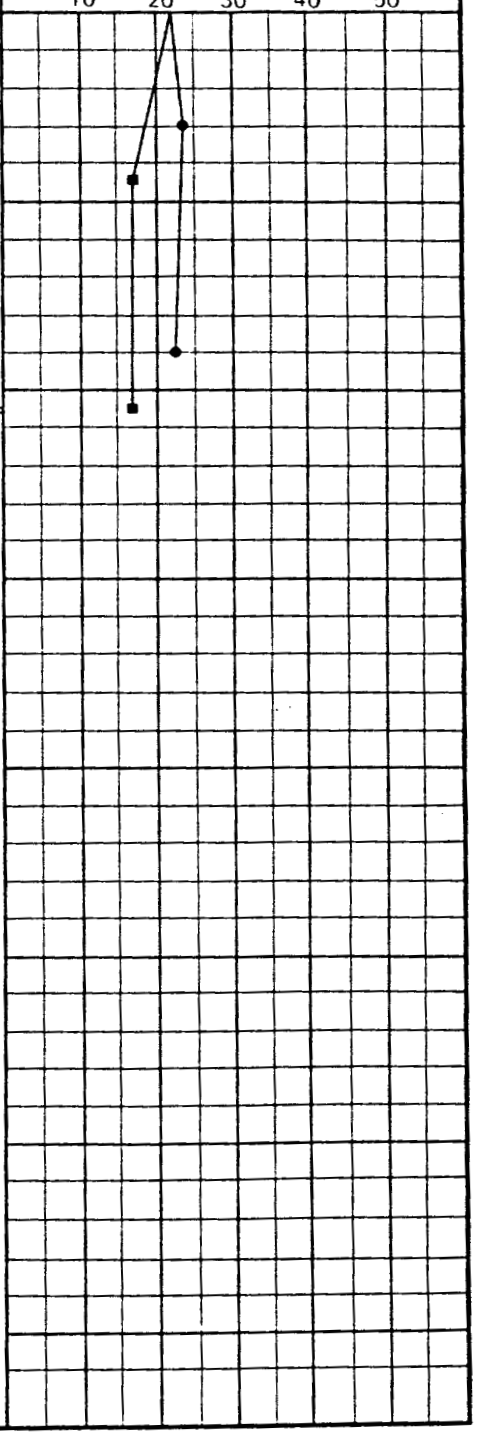
BOREHOLE No.
BH# 80-83
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
			FROZEN
8	CLAY - some silt, homogeneous, uniform, medium plastic, very dark grey	G	Vs+Vr 30% (clay slightly bonded)
9		G	Vs+Vr 30% (clay slightly bonded)
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba	SFC. ELEVATION (m) -8.5	DATE DRILLED 13/10/80	BOREHOLE No. BH#80-83
	COMPLETION DEPTH (m) 9.1	LOGGED BY GL	
	DRILLING RIG FA 1500	LOCATION Tarsiut S #18	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - gravelly, maximum 25mm subrounded & smooth, medium to fine grained (gap graded), saturated	G	UNFROZEN M=5%, S=65% G=30% (SP) D50=250 μm
1	- some gravel	G	
	- trace of gravel, maximum 10mm, medium to fine grained, saturated, olive grey	G	
2		G	M=7%, MS=87% G=6% (SP-SM) D50=190 μm
	- trace of silt, medium to fine grained, moist, olive grey	G	
3	NO RECOVERY		
4	FINES WASHING OUT		
5	GRAVEL (GP-GM) sandy, trace silt and clay, maximum particle size 25 mm, angular, moist, dark grey	G	C&M=10% S=22%, G=68% (GP-GM) D50=6500 μm slightly bonded
6		G	
	SAND (SM) silty, some clay and organics, trace of shell fragments, very dense, moist, dark grey	G	
7	- trace of organic pockets	G	C&M=37% S=63% (SM)

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -13.4	DATE DRILLED 10/09/80
COMPLETION DEPTH (m) 21.4	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #1

BOREHOLE No. BH# 80-84

PAGE 1 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND (SM), silty, trace of clay, trace of shell fragments, compact, wet, dark grey	G	UNFROZEN
8	- organic streaks, sand content increasing, wet to saturated	G	
	- very dark grey (5Y 3/1)	G	
9	- AND SILT, trace organics, fine grained, uniform, wet to moist, very dark grey (5Y 3/1)	G	M=33%, S=67% (SM)
10			
11	- silty fine grained, poorly graded, uniform, saturated, dark olive grey	G	
12			
13	- some silt to silty, fine grained, uniform, wet, olive brown	G	M=17%, S=83% (SM) D50=130 μm
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -13.4	DATE DRILLED 10/09/80
COMPLETION DEPTH (m) 21.4	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #1

BOREHOLE No. BH# 80-84

PAGE 2 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones ... interpreted ... accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
15	- SAND (SP-SM) - trace of silt, fine grained, uniform, saturated, olive brown	G	UNFROZEN
16			
17		G	
18	SAND (SP-SM) - trace of silt, trace of coal fragments, medium to fine grained, wet, olive brown individual fine grained sand lenses	G	M=10%, S=90% (SP-SM) D50=230 μm
19			
20			
21	- silty, fine grained	G	
	CLAY - silty, trace of sand, stiff, moist, very dark grey		END OF HOLE 21.4 m

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -13.4	DATE DRILLED 10/09/80
COMPLETION DEPTH (m) 21.4	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #1

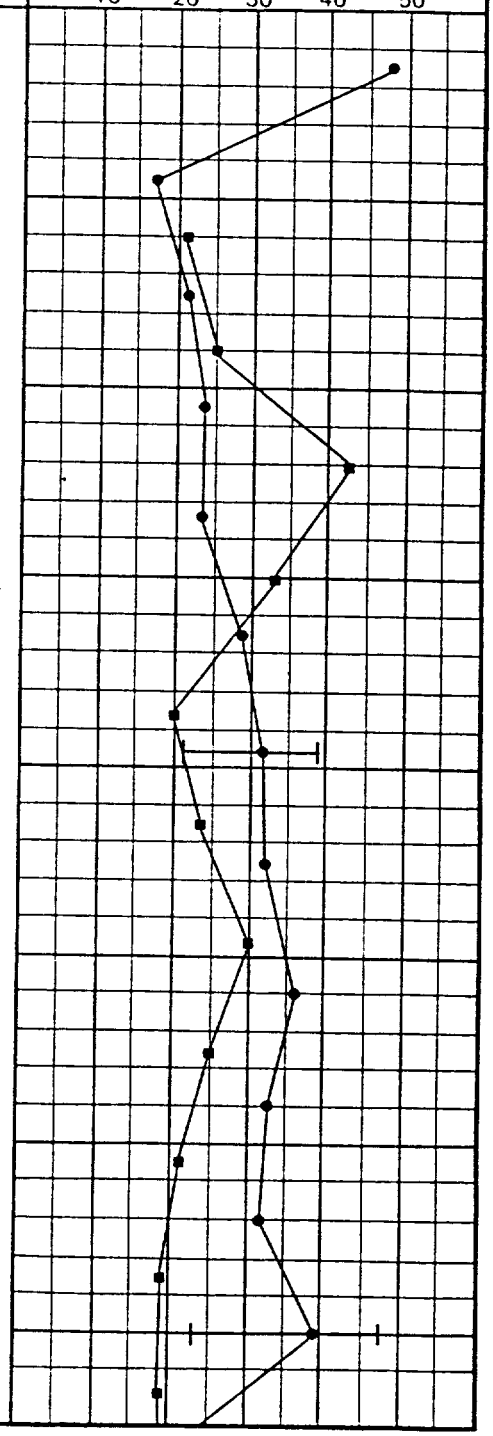
BOREHOLE No.
BH# 80-84
PAGE 3 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	CLAY - some silt, trace of sand in thin horizontal lenses, firm to soft, saturated, grey	G	UNFROZEN
1	SAND (SP) - trace of silt, trace of clay, fine grained, homogeneous, loose, saturated, dark grey	G	
	- medium to fine grained, trace of gravel to 15mm maximum, subrounded, smooth, dense, moist, brownish grey	G	
2	- trace of shell fragments - horizontal silt lenses to 4mm thick	G	M=5%, S=95% (SP) D50=200 μm
		G	
3	CLAY (CL) - silty, trace of shell fragments, laminated, stiff, damp, dark grey	G	p.p.=1.8 tsf t.v.=0.8 tsf
	- occasional rounded pebbles to 30mm maximum, low plastic	G	p.p.=1.5 tsf t.v.=0.8 tsf C&M=97% S=3% (CL)
4	- trace of organics	G	p.p.=1.0 tsf t.v.=0.5 tsf
5		G	p.p.=0.8 tsf t.v.=0.4 tsf
	- trace of black organic pockets and interbedded organics	G	p.p.=0.9 tsf t.v.=0.5 tsf
6	- trace of shell fragments, medium plastic	G	p.p.=0.8 tsf t.v.=0.4 tsf
	- silty, trace of organics, shell fragments and mica flakes, laminated, firm, damp to moist, dark grey	G	p.p.=0.8 tsf t.v.=0.4 tsf C&M=98% S=2% (CL)
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -14.3	DATE DRILLED 10/09/80
COMPLETION DEPTH (m) 18.3	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Isserk #2

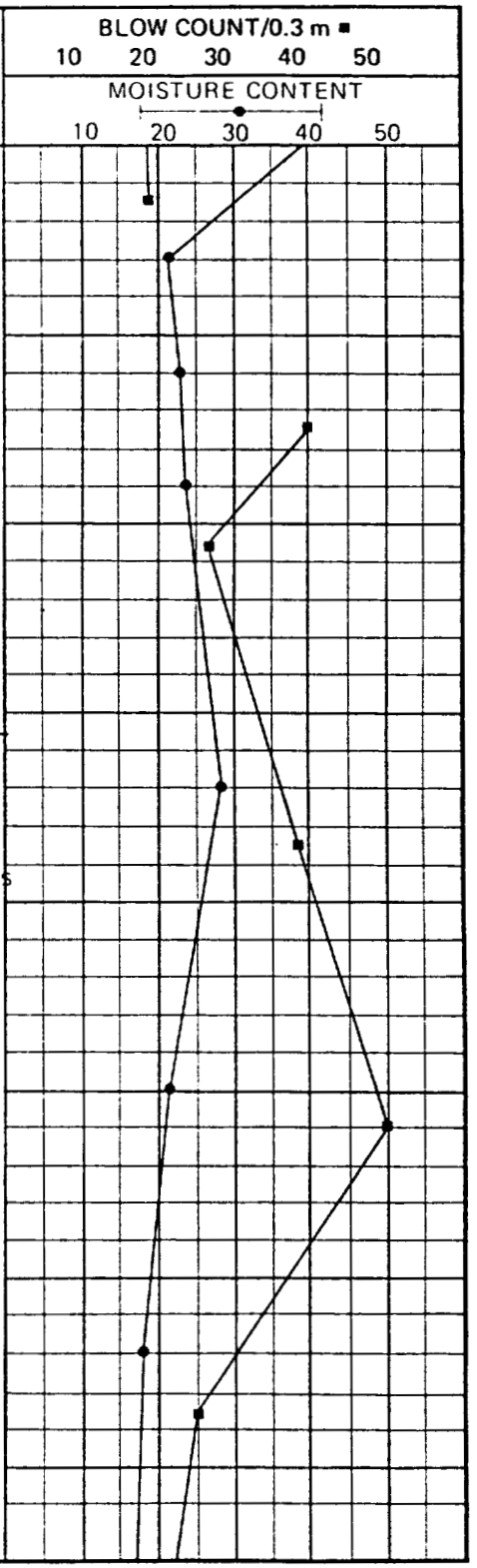
BOREHOLE No. BH#80-85

PAGE 1 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND (SP-SM) - some silt, medium to fine grained, predominantly fine, wet, dense, dark grey		UNFROZEN
		G	
8		G	
	- trace of silt, trace of mica, homogeneous, wet, dense, dark grey	G	M=5%, S=95% (SP-SM) D50=185 μm
9			
10			
	- trace of shell fragments and organics, trace of coarse grained sand, dark grey	G	FROZEN Vx+Vs <5% sand bonded into horizontal layers by ice Nbe M=10%, S=90% (SP-SM) D50=200 μm
11			
	- fine grained, trace of silt, organics and mica flakes, homogeneous	G	no ice or bonding M=11%, S=89% (SP-SM) D50=185 μm
12			
	- AND SILT, some organics, fine grained, uniform		
13			
	- trace of shell fragments, micaceous, occasional coarse grained sand, predominantly fine grained, laminated, saturated, very dark greenish grey	G	trace of ice bonding Nbn
14			



eba	SFC. ELEVATION (m) -14.3	DATE DRILLED 10/09/80	BOREHOLE No. BH# 80-85
	COMPLETION DEPTH (m) 18.3	LOGGED BY GL	
	DRILLING RIG FA 1500	LOCATION Isserk #2	PAGE 2 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
15	- SAND(SM) AND SILT, some clay micaceous, trace of shell fragments, fine grained with occasional fine grained laminations, wet to moist, very dark grey		FROZEN
		G	M=45%, S=55% (SM)
16			
	- some clay, fine grained sand with occasional coarse grained pebbles, trace of shell fragments, very dark grey	G	Vx+Vs <3% ice parallel to lamina-tions some bonded grains
17			
	- laminated, very dark grey black	G	trace of bonded lumps
18			
	END OF HOLE		
19			
20			
21			

BLOW COUNT/0.3 m ■ ●
10 20 30 40 50

MOISTURE CONTENT
10 20 30 40 50

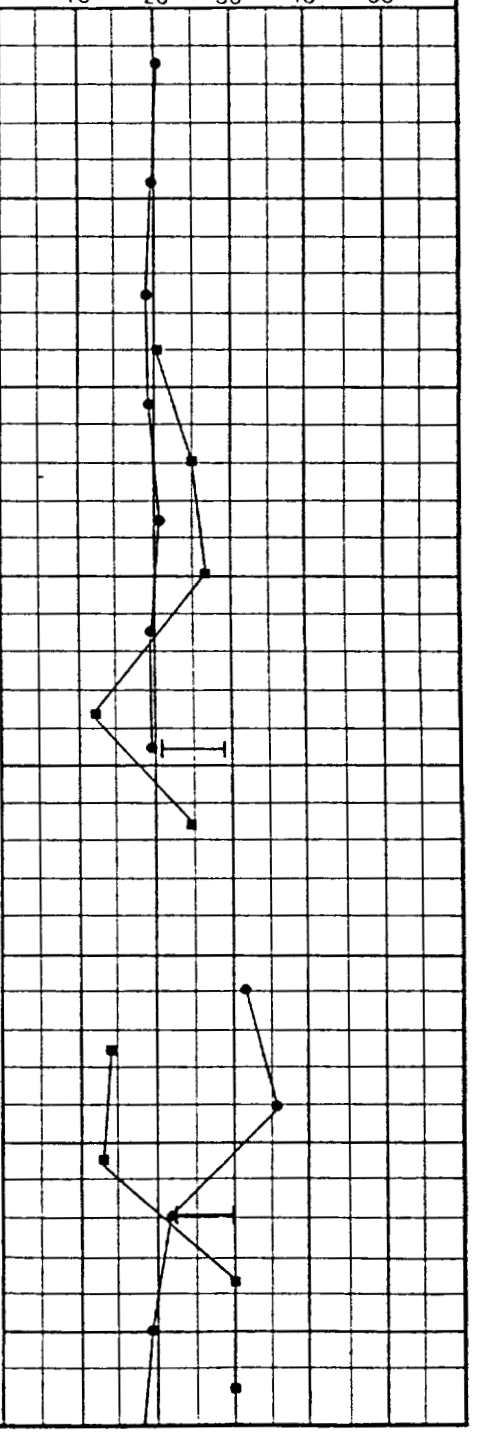
SFC. ELEVATION (m) -14.3	DATE DRILLED 10/09/80	BOREHOLE No. BH#80-85
COMPLETION DEPTH (m) 18.3	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Isserk #2	PAGE 3 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil units have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
1	SAND (SP-SM) - trace of silt, occasional pebble to 15mm, medium to fine grained, uniform, homogeneous, dense, wet, brown	G	UNFROZEN
		G	M=6%, S=94% (SP-SM) D50=250 μm
	- trace of clay laminations to 5mm thick, trace of shell fragments, sand predominantly fine grained	G	
2	- becoming medium grained uniform	G	M=2%, S=98% (SP) D50= 200μm
3	- trace of irregular clay lenses and pockets <5mm, some shell fragments, trace of organics - trace of gravel	G	
		G	
4	CLAY(CL) AND SILT(ML), trace fine grained sand, organics and shell fragments, micaceous, laminated, damp dark grey, low plastic, hard	G	C&M=98% S=2% (CL) p.p.=5.0 tsf t.v.=1.3 tsf
	NO RECOVERY		
5	- stiff, low plastic	G	p.p.=1.5 tsf t.v.=0.8 tsf
		G	p.p.=1.6 tsf t.v.=0.8 tsf
6	- traces of organics, wood and shell fragments, micaceous, damp, stiff, dark grey	G	p.p.=1.9 tsf t.v.=0.8 tsf (CL)
7	- trace fine and coarse grained sand(to 5mmØ) rounded and smoooth	G	p.p.=1.3 tsf t.v.=0.7 tsf

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba	SFC. ELEVATION (m) -11.3	DATE DRILLED 10/09/80
	COMPLETION DEPTH (m) 15.2	LOGGED BY GL
	DRILLING RIG FA 1500	LOCATION Isserk #3

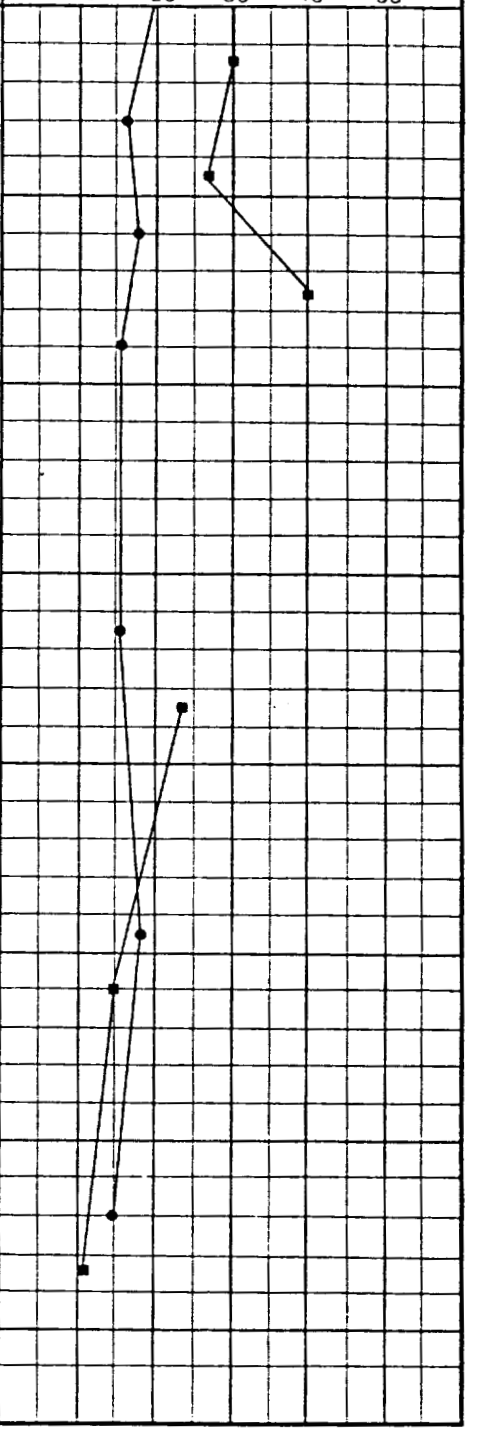
BOREHOLE No.
BH# 80-86
PAGE 1 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples. It has been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	CLAY (CL) AND SILT (ML) as above, sand content increasing with depth to 8.0 metres, very low plasticity.		UNFROZEN
		G	p.p.=2.1 tsf t.v.=0.8 tsf M=46%, S=53% G=1% (SM)
8	- no sand, trace of shell fragments, very stiff	G	p.p.=4.6 tsf t.v.=1.5 tsf
			FROZEN
		G	p.p.=3.4 tsf t.v.=1.6 tsf
9			trace of ice but no bonding
10	- some sand, homogeneous, damp to moist, stiff	G	p.p.=2.4 tsf t.v.=0.5 tsf
11			
	SAND (SM), AND SILT trace of clay, fine grained, laminated, homogeneous, black	G	trace of Nf C&M=32% S=68% (SM)
12			
13	- silty, fine grained, homogeneous, black	G	Nf in centre of sample (discontinuous)
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

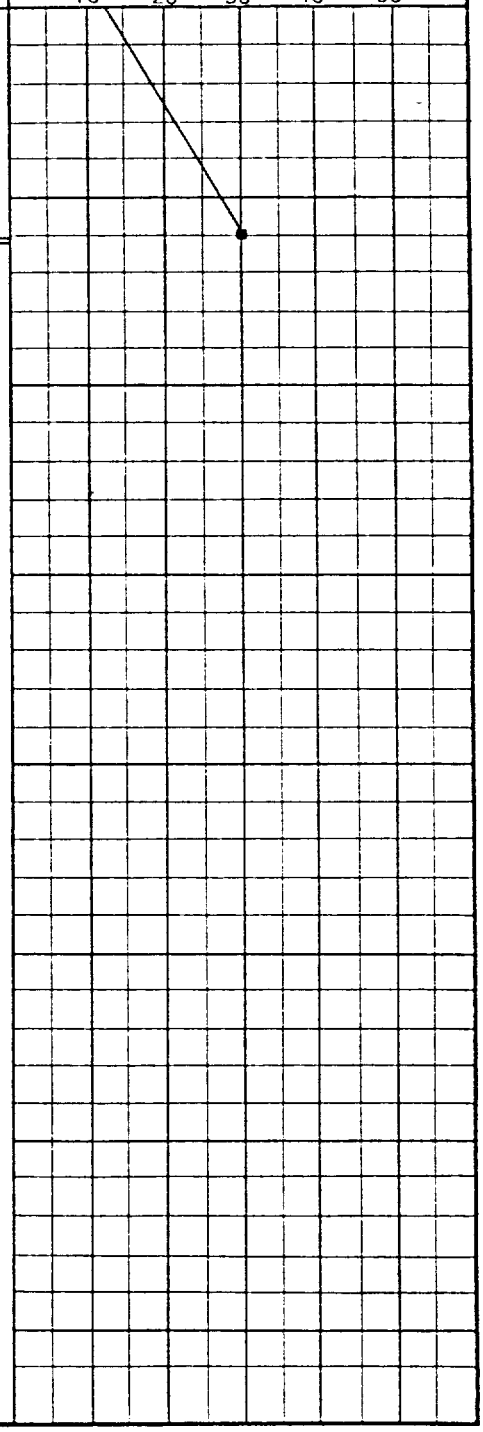


SFC. ELEVATION (m) -11.3	DATE DRILLED 10/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 15.2	LOGGED BY GL	BH#80-86
DRILLING RIG FA 1500	LOCATION Isserk #3	PAGE 2 OF 3

...combination of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones ... interpreted according to commonly accepted practice. The change from one type to another as indicated on the log, may be transitional and not ... Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION	BLOW COUNT/0.3 m ■ 10 20 30 40 50 MOISTURE CONTENT 10 20 30 40 50
	SAND (SM) - silty, fine grained, homogeneous, black		FROZEN	
	- becoming coarser grained, trace of medium grained	G		
15	END OF HOLE			
16				



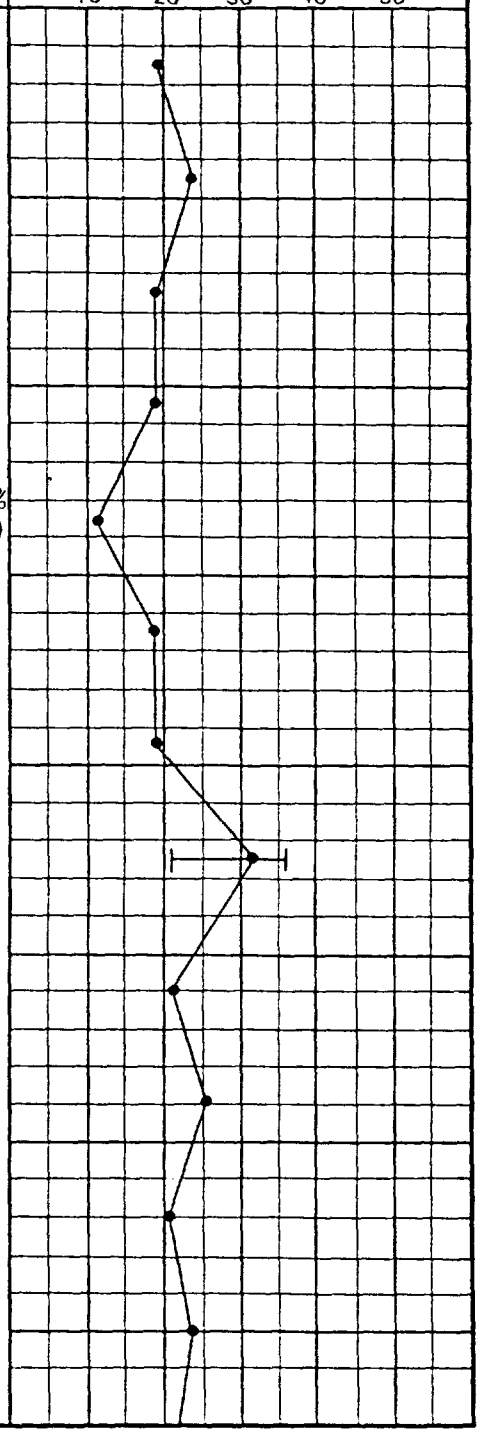
SFC. ELEVATION (m) -11.3	DATE DRILLED 10/09/80	BOREHOLE No. BH#80-86
COMPLETION DEPTH (m) 15.2	LOGGED BY GL	
DRILLING RIG FA 1500	LOCATION Isserk #3	PAGE 3 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
1	SAND (SP-SM)- trace of silt, trace of shell fragments, medium to fine grained, predominantly fine grained, clean, compact, saturated	G	UNFROZEN
	- wet	G	M=4%, S=94% G=2%, (SP) D50=200 μm
		G	
2	- trace of coarse grained sand to 5mm maximum, horizontal clay laminations to 10mm thick	G	C&M=9% S=89%, G=2% (SP-SM) D50=200 μm
	- gravel content increasing (20mm maximum), saturated	G	C&M=11%, S=54% G=35%, (SP-SM) D50=375 μm
3		G	
4	CLAY and SILT and SAND(CL) - randomly distributed and interbedded lenses to a minimum of 2mm thick CLAY - medium to low plastic, stiff to very stiff, moist, very dark grey	G	p.p.=1.4-2.3 tsf
		G	C&M=84% S=16% (CL)
5	SILT - moist, very dark grey to black SAND - fine grained, uniform, moist to wet	G	
6		G	
	SAND (SM) - some silt fine grained, uniform, compact, moist, olive grey	G	
7		G	M=12%, S=87% G=1% (SM) D50=120 μm

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba	SFC. ELEVATION (m) -14.3	DATE DRILLED 11/09/80
	COMPLETION DEPTH (m) 15.2	LOGGED BY MAV
	DRILLING RIG FA 1500	LOCATION Isserk #4

BOREHOLE No.
BH# 80-87
PAGE 1 OF 3

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
1	CLAY - some silt, some sand, trace of shell fragments, interbedded medium to fine grained sand lenses to 10mm, dense and wet. Clay, medium plastic, soft, damp, dark grey	G	UNFROZEN p.p.=0.6 tsf
		G	p.p.=0.7-1.0 tsf
	- becoming firm and SAND, interbedded clay (some silt, trace of organics and shell fragments, laminated, firm, damp, dark grey). Sand (medium to fine grained, dense, wet) lenses to 30mm wet sand	G	
2		G	C&M=32% S=68% (SM)
3		G	
		G	
4	SAND (SM) AND SILT - with occasional clay laminations to 5mm, compact, wet, dark grey medium to fine grained, pebbles to 10mm, damp	G	M=38%, S=62% (SM) trace of ice bonded sediments in centre of sample Nbn
	- trace of clay, fine grained, homogeneous	G	
5	- trace of coarse grained, rounded trace of silt lenses to 5mm, moist, dark grey	G	
	- medium to fine grained with occasional clay lenses 30-50mm, moist, wet	G	NOT FROZEN
6	- trace of shell fragments	G	
	- micaceous, homogeneous, wet to saturated if not bonded	G	FROZEN trace of ice bonded sediments Nbe
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

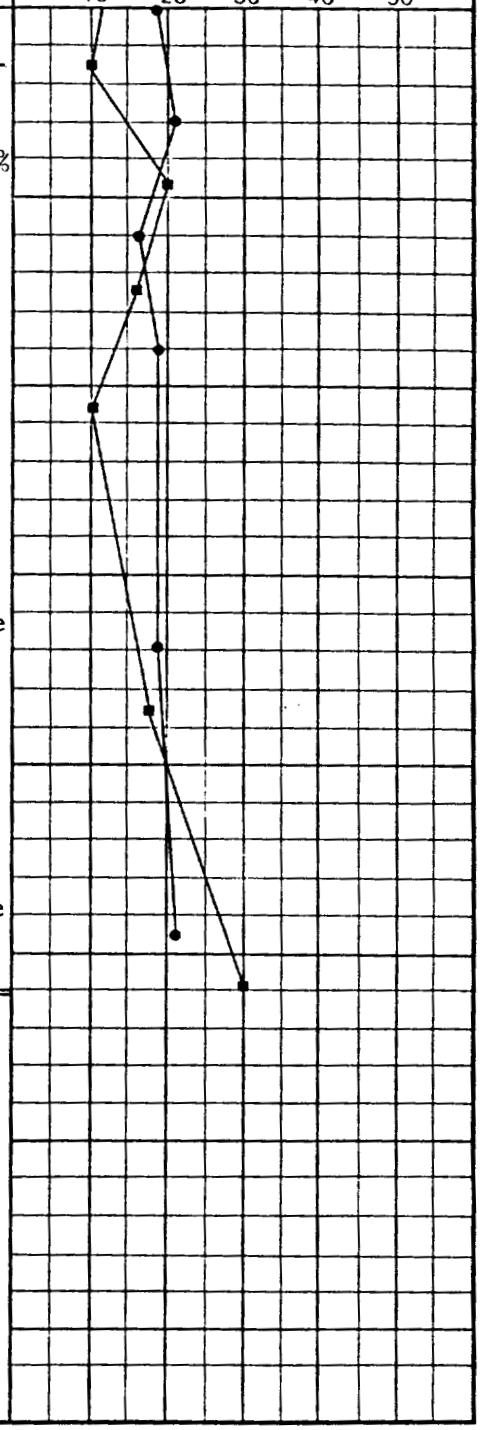
SFC. ELEVATION (m) -14.9	DATE DRILLED 24/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 12.2	LOGGED BY GL	BH# 80-88
DRILLING RIG FA 1500	LOCATION Isserk #5	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SM) - some silt, medium to fine grained, micaceous, homogeneous, saturated, dense, dark brownish grey	G	trace of bonded sediments Nbn M=17%, S=83% (SM) D50=140 μm
	- predominantly medium grained, laminated, homogeneous, dark brownish grey (2.5Y 3/2)	G	
9	- trace of fine grained, trace of silt, micaceous, homogeneous, saturated	G	trace of ice bonded sediments Nbn
10	- trace of shell fragments, trace of fine grained, predominantly medium grained, dense, saturated, dark greyish brown	G	trace of ice bonded sediments Nbn
11			
12	- medium grained	G	trace of ice bonded sediments Nbn
	END OF HOLE		
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -14.9	DATE DRILLED 24/09/80
COMPLETION DEPTH (m) 12.2	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Isserk #5

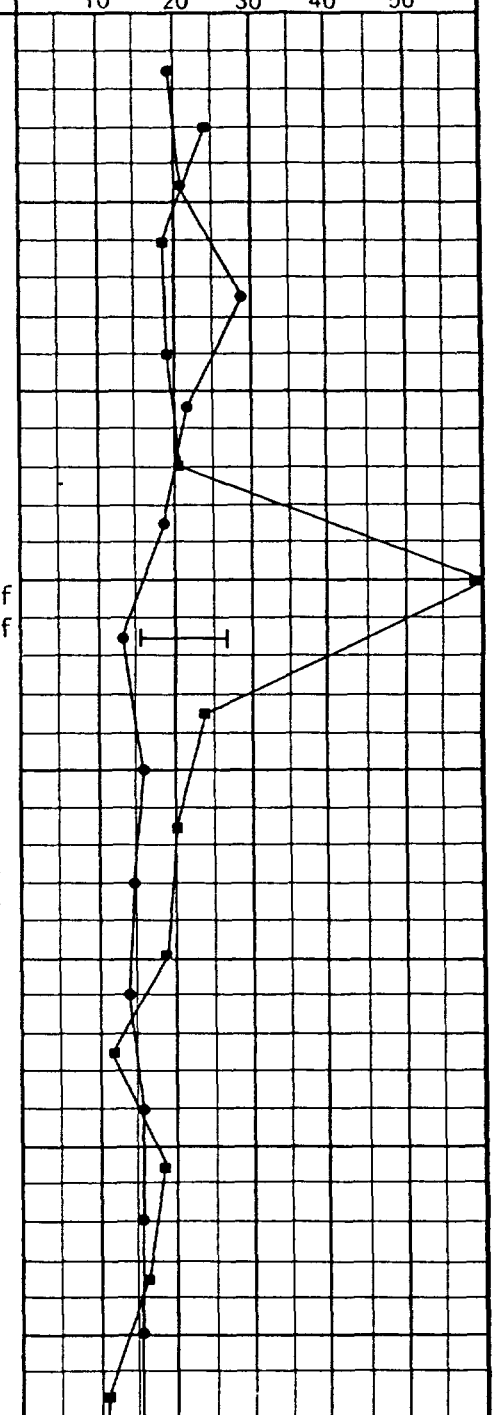
BOREHOLE No.
BH# 80-88
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - trace of shell fragments, medium grained, loose to compact, clean, saturated, dark brown	G	UNFROZEN
1	trace of fine grained sand and silt medium grained sand, some fine grained sand, trace coarse grained rounded particles, occasional clay lenses to 5mm, clean, homogeneous, wet, compact	G G	M=6%, S=94% (SP-SM) D50=200 μm
2	CLAY lens to 15mm, silty with medium grained sand partings, stiff, damp, dark grey	G G	
3	CLAY (CL) AND SILT, trace of coarse grained subrounded sand, laminated, damp, hard	G	p.p.=5.0 tsf t.v.=1.5 tsf C&M=70% S=27%, G=3% (CL)
4	- trace of fine grained sand only, faintly laminated, stiff to very stiff, moist, black - becoming sandier	G G	p.p.=2.0 tsf t.v.=3.0 tsf p.p.=2.0 tsf t.v.=0.4 tsf
5	SAND (SM) - silty, trace of clay, homogeneous, wet compact, black	G	
6	- medium to fine grained, silty, trace clay, faintly laminated, wet, compact - trace of silt, uniform, saturated, compact, black	G G	C&M=32%, S=68% (SM)
7		G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



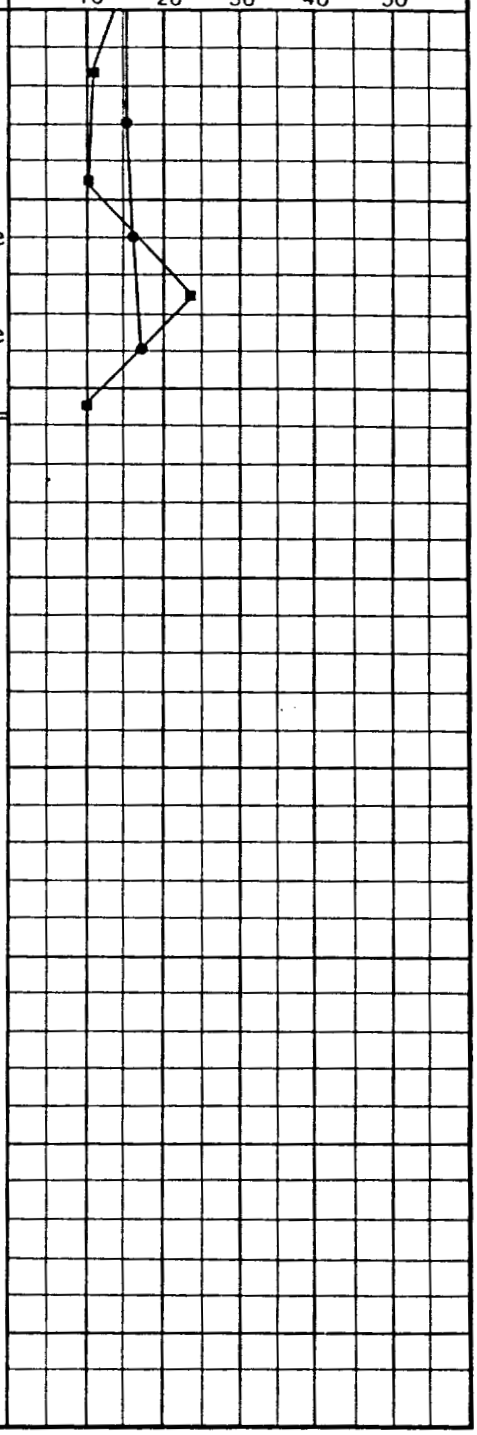
SFC. ELEVATION (m) -13.4	DATE DRILLED 24/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH#80-89
DRILLING RIG FA 1500	LOCATION Isserk #6	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND - some clay, trace of silt, medium to fine grained, homogeneous, wet, compact, black	G	FROZEN trace of ice bonded sediments
		G	
	- micaceous, uniform, with occasional thin clay lenses	G	Nbn in centre
	- becoming clayey and siltier	G	Nbn in centre
9	CLAY -sandy, some silt, black, with occasional sand lenses to 3mm		
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -13.4	DATE DRILLED 24/09/80
COMPLETION DEPTH (m) 9.1	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Isserk #6

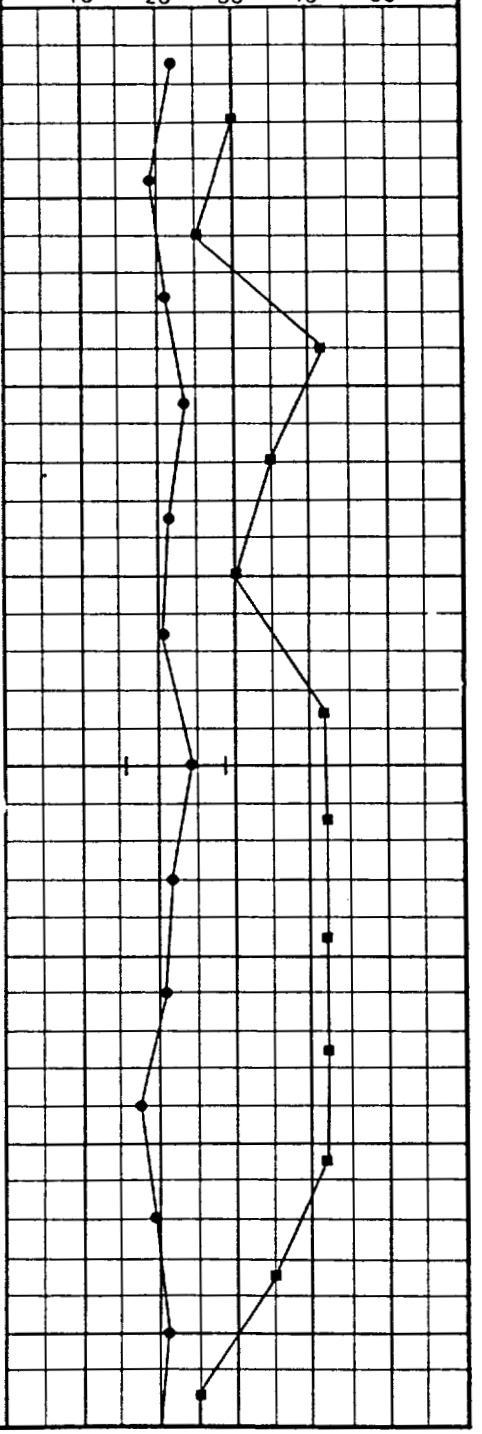
BOREHOLE No.
BH# 80-89
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM), fine grained, clean, uniform, wet, olive grey	G	UNFROZEN
1	- trace of shell fragments and organic streaks, occasional silt laminations	G	M=14%, S=81% G=5% (SM) D50=190 μm
	- silt laminations, moist	G	
2	- cleaner	G	M=5%, S=95% (SP) D50=180 μm
	- trace to some clay	G	
3	CLAY (CL) - some silt and organic streaks, medium to low plastic, very stiff, very dark grey	G	p.p.=2.8 tsf t.v.=1.4 tsf
4	- trace wood fragments and organic pockets, low plastic - silty, trace fine grained sand, low plastic, very stiff, moist, very dark grey	G	p.p.=2.5 tsf t.v.=1.4 tsf (CL)
		G	p.p.=2.6 tsf t.v.=1.1 tsf
5	SAND (SP-SM)-trace silt, fine grained, uniform, wet, dark olive grey	G	M=9%, S=91% (SP-SM) D50=200 μm
6	- some silt, fine grained, uniform, wet, very dark grey horizontal silt laminations to 4mm	G	
	- regularly spaced silty clay laminations with a trace of shell fragments	G	
7	SILT - clayey, trace fine grained sand, moist, very dark grey - SAND lamination to 100mm wet	G	

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



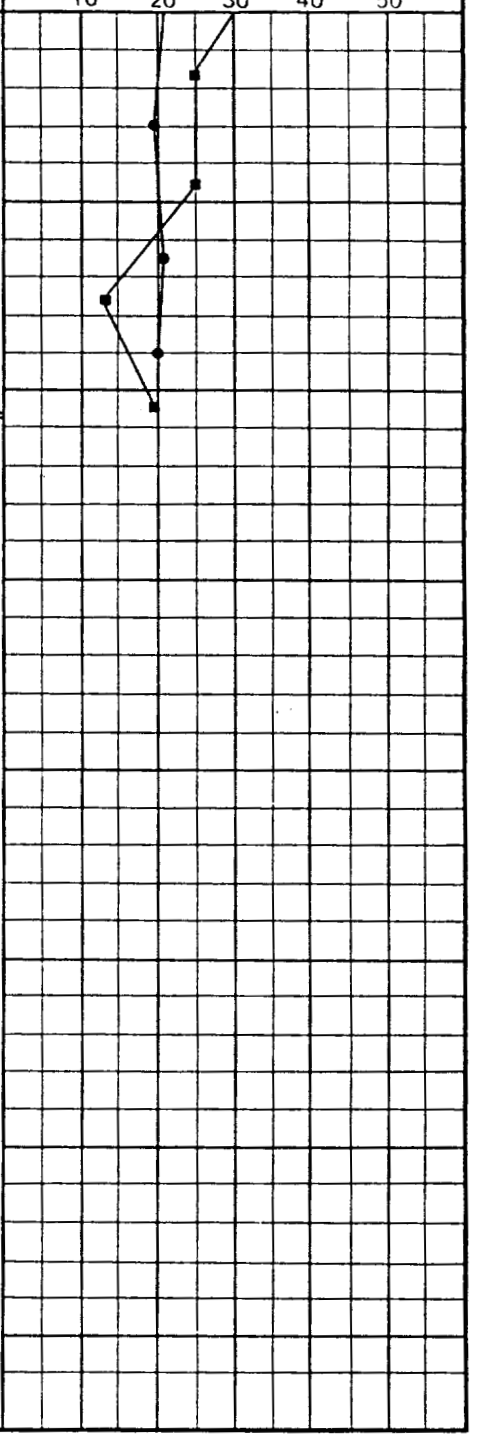
eba	SFC. ELEVATION (m) -13.4	DATE DRILLED 25/09/80	BOREHOLE No. BH# 80-90
	COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	
	DRILLING RIG FA 1500	LOCATION Isserk #7	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SILT, as above, clayey sand laminations, non-plastic, trace gravel, moist, very dark grey, compact.	G	UNFROZEN C&M=46% S=53%, G=1% (SM)
		G	
		G	
9	- and sand, frequent sand laminations (up to 150mm) some clay, compact, wet, dark grey to black	G	C&M=42% S=58% (SM)
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -13.4	DATE DRILLED 25/09/80
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #7

BOREHOLE No. BH# 80-90

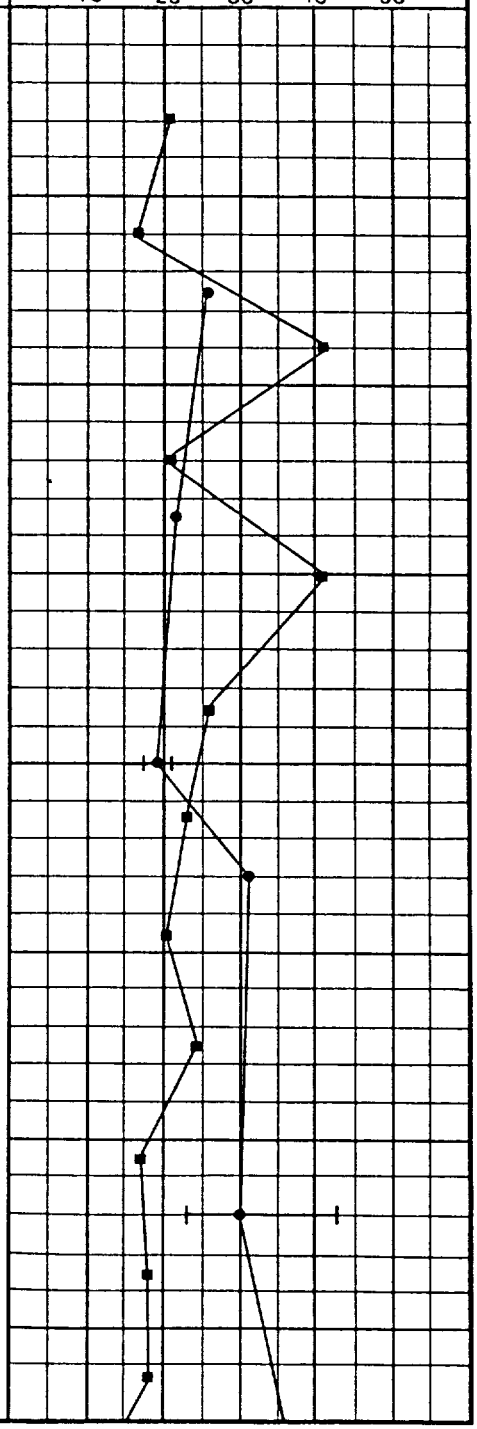
PAGE2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM)- trace silt, fine grained, uniform, wet, olive grey	G	UNFROZEN
1	- medium to fine grained, predominantly fine grained, occasional interbedded horizontal clay laminations to 3mm clean, moist to wet, uniform	G	
		G	M=3%, S=97% (SP) D50=200 μm
2	- compact	G	
		G	M=7%, S=93% (SP-SM) D50=190 μm
3	CLAY (CL) AND SILT trace of organic streaks, homogeneous, low plastic, stiff, moist, very dark grey	G	p.p.=1.3 tsf t.v.=0.6 tsf
4	- trace of interbedded sand laminations to 5mm, trace organic streaks, low plastic, moist, very stiff, very dark grey	G	p.p.=2.0 tsf t.v.=1.0 tsf C&M=71% S=29% (CL)
	medium to low plasticity, stiff, moist, very dark grey organic streaks & pockets	G	p.p.=1.6 tsf t.v.=0.8 tsf
5		G	p.p.=1.6 tsf t.v.=0.8 tsf
	- trace sand, trace organic streaks, homogeneous, low plastic, stiff, wet, very dark grey.	G	p.p.=1.4 tsf t.v.=0.6 tsf
6	- firm, wet, medium to low plasticity	G	p.p.=0.8 tsf t.v.=0.3 tsf C&M=99% S=1% (CL)
7		G	p.p.=0.8 tsf t.v.=0.4 tsf

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m)-13.1	DATE DRILLED 25/09/80
COMPLETION DEPTH (m) 9.7	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #8

BOREHOLE No. BH#80-91

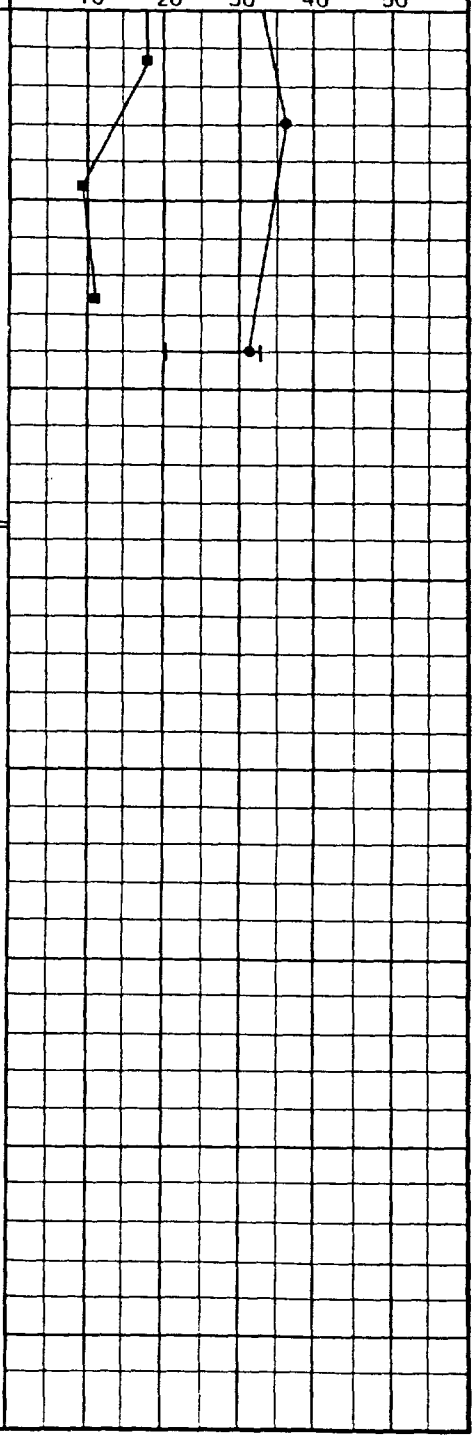
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly ... The ... to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at ... and may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	CLAY (CL) AND SILT trace organic streaks, homogeneous, low plastic, firm, wet, very dark grey	G	UNFROZEN
		G	p.p.=0.7 tsf t.v.=0.4 tsf
8	- sandy, some interbedded fine grained sand lenses	G	p.p.=0.9 tsf t.v.=0.4 tsf
	- thin organic laminations	G	p.p.=1.1 tsf t.v.=0.5 tsf C&M=90% S=10%, (CL)
9	- trace of shell fragments, low plastic	G	
10	END OF HOLE		
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



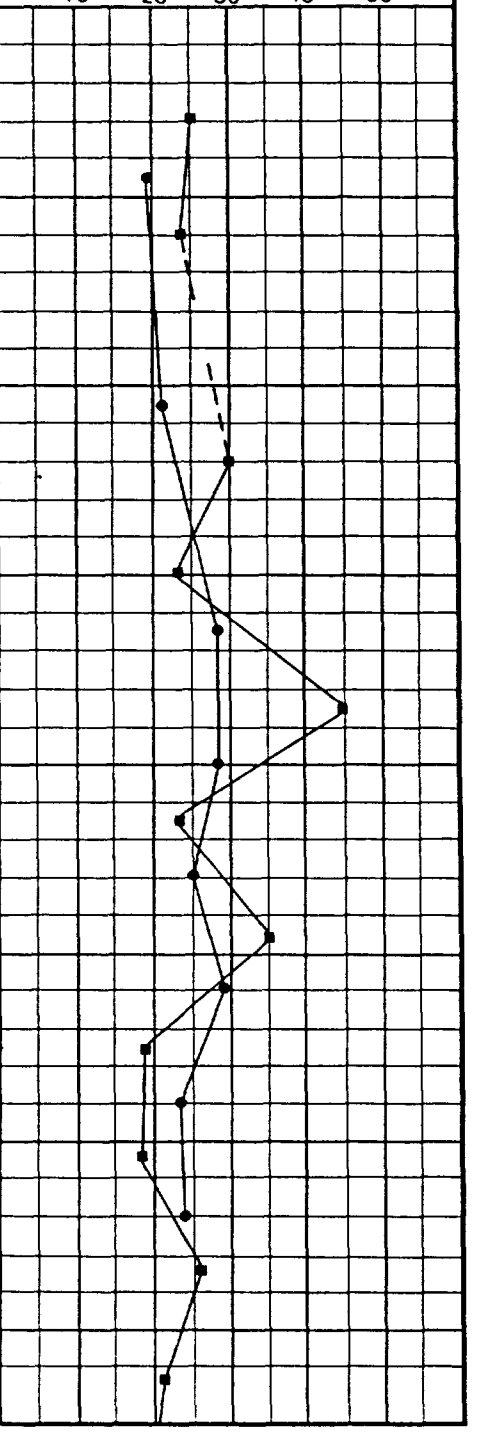
SFC. ELEVATION (m) -13.1	DATE DRILLED 25/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.7	LOGGED BY MAV	BH# 80-91
DRILLING RIG FA 1500	LOCATION Isserk #8	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND (SP) - trace clay in lenses to 3mm, trace silt, fine grained, moist to wet, dense, dark brownish grey	G	UNFROZEN
1	medium to fine grained, some silty clay lenses to 3mm	G	
	trace coarse grained sand and gravel, rounded and polished	G	
2		G	M=3%, S=97% (SP) D50=210 μm
	- some coarse grained sand, angular and subangular, trace gravel to 20mm maximum, trace clay	G	
3	- moist to wet, dark greyish brown		
	CLAY - silty, trace shell fragments, with interbedded sand lenses (undulating), stiff, damp, very dark grey, low plastic	G	p.p.=1.5 tsf t.v.=0.9 tsf
4	some sand, trace of organic pockets	G	p.p.=2.0 tsf t.v.=0.8 tsf
	- very stiff	G	p.p.=3.5 tsf t.v.=1.1 tsf
5	- fine grained sand lenses to 30mm thick, trace of wood fragments	G	p.p.=2.2 tsf
	and SAND - interbedded clay (silty, trace organics, laminated, damp) and sand (some shell fragments, fine grained, damp, dense)	G	FROZEN p.p.=2.3 tsf trace of ice bonded sediments Nbn
6	SAND (SP-SM) -trace shell fragments, trace silty clay pockets, fine grained, dense, wet, dark greenish grey	G	M=10%, S=90% (SP-SM) D50=120 μm
7	medium to fine grained, predominantly fine grained	G	trace of ice bonding Nbn

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



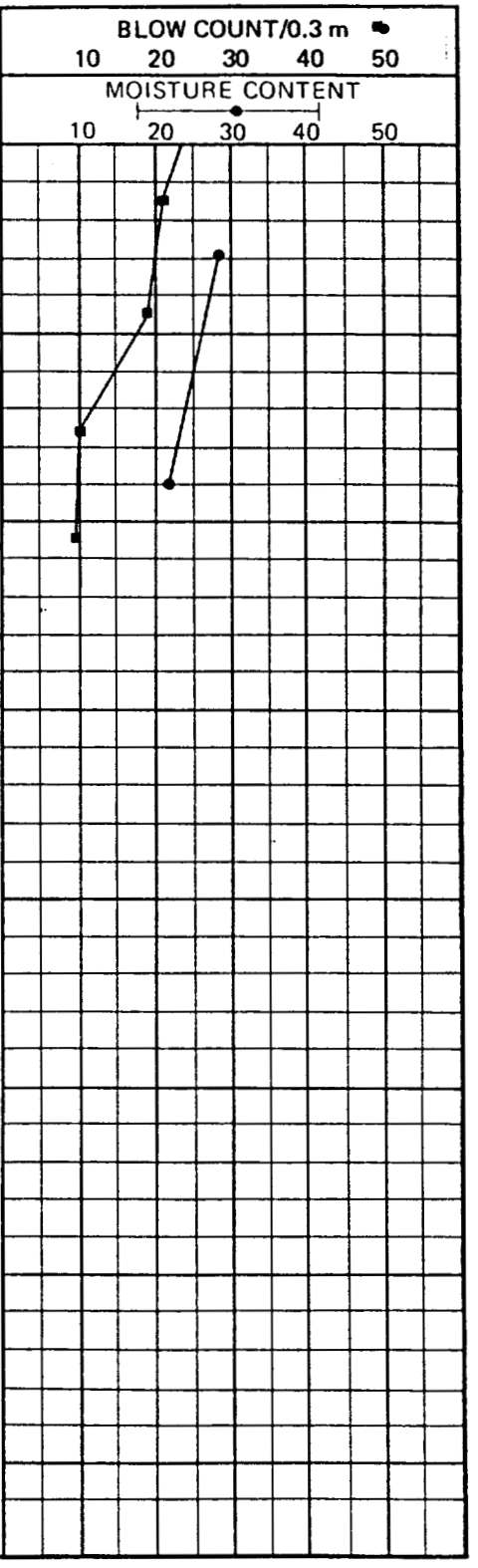
eba	SFC. ELEVATION (m) -14.0	DATE DRILLED 25/10/80
	COMPLETION DEPTH (m) 9.1	LOGGED BY GL
	DRILLING RIG FA 1500	LOCATION Isserk #9

BOREHOLE No.
BH# 80-92
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
	SAND and CLAY (below 7.2 m) interbedded silty clay and fine grained sand, dark greenish grey, trace clay pockets	G	FROZEN
		G	trace of ice bonded sediment Nbn
8	SAND, trace silt and organics, trace of shell fragments, micaceous, homogeneous, dense, saturated, dark greenish grey	G	
	- trace random silt lenses, trace organics, micaceous	G	trace of ice bonded sediment Nbn
9	END OF HOLE		
10			
11			
12			
13			
14			



eba

SFC. ELEVATION (m) -14.0	DATE DRILLED 25/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Isserk #9

BOREHOLE No.
BH# 80-92
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. It have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transi... Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction ...

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	CLAY -silty, trace coarse grained sand and shell fragments, homogeneous, medium plastic, moist	G	UNFROZEN
	SAND (SP-SM) -with occasional silty clay lenses to 5mm, medium grained, homogeneous, dense, damp, dark greyish brown	G	
1	trace fine grained sand, cobble to 80mm subrounded predominantly medium grained trace coarse grained sand & gravel, wet, dark greyish brown	G	M=4%, S=96% (SP) D50=185 μm
2	homogeneous, moist, dense silty clay lens to 7mm -increased clay content	G	
	-170mm interval of interbedded SAND and CLAY	G	M=8%, S=92% (SP-SM) D50=200 μm
3	SAND - trace of clay interbeds	G	
		G	
4	CLAY -silty, trace organics, with sand laminations to 15mm (medium grained sand, trace of shell fragments)	G	p.p.=1.4 tsf t.v.=1.1 tsf
	silty, laminated, stiff, damp, dark grey	G	
5	sand interbeds	G	
	SAND (SP) - trace shell fragments, trace silty clay lenses, medium grained, damp, dense, dark	G	
6	greyish brown medium to fine grained, faintly laminated	G	M=2%, S=98% (SP) D50=200 μm
	- trace coarse grained sand	G	FROZEN trace of ice bonded sediment Nbn
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

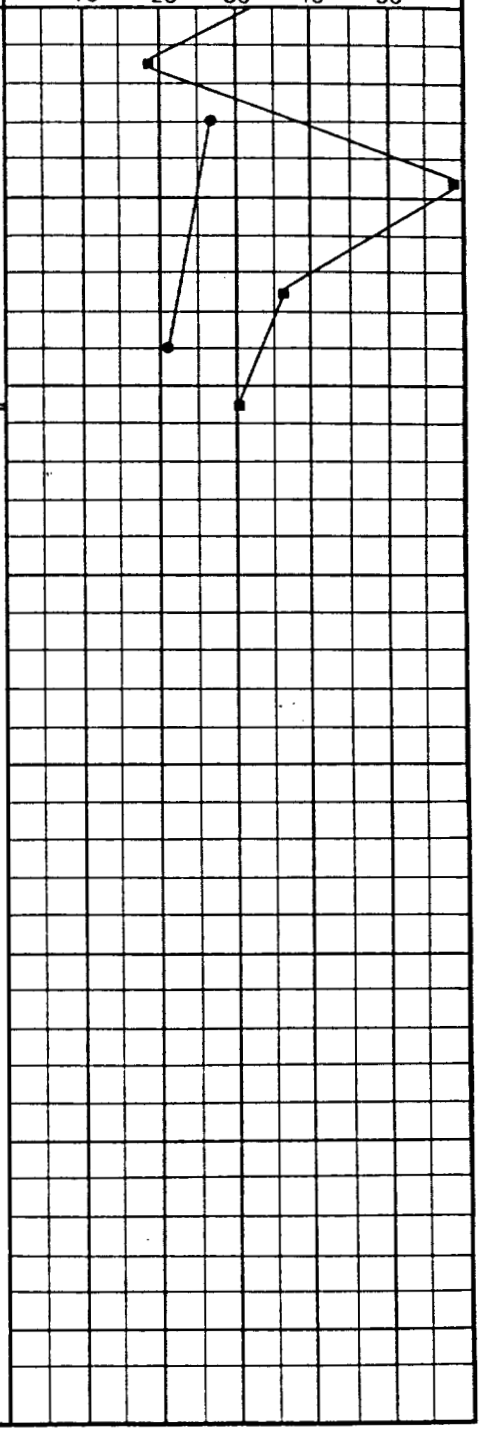
SFC. ELEVATION (m) -14.0	DATE DRILLED 25/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH#80-93
DRILLING RIG FA 1500	LOCATION Isserk #10	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND - trace clay lenses, medium to fine grained, uniform, damp, dense, dark greyish brown	G	FROZEN
		G	trace of ice bonded sediment Nbn
	- trace shell fragments, laminated	G	
9	- damp to moist	G	trace of ice bonded sediment Nbn
	END OF HOLE		

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba	SFC. ELEVATION (m) -14.0	DATE DRILLED 25/09/80
	COMPLETION DEPTH (m) 9.1	LOGGED BY GL
	DRILLING RIG FA 1500	LOCATION Isserk #10

BOREHOLE No.
BH# 80-93
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SM) - gravelly, trace clay laminations to 5mm, gravel to 25mm maximum, saturated - trace silt, occasional clay laminations, fine grained, uniform, wet, olive grey	G	UNFROZEN
1		G	M=14%, S=86% (SM) D50=165 μm
		G	
2		G	M=10%, S=90% (SP-SM) D50=120 μm
		G	
3	- trace of silt, trace of black organic streaks, some clay laminations to 15mm	G	
4		G	
	CLAY - some silt, trace organics, interbedded medium to fine grained sand laminations 15 to 30mm thick - medium to low plastic, stiff, moist, olive grey	G	p.p.=1.6 tsf t.v.=0.6 tsf
5		G	
	- interbedded CLAY and SAND		
	SAND (SP) - trace silt, medium to fine grained, compact, wet, olive grey	G	M=2%, S=98% (SP) D50=200 μm
6		G	
		G	
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

eba

SFC. ELEVATION (m) -15.2	DATE DRILLED 26/09/80
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #11

BOREHOLE No.
BH# 80-94
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	- trace shell fragments	G	UNFROZEN
	- dense	G	
9	SAND(SP) - trace silt, medium to fine grained, wet, dense, olive grey	G	M=4%, S=96% (SP) D50=190 μm
	END OF HOLE		

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

SFC. ELEVATION (m) -15.2	DATE DRILLED 26/09/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	BH# 80-94
DRILLING RIG FA 1500	LOCATION Isserk #11	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - trace clay, trace silt, medium grained, trace coarse grained, compact, moist, light brown	G	UNFROZEN
	- clayey silt lenses to 5mm, subhorizontal	G	
1	- very dense to dense, dark brownish grey, trace gravel		
	- medium grained, homogeneous, moist, dense, medium brown	G	M=3%, S=93% G=4%, (SP) D50=195 μm
2	- trace of shell fragments, moist, wet	G	
	- trace coarse grained sand, trace gravel pebbles to 35mm (smoothed and sub-rounded)	G	M=7%, S=93% (SP-SM) D50=200 μm
3	clay lenses to 5mm horizontal, moist, compact, dark brownish grey	G	
	- trace silt, trace subangular gravel to 30mm, medium to fine grained, homogeneous, no lenses of clay, damp, dense, dark greenish grey	G	
4		G	M=9%, S=91% (SP-SM) D50=160 μm
	- trace shell fragments, dark olive grey (5Y 3/2)	G	
5		G	
	CLAY - silty, trace fine grained sand, gravel, shell fragments, organic pockets to 40mm, very stiff, laminated, very dark grey, low plastic	G	p.p.=2.4 tsf t.b.=1.1 tsf
6		G	
	SAND (SM) - silty, trace clay and shell fragments, fine grained, uniform, laminated, dense, very dark grey	G	
7	some clay		

BLOW COUNT/0.3 m ■ 10 20 30 40 50

MOISTURE CONTENT 10 20 30 40 50

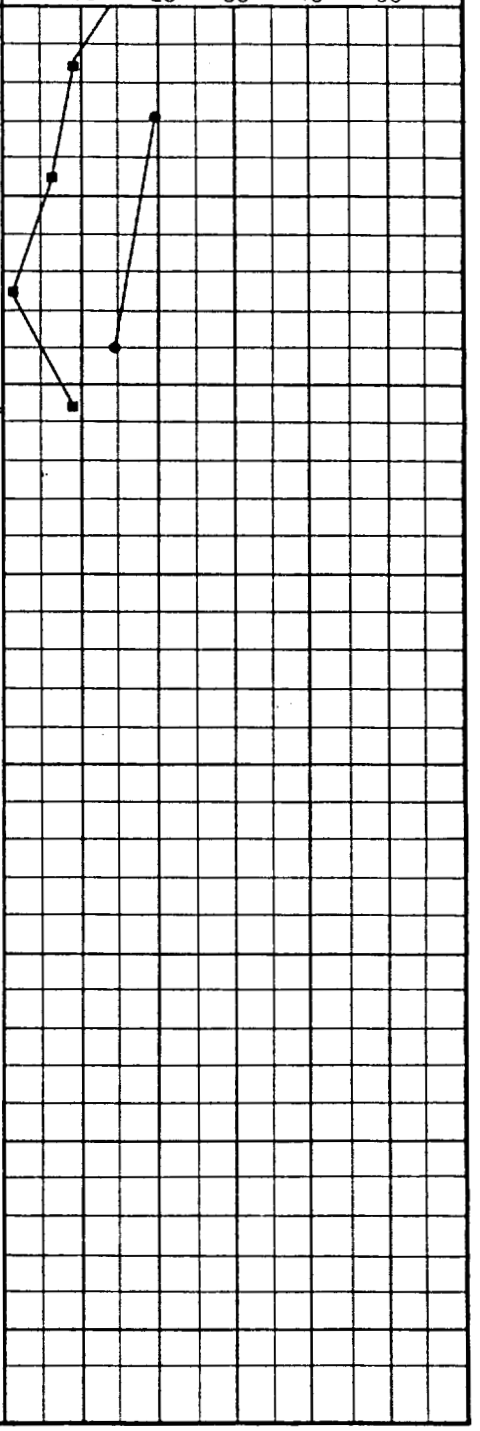
SFC. ELEVATION (m) -12.2	DATE DRILLED 06/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH# 80-95
DRILLING RIG FA 1500	LOCATION Isserk #12	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SM) - silty, some clay, trace gravel, sub-angular & smooth, clay lenses to 5mm, fine grained, compact, moist to wet, dark grey	G	UNFROZEN
		G	M=31%, S=69% (SM)
	- trace of mica	G	
9	- trace silt, some clay, homogeneous, compact, moist, dark grey (5Y 3/1)	G	
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ●
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -12.2	DATE DRILLED 06/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY GL
DRILLING RIG FA 1500	LOCATION Isserk #12

BOREHOLE No. BH#80-95

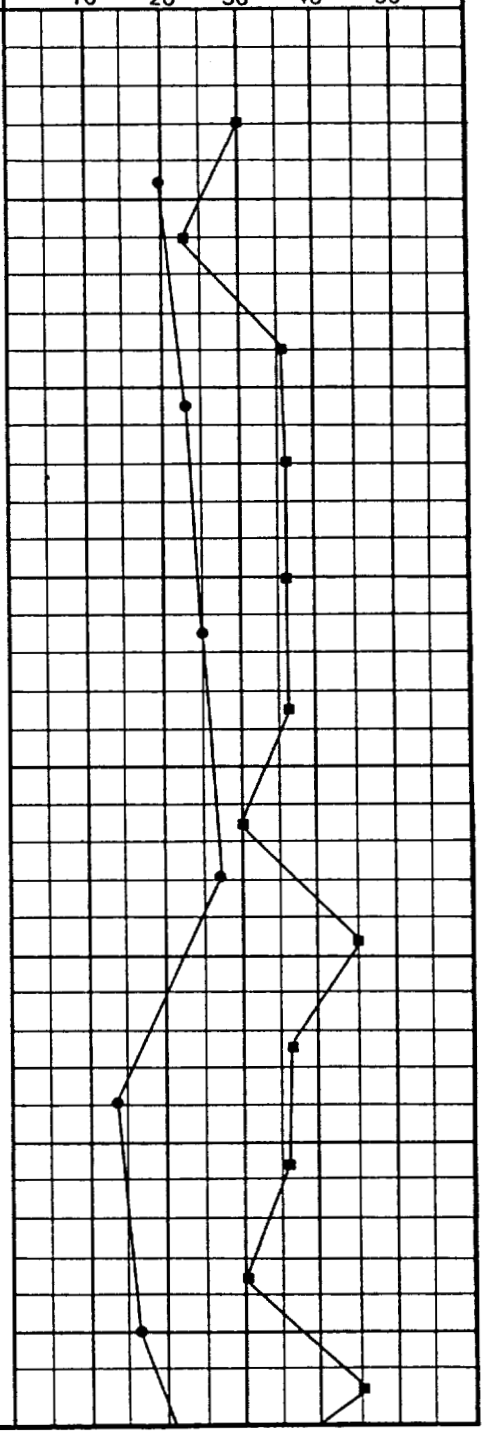
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction a

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
0	SAND (SP-SM) - trace silt, fine grained, uniform, saturated, greyish brown	G	UNFROZEN
	- trace coarse grained and medium grained, trace shell fragments	G	M=2%, S=94% (SP) G=4% D50=210 μm
1	- trace coarse grained to 5mm, angular, smooth, wet	G	
	- trace silt, fine grained, uniform, compact, moist to wet, greyish brown	G	
2	- dense	G	
		G	
3		G	M=6%, S=94% (SP-SM) D50=180 μm
	- trace shell fragments, dense, moist to wet	G	
4		G	
	- trace silt, with inter-bedded silty clay and organic streaks, moist, dark grey	G	
5	SAND and CLAY interbedded, moist to wet	G	
	SAND (SM) -some silt to silty, fine grained, homo-geneous, uniform, dense, moist to wet, dark grey	G	
6	- silty	G	
		G	
7			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50



eba

SFC. ELEVATION (m) -11.9	DATE DRILLED 07/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #13

BOREHOLE No.
BH# 80-96
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SM) - silty, fine grained, uniform, saturated, dense, dark grey	G	UNFROZEN M=21%, S=79% (SM) D50=160 μm
	- trace to some silt, fine grained, uniform, wet, dark grey	G	
9		G	
	END OF HOLE		

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

10 11 12 13 14

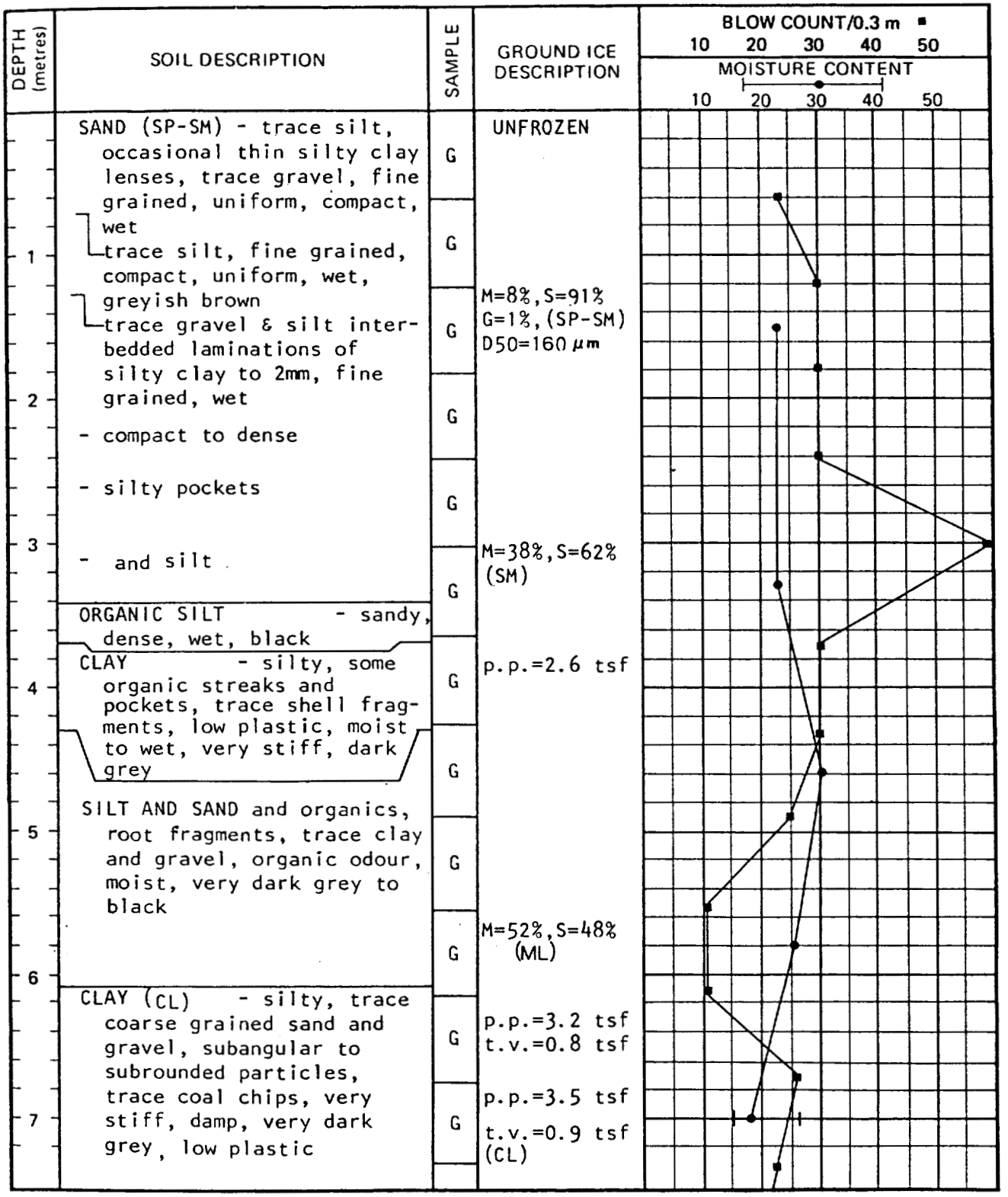
eba

SFC. ELEVATION (m) -11.9	DATE DRILLED 07/10/80
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
DRILLING RIG FA 1500	LOCATION Isserk #13

BOREHOLE No.
BH# 80-96
PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST



eba	SFC. ELEVATION (m) -12.5	DATE DRILLED 07/10/80
	COMPLETION DEPTH (m) 9.1	LOGGED BY MAV
	DRILLING RIG FA 1500	LOCATION Isserk #14

BOREHOLE No. BH#80-97

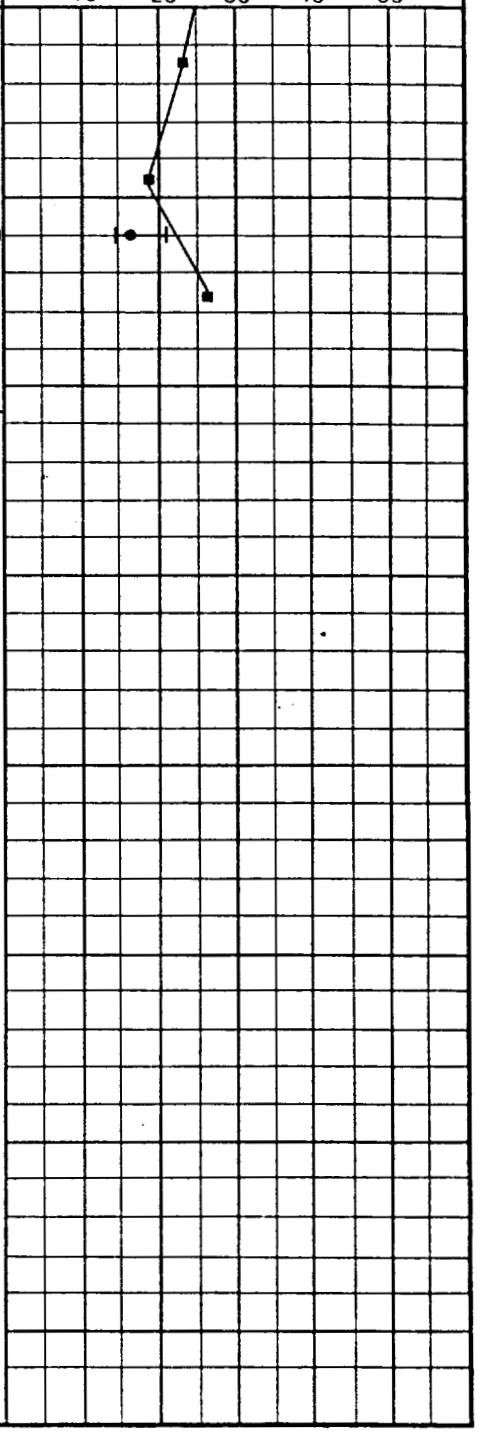
PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	CLAY (CL-ML) - silty, trace fine grained sand, trace coal fragments, uniform, very dark grey, low plastic	G	FROZEN
		G	trace of bonded clay Nbn (CL-ML)
	- trace of gravel, smooth, subrounded, maximum 30mm ø	G	Vs 10% lenses to 4mm
9	- faintly laminated, uniform, black	G	Vs 10% Vs+Vx 10% Nbn
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m ■
10 20 30 40 50
MOISTURE CONTENT
10 20 30 40 50

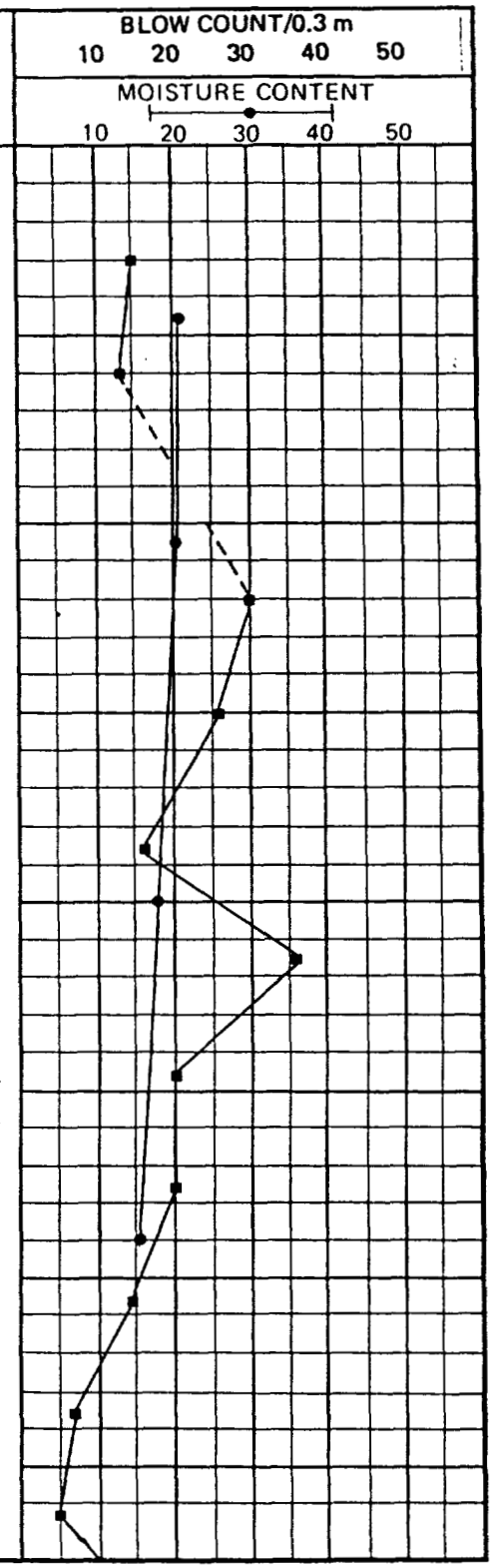


SFC. ELEVATION (m) -12.5	DATE DRILLED 07/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY MAV	BH# 80-97
DRILLING RIG FA 1500	LOCATION Isserk #14	PAGE 2 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG -- PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
1	SAND (SP) - trace clay lenses (subhorizontal and undulating), trace rounded and smooth gravel, trace shell fragments, medium to fine grained, compact, damp to moist, light brownish grey - flat polished pebble to 15mm	G	UNFROZEN
		G	M=3%, S=97% (SP) D50= 210 μm
2		G	
	- trace mica, homogeneous, dense - medium grained, compact, moist to dense	G	
3	- medium, predominantly fine grained with silty clay lenses to 30mm (laminated) - some silt, homogeneous, damp, medium, greyish brown	G	
4	- trace to some silt, fine grained, dense, wet - trace shell fragments and trace clay	G	M=14%, S=86% (SM) D50=160 μm
		G	
5	CLAY -some silt, trace fine grained sand and shell fragments, laminated, moist, stiff	G	p.p.=1.8 tsf t.v.=0.8 tsf
	CLAY and SAND trace silt, shell fragments and wood (carbonized), interbedded, wet sand and damp clay, dark grey	G	C&M=33% S=67%, (SM)
6	homogeneous, moist to wet	G	
7	SAND - clayey, trace silt, trace shell fragments, homogeneous, compact, dark grey	G	



eba

SFC. ELEVATION (m) -12.2	DATE DRILLED 07/10/80	BOREHOLE No.
COMPLETION DEPTH (m) 9.1	LOGGED BY GL	BH# 80-98
DRILLING RIG FA 1500	LOCATION Isserk #15	PAGE 1 OF 2

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the boreholes. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and that may vary with time, geologic conditions, and construction activity.

BOREHOLE LOG – PERMAFROST

DEPTH (metres)	SOIL DESCRIPTION	SAMPLE	GROUND ICE DESCRIPTION
8	SAND (SM) - some silt, trace clay, fine grained, uniform, compact, saturated, dark brownish grey	G	UNFROZEN
		G	C&M=18% S=82%, (SM) D50=180 μm
	- no clay	G	
9	- saturated	G	
	END OF HOLE		
10			
11			
12			
13			
14			

BLOW COUNT/0.3 m
10 20 30 40 50

MOISTURE CONTENT
10 20 30 40 50

eba	SFC. ELEVATION (m) -12.2	DATE DRILLED 07/10/80	BOREHOLE No. BH# 80-98
	COMPLETION DEPTH (m) 9.1	LOGGED BY GL	
	DRILLING RIG FA 1500	LOCATION Isserk #15	PAGE 2 OF 2

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LOCATION: KOAKOAK I - 4
UTM COORDINATES: 7 809 930 m N 537 232 m E WATER DEPTH: 52.7 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE T
	1	CLAY (CH) - silty with black organic laminations, very soft, high plasticity, dark grey (10YR 4/1)	NOT FROZEN -1.3
	2		-1.4
	3	- finely laminated with black organics	-1.2
	4	- organic rich layer 50 mm thick	-0.8
		3.7 (-56.4 El.)	
	5	SAND (SM) - some silt, trace of shell fragments, fine grained, uniform, loose (estimated), brownish grey (10YR 6/2)	-1.4
	6	- dense at 4 m and harder drilling noted	-0.5
	7	- silty CLAY and organic laminations	-0.5
	8	- organic layer 10 mm thick, and SILT	0.1
	9	- interbedded with silty CLAY and organics	-0.4
	10	- interbedded with silty CLAY and organics	-0.3
		9.1 (-61.8 El.)	
	11	CLAY (CL) - silty, trace of shell fragments, laminated, soft to firm (10YR 4/1)	-0.6
	12	- SAND layer, some SILT, fine grained uniform	-0.9
		11.2 (-63.9 El.)	-0.4
	13	SAND (SM) - silty, laminated, fine grained, uniform, dense (estimated), brownish grey (10YR 6/2)	0.4
	14	- silty laminations	0.4
	15		0.6
	16	- and SILT	0.4
	17		-1.1
	18		
	19	- silty	-1.2
	20		
	21	- 1 mm thick, organic laminations at a 10 mm interval	-1.2
	22		
	23	- finely laminated	-0.7
	24		
	25	- SAND becoming coarser grained, trace of SILT	-1.1
		29.6 (-82.3 El.)	
		END OF BOREHOLE	

BULK DENSITY (Mg m⁻³) 1.4 1.6 1.8 2.0
PLASTIC LIMIT | WATER CONTENT (%) | LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS

G,S S = 32 ppt

G,S S = 39 ppt

G,S S = 23 ppt

DEPTH BELOW SEABED (metres)
0 5 10 15 20 25 30 35 40 45 50

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/09/06
BOREHOLE DEPTH: 29.6 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

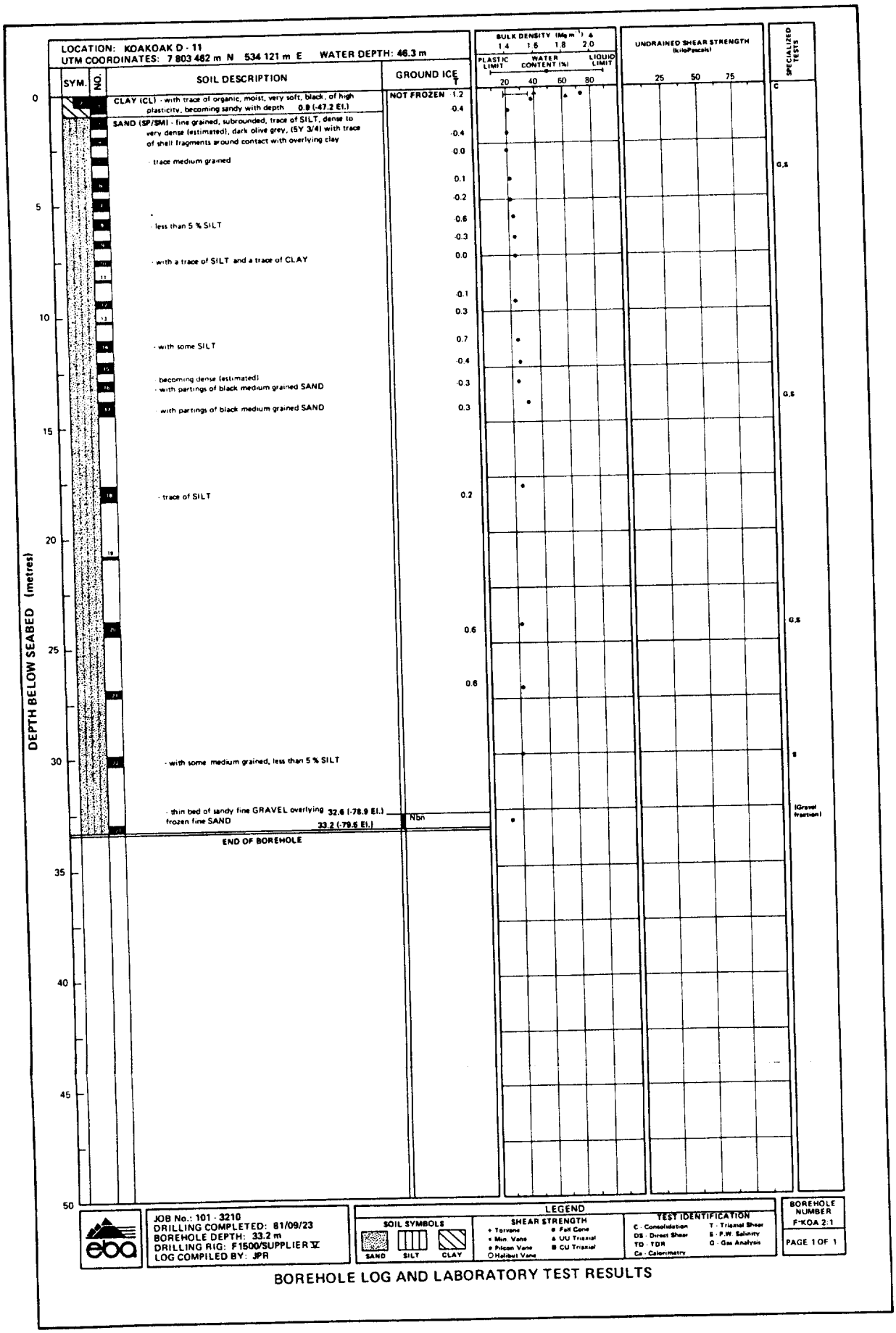
SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Pilcon Vane
○ Halibert Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-KOA 1:1

PAGE 1 OF 2

BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK D - 11
UTM COORDINATES: 7 803 981 m N 564 612 m E WATER DEPTH: 45.1 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
		CLAY and SILT (CL) - organic with thin beds of SAND, silty, fine grained, very soft, of high plasticity, dark grey (2.5NY 4/6)	NOT FROZEN	
		- becoming SAND with CLAY and SILT beds with depth 2.0 (-47.1 El.)		-1.1
		SAND (SM) - fine grained with some SILT, in parts "silty" subangular to subrounded, with thin beds of fine grained SAND with a trace of SILT, often very dense, (estimated), dark olive grey (5Y 4/3)		-0.5
		- with trace of broken shell fragments		-0.6
				-0.5
				-0.9
		6.2 (-51.3 El.)		-0.6
		SILT (ML) - fine grained, sandy, firm, dark olive grey (5Y 4/3) 7.0 (-52.1 El.)		-0.1
		SAND (SM/SP) - fine grained, with some SILT, subrounded, dense to very dense (estimated), dark olive grey (5Y 4/3)		0.0
		- even, thin parallel laminations of black fine grained SAND, possibly organic		0.4
		- becoming SAND (SP), fine grained with trace of SILT, dense (estimated)		0.4
				0.5
		- with several parallel thin laminations of lithified wood fragments		0.5
				-0.7
				-0.6
				-1.3
				-0.6
				-0.3
				-0.5
				-0.6
				-0.3
		30.2 (-75.3 El.)		-1.0
		END OF BOREHOLE		

DEPTH BELOW SEABED (metres)

BULK DENSITY (Mg m⁻³) 1.4 1.6 1.8 2.0
PLASTIC LIMIT WATER CONTENT (%) LIQUID LIMIT 20 40 60 80
UNDRAINED SHEAR STRENGTH (kiloPascals) 25 50 75
SPECIALIZED TESTS

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/10/17
BOREHOLE DEPTH: 30.2 m
DRILLING RIG: F1500/SUPPLIER
LOG COMPILED BY: JPR

LEGEND
SOIL SYMBOLS: SAND, SILT, CLAY
SHEAR STRENGTH: + Torvane, × Min. Vane, ⊕ Pilcon Vane, ○ Halibut Vane, ◆ Fall Cone, ▲ UU Triaxial, ■ CU Triaxial
TEST IDENTIFICATION: C - Consolidation, DS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F-KOA 2:2
PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK D - 11
UTM COORDINATES: 7 804 453 m N 533 998 m E WATER DEPTH: 46.3 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
		CLAY (CL) - trace of silt, very soft to soft, highly plastic, dark grey (5Y 4/1)	-1.4
		- becoming interbedded with thin bands of SAND fine grained 1.5 (-47.8 El.)	-0.8
		SAND (SM/SC) - fine grained and SILT with occasional bands of organic SILT, subangular becoming subrounded, dense to very dense, (estimated), dark olive grey (5Y 4/3)	-0.8
		- with thin bands (< 20 mm) of CLAY, dark grey (5Y 4/1)	-0.1
			0.0
			0.0
		- with organic rich layer	-0.2
			-0.1
			-0.2
		- becoming less dense (estimated)	-1.0
			-0.1
			-0.3
		- with thin bands of medium to fine grained SAND	-0.2
			-0.2
			-0.4
			-0.6
		- becoming SAND (SP), fine grained, trace medium, clean and dense (estimated)	-0.5
			-0.9
			-0.6
		- with thin band of SILT, clayey, firm, dark grey	-0.6
		29.1 (-75.4 El.)	NSH well bonded
		END OF BOREHOLE	

DEPTH BELOW SEABED (metres)

BULK DENSITY (Mg m⁻³) 1.4 1.6 1.8 2.0
PLASTIC LIMIT WATER CONTENT (%) LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
G,S
G,S
S

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/10/10
BOREHOLE DEPTH: 29.1 m
DRILLING RIG: F1500/SUPPLIER V
LOG COMPILED BY: JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
⊕ Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F - KOA 2:3

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK D - 11
UTM COORDINATES: 7 803 992 m N 533 618 m E WATER DEPTH: 46.1 m

SYM	NO	SOIL DESCRIPTION	GROUND ICE
	1	CLAY and SILT (CH) - with thin laminae of black SAND throughout, very soft, of high plasticity, dark grey	NOT FROZEN
		0.5 (-46.6 El.)	
	2	SAND (SM/SP) - fine grained with trace of SILT, subrounded with thin beds of fine grained SAND with some SILT, dense to very dense (estimated), dark olive grey (5Y 3/4)	-0.6
	3		-0.8
	4		-0.4
	5		-0.8
	6		-0.6
	7	- even, thin, parallel laminations of black, fine grained SAND	0.7
	8		-0.6
	9	- becoming SAND, fine grained with trace of SILT, dense (estimated)	-1.0
	10	- even, thin, parallel laminations of black, fine grained SAND	0.3
	11	- nodule (≥ 20 mm diameter) of CLAY, dark grey	-0.7
	12	- even, thin parallel laminations of black, fine grained SAND (SP)	
	13		0.7
	14		-0.7
	15	- trace of lithified wood fragments and organic mud	-1.0
	16		-1.1
	17		
	18	- becoming SAND (SP), fine grained, clean, subrounded, brown	-0.3
	19		
	20		-0.6
	21		-0.5
	22	- layer of CLAY, very stiff, of high plasticity, dark grey (2.5NY 4/6) between 29.7 and 29.8 m depth 29.9 (-76.0 El.)	-1.1
		END OF BOREHOLE	

BULK DENSITY (Mg m⁻³) Δ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
G,S
G,S
G,S

DEPTH BELOW SEABED (metres)
0 10 20 30 40 50

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/10/17
BOREHOLE DEPTH: 29.9 m
DRILLING RIG: F1500/SUPPLIER V
LOG COMPILED BY: JPR/MAL

LEGEND
SOIL SYMBOLS: SAND, SILT, CLAY
SHEAR STRENGTH: + Torvane, × Min. Vane, ○ Pilcon Vane, ○ Halibut Vane, ⊕ Fall Cone, △ UU Triaxial, ■ CU Triaxial
TEST IDENTIFICATION: C - Consolidation, OS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analyses

BOREHOLE NUMBER F'KOA 2:4
PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK D - 11
UTM COORDINATES: 7 803 475 m N 533 517 m E WATER DEPTH: 45.0 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE T
	1	CLAY and SILT (CL) - fine grained, sandy, trace of organic with thin parallel black organic laminations, very soft, of high plasticity, dark gray (2.5NY 4/6), trace of shell fragments at base	NOT FROZEN -1.1
		1.1 (-46.1 El.)	
	3	SAND (SM) - fine grained with a trace of SILT, becoming with some SILT, subrounded, dark olive grey (5Y 4/3)	-0.4
		3.4 (-48.4 El.)	0.0
	5	SILT AND SAND (SM/ML) - fine grained with thin laminations of SILT material, firm, dark olive grey (5Y 4/3)	0.0
	6	- becoming less silty towards base	-0.8
		5.2 (-50.2 El.)	
	7	SAND (SM) - fine grained with some SILT, with thin parallel laminations of SILT, dense to very dense (estimated), dark olive grey (5Y 4/3)	-0.4
	8		-1.2
	9	- becoming SAND (SP), fine grained with trace of SILT, dense estimated.	-0.4
	10		-0.4
	11	- 2 mm lamination of lithified wood fragments	-0.2
	12		-0.6
	13	- with thin even parallel laminations of black lithified wood fragments	-0.8
		17.1 (-62.0 El.)	-0.5
	14	END OF BOREHOLE	

DEPTH BELOW SEABED (metres)

BULK DENSITY (Mg m⁻³) △ 1.4 1.6 1.8 2.0
PLASTIC LIMIT | WATER CONTENT (%) | LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
G,S
G,S

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/10/18
BOREHOLE DEPTH: 17.1 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: MAL/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
⊕ Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Co - Colorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F - KOA 2:5

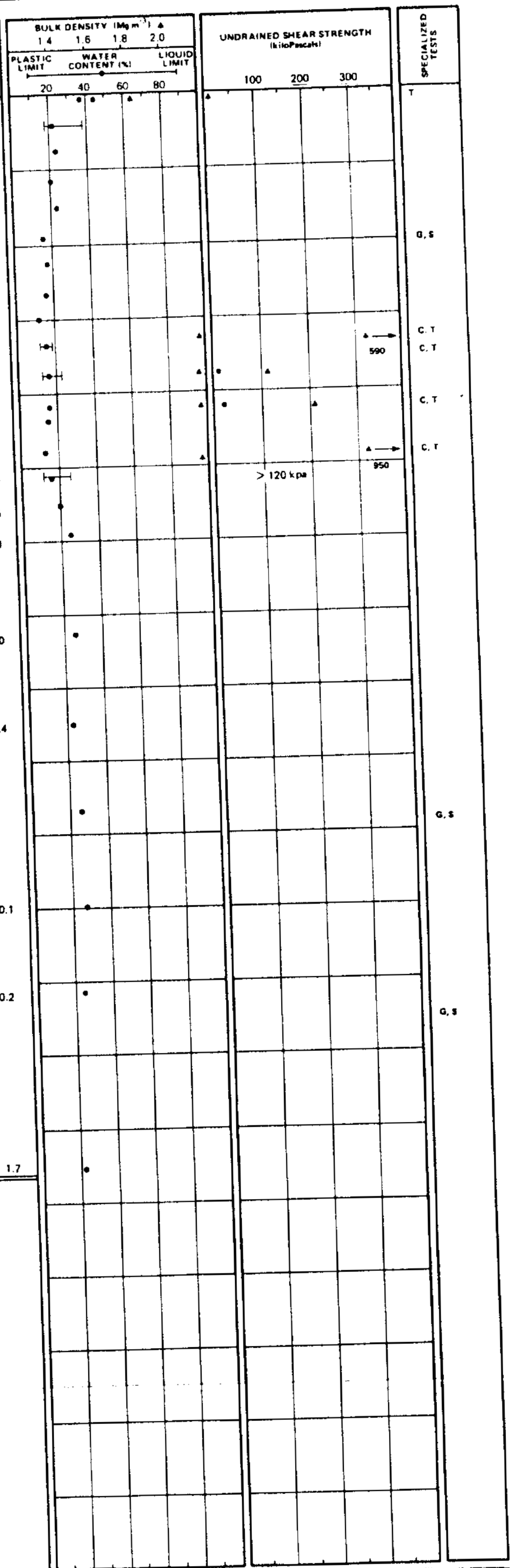
PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK
UTM COORDINATES: 7 804 385 m N 584 563 m E WATER DEPTH: 45.7 m

DEPTH BELOW SEABED (metres)

SOIL DESCRIPTION	GROUND ICE
CLAY (CL) - trace of organic, very soft, of high plasticity, dark olive grey (5Y 2.5/2), with thin laminae of: SILT, fine, sandy, black 1.4 (-47.1 El.)	NOT FROZEN 1.2
SAND (SM/SC) - fine grained with some SILT, subangular to subrounded, dense to very dense (estimated) dark olive grey (5Y 4/3) - with trace of SILT - SILTY, dense to very dense (estimated) - becoming SILT and fine grained SAND - with trace of CLAY 8.9 (-54.6 El.)	1.1 1.2 1.3 1.8 2.6 2.7 2.1 2.2
SILT - trace of clay, with laminae of: **CLAY (CL)** - silty with trace of fine grained SAND, stiff, of low plasticity, black (5Y 2.5/1) - becoming sandy 11.0 (-56.7 El.)	1.8 0.9
Interbedded: **SAND (ML)** - fine grained, some SILT/with trace of SILT, subrounded, dense to very dense, (estimated), dark olive grey (5Y 4/3) and: **SILT** - with a trace of fine SAND and a trace of CLAY, very stiff, of high plasticity, black (5Y 2.5/1) 13.2 (-58.9 El.)	0.2
SAND (SP - SM) - fine grained with some SILT, subrounded, dense to very dense (estimated) becoming dense with depth, dark olive grey (5Y 4/3) - trace of medium grained - trace of SILT in lower part of sample - fine grained, trace of medium grained, trace of SILT (SP) - fine grained, trace of SILT and trace of medium grained SAND - fine to medium grained 36.5 (-82.2 El.)	0.5 0.0 0.0 0.4 -0.1 0.2 1.7
END OF BOREHOLE	



JOB No.: 101 - 3210
DRILLING COMPLETED: 81/09/24
BOREHOLE DEPTH: 36.5 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane; × Min. Vane; • Pilcon Vane; ○ Halibut Vane; ● Fall Cone; ▲ UU Triaxial; ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation; DS - Direct Shear; TD - TDR; Ca - Calorimetry; T - Triaxial Shear; S - P.W. Salinity; G - Gas Analysis

BOREHOLE NUMBER F KOA 3:1

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: KOAKOAK
UTM COORDINATES: 7 805 284 m N 534 994 m E WATER DEPTH: 46.7 m

USC	NO.	SOIL DESCRIPTION	GROUND ICE T
		CLAY (CL) - with sand pockets and sand laminations, very soft, low plastic, dark grey (5Y 2.5/3)	NOT FROZEN 1.5
		1.5 (-48.2 El.)	-1.2
		SAND (SM) - fine grained with trace of SILT, subangular , uniform dark olive grey (5Y 4/3) with laminations of: SILT, black (5Y 2.5/1)	0.8
		- trace of SILT and CLAY	0.1
		- silty, trace of clay	0.2
			0.2
		- with thin laminae of: dense to very dense (estimated) SILT black (5Y 2.5/1)	0.7
		- becoming dense (estimated)	0.0
			0.7
		- trace to some SILT	0.4
			0.5
		- trace of peat matter	0.0
			-0.8
			-0.4
			-0.1
		(SP) - trace of silt	0.1
		- with some medium grained	0.2
			0.0
			0.1
		- with trace of medium grained	0.1
		- fine grained, no medium grained	0.1
		30.2 (-76.9 El.)	Nbn to Vx trace
		END OF BOREHOLE	

BULK DENSITY ($Mg\,m^{-3}$) △ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS

DEPTH BELOW SEABED (metres)
0 5 10 15 20 25 30 35 40 45 50

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/09/25
BOREHOLE DEPTH: 30.2 m
DRILLING RIG: F1500 SUPPLIER V
LOG COMPILED BY: JPR

LEGEND
SOIL SYMBOLS: SAND, SILT, CLAY
SHEAR STRENGTH: + Torvane, × Mini Vane, ⊕ Pilcon Vane, ○ Halibut Vane, ⊕ Fall Cone, △ UU Triaxial, ■ CU Triaxial
TEST IDENTIFICATION: C - Consolidation, DS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F KOA 4:1
PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E-1 SUMMARY OF CONSOLIDATION TEST RESULTS, KOAKOAK

Borehole Number	Sample Number	Depth Interval (m)	USC	Effective Overburden Pressure (kPa)	Estimated Preconsolidation Pressure (kPa)	Over-consolidation Ratio	Compresssion Index
F-KOA2:2	1:3	0.1-0.2	CL	<5	30	6	0.58
F-KOA2:1	2B	0.12-0.25	ML	--	--	--	0.37
F-KOA3:1	10B	8.43-8.61	ML	90	70-80	.8-.9	0.02-0.03
F-KOA3:1	11B	9.27-9.48	SP	100	100-145	1.0-1.5	0.04-0.05
F-KOA3:1	12C	10.36-10.56	ML	105	130	1.2	0.03-0.04
F-KOA3:1	14B	12.05-12.21	SP	135	300	2.2	0.03-0.04

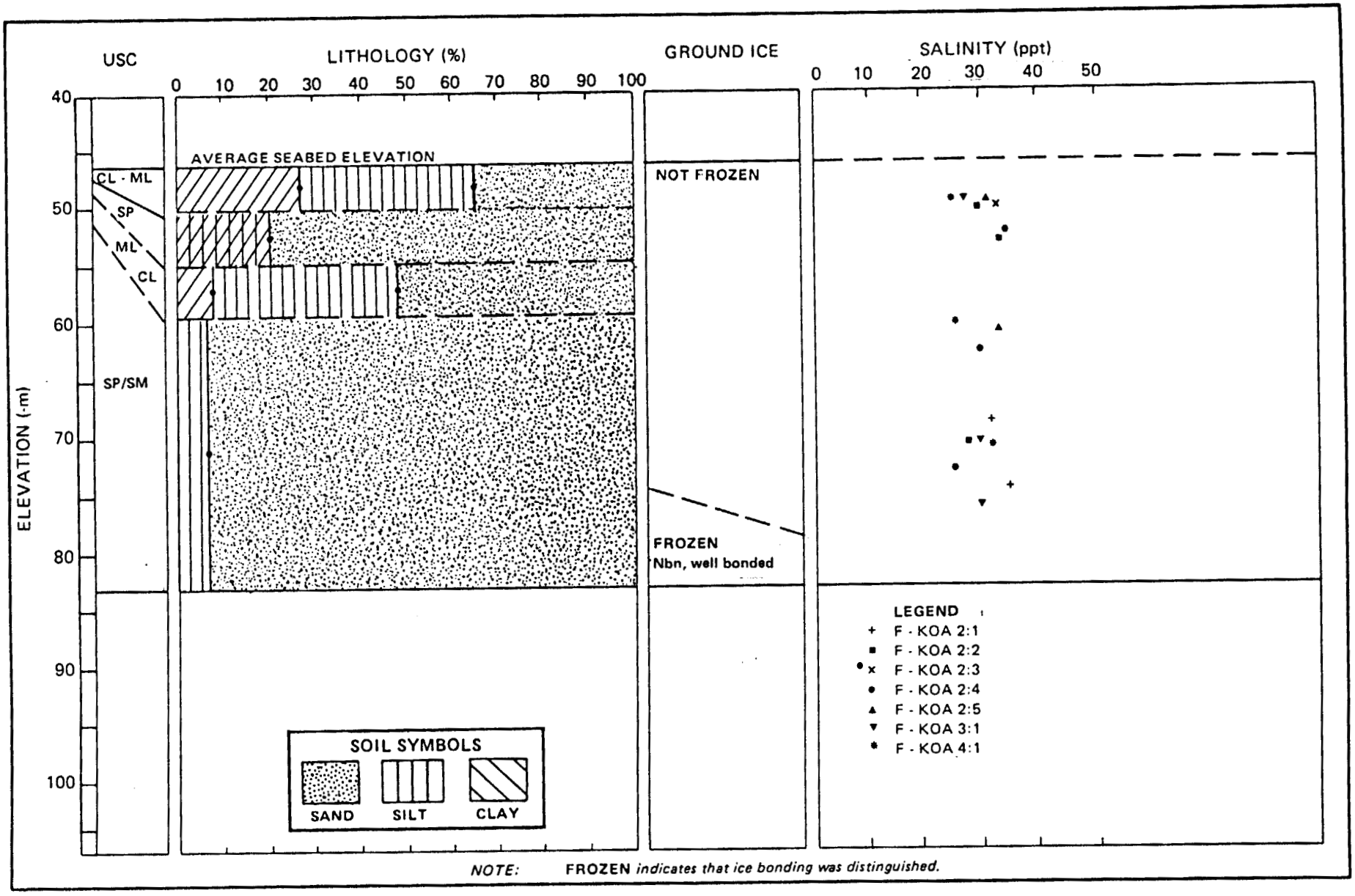
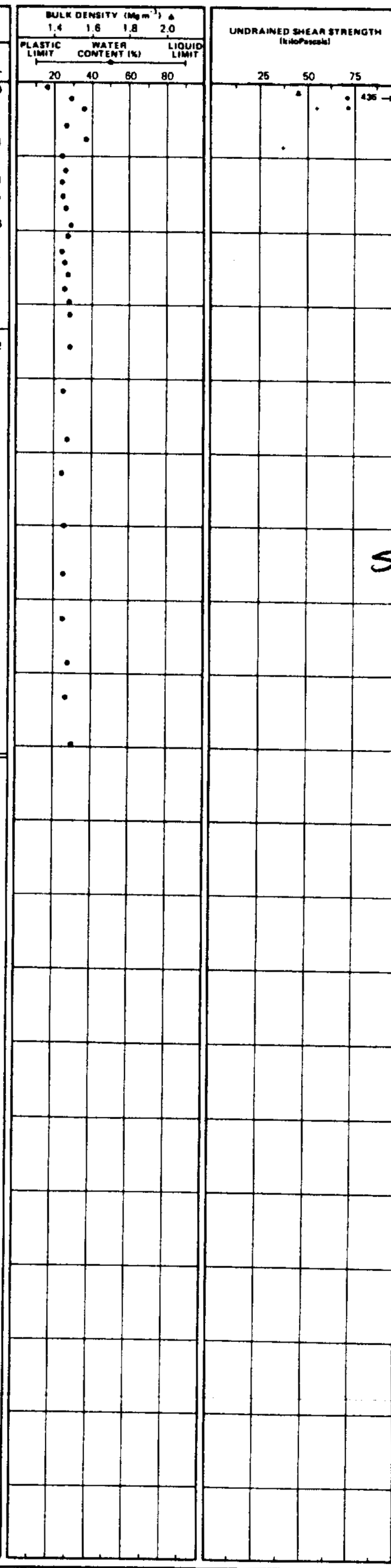


FIGURE B.3 SALINITY PROFILE, KOAKOAK D-11 AREA

LOCATION: IRKALUK B - 35
UTM COORDINATES: 7 828 103 m N 530 123 m E WATER DEPTH: 58.2 m

DEPTH BELOW SEABED (metres)	SOIL DESCRIPTION	GROUND ICE	SPECIALIZED TESTS
0	CLAY (CL/SP) - stiff, low plasticity, dark grey (2.5YN 4/0) interbedded with: SAND, fine-grained, with a trace of SILT subrounded, dark olive grey 1.5 (-59.7 El.)	NOT FROZEN −0.9	T, T C
	CLAY (CL) - massive, firm-stiff, of low plasticity, dark grey (2.5YN 4/0) 3.0 (-61.2 El.)	−0.8	
	CLAY (CL/SP) - interbedded (as above), SAND is (5Y 4/3) 4.6 (-62.8 El.)		
	SAND (SP) - fine-grained with a trace of SILT and laminations of black, fine-grained silty SAND, subrounded, dark olive grey (5Y 4/3)	−0.3 −0.5	S, G
10	- trace of lithified wood fragments of medium sand size - trace of medium-grained SAND - becoming slightly finer with no trace of medium	−0.6 −0.4 −0.7	
	16.5 (-74.7 El.)	−0.8	S, G, TD Ca
20	- trace of lithified wood fragments of fine sand size	FROZEN 1.2 Nbn to Vx trace −0.7	TD
	- becoming significantly banded, thin, parallel, even light brown/dark olive grey with no change in grading	−1.0 −1.4	TD TD
	28.3 (-86.5 El.)		
30	SAND (SP) - fine-grained with a trace of SILT and occasional parallel laminations of black, silty, fine-grained SAND, subrounded to rounded, light brown (10YR 6/3)	Nbn to Vx trace −1.3 −1.4 −1.1	Ca TD S, G, TD Ca TD, Ca
40	40.8 (-99.0 El.)	−1.1	G, S
	SAND (SP) - fine-grained with a trace of SILT and faint parallel thin laminae throughout, dark olive grey (5Y 4/3) 45.8 (-104.0 El.)	Nbn to Vx trace −1.4 −1.1	G, S, TD
	END OF BOREHOLE		

Handwritten notes beside the SPECIALIZED TESTS column: S = 27 ppt (at S, G); S = 34 ppt (at S, G, TD, about 17 m); S = 15 ppt (about 32 m); S = 6 ppt (about 40 m); S = 7 ppt (at 45.8 m).



JOB No.: 101 - 3210
DRILLING COMPLETED: 81/10/14
BOREHOLE DEPTH: 45.8 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: JPR

LEGEND
SOIL SYMBOLS: SAND, SILT, CLAY
SHEAR STRENGTH: + Torvane; × Min. Vane; • Pilcon Vane; ○ Halibut Vane; ● Fall Cone; ▲ UU Triaxial; ■ CU Triaxial
TEST IDENTIFICATION: C - Consolidation; DS - Direct Shear; TD - TDR; Ca - Calorimetry; T - Triaxial Shear; S - P.W. Salinity; G - Gas Analysis

BOREHOLE NUMBER F-IRK 1:1

PAGE 1 OF 2

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E.1 CONSOLIDATION TEST RESULT, IRKALUK B-35

SAMPLE NUMBER	DEPTH	USC	MOISTURE CONTENT INITIAL	MOISTURE CONTENT FINAL	BULK DENSITY INITIAL	BULK DENSITY FINAL	EFFECTIVE OVERBURDEN PRESSURE	ESTIMATED PRECONSOLIDATION PRESSURE	C_c	NORMAL STRESS	e	C_v	m_v	k
	(metres)		(%)	(%)	(Mg/m^3)	(Mg/m^3)	(kPa)	(kPa)		(kPa)		(m^2/yr)	(1/MPa)	(m/s)
3A	1.83-1.95	CL	31	27	1.95	2.04	20	62-66	0.23-0.27	0	0.867			
										10	0.863	7.07E 01	2.19E-01	4.82E-09
										16	0.857	3.44E 01	5.26E-01	5.63E-09
										20	0.854	6.37E 01	4.94E-01	9.79E-09
										UNLOADED to 10 kPa with e = 0.864				
										20	0.861	8.93E 00	1.58E-01	4.39E-10
										30	0.859	1.53E 01	8.65E-02	4.12E-10
										45	0.854	6.12E 00	1.97E-01	3.74E-10
										70	0.842	1.90E 01	2.53E-01	1.50E-09
										100	0.827	4.34E 00	2.70E-01	3.64E-10
										225	0.779	1.05E 01	2.11E-01	6.87E-10
										500	0.717	3.04E 00	1.27E-01	1.20E-10
										1000	0.665	4.39E 00	6.00E-02	8.20E-11
										2000	0.588	2.38E 00	4.66E-02	3.44E-11
										3200	0.539	4.53E 00	2.57E-02	3.62E-11
										UNLOADED to 500 kPa with e = 0.560				
										UNLOADED to 45 kPa with e = 0.620				
										UNLOADED to 10 kPa with e = 0.649				
										UNLOADED to 0 kPa with e = 0.727				

LOCATION: MITERK I - 40
UTM COORDINATES: 7 839 381 m N 512 705 m E WATER DEPTH: 56.4 m

DEPTH BELOW SEABED (metres)	SOIL DESCRIPTION	GROUND ICE / T	SPECIALIZED TESTS	
0	CLAY (CL) - silty, some sand, laminated, very soft, low plasticity, dark grey (10YR 5/1) 1.4 (-57.8 El.)	NOT FROZEN -1.2	G, S C	S=35ppt
	CLAY (CL) - silty, trace of sand, laminated, soft 2.9 (-59.3 El.)		C, T	
	SAND (SM) - some silt to silty, trace of organics, laminated, fine grained, uniform, greyish brown (10YR 5/2)			
5	- clay layer	0.4		
	- some silty laminations			
10		0.2		
	- trace of silt, fine to medium grained, uniform, homogeneous			S=31ppt
15	- some silty laminations 5 - 15 mm thick			
		0.2		
20		-0.1		
	- frequent silty clay laminations (sampling system changed from shelby tube to thick wall tube)	0.0		
25	*- in situ temperature -1.3 °C* 26.5 (-82.9 El.)	0.4		
	(SW) - some fine gravel, trace of silt, well graded, subrounded 30.0 (-86.4 El.)	FROZEN - Vs trace with up to 3 mm		S=18ppt
30		NOT FROZEN		
35	*- in situ temperature -0.3 °C*	0.3		
		0.3		
40		0.5	G,S	S=31ppt
	- in situ temperature -0.6 °C 45.4 (-101.8 El.)	0.9		
45	- well bonded permafrost noted by driller at 45.4 m	FROZEN Nbe to Vs trace Well bonded -1.4		
50		-1.5		
	- organic laminations		G,S	S=11ppt
55	- some silt, greyish brown (10YR 6/2)	-1.4		
		Nf - Nbn		
	- some to silty, fine grained, uniform, clay laminations; dark grey (10YR 4/1)	-1.6		
60		Nbe trace 0.3		
65		0.3	G,S	S=31ppt
		Nf - Nbn -1.5		
70	*- in situ temperature -1.6 °C*			
	- trace of silt	-1.8	G,S	S=13ppt
	74.3 (-130.7 El.)	-1.2		
75	*END OF BOREHOLE (terminated due to ice floes)*			
80				
85				
90				
95				
100				

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0

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

UNDRAINED SHEAR STRENGTH (kiloPascals): 25 50 75

First 15 metres presented in more detail on Page 2.

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JOB No.: 101 - 3210
DRILLING COMPLETED: 81/09/09
BOREHOLE DEPTH: 74.3 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane; × Min. Vane; • Pilcon Vane; ○ Halibut Vane; ● Fall Cone; ▲ UU Triaxial; ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation; DS - Direct Shear; TD - TDR; Ca - Calorimetry; T - Triaxial Shear; S - P.W. Salinity; G - Gas Analysis

BOREHOLE NUMBER F-MIT 1:1

PAGE 1 OF 2

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: MITERK I - 40
UTM COORDINATES: 7 839 381 m N 512 705 m E WATER DEPTH: 56.4 m

DEPTH BELOW SEABED (metres)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY (CL) - silty, some sand, laminated, very soft low plasticity, dark grey (10YR 5/1)	NOT FROZEN
	2	- trace of organics and sand, soft - sand lenses 1.4 (-57.8 El.)	-1.2
		SAND (SM) - silty, fine grained, uniform, grey 1.6 (-58.0 El.)	-0.5
	3	CLAY (CL) - silty, trace of sand, laminated, soft low plasticity, dark grey (10YR 5/1) 2.9 (-59.3 El.)	-0.8
	4	SAND (SM) - some silt to silty, trace of organics, laminations of clay, fine grained, uniform, brownish grey (2.5YR 5/2)	0.1
	6	- trace of shell fragments	
	5	- CLAY layer, silty, stiff, low plasticity dark grey	0.4
	7	- no laminations	0.3
	8		0.4
	9	- some silty laminations	0.3
	10		0.1
	11		0.1
	12		0.2
	13	- trace of silt, fine to medium grained, uniform, homogeneous, brownish grey	0.2
	14		0.2
	15		0.3
	16		0.1
	17	- some silty laminations, 5 - 15 mm thick	0.2

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
G, S
C
C,T
G, S

JOB No.: 101 - 3210
DRILLING COMPLETED: 81/09/05
BOREHOLE DEPTH: 74.3 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-MIT 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E-1 CONSOLIDATION TEST RESULTS, MITERK I-40

SAMPLE NUMBER	DEPTH	USC	MOISTURE CONTENT		BULK DENSITY		EFFECTIVE OVERBURDEN PRESSURE	ESTIMATED PRECONSOLIDATION PRESSURE	c_c	NORMAL STRESS	e	c_v	m_v	k
			INITIAL	FINAL	INITIAL	FINAL								
	(metres)		(%)	(%)	(Mg/m^3)	(Mg/m^3)	(kPa)	(kPa)		(kPa)		(m^2/yr)	(1/MPa)	(m/s)
2B	1.07-1.22	CL	51	34	1.77	1.94	9	50	0.38	1	1.35			
										5	1.33	1.7E 00	2.3E 00	1.2E-09
										8	1.31	1.4E 00	2.7E 00	1.2E-09
										15	1.28	1.2E 00	1.9E 00	6.9E-10
										20	1.25	1.2E 00	2.3E 00	8.9E-10
										UNLOADED TO 8 kPa (e=1.25)				
										30	1.22	2.2E 00	1.0E 00	7.2E-10
										45	1.18	1.5E 00	1.4E 00	6.4E-10
										70	1.12	1.7E 00	1.1E 00	5.9E-10
										100	1.06	1.4E 00	9.2E-01	4.1E-10
										160	0.98	1.6E 00	6.5E-01	3.2E-10
										225	0.92	2.5E 00	4.3E-01	3.3E-10
										400	0.83	1.9E 00	2.8E-01	1.7E-10
										UNLOADED TO 5 kPa (e=0.91)				

TABLE E-2 CONSOLIDATION TEST RESULTS, MITERK I-40

SAMPLE NUMBER	DEPTH	USC	MOISTURE CONTENT		BULK DENSITY		EFFECTIVE OVERBURDEN PRESSURE	ESTIMATED PRECONSOLIDATION PRESSURE	C_c	NORMAL STRESS	e	C_v	m_v	k
			INITIAL	FINAL	INITIAL	FINAL								
	(metres)		(%)	(%)	(Mg/m^3)	(Mg/m^3)	(kPa)	(kPa)		(kPa)		(m^2/yr)	(1/MPa)	(m/s)
3B	1.98-2.13	CL	26	21	2.07	2.13	16	50	0.11	1	0.68			
										5	0.67	1.7E 01	6.8E-01	3.5E-09
										8	0.67	1.2E 01	6.8E-01	2.4E-09
										15	0.66	4.6E 00	6.9E-01	9.8E-10
										20	0.65	1.5E 01	8.6E-01	4.0E-09
										UNLOADED TO 8 kPa (e=0.65)				
										30	0.65	2.1E 01	3.9E-01	2.6E-09
										45	0.64	1.1E 01	2.6E-01	8.6E-10
										70	0.62	1.4E 01	5.4E-01	2.4E-09
										100	0.60	6.0E 00	3.1E-01	5.8E-10
										160	0.58	1.4E 01	2.4E-01	1.1E-09
										225	0.56	1.3E 01	1.4E-01	5.7E-10
										400	0.54	2.1E 01	1.1E-01	7.1E-10
										UNLOADED TO 5 kPa (e=0.56)				

LOCATION: UVILUK P-66
UTM COORDINATES: 7 797 311 m N 601 278 m E WATER DEPTH: 22.9 m (29.7 m)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
		SAND (SP) - fine grained with trace of fine gravel, subrounded, dark olive (5Y 3/2) MADE GROUND	NOT FROZEN
		(Level of original seabed) 6.8 (-29.7 El.)	
		Cyclic alternations of: SAND (SP) - fine grained with trace of medium and trace SILT, subrounded, dark olive grey (5Y 3/2); GRAVEL (GC) - fine grained, subangular to subrounded in matrix of CLAY, dark grey (5Y 4/2), organic, of high plasticity; SAND (SM/SP) - medium to fine, trace of coarse, subrounded, dark olive grey	+1.8
		11.8 (-34.7 El.)	
		SAND (SP) - fine grained with some SILT and a trace of medium, rounded to subrounded, medium dense to dense (estimated), olive (5Y 4/4)	+1.6
		- trace fine grained well rounded GRAVEL	
		- trace of SILT	+0.9
			+2.0
		- with some SILT	
		- becoming slightly coarser	
			+3.0
		41.5 (-64.4 El.)	
		- trace medium - becoming medium dense (estimated)	FROZEN Vx 10-15%, well bonded
		46.3 (-69.2 El.)	-0.6
		CLAY (CL) - slightly organic, with some SILT, with thinly spaced discontinuous curved nonparallel fissures, friable, dark grey (5Y 3/2) becoming progressively less fissured over 2 m, of low plasticity	Vs 5% with Vx 10% Nf -0.5
		- becoming silty CLAY, clayey SILT with thin beds of CLAY	-1.9 Nf - Nbn
		54.0 (-75.9 El.)	
		SILT (ML) - with some CLAY, slightly organic, with very thin, even nonparallel lamina, dark grey (5Y 3/1)	Nf
		57.0 (-79.9 El.)	-2.0
		CLAY (CL) - slightly organic, with some SILT, in places with thinly spaced discontinuous curved nonparallel fissures, friable, dark grey (5Y 3/2), low plasticity	Nbn
		- becoming progressively less fissured	-2.1 Vs trace oblique ice lens of 1-2 mm thickness Vr/ Vx trace
			-2.2 Nbn
			-2.2 Vx 10% vertical lenses of 1-2 mm thickness
			-2.3 ICE, cloudy, vertical lens 300mm x 30mm
			-2.4
		- becoming with occasional thin laminations of SILT	-2.4 Nf
		90.9 (-113.8 El.)	
		SILT AND SAND (ML-SP) - thinly laminated with black, trace organic CLAY, dark grey (5Y 4/2), becoming SAND (SP), trace of SILT dense (estimated) with depth	-1.6 Vx 10-15%, well bonded Nf Nbn Vx trace
		108.3 (-131.2 El.)	-0.8
		END OF BOREHOLE	

DEPTH BELOW SEABED (metres)

NOTE: SCALE CHANGE

BULK DENSITY (Mgm^{-3}) 1.4 1.6 1.8 2.0 ▲

PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT

20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)

100 200 300

First 15 metres see pages 2 and 3

NOTE: Shear strength measured on thawed soil.

SPECIALIZED TESTS

G,S
G,S
G,S
G,S
Ca
C, T
G,S
C, T
C
G,S,TD,Ca
TD, T
T
T
TD, C, T
TD
TD, T
TD
TD
T
TD
TD,Ca,T
TD,Ca
TD,Ca
TD, T
TD,Ca,T
C
No sample
No sample
G,S

JOB No.: 101-3210
DRILLING COMPLETED: 81/08/25
BOREHOLE DEPTH: 108.3 m
DRILLING RIG: F1500/SUPPLIER V
LOG COMPILED BY: JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane, ⊕ Fall Cone, × Mini. Vane, ▲ UU Triaxial, ⊛ Pilcon Vane, ■ CU Triaxial, ○ Halibut Vane

TEST IDENTIFICATION: C - Consolidation, T - Triaxial Shear, DS - Direct Shear, S - P.W. Salinity, TD - TDR, G - Gas Analyses, Ca - Calorimetry

BOREHOLE NUMBER F UV1 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE E-1 SUMMARY OF CONSOLIDATION TEST RESULTS, UVILUK P-66

TEST TYPE "CRS"

SAMPLE	DEPTH INTERVAL (m)	USC	EFFECTIVE OVERBURDEN PRESSURE (kPa) P_o	ESTIMATED PRECONSOLIDATION PRESSURE (kPa) P_c	OVERCONSOLIDATION RATIO	COMPRESSION INDEX C_c
38A*	50.00-50.18	ML	400	500-570	1.3-1.9	0.31-0.34
38B	50.18-50.28	ML	400	420-520	1.1-1.3	0.81
40B*	53.22-53.32	ML	425	550	1.3	0.20
41B	54.89-54.96	ML	430	580	1.3	0.26
49C	63.95-64.10	CL	525	650	1.2	0.21
58B*	80.51-80.71	CL	680	650-900	0.9-1.3	0.21-0.25
61C*	89.00-89.86	CL	760	980	1.3	0.21

NOTE: 1. Samples marked by asterisk were returned frozen from the field. These samples were thawed as a first stage in testing.

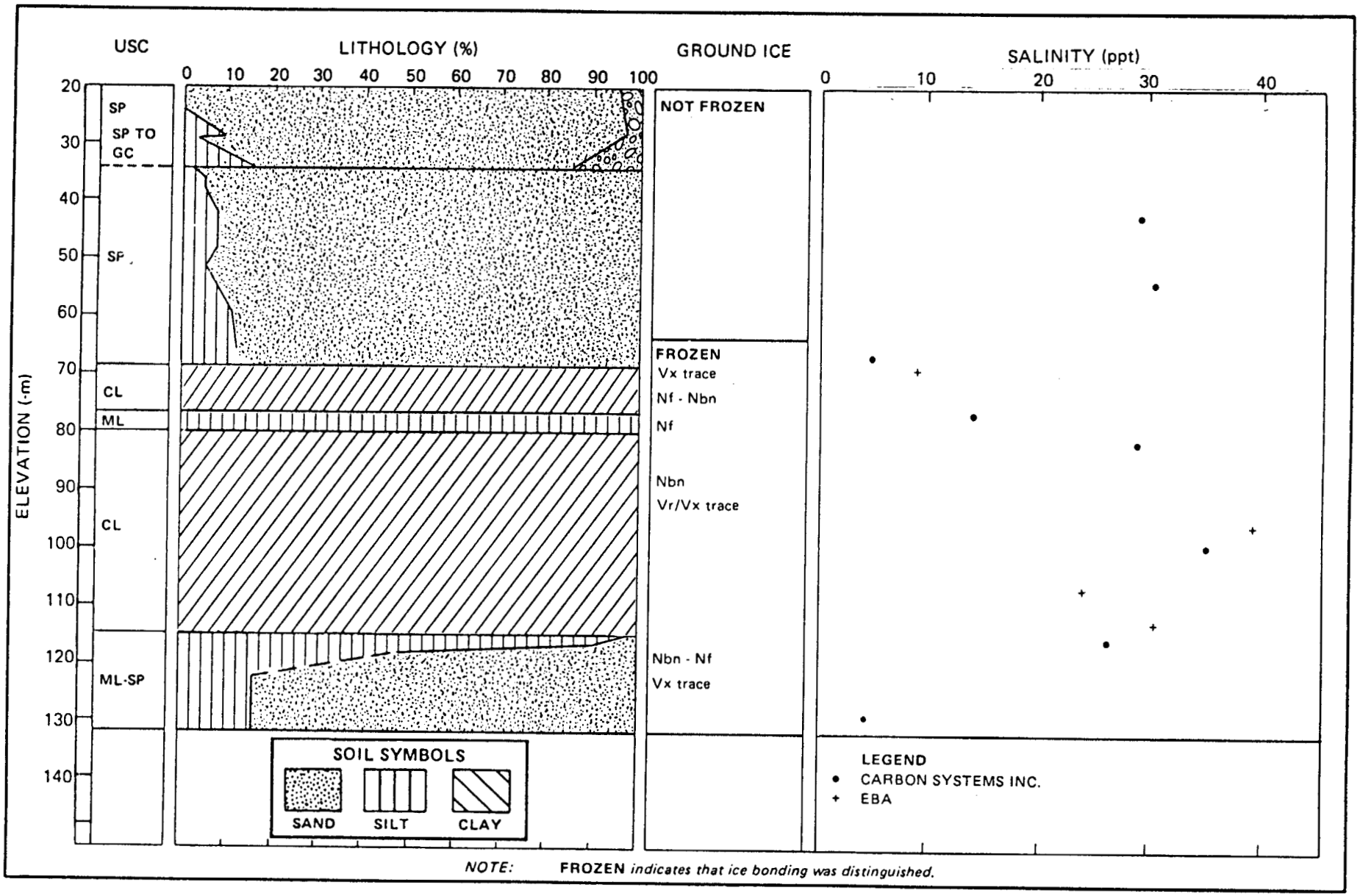


FIGURE B - 5 SALINITY PROFILE, UVILUK P - 66

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 753 478 m N 458 874 m E WATER DEPTH: 21.7 m

USC	NO.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY and SILT (CH) - trace of shell fragments, fine organic laminations, very soft, high plasticity, dark grey (10YR 4/1)	NOT FROZEN
	2	- soft	
	3		
	4	- soft to firm	
		0.7 (-22.4 m El.)	
		END OF BOREHOLE	
		NOTE: 127 mm ϕ push tube from mudline.	

DEPTH BELOW SEABED (metres)

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
10 20 30

SPECIALIZED TESTS

JOB No.: 101 - 3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.7 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:1

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 753 473 m N 458 838 m E WATER DEPTH: 21.3 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1–6	CLAY and SILT (CH) - traces of shell sand organics, laminated, very soft, low plasticity, dark grey (10YR 4/1)	
		0.66 (-22.0 m El.)	
		END OF BOREHOLE *NOTE: 127 mm ϕ push tube from mudline.*	

DEPTH BELOW SEABED (metres): 0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲: 1.4, 1.6, 1.8, 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT: 20, 40, 60, 80

UNDRAINED SHEAR STRENGTH (kiloPascals): 10, 20, 30

SPECIALIZED TESTS

c — P_o = 3.5 kPa, P_c = 54 kPa, C_c = 0.35
c — P_o = 4.4 kPa, P_c = 82 kPa, C_c = 0.33
c — P_o = 5.3 kPa, P_c = 103 kPa, C_c = 0.33

eba

JOB No.: 101 - 3210 / 101 - 3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.66 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
● Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Cc - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:2

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 754 562 m N 452 343 m E WATER DEPTH: 21.4 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY and SILT (CH) - trace of organics and shell fragments, very soft, high plasticity, very dark grey (10YR 3/1)	NOT FROZEN
	2		
	3		
	4	- very soft to soft	
		0.7 (-22.1 m El.)	
		END OF BOREHOLE	

NOTE: 127 mm ϕ push tube from mudline.

DEPTH BELOW SEABED (metres): 0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲: 1.4, 1.6, 1.8, 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT: 20, 40, 60, 80

UNDRAINED SHEAR STRENGTH (kiloPascals): 10, 20, 30

SPECIALIZED TESTS

C / P_o = 2.7 kPa, P_c = 19 kPa, C_c = 0.40

T, C / P_o = 4.5 kPa, P_c = 30 kPa, C_c = 0.33

T

eba

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.7 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane, × Min. Vane, ⊕ Pilcon Vane, ○ Halibut Vane, ● Fall Cone, ▲ UU Triaxial, ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation, OS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:3

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 775 811 m N 453 392 m E WATER DEPTH: 20.7 m

SYM.	SMPL	SOIL DESCRIPTION	GROUND ICE
	1	CLAY - silty, moist, soft, high plastic dark grey (10YR 4/1) top of the first two samples had a 10 mm to 30 mm layer of sand believed to be slough	NOT FROZEN
	2		
	3		
	4		
	5	- damp, firm	
	6		
	7	- fine organic lamination, occasional shell fragments, low plastic, damp, stiff, dark grey (10YR 4/1)	
	8		
		6.1 (-26.8 m El.)	
		END OF BOREHOLE	
		NOTE: 76 mm ϕ push tubes in borehole	

DEPTH BELOW SEABED (metres)

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
T T T T T

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 6.1 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
♦ Remoulded Sample
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER
F - TAR 1:5

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 755 106 m N 453 674 m E WATER DEPTH: 23.4 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY and SILT (CH) - trace of organics and shell fragments, very soft, high plasticity, very dark grey (10YR 3/1)	NOT FROZEN
	2	- structural flaw in sample which could possibly be failure plane at very flat angle to horizontal <30°	
	3	- faint laminations, soft to firm	
	4	- firm	
		0.6 (-24.0 m El.)	
		END OF BOREHOLE	
		NOTE: 127 mm ϕ push tube from mudline	

DEPTH BELOW SEABED (metres)

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0

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

UNDRAINED SHEAR STRENGTH (kiloPascals)
10 20 30

SPECIALIZED TESTS

T: P_o = 3.3 kPa, P_c = 40 kPa, C_c = 0.30
C

T, C: P_o = 4.9 kPa, P_c = 62 kPa, C_c = 0.34

eba

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.6 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:6

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND ATION
UTM COORDINATES: 7 754 890 m N 454 193 m E WATER DEPTH: 22.2 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1	SAND FILL (SP) - trace of silt, fine grained, uniform	NOT FROZEN
		0.1 (-22.9 El.)	
	2	CLAY and SILT (CH) - trace of organics, very soft, high plasticity, dark grey (10YR 4/1)	
	3		
	4	- discrete zone of SAND sampled at this level: explanation uncertain but it tapers out at end of borehole	
	5	- becoming stiffer	
		0.9 (-23.1 m El.)	
		END OF BOREHOLE	
		NOTE: 127 mm ϕ push tube from mudline	

DEPTH BELOW SEABED (metres)

0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0

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

UNDRAINED SHEAR STRENGTH (kiloPascals)
10 200 30

SPECIALIZED TESTS

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.9 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Pilcon Vane
○ Halibut Vane
⊕ Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:7

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 754 890 m N 454 193 m E WATER DEPTH: 20.1 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1, 2, 3	CLAY and SILT (CH) - trace of organics and shell fragments, very soft, high plasticity, dark grey (10 YR 4/1)	NOT FROZEN
		0.33 (-20.4 m El.)	
		END OF BOREHOLE	
		NOTE: Cap on the extruder broken during extrusion resulted in disturbance: sample destroyed.	

DEPTH BELOW SEABED (metres)

0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
10 20 30

SPECIALIZED TESTS

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.33 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
Pilcon Vane
○ Halibut Vane
Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:8

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 754 100 m N , 454 199 m E WATER DEPTH: 21.6 m

DEPTH BELOW SEABED (metres)

SYM.	SMPL.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY - silty trace of organics and shells, moist, soft, high plastic dark grey (10YR 4/1)	NOT FROZEN
	2		
	3	- very soft to soft and shear failure plane was note in the bottom of the tube	
	4		
	5	- low plastic, firm	
	6		
	7		
	8	- low plastic, stiff occasional shell and trace of organics	
	9	5.64 (-32.6 m El.)	
		END OF BOREHOLE	
		NOTE: 76 mm ϕ push tubes in borehole	

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS
T
C T
C T
C S
T
T
C
T
T

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 5.64 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F - TAR 1:9

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 754 485 m N 453 504 m E WATER DEPTH: 21.8 m

SYM.	SMPL.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY - silty, trace of shell fragments, dark grey (10YR 4/1) very soft, highly plastic	
	2	- trace silt, homogenous, olive grey, soft (10YR 4/1)	
		- trace organics, dark grey, firm	
	3	- trace shell fragments & organics, dark grey (10YR 4/1) highly plastic	
		- trace silt	
	4	- trace shell fragments & organics, dark grey (10YR 4/1) highly plastic	
	5	- as above	
	6	- dark grey (10YR 4/1), highly plastic, soft	
	7	- trace organics & shell fragments, dark grey (10YR 4/1) soft, highly plastic	
	8	- as above	
	9	- trace organics dark grey (10YR 4/1), soft highly plastic	
	10	- trace shell fragments & organics, dark grey (10YR 4/1)	
		END OF BOREHOLE 5.71 (-27.5 m El.)	

NOTE: 76 mm ϕ push tubes in borehole

DEPTH BELOW SEABED (metres)

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
25 50 75

SPECIALIZED TESTS

0	T
1	T, C
1	T, C
2	T
2	T
3	T
3	T
3	T, C
4	T
4	T
4	T
5	C
5	T
5	T
6	T, C
7	

eba

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 5.7 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
● Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER
F - TAR 1:10

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT N-44 CAISSON RETAINED ISLAND
UTM COORDINATES: 7 754 446 m N 454 191 m E WATER DEPTH: 23.8 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
	1	CLAY and SILT (CH) - trace of black organics and shell fragments, soft, high plasticity, very dark grey (10YR 3/1)	NOT FROZEN
	2	- fine black lamination at 10 mm intervals	
	3	- silt lamination 10 mm thick	
	4	- pockets of silt and organics	
		0.7 (-24.5 m El.)	
		END OF BOREHOLE	

NOTE: 1. 127 mm ϕ push tube from mudline.
2. Elevations in respect to subcut level.

DEPTH BELOW SEABED (metres): 0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4

BULK DENSITY ($Mg\,m^{-3}$) ▲: 1.4, 1.6, 1.8, 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT: 20, 40, 60, 80

UNDRAINED SHEAR STRENGTH (kiloPascals): 10, 20, 30

SPECIALIZED TESTS: C, T, T, C

JOB No.: 101-3210 / 101-3443
DRILLING COMPLETED: JULY 1981
BOREHOLE DEPTH: 0.7 m
DRILLING RIG: F 1500/SUPPLIER V
LOG COMPILED BY: PMR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TAR 1:18

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

TABLE 9 SUMMARY OF ONE-DIMENSIONSAL CONSOLIDATION TESTS

BOREHOLE NO.	SAMPLE NO.	DEPTH (m)	*P_o' (kPa)	+P_c (kPa)	°OCR	C_c
FTAR 1:2	4E	0.34 - 0.44	3.5	54	15.9	0.33
	5E	0.44 - 0.54	4.4	82	19.6	0.33
	6E	0.54 - 0.63	5.3	103	10.4	0.33
FTAR 1:3	2E	0.2 - 0.4	2.7	19	7.0	0.40
	3E	0.4 - 0.6	4.5	30	6.7	0.33
FTAR 1:6	3B	0.27 - 0.47	3.3	40	12.1	0.30
	4C	0.47 - 0.62	4.9	62	12.6	0.34
FTAR 1:9	2C	0.72 - 0.80	6.8	38	6.6	0.32
	3B	2.00 - 2.07	18.3	90	4.9	0.31
	4B	2.63 - 2.68	23.7	35	1.5	0.29
	7A	4.30 - 4.36	39.0	100	2.6	0.26
FTAR 1:10	2B	0.70 - 0.75	6.6	42	6.4	0.31
	3B	1.30 - 1.35	12.0	47	3.9	0.30
	6B	3.15 - 3.20	28.5	48	1.7	0.27
	8C	4.70 - 4.75	42.6	96	2.3	0.31
	10B	5.54 - 5.59	50.0	280	5.6	0.27
FTAR 1:18	1B	0.76 - 0.80	7.0	101	14.4	0.33
	4D	1.30 - 1.39	12.1	180	14.9	0.27

Note: * Calculated assuming an average effective overurden stress of 9 kPa/metre.
+ Using Casagrande construction method.
o Overconsolidation Ratio

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE
			NOT FROZEN
	6	SILT (ML) - becoming clayey interbedded with or with trace of fine grained SAND, thin, even parallel laminations of black (organic?) SILT, firm, dark grey (5Y 3/1)	-1.3
	7		
	8	- thin, parallel laminations of clayey SILT and SILT	
	9		
	10	- very thin, parallel laminations of SILT (organic?)	-1.8
	11		
	12		
	13		-0.8
	14	- shell fragment, very dark grey (5Y 3/1)	-0.2
	15		-2.0
	16	SILT (ML) - trace of clay, trace of very fine SAND, very fine horizontal lamination, even parallel	
	17		-2.2
	18		-2.4

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75

P_o = 200
C / P_c = 250
C_c = 0.03-0.04
TD
G, S
TD
TD
P_o = 300kPa
/ P_c = 400kPa
TCC C_c = 0.14-0.26
P_o = 310kPa
P_c = 540kPa
C_c = 0.18-0.24

eba

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR NO. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane, × Min. Vane, Pilcon Vane, Halibut Vane, ● Fall Cone, ▲ UU Triaxial, ■ CU Triaxial

TEST IDENTIFICATION: C - Consolidation, DS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
	19	CLAY (CL) - silty with trace of fine sand and broken shell fragments, very stiff to hard, of low plasticity, dark grey (5Y 3/2)	NOT FROZEN	-2.3
		- (mud in 0.5°C/out -3.8°C)		
	20	- (mud in 0.5°C/out -3.8°C)		-2.1
	21	- (mud in 0.5°C/out 0.7°C)		-1.6
	22			-1.6
	23			-2.3
	24			-2.1
		- repushed		-1.9
	26	- and SILT, laminated		-2.4
	27			-2.3
	28			-2.1
	29			-2.5
	30			-2.4
	31			-2.5
	32			-2.4

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

75	T T
76	G, S
77	
78	TD
79	
80	
81	
82	
83	T
84	TD
85	G, S
86	
87	
88	
89	TD
90	

eba

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
	33	CLAY (CL) and SILT - thin even parallel laminations of black and dark olive grey components, possibly organic, very stiff, dark olive grey (5Y 4/1)	NOT FROZEN	-2.4
	34	- blocky structure, friable		-2.4
			IN-SITU TEMP. 95.8 m RT	-0.9
	35	- becoming hard	Nf	-2.6
	36	- trace of fine sand	Nf with Nbn locally 5%	-2.6
	37			
	38		Nf, Nbn	-1.8
	39	- with very thin bed of possibly organic material (101.25 m)		-2.6
	40			-2.6
	41		Nbn, Vs trace and Vx trace	-1.8
	42			-1.9

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
TD
TD C, T
G, S
TD

$P_o = 510 kPa$
$P_c = 500 kPa$
$C_c = 0.09 - 0.11$

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)	SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
105		43	CLAY (CL) - silty with trace of fine sand and broken shell fragments, very stiff to hard, of low plasticity, dark grey (5Y 3/2)		-2.8
106		44	- with thin non-parallel laminations of black siltier, possibly organic, material and calcite crystals also fine gravel sized rounded pebble of ?dolerite?	Nbn to Vx trace Moderately well bonded	-2.8
107		45			-2.8
108		46	- with thin even parallel laminations as above		-2.8
109		47	- becoming with some SILT - sample disturbed by overdriving		-2.7
110		48		Nbn	-2.8
111		49	- sample held in hole for 90 min.	Vx trace Nbe becoming Nbn	
112				IN SITU TEMP. -3.1 -112.7 m RT	
113		50	- sample held in hole for 60 min.		-2.9
114		51	- coal specks throughout, appears dessicated and fissures were noted, forams found on fissure surfaces		-2.9
115		52	- with faint thin non-parallel laminations, shell fragments		-2.9
116		53	- with fissures as above		
117		54	- fine grained silty SAND layer - bent shelby tube		-1.4
118		55	- with some iron oxide, coal specks and fissured as above	Nbn	-2.9
119		56	- with some silt pockets	Nf	-3.0
120					

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300
>120
>120

SPECIALIZED TESTS
G, S
TD
T
TD
G, S
T T
C T
G, S
TD

P_o = 620 kPa
P_c = 560 kPa
C_c = 0.11

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND
SOIL SYMBOLS: SAND, SILT, CLAY
SHEAR STRENGTH: + Torvane, × Min. Vane, • Pilcon Vane, ○ Halibut Vane, ● Fall Cone, ▲ UU Triaxial, ■ CU Triaxial
TEST IDENTIFICATION: C - Consolidation, DS - Direct Shear, TD - TDR, Cc - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
	57	- with fissures as above		-3.0
	58			-2.9
	59	- becoming more plastic, coal laminations at 122.1 m RT and slickenslided surface 30° to vertical - mud temp. +1°C		-3.1
	60			-3.0
	61		Vr < 5%, 1mm thick ice lens by 20 mm long	
	62			-3.1
	63	- with slickenslided fissures 40° to vertical at 126.1 m RT and 126.4-m RT, trace of shell fragments	Vx trace	-2.9
	64	- with slickenslided fissure 40° angle to vertical at 127.4 m RT	Vx trace	-2.9
	65	SAND (SM) - silty, very fine grained, micaceous, traces of clay, dense (estimated), dark olive grey (5Y 3/2) - mud temp. In 1.4/Out 1.7 - bent shelby tube	Vx < 1%	(-1.9)
	66			(-1.9)
	67	- bent shelby tube	Nf - Nbn	(-1.9)
	68	- bent shelby tube	Nbn	(-1.6)
	69	- with a few laminations (1 mm thick) at 133.1 - bent shelby tube	Nbn	(-1.4)
	70	- with a few laminations of coarser sand at 133. - mud temp. In 1.7/Out 3.9 - bent shelby tube		
	71	SILT (ML) - with some clay, firm to stiff, of low plasticity, dark grey brown (5Y 3/1) becoming	Vx trace	-3.1

BULK DENSITY ($Mg\,m^{-3}$) ▲
1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300
1542 →

SPECIALIZED TESTS
TD
G, S
C T
TD
T
G, S

Pb = 810
Pc = 640
Cc = 0.17 - 0.21

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
● Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
	72	becoming CLAY (CL) - with some silt, very stiff, of low plasticity, dark brown to black (5Y 2.5/1)	Vx 5%	-3.0
			Attempted temp. probe ~136.4 m RT	
	73	- thin bed of clayey SILT and thin parallel even laminations	Nbn, Vx trace	-2.4
		- tube damaged		
	74	- thin bed of thinly laminated SILT		-2.6
		- tube damaged		
	75	- with some fine grained SAND	Nbn	-2.0
		- tube damaged		
	76	SILT (ML) - with non-parallel thin laminations, of low plasticity, very stiff to hard		
		- bottom of sample contains much organic matter incl. fibrous material		
		- tube damaged, no recovery		
	77	becoming clayey - frequent fine silty SAND laminations and pockets and curved parallel thin vertical laminations at 141.0 m RT	Nbn and locally Vx trace	-3.1
	78			-3.1
	79	- with frequent thin parallel even laminations of darker hue		-3.0
	80	CLAY (CL) - with trace of silt, hard, of low plasticity, dark grey (2.5Y 2/0) with occasional thin even parallel laminations	Nbn	-3.2
	81	- with thin laminations of black silty ?organic? material and blocky structure		-3.2
	82	- slickensided failure plane at ~45° to vertical		-3.2
	83	- blocky structure		-3.2
	84	- vertical and subvertical planes of weakness		-3.1

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

TD

C P_o = 870 kPa
P_c = 960 kPa
C_c = 0.18

TD

C T P_o = 920 kPa
P_c = 900 kPa
C_c = 0.28 - 0.25

TD

T

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

PAGE 6 OF 10

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

	SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
150			(continued)	Nbn	
			CLAY - with trace of silt, thinly laminated, hard, of low plasticity, dark grey (2.5Y 2/0)		
151		85			-2.8
152		86	- 5 mm ϕ nodule of brganic material, becoming with some silt		-3.2
153		87		Vx trace	-3.3
		88	- tube damaged		-3.2
154		89	- vertical and subvertical planes of weakness, slight organic smell		-3.2
155					
			becoming with some SILT		
156		90			-3.2
			becoming with very thin to thin even wavy parallel laminations		
157		91			-2.7
158		92			-3.2
			becoming occasional thin seams of dark grey clay		
159		93		Nf	-3.2
160		94	- platey, slight odour - mud temp. IN 0.5/OUT 0.2 very dark grey (5Y 3/1)		-2.7
161		95	- slickensided, fissured, shears of 40° to vertical at regular 50 mm intervals, few shells	Vx trace	-3.2
162		96	- laminated, black (5Y 2.5/1)	Vr trace	-3.1
163		97		Vr <5%	-2.5
			- mud temp. IN 0.5/OUT 0.5		
164		98	- sand pocket beneath ice lamination at 163.83 m RT	Vr 5%	-3.2
165			(see over)		

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

TD	
TD	
GS	
TD	
T	
C	

P_o = 1070 kPa
P_c = 1100 kPa
C_c = 0.11

eba

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
Pilcon Vane
○ Halibut Vane
Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	
	99	· tube damaged	Nf	·2.2
		SILT (ML) - clayey, some very fine micaceous sand, hard, black (5Y 2.5/1)		
	100	SILT and SAND (ML/SP) - trace of clay, very fine grained, micaceous, dense (estimated), dark grey (10Y 4/1)		
		· no recovery · mud temp. in 0.4/out 1.4		
		· laminated, forams coal and wood flakes in laminations		
	101	· tube damaged		
		SILT (ML) - trace of clay and fine sand, micaceous, moist, laminated hard, slight organic odour, dark grey (5Y 4/1)		
	102	· sand lamination, silty, fine grained, shells and coarser sand on		·3.2
		· 2 m peat lamination, black contact becoming	Nbn	
	103	with clay and thin sand laminations, organics coal specks and shell throughout		·2.4
		SAND (SM) - silty, fine grained, dense (estimated), dark grey (10YR 3/1)		
		SILT (ML) - some clay, trace of very fine micaceous sand, laminated, hard, dark grey (10YR 3/1)	IN SITU TEMP -171.0 m RT	·1.25
	104	· laminations at 45° to vertical, slight odour, moist very dark grey (10YR 3/1)	Nbn	·3.3
	105	· strong odour, forams throughout · 6 mm sand layer	Vx · trace	·3.3
	106	· laminations at 25° from horizontal , slightly fissured		·3.4
	107	· laminations at 20° from horizontal , very dark grey (10 YR 3/1)	Vx trace	·3.3
	108	· horizontal laminations, strong odour, forams throughout	Nbn	·3.1
	109	· tube damaged		
		SAND - silty, trace clay, uniform, dense (estimated), dark olive grey (5Y 3/2)	Nbn	·1.75
	110	SILT - trace to some clay, hard platey, natural void (64 mm x 32 mm) very dark grey (5Y 3/1)		·2.8
	111	· clayey pockets		

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT WATER CONTENT (%) LIQUID LIMIT 20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals) 100 200 300

SPECIALIZED TESTS: TD, T, T

eba

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: ·212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH: + Torvane, × Min. Vane, ⊕ Pilcon Vane, ○ Halibut Vane, ⊕ Fall Cone, ▲ UU Triaxial, ⊕ CU Triaxial

TEST IDENTIFICATION: C - Consolidation, DS - Direct Shear, TD - TDR, Ca - Calorimetry, T - Triaxial Shear, S - P.W. Salinity, G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)	SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
180			becoming		
181		112	CLAY (CL) - silty, thin, even, parallel laminated, very stiff, of low plasticity, patchily black, dark olive grey (5Y 3/2)	Nbn Vx trace	-3.4
182		113	- with wavy parallel laminations		-3.3
183		114	- patchily silty		-3.0
			becoming with some silt	Vr trace ice lensing (1 x 4 mm)	-3.1
184		115			
185		116	- tube damaged	Vx 10%	-2.3
186		117		Vr 2%	-3.4
187		118	- two attempts		
188		119	- no laminae	Vr trace	-3.1
189		120	* - silt in ice fissures*	- ice lens runs vertically through sample - ice granular, cloudy Vr trace	-3.6
190		121	becoming with trace of silt, very stiff to hard		-3.6
191		122	- very thin bed of silty CLAY	Nbn	-3.5
192		123		Vx trace	-3.3
193		124		Vx trace Vr trace	-3.4
194		125	- with some organic material and calcite crystals - tube bent		-3.5
195		126			

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS
G, S
TD
C
TD
G, S
TD

P_o = 1240 kPa
P_c = 1120 kPa
C_c = 0.20

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
Pilcon Vane
Halibut Vane
Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: TARSIUT CAISSON RETAINED ISLAND (TARSIUT N - 44)
UTM COORDINATES: 7 754 646 m N 454 195 m E WATER DEPTH:

DEPTH BELOW ROTARY TABLE (m RT)

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE	T
		continued		
	127	CLAY - with a trace of silt, with even parallel thin laminations, very stiff to hard, of low plasticity, dark olive grey (5Y 3/2)	Nbn	
		- some randomly orientated laminae and some patches of organic material	Vx trace	
	128	* - slickensided failure surface at ~30° to horizontal and thin beds of organic material	IN SITU TEMP. -3.5	
			-197.4 m RT	
	129	- some thinly laminated zones		
	130	- some silt, laminated, hard, blocky structure, carbonaceous, calcite crystals	Vx trace	-2.5
			Nbn	
	131			-3.1
	132			-3.6
	133			-2.5
	134			
		END OF BOREHOLE		

BULK DENSITY ($Mg\,m^{-3}$) ▲ 1.4 1.6 1.8 2.0
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

UNDRAINED SHEAR STRENGTH (kiloPascals)
100 200 300

SPECIALIZED TESTS

TD C P_o = 1370 kPa
P_c = 1425 kPa
T C_c = 0.21 - 0.35

JOB No.: 101 - 3430
DRILLING COMPLETED: 81/12/18
BOREHOLE DEPTH: -212 m RT
DRILLING RIG: CBIR No. 1
LOG COMPILED BY: PMR/JPR

LEGEND

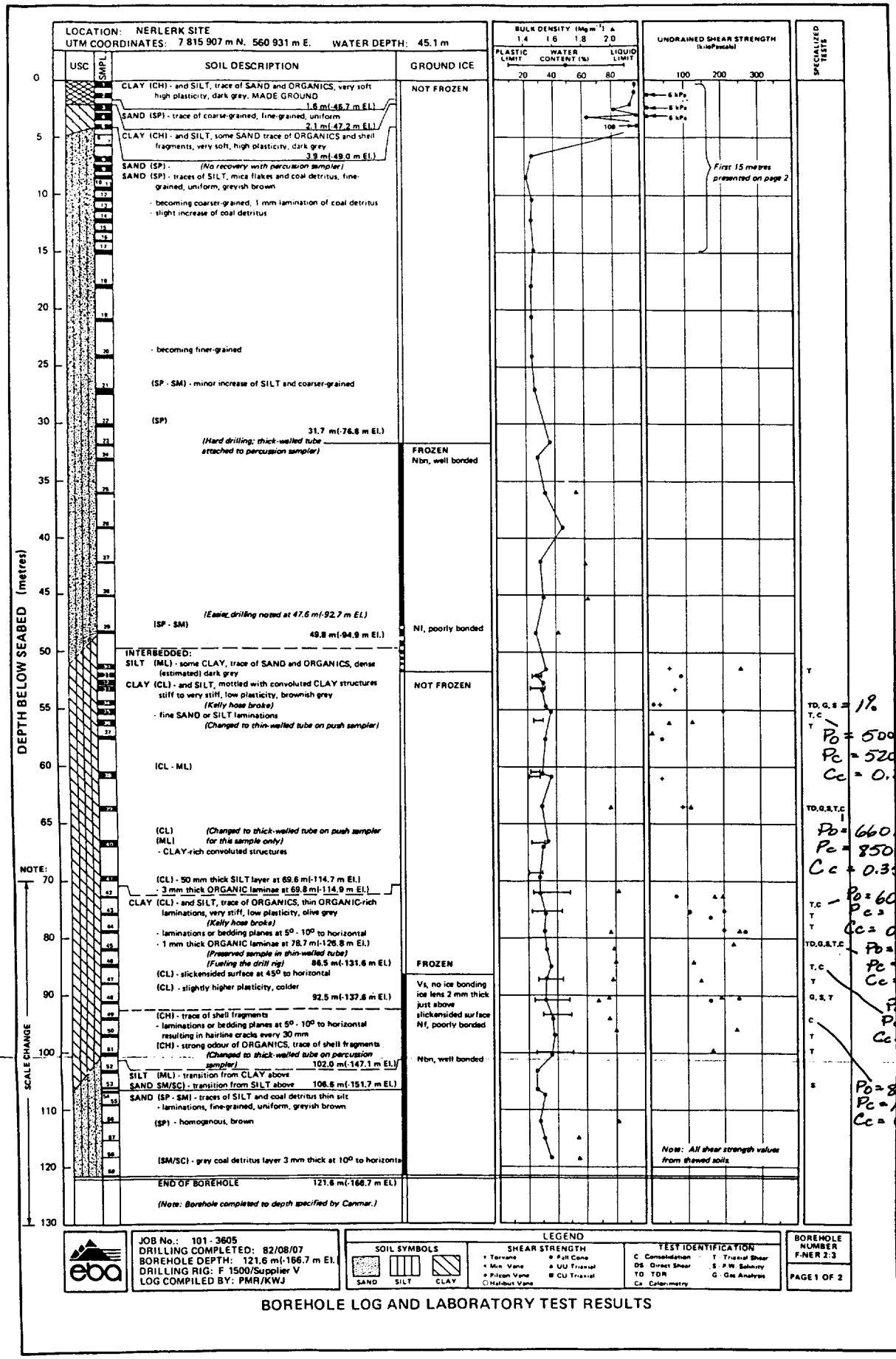
SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

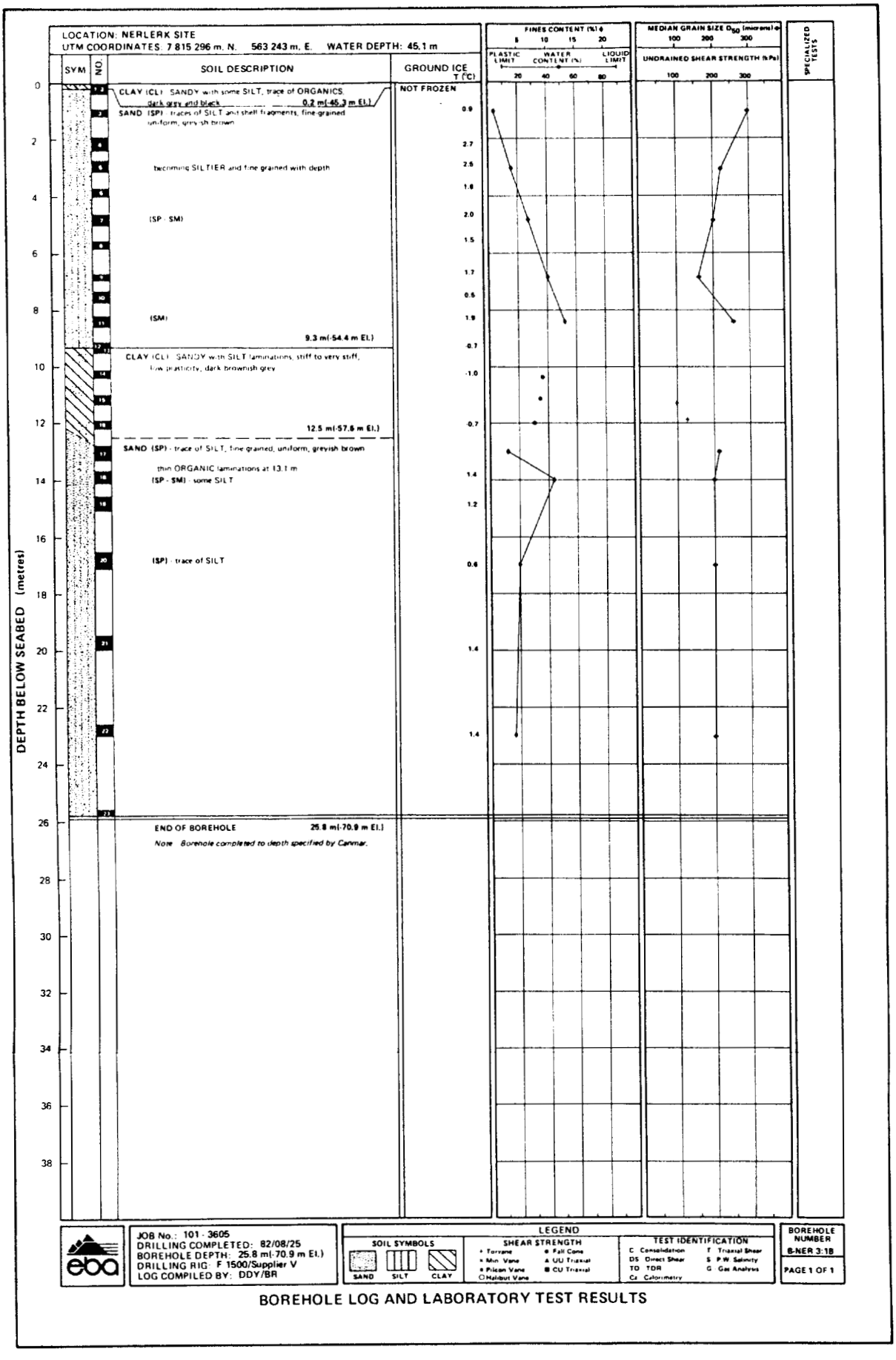
TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER F-TD 1:1

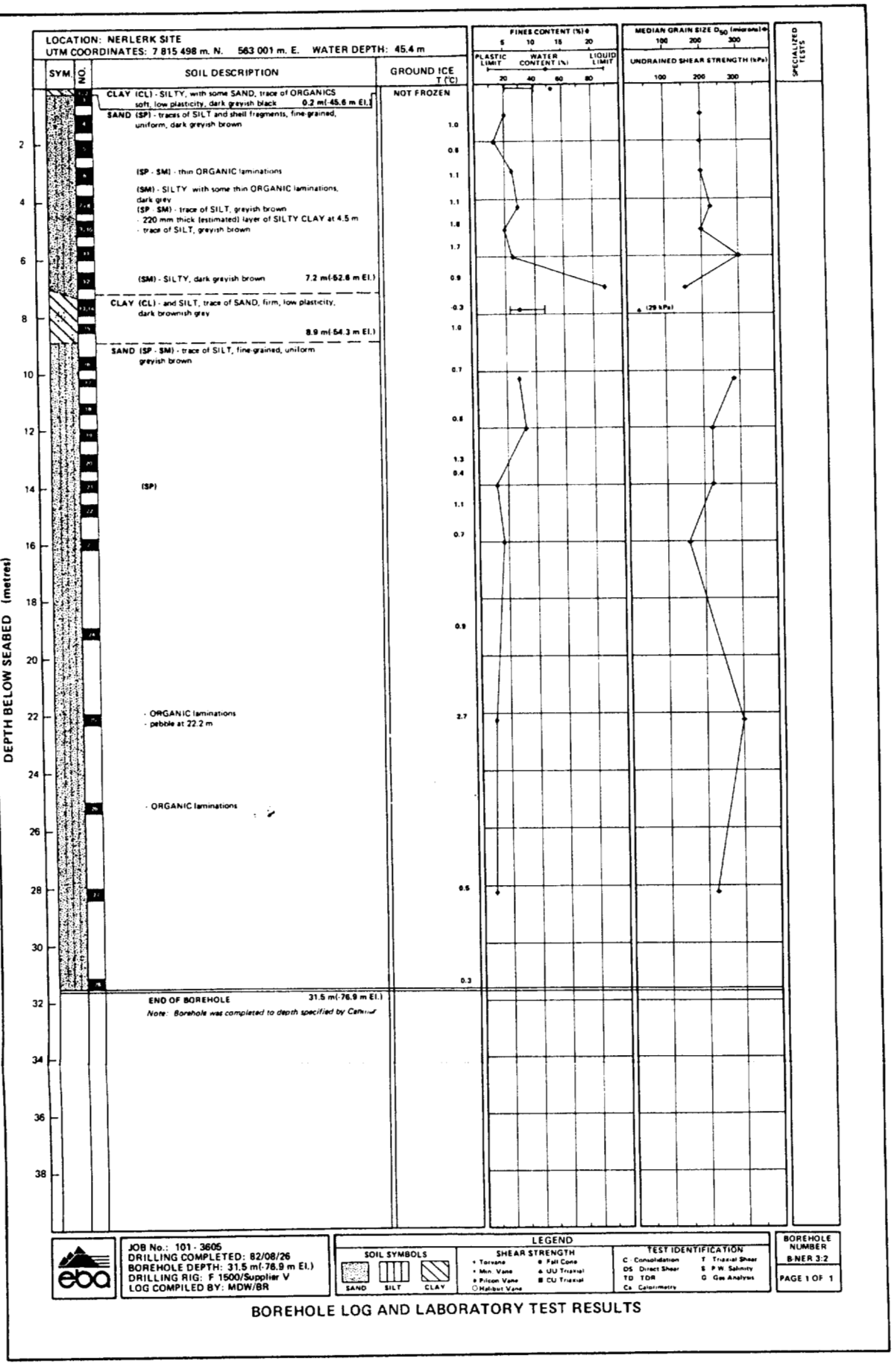
BOREHOLE LOG AND LABORATORY TEST RESULTS



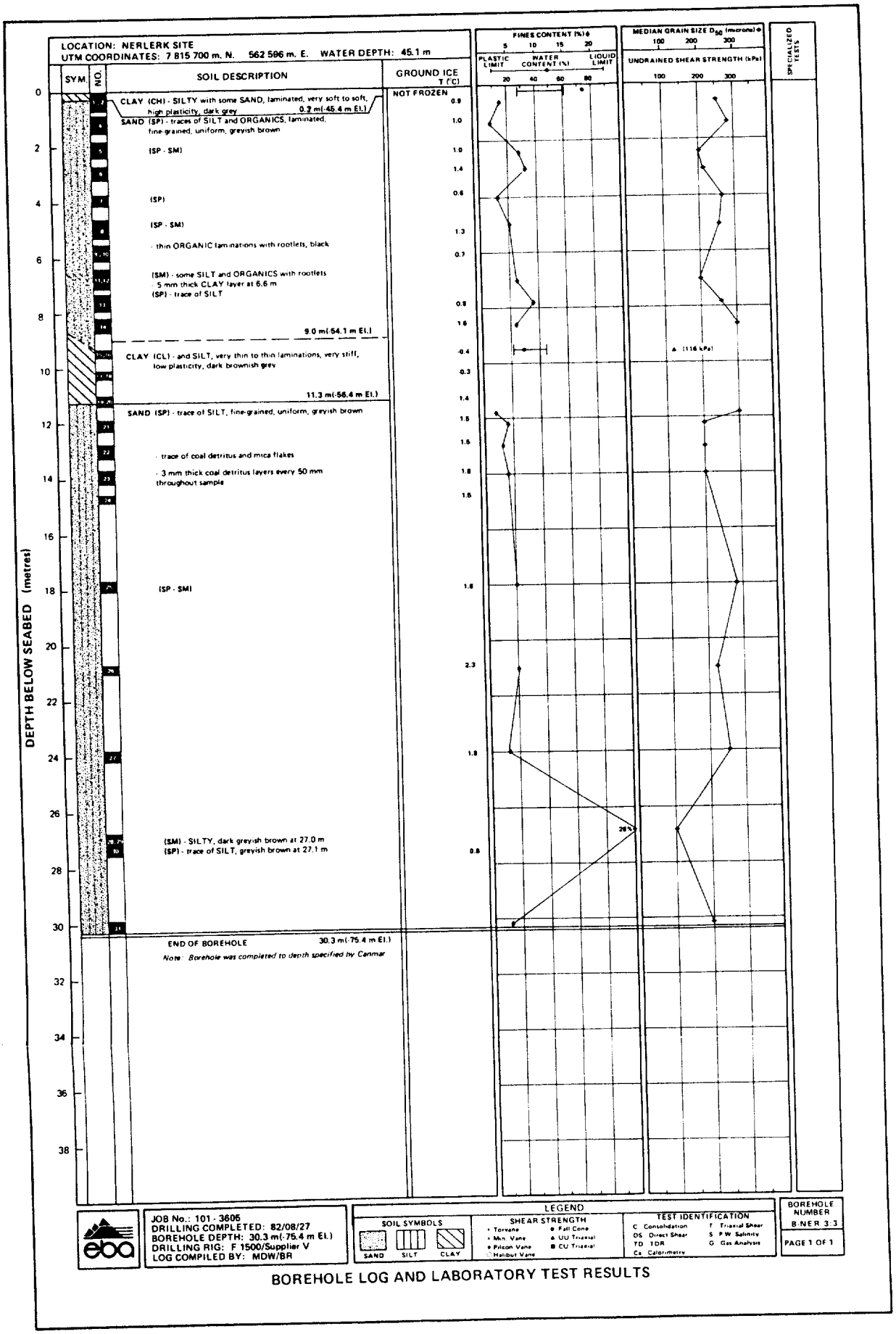
BOREHOLE LOG AND LABORATORY TEST RESULTS



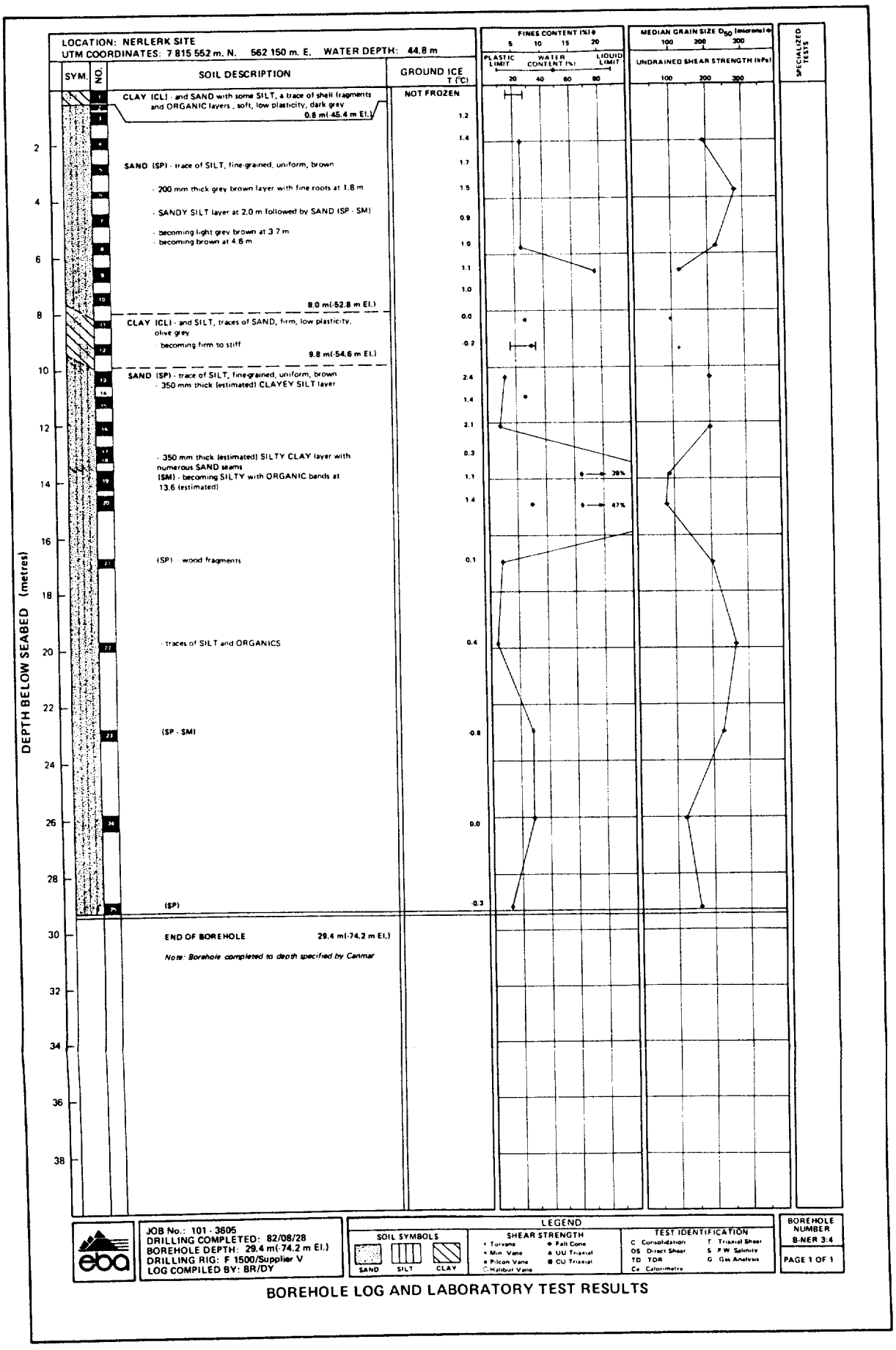
BOREHOLE LOG AND LABORATORY TEST RESULTS



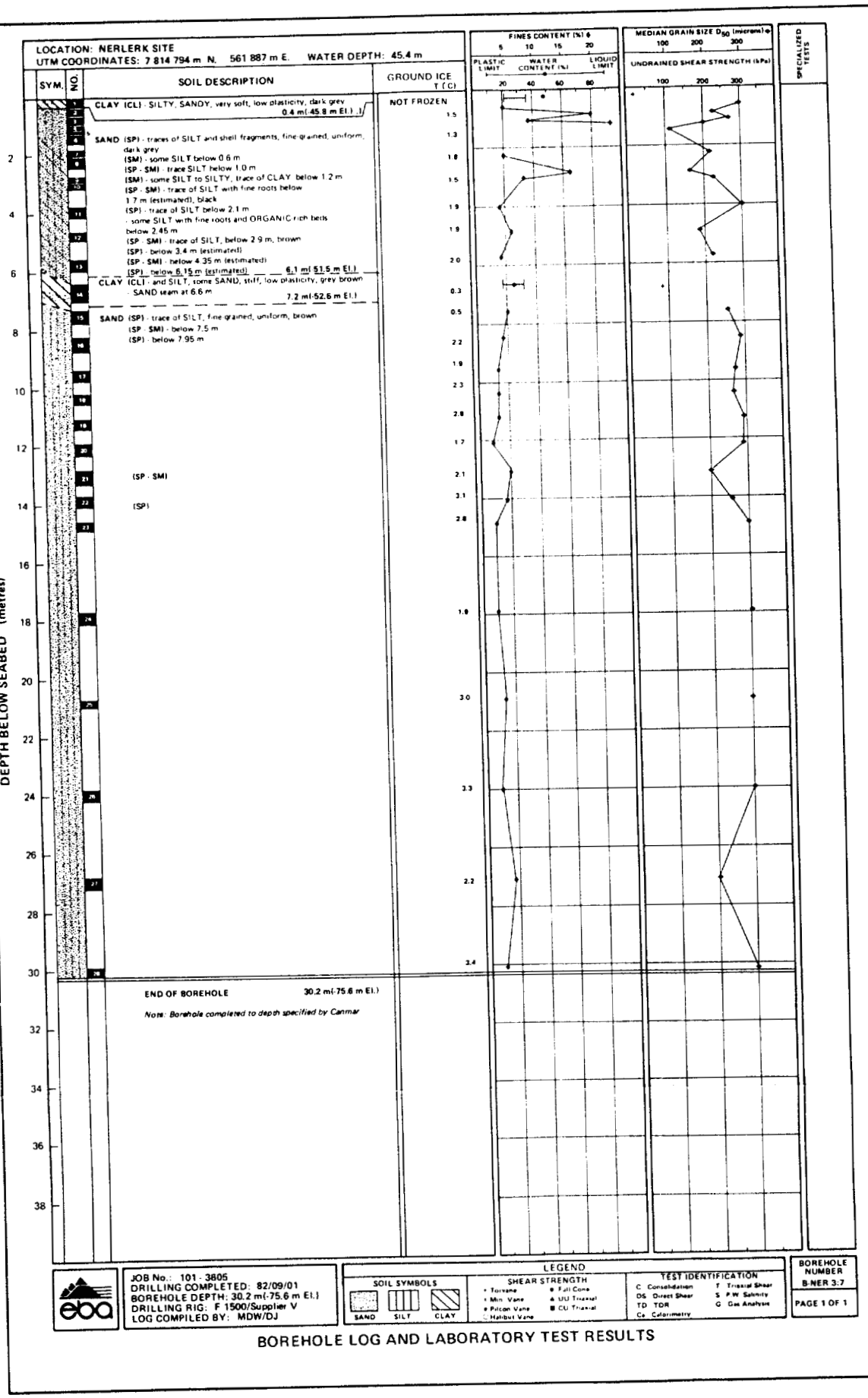
BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 397 m N. 561 992 m E. WATER DEPTH: 44.8 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
		CLAY (CL) - SILTY and SANDY, soft, low plasticity, dark grey 0.2 m(-45.0 m El.)	NOT FROZEN 0.5
		SAND (SP - SM) - trace of SILT, fine-grained, uniform, brown 0.8 m(-45.6 m El.)	1.1
		CLAY (CL) - SILTY and SANDY, soft, low plasticity, dark grey 1.1 m(-45.9 m El.)	
		SAND (SP) - trace of SILT, fine-grained, uniform, brown 2.3 m(-47.1 m El.)	2.2
		CLAY (CL) - SILTY, some SAND, hard, olive grey *(Material change noted by driller at 2.3 m)* 3.4 m(-48.2 m El.)	4.3
		SAND (SP) - trace of SILT, fine-grained, uniform, brown	4.0
		(SP - SM)	3.9
		(SP)	1.5
		10 mm thick CLAY lens and one 13 mm diameter pebble	0.6
		(SP - SM) *Note: Borehole was teminated as specified by Canmar.*	0.9
		END OF BOREHOLE 15.0 m(-59.8 m El.)	2.9 2.6 2.5 1.9 1.7 1.3 1.3

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ◆ 5 10 15 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300
UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

SPECIALIZED TESTS

ORGANIC CONTENT 5% at 1.9 m

eba

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/09/05
BOREHOLE DEPTH: 15.0 m(-59.8 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: MDW/BR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER B-NER 3:10

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 816 484 m N. 559 726 m E. WATER DEPTH: 45.7 m

SYM.	NO.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1	SAND (SC) - SILTY and CLAYEY, traces of ORGANICS and shell fragments, fine-grained, very soft, low plasticity, dark grey black - 100 mm thick clean SAND layer at 0.4 m - 10 mm thick ORGANIC layer at 0.9 m - 40 mm thick clean SAND layer at 1.3 m	NOT FROZEN
	2	2.0 m(-47.7 m El.)	
	3	SAND (SP) - trace of SILT, fine-grained, uniform, grayish brown	
	4		
	5	(SP - SM)	
	6		
	7	(SP)	
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
		END OF BOREHOLE 31.1 m(-76.8 m El.)	

Note: Borehole completed to depth specified by Canmar

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ◆ — PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT

MEDIAN GRAIN SIZE D_{50} (microns) ◆

UNDRAINED SHEAR STRENGTH (kPa)

SPECIALIZED TESTS

JOB No.: 101-3605
DRILLING COMPLETED: 82/08/09
BOREHOLE DEPTH: 31.1 m(-76.8 m EL)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: PMR/KWJ

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

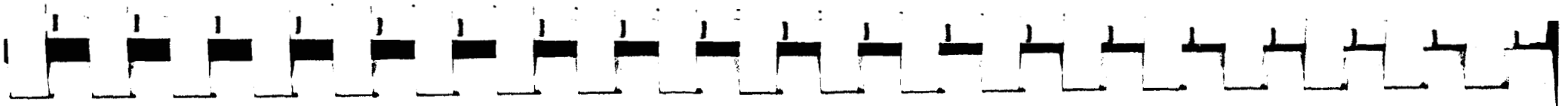
SHEAR STRENGTH: + Torvane, ◆ Fall Cone, × Mini. Vane, ▲ UU Triaxial, ● Pitcon Vane, ■ CU Triaxial, ○ Halibut Vane

TEST IDENTIFICATION: C Consolidation, f Triaxial Shear, DS Direct Shear, S P.W. Salinity, TD TDR, G Gas Analysis, Ca Calorimetry

BOREHOLE NUMBER B-NER 2-10

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS



LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 322 m N. 562 224 m E. WATER DEPTH: 44.2 m

DEPTH BELOW SEABED (metres)

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1	CLAY (CL) - SILTY, SANDY, *traces of shell fragments and ORGANICS, firm, low plasticity, dark grey*	NOT FROZEN
	2	- CLAYEY SAND layer at 0.5 m	0.0
		1.6 m(-45.8 m El.)	0.0
	3	SAND (SP - SM) - trace of SILT, fine-grained, uniform, brown	2.1
	4		2.0
		- black ORGANIC lenses to 4.8 m	
	5		2.5
	6		1.6
	7		
	8		2.6
	9		2.6
	10		2.8
	11	8.4 m(-52.6 m El.)	
	12	SILT (ML) - occassional thin beds of SILTY fine-grained SAND, *compact to dense, dark grey*	1.6
		9.2 m(-53.4 m El.)	
	13	CLAY (CL) - and SILT, some SAND, very stiff, grey brown	
	14		2.0
		10.8 m(-55.0 m El.)	
	15	SAND (SP) - trace of SILT, fine-grained, uniform, brown	2.7
		END OF BOREHOLE 11.5 m(-55.7 m El.)	

Note: Borehole completed to depth specified by Canmar.

FINES CONTENT (%) ◆ 5 10 15 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300
UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

SPECIALIZED TESTS

eba

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/09/15
BOREHOLE DEPTH: 11.5 m(-55.7 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: MDW/DJ

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER B-NER 3:11

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 807 m. N. 561 013 m. E. WATER DEPTH: 46.3 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1B	SAND (SP) - medium to fine-grained, uniform, brown MADE GROUND	NOT FROZEN
	2A	*original seabed 1.3 m(-47.6 m El.)	
	2B	CLAY (CH) - SILTY, some SAND, trace ORGANICS, very soft, high plasticity, dark blackish grey	
	3A		
	4A	- (CL), SILTY and SANDY - ORGANIC pockets below 2.8 m	
	4B	- fine-grained SAND layer at 3.3 m 3.4 m(-49.7 m El.)	
	5C	SAND (SP) - trace of SILT, fine-grained, uniform brown 3.5 m(-49.8 m EL)	
	6A 6B	CLAY (CH) - SILTY, some SAND, very soft, high plasticity, grey 4.0 m(-50.3 m El.)	
	6C	SAND (SP - SM) - traces of SILT and shell fragments, fine-grained, uniform, grey brown	
	7	END OF BOREHOLE 5.9 m(-52.2 m El.)	

Note: Borehole was terminated after seabed clay thickness was verified.

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ♦ 5 10 15 20

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

MEDIAN GRAIN SIZE D_{50} (microns) ♦ 100 200 300

UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

(6 kPa)

(5 kPa)

SPECIALIZED TESTS

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/09
BOREHOLE DEPTH: 5.9 m(-52.2 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: PMR/CHL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
⊕ Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:4

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 985 m. N. 560 802 m. E. WATER DEPTH: 47.5 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1A	SAND (SP) - trace SILT, medium to fine-grained, uniform, brown, MADE GROUND	NOT FROZEN
	1B	*original seabed 0.2 m(-47.7 m El.)	
	1C	CLAY (CH) - SILTY, some SAND, trace shell fragments, ORGANIC pockets, very soft, high plasticity, dark black grey	
	2A	· 20 mm thick SANDY layer	
	2B		
	3A	· 10 mm thick ORGANIC laminae	
	3B		
	4A	3.3 m(-50.8 m El.)	
	4B	SAND (SP - SM) - trace SILT, fine-grained, uniform, brown grey	
	5A	· (SP) below 3.7 m	
		END OF BOREHOLE 4.1 m(-51.6 m El.)	

Note: Borehole was terminated after seabed clay thickness was verified.

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ♦ 5 10 15 20
PLASTIC LIMIT WATER CONTENT (%) LIQUID LIMIT 20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ♦ 100 200 300
UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

+ (9 kPa)
• (8 kPa)
+ (10 kPa)
+ (12 kPa)
• (6 kPa)
+ (10 kPa)
• (8 kPa)

SPECIALIZED TESTS

eba

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/08
BOREHOLE DEPTH: 4.1 m(-51.6 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: PMR/CHL

LEGEND

SOIL SYMBOLS: SAND · SILT · CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:5

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 805 m. N. 560 749 m. E. WATER DEPTH: 46.6 m

DEPTH BELOW SEABED (metres)

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1A	SAND (SP) - trace SILT, fine-grained, uniform, brown	NOT FROZEN
	1B	MADE GROUND	
		*original seabed 0.1 m(-46.7 m El.)	
		CLAY (CH) - and SILT, trace SAND, ORGANIC pockets and shell fragments, very soft, high plasticity, dark grey	
	2A		
	2B	- mottled brown	
	2C	- 2 mm thick SAND layer	
		2.1 m(-48.7 m El.)	
	3A	SAND (SP - SM) - traces of SILT, CLAY and shell fragments, fine-grained, uniform, brown	
	3B		
	4A	- 4 mm thick SILT layer	
		- (SM), 10 mm thick SILT layers at 3.7 m and 4.1 m	
	5A		
		END OF BOREHOLE 4.2 m(-50.8 m El.)	

Note: Borehole was terminated after seabed clay thickness was verified.

FINES CONTENT (%) ◆ 5 10 15 20

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

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300

UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

± (10 kPa)
● (6 kPa)
▲ (8 kPa)

+ (10 kPa)
● (5 kPa)

SPECIALIZED TESTS

BULK DENSITY = 1.5 Mgm^{-3}

eba

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/08
BOREHOLE DEPTH: 4.2 m(-50.8 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: KWJ/RB

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
● Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:6

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 816 004 m. N. 561 121 m. E. WATER DEPTH: 45.4 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1A	SAND (SP) - trace SILT, fine-grained, uniform, light brown	NOT FROZEN
		MADE GROUND	
	1B	*original seabed 0.2 m(-45.6 m El.)	
		CLAY (CH) - SILTY, some SAND, soft, high plasticity, mottled grey and brown	
	2A		
	2B	- ORGANIC pockets and 10 mm thick SAND layer at 1.4 m	
	3A	2.0 m(-47.4 m El.)	
	3B	SAND (SP) - traces of SILT and shell fragments, medium to fine-grained, uniform, grey	
	4A	- 25 mm thick ORGANIC-rich layer at 2.2 m	
	5A		
		END OF BOREHOLE 4.0 m(-49.4 m El.)	
		Note: Borehole was terminated after seabed clay thickness was verified.	

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ♦ 5 10 15 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80
80%

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300
UNDRAINED SHEAR STRENGTH (kPa) 100 200 300
+ (6 kPa)
● (5 kPa)
† (10 kPa)
440µm

SPECIALIZED TESTS

JOB No.: 101 3605
DRILLING COMPLETED: 82/08/08
BOREHOLE DEPTH: 4.0 m(-49.4 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: KWJ/RB

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:7

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 866 m N. 560 947 m E. WATER DEPTH: 44.8 m

DEPTH BELOW SEABED (metres)

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	2	SAND (SP) - trace SILT, medium to fine-grained, some coarse-grained SAND, poorly graded, brown, MADE GROUND (No recovery at sample interval No. 1)	NOT FROZEN
	3A		
	3B	- 20 mm diameter pebble and shell fragments	
		2.5 m(-47.3 m El.)	
	4B	CLAY (CH) - and SILT, trace of SAND, ORGANIC pockets, very soft, high plasticity, mottled grey and brown	
	5B	4.0 m(-48.8 m El.)	
	5C	SAND (SP) - trace to some SILT, trace shell fragments, medium to fine-grained, some coarse-grained SAND, uniform, grey brown	
	6	- SILT pockets in Sample No. 6	
	7	- 5 mm thick SILT layer with one 20 mm diameter pebble	
		END OF BOREHOLE 5.9 m(-50.7 m El.)	
		Note: Borehole was terminated after seabed clay thickness was verified.	

FINES CONTENT (%) ◆ — 5, 10, 15, 20

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

105%

MEDIAN GRAIN SIZE D_{50} (microns) ◆ — 100, 200, 300

UNDRAINED SHEAR STRENGTH (kPa) — 100, 200, 300

500μm

+ (5 kPa)
● (6 kPa)

+ (10 kPa)
● (8 kPa)

SPECIALIZED TESTS

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/08
BOREHOLE DEPTH: 5.9 m(-50.7 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: PMR/CHL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
● Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C Consolidation
DS Direct Shear
TD TDR
Ca Calorimetry
T Triaxial Shear
S P.W. Salinity
G Gas Analysis

BOREHOLE NUMBER V-NER 2:8

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 867 m N. 560 870 m E. WATER DEPTH: 45.1 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1	SAND (SP) - trace SILT, medium to fine-grained, uniform, brown, MADE GROUND	NOT FROZEN
	2		
	3		
		*original seabed 2.5 m(-47.6 m El.)	
	4	CLAY (CH) - SILTY, some SAND, very soft, high plasticity, dark grey - ORGANIC pockets between 2.7 and 2.9 m	
		- becoming SANDIER with depth	
	5A	4.2 m(-49.3 m El.)	
	5B	SAND (SP) - trace of SILT, fine-grained, uniform brown 4.4 m(-49.5 m El.)	
	6B	CLAY (CH) - SILTY, trace SAND, very soft, high plasticity, dark grey 4.9 m(-50.0 m El.)	
	6C	SAND (SP) - trace SILT, fine-grained, uniform, grey brown - (SP - SM) below 5.3 m (estimated) - 2 mm thick SILT layer at 5.8 m	
	7		
		END OF BOREHOLE 5.8 m(-50.9 m El.)	
		Note: Borehole was terminated after seabed clay thickness was verified.	

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ♦ 5 10 15 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300
UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

+ (8 kPa)
● (7 kPa)
+ (8 kPa)
■ (9 kPa)
+ (8 kPa)
● (9 kPa)

SPECIALIZED TESTS

eba

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/08
BOREHOLE DEPTH: 5.8 m(-50.9 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: PMR/CHL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane ● Fall Cone
× Min. Vane ▲ UU Triaxial
• Pilcon Vane ■ CU Triaxial
○ Halibut Vane

TEST IDENTIFICATION
C - Consolidation T - Triaxial Shear
DS - Direct Shear S P.W. Salinity
TD - TDR G - Gas Analysis
Ca Calorimetry

BOREHOLE NUMBER V-NER 2.9

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 947 m N. 561 789 m E. WATER DEPTH: 43.6 m

DEPTH BELOW SEABED (metres)

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	1	CLAY (CH) - SILTY, some SAND, trace ORGANICS, very soft, high plasticity, dark grey	NOT FROZEN
	2	- (CL) and SAND, some SILT below 1.25 m (estimated)	
	3A	- trace shell fragments	
	3B	- 10 cm thick SILT-SAND layer	
	4A	2.9 m(-46.5 m El.)	
	4B	SAND (SP - SM) - trace to some SILT, trace shell fragments, fine-grained, uniform, grey brown	
	5	- ORGANIC layer at 3.1 m	
	6		
		END OF BOREHOLE 5.1 m(-48.7 m El.)	

Note: Borehole was terminated after seabed clay thickness was verified.

FINES CONTENT (%) ● 5 10 15 20

PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT

20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ◆ 100 200 300

UNDRAINED SHEAR STRENGTH (kPa) 100 200 300

● (9 kPa)

● (12 kPa)

● (8 kPa)

SPECIALIZED TESTS

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/12
BOREHOLE DEPTH: 5.1 m(-48.7 m El.)
DRILLING RIG: F 1500/Supplier V
LOG COMPILED BY: CHL/BR

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:12

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 999 m N. 561 790 m E. WATER DEPTH: 45.1 m

DEPTH BELOW SEABED (metres)

SYM.	No.	SOIL DESCRIPTION	GROUND ICE
	A1	CLAY (CH) - SANDY, some SILT, traces of ORGANICS, shells and SAND partings, very soft, high plasticity, olive grey	NOT FROZEN
		0.3 m(-45.4 m El.)	
	A2	SAND (SM) - SILTY, traces of shell fragments and ORGANICS, fine-grained, uniform, dark grey	
	B1	- (SP), traces of SILT and ORGANIC fibres, brown grey	
	B2	- high ORGANIC content (estimated to be 25% by volume), grey	
	C1	- brown grey	
	C2	- some SILT, some ORGANICS, grey	
	D		
	E		
		END OF BOREHOLE 5.0 m(-50.1 m El.)	

Note: Maximum penetration after 60 minutes

FINES CONTENT (%) ♦ — 5, 10, 15, 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT — 20, 40, 60, 80
58%

MEDIAN GRAIN SIZE D_{50} (microns) ♦ — 100, 200, 300
UNDRAINED SHEAR STRENGTH (kPa) — 100, 200, 300
(10 kPa)

SPECIALIZED TESTS

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/14
BOREHOLE DEPTH: 5.0 m(-50.1 m El.)
DRILLING RIG: Vibrocore
LOG COMPILED BY: BR/CL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C Consolidation
DS Direct Shear
TD TDR
Ca Calorimetry
T Triaxial Shear
S P.W. Salinity
G Gas Analysis

BOREHOLE NUMBER V-NER 2:14

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 999 m N. 561 886 m E. WATER DEPTH: 44.2 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	A	CLAY (CH) - SILTY, some SAND pockets, numerous ORGANIC pockets, very soft, high plasticity, olive grey	NOT FROZEN
		0.7 m(-44.9 m El.)	
	B	CLAY (CL) - SILTY, high ORGANIC content, soft, low plasticity, brown	
		END OF BOREHOLE 1.2 m(-45.4 m El.)	

Note: Maximium penetration after 60 minutes

DEPTH BELOW SEABED (metres)

FINES CONTENT (%) ♦
5 10 15 20
PLASTIC LIMIT — WATER CONTENT (%) — LIQUID LIMIT
20 40 60 80

MEDIAN GRAIN SIZE D_{50} (microns) ♦
100 200 300

UNDRAINED SHEAR STRENGTH (kPa)
100 200 300
● (9 kPa)

SPECIALIZED TESTS

JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/14
BOREHOLE DEPTH: 1.2 m(-45.4 m El.)
DRILLING RIG: Vibrocore
LOG COMPILED BY: BR/CL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

SHEAR STRENGTH
+ Torvane
× Min. Vane
• Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER
V-NER 2:15

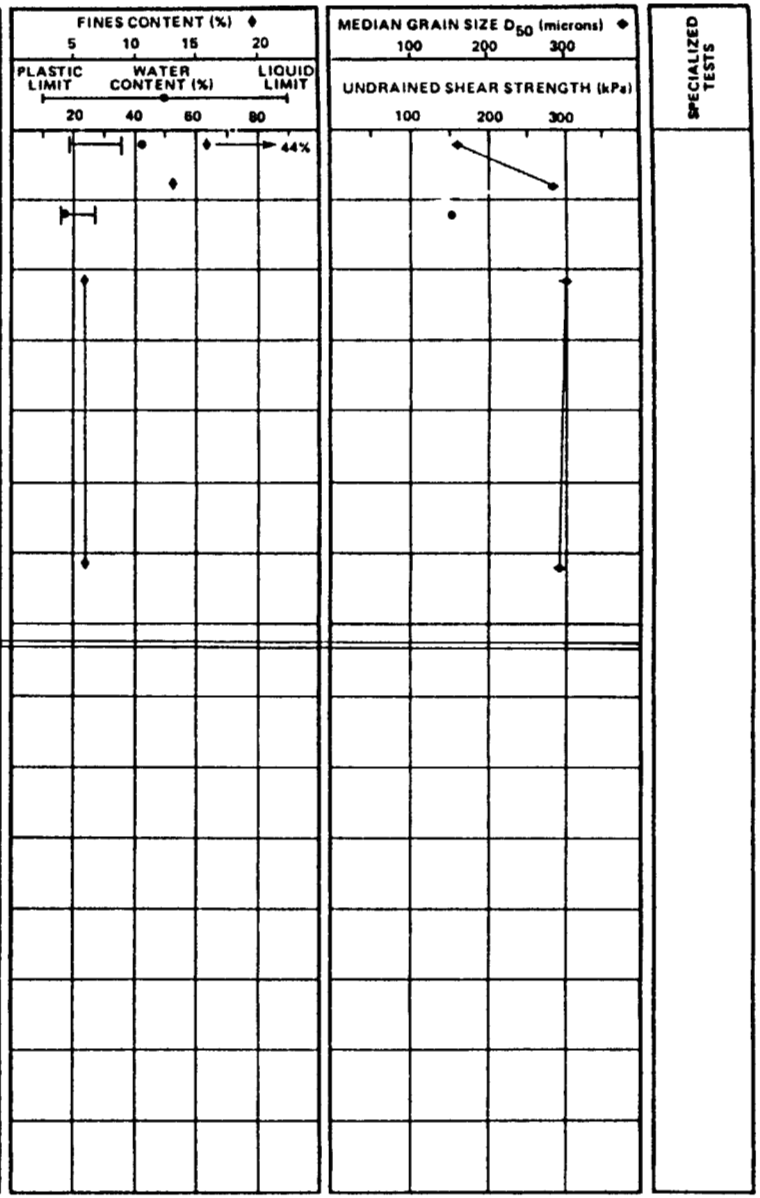
PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS

LOCATION: NERLERK SITE
UTM COORDINATES: 7 815 712 m N. 561 875 m E. WATER DEPTH: 44.2 m

SYM.	No.	SOIL DESCRIPTION	GROUND ICE T (°C)
	A	SAND (SC) - CLAYEY, some SILT, fine-grained, very soft, low plasticity, dark grey	NOT FROZEN
	B	0.2 m(-44.4 m El.)	
	C	SAND (SM) - traces of SILT and shell fragments, fine-grained, uniform, brown	
	D	0.5 m(-44.7 m El.)	
	E	CLAY (CL) - and SILT, SAND partings, stiff, low plasticity, brown	
		0.8 m(-45.0 m El.)	
	F	SAND (SP - SM) - trace SILT, fine-grained, uniform, brown	
	G	- CLAYEY below 3.55 m	
		END OF BOREHOLE 3.6 m(-47.8 m El.)	

Note: Maximum penetration after 60 minutes



JOB No.: 101 - 3605
DRILLING COMPLETED: 82/08/15
BOREHOLE DEPTH: 3.6 m(-47.8 m El.)
DRILLING RIG: Vibrocore
LOG COMPILED BY: BR/CL

LEGEND

SOIL SYMBOLS: SAND, SILT, CLAY

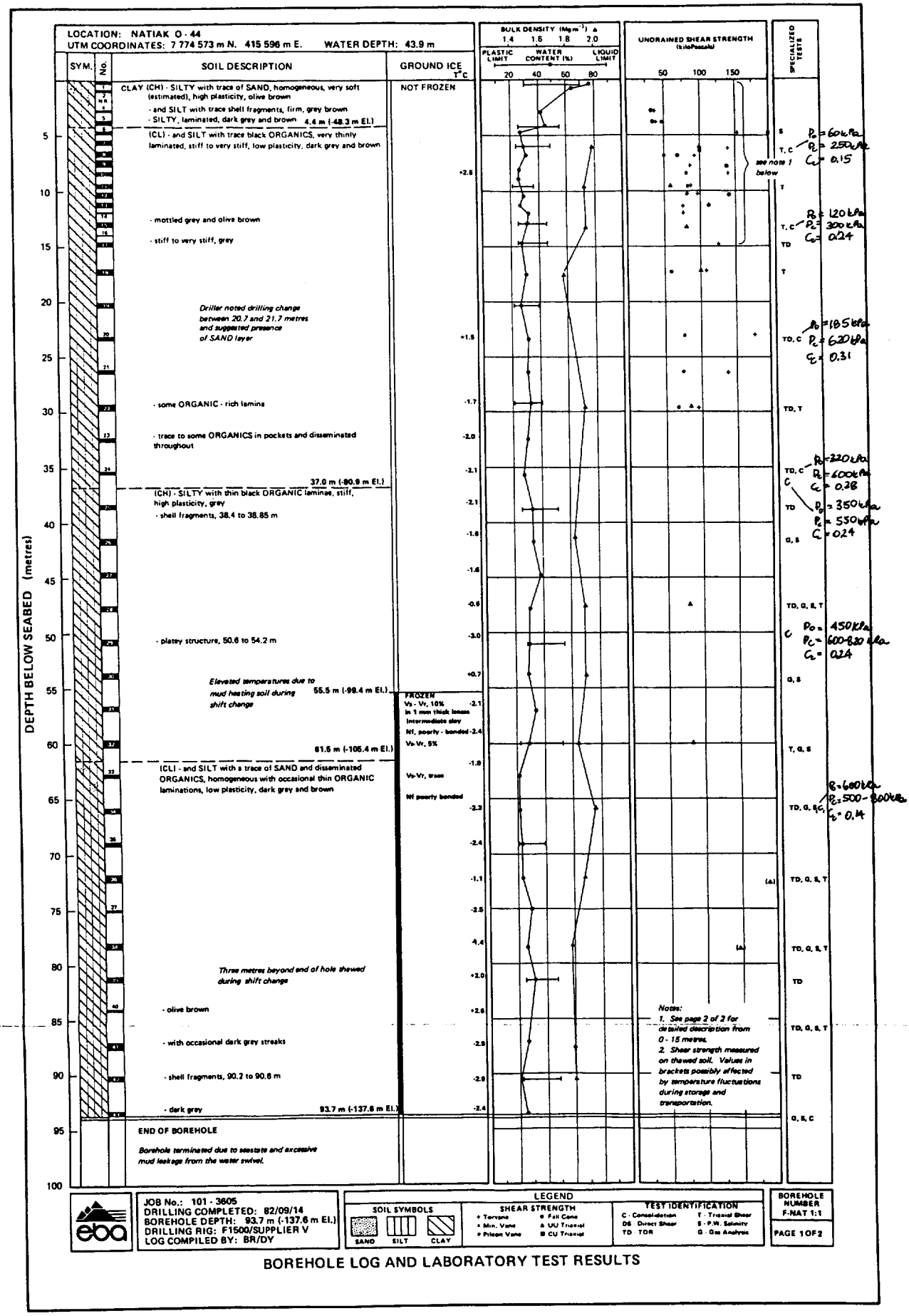
SHEAR STRENGTH
+ Torvane
× Min. Vane
⊕ Pilcon Vane
○ Halibut Vane
● Fall Cone
▲ UU Triaxial
■ CU Triaxial

TEST IDENTIFICATION
C - Consolidation
DS - Direct Shear
TD - TDR
Ca - Calorimetry
T - Triaxial Shear
S - P.W. Salinity
G - Gas Analysis

BOREHOLE NUMBER V-NER 2:21

PAGE 1 OF 1

BOREHOLE LOG AND LABORATORY TEST RESULTS



BOREHOLE LOG AND LABORATORY TEST RESULTS

SUMMARY OF TEST RESULTS

Borehole Number / Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (Mgm^{-3})	ATTERBERG LIMITS: Liquid Limit (%)	ATTERBERG LIMITS: Plastic Limit (%)	GRAIN SIZE DISTRIBUTION: Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D_{50} (μm)	SHEAR STRENGTH: Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	CONSOLIDATION CHARACTERISTICS: P_o (kPa)	P_c (kPa)	C_c	TEST RESULTS TABULATED SEPARATELY
1A	B	0.0-0.3	CH			77		2.2SG	69	30	64	34	2	0	1.3				very soft				0=9%
2A	B	*0.9-1.1				64																	
3A	NR	1.8-																					
4A	B	**2.7-2.9				41										TV	35		firm				
																FC	33		firm				
5A	B	*3.7-4.1	CH			47			55	26	56	38	6	0	1.5	TV	39		firm				
																FC	33		firm				
																PV	48		firm				
6A	B	*4.6-4.9				26										TV	155		v. stiff				S
																FC	196		v. stiff				
7A	W	*5.5-5.9				23/27		1.98								UU	100	20	v. stiff	60	250	0.15	
7B	B	5.5-5.9	CL			30			48	24	35	63	2	0	4.0	TV	139		v. stiff				
																PV	100		v. stiff				
8A	B	6.4-6.9				32										TV	91		stiff				
																FC	67		stiff				
																PV	50		firm				
9A	W	*7.3-7.8				29		1.95								UU	85	20	stiff				
9B	B	7.3-7.8						2.7SG								TV	86		stiff				0=9%
																FC	132		v. stiff				
10A	B	*8.2-8.6			+2.5	28										TV	139		v. stiff				
																PV	80		stiff				

LEGEND AND NOTES

- B Bag Sample
- G Gas Sample
- L Liner Sample
- P Piston Sample
- NR No Recovery
- NS No Sample Remaining
- PF Permafrost Sample
- PW Porewater Sample
- T Sample Stored in Tube
- W Waxed Sample
- RC Radiocarbon Sample
- MV Minivane
- FC Fall Cone
- TV Torvane
- PV Pilcon Vane
- RV Remote Vane
- UU Unconsolidated Undrained Triaxial
- UUp UU Triaxial with Pore Pressure Measurements
- CU Consolidated Undrained Triaxial
- CUp CU Triaxial with Pore Pressure Measurements
- CD Consolidated Drained Triaxial
- O Organic Content
- S Salinity
- TS Thaw Strain
- SG Specific Gravity

1982 OFFSHORE GEOTECHNICAL SITE INVESTIGATION
NATIAK O-44, BEAUFORT SEA

Project Number: 101-3605

Reviewed By: _____ P.Eng.

2143

SUMMARY OF TEST RESULTS

Borehole Number / Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (Mgm^{-3})	ATTERBERG LIMITS: Liquid Limit (%)	ATTERBERG LIMITS: Plastic Limit (%)	GRAIN SIZE DISTRIBUTION: Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D_{50} (μm)	SHEAR STRENGTH: Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	CONSOLIDATION CHARACTERISTICS: P_o (kPa)	P_c (kPa)	C_c	TEST RESULTS TABULATED SEPARATELY
11A	W	*9.3-9.8				30		1.93								UU	56	20	soft				
11B	B	9.3-9.8	CL			29			37	22						TV	86		stiff				
																PV	82		stiff				
12A	B	*10.1-10.6				30		2.7SG								TV	96		stiff				0=10%
																FC	137		v. stiff				
																PV	80		stiff				
13A	W	*11.0-11.5				27		1.97								UU	162	12	v. stiff				
13B	B	11.0-11.5				28										TV	72		stiff				
																PV	110		v. stiff				
14A	B	*11.9-12.0				32										TV	72		stiff				
15A	W	*12.8-13.2				27	1.94									UU	77	19	stiff				
		12.8-13.2				30	1.94													120	300	.24	
15B	B	12.8-13.2	CL			32			45	25	33	66	1	0	4.0								
16A	NR	13.7-																					
17	B	*14.6-15.0	CL			28			46	25	40	60	0	0	3.0	TV	122		v. stiff				
18A	B	17.1-17.2				30										TV	107		v. stiff				S
																PV	58		stiff				
18B	W	*17.2-17.6				29	1.78									UU	100	14	v. stiff				
19	B	*20.1-20.4	CL			28			38	22													
20A	B	23.2-23.3			+1.5	32										TV	172		v. stiff				
																PV	72		stiff				

LEGEND AND NOTES

- B - Bag Sample
- G - Gas Sample
- L - Liner Sample
- P - Piston Sample
- NR - No Recovery
- NS - No Sample Remaining
- PF - Permafrost Sample
- PW - Porewater Sample
- T - Sample Stored in Tube
- W - Waxed Sample
- RC - Radiocarbon Sample
- MV - Minivane
- FC - Fall Cone
- TV - Torvane
- PV - Pilcon Vane
- RV - Remote Vane
- UU - Unconsolidated Undrained Triaxial
- UUp - UU Triaxial with Pore Pressure Measurements
- CU - Consolidated Undrained Triaxial
- CUp - CU Triaxial with Pore Pressure Measurements
- CD - Consolidated Drained Triaxial
- O - Organic Content
- S - Salinity
- TS - Thaw Strain
- SG - Specific Gravity

1982 OFFSHORE GEOTECHNICAL SITE INVESTIGATION
NATIAK O-44, BEAUFORT SEA

Project Number: 101-3605

Reviewed By: _____ P.Eng.

2143

SUMMARY OF TEST RESULTS

Borehole Number / Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (Mgm^{-3})	ATTERBERG LIMITS: Liquid Limit (%)	ATTERBERG LIMITS: Plastic Limit (%)	GRAIN SIZE DISTRIBUTION: Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D_{50} (μm)	SHEAR STRENGTH: Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	CONSOLIDATION CHARACTERISTICS: P_o (kPa)	P_c (kPa)	C_c	TEST RESULTS TABULATED SEPARATELY
20B	W	*23.3-23.5			+1.5	33	3	1.92												185	620	.31	
21A	B	*26.2-26.3				31										TV	131		v. stiff				0=9
								2.7SG								PV	72		stiff				
21B	W	*26.3-26.5				29		1.98								UU	111	18	v. stiff				
22A	B	29.3-29.4	CL		-1.7	31			42	22	34	65	1	0		TV	93		stiff				
22B	W	*29.4-29.8					2									PV	65		stiff				
22B	W	29.4-29.8			-1.7	29		1.92								UU	81	18	stiff				
23	PF	*32.3-32.7			-2.0	31																	
24A	PF	*35.4-35.6			-2.1	25	1	1.88												320	600	.28	
24B	B	35.6-35.7			-2.1	28																	
25A	PF	*38.4-38.7			-2.1	32/30		1.86								UU	90	20	stiff	350	550	0.24	
25B	B	38.7-38.8	CH		-2.1	33	4	1.93	51	25													S
26A	PF	*41.4-41.6			-1.6	33		1.87								UU	77	9	stiff				0=10%
26	G	*41.6-41.7			-1.6																		
26	PW	*41.6-41.7			-1.6																		S
26B	B	*41.7-41.8			-1.6	33		2.8SG															
27A	B	44.5-44.8			-1.6	39																	
27B	PF	*44.8-44.9			-1.6	31		1.87								UU	79	9	stiff				
28	G	47.5-47.6			-0.6																		
28	PW	47.5-47.6			-0.6																		S
28A	PF	*47.7-47.8			-0.6	27		1.9								UU	77	9.5	stiff				

LEGEND AND NOTES

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- PV - Pilcon Vane
- RV - Remote Vane
- UU - Unconsolidated Undrained Triaxial
- UUp - UU Triaxial with Pore Pressure Measurements
- CU - Consolidated Undrained Triaxial
- CUp - CU Triaxial with Pore Pressure Measurements
- CD - Consolidated Drained Triaxial
- O - Organic Content
- S - Salinity
- TS - Thaw Strain
- SG - Specific Gravity

1982 OFFSHORE GEOTECHNICAL SITE INVESTIGATION
NATIAK O-44, BEAUFORT SEA

Project Number: 101-3605

Reviewed By: _____ P.Eng.

2143

SUMMARY OF TEST RESULTS

Borehole Number / Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (Mgm^{-3})	ATTERBERG LIMITS: Liquid Limit (%)	ATTERBERG LIMITS: Plastic Limit (%)	GRAIN SIZE DISTRIBUTION: Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D_{50} (μm)	SHEAR STRENGTH: Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	CONSOLIDATION CHARACTERISTICS: P_o (kPa)	P_c (kPa)	C_c	TEST RESULTS TABULATED SEPARATELY
28B	B	47.8-48.0			-0.6	31	2																
29A	PF	*50.6-51.0			-0.3	31		1.94												450	600-	0.24	
29B	B	51.0-51.1	CH		-0.3	29			55	28	65	35	0	0							820		
30	G	53.7-54.2			+0.7																		
30	PW	53.7-54.2			+0.7																		S
30A	PF	*53.9-54.0			+0.7	27		1.94								UU	233	16					
30B	B	54.0-54.2			+0.7	29																	
31	B	*56.7-57.1		Vr-Vs	-2.1	36																	
32	G	59.7-60.4		Vr-Vs	-2.4																		
32	PW	**59.7-60.4		Vr-Vs	-2.4																		S
32A	PF	60.0-60.2		Vr-Vs	-2.4	27		1.8								UU	80	4.5	stiff				
32B	B	60.3-60.4	CH	Vr-Vs	-2.4	30			53	23													S, O=10%
33	B	*62.8-63.1		Vr-Vs	-1.0	22																	
34	G	65.8-66.2		Nf	-2.3	23		2.07												600	500-	0.14	
34	PW	65.8-66.2		Nf	-2.3																800		S
34A	PF	*65.9-66.0		Nf	-2.3	22		2.02								UU	269	9					O=8%
34B	B	66.0-66.2		Nf	-2.3	22	11																
35	B	*68.9-69.3	CL	Nf	-2.4	24			40	22	28	71	1	0									
36	G	71.9-72.2		Nf	-1.1																		
36	PW	71.9-72.2		Nf	-1.1																		S
36A	PF	*72.2-72.3		Nf	-1.1	12		1.9								UU	188	6.0	v. stiff				

LEGEND AND NOTES

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- T - Sample Stored in Tube
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- MV - Minivane
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- TV - Torvane
- PV - Pilcon Vane
- RV - Remote Vane
- UU - Unconsolidated Undrained Triaxial
- UUp - UU Triaxial with Pore Pressure Measurements
- CU - Consolidated Undrained Triaxial
- CUp - CU Triaxial with Pore Pressure Measurements
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- S - Salinity
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1982 OFFSHORE GEOTECHNICAL SITE INVESTIGATION
NATIAK O-44, BEAUFORT SEA

Project Number: 101-3605

Reviewed By: _____ P.Eng.

2143

SUMMARY OF TEST RESULTS

Borehole Number / Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (Mgm^{-3})	ATTERBERG LIMITS: Liquid Limit (%)	ATTERBERG LIMITS: Plastic Limit (%)	GRAIN SIZE DISTRIBUTION: Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D_{50} (μm)	SHEAR STRENGTH: Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	CONSOLIDATION CHARACTERISTICS: P_o (kPa)	P_c (kPa)	C_c	TEST RESULTS TABULATED SEPARATELY
36B	B	72.4-72.5		Nf	-1.1	24	10																
37	B	*75.0-75.2		Nf	-2.5	30																	S
38	G	78.4-78.5		Nf	-1.4																		
38	PW	*78.4-78.5		Nf	-1.4																		S
38A	PF	*78.3-78.4		Nf	-1.4	27	14	1.74								UU	145	20	v. stiff				
38B	B	78.5-78.6		Nf	-1.4	27																	
39A	B	*81.1-81.6	CL	Nf	+2.0	32	18		48	26													
40A	B	*84.1-84.3		Nf	+2.6	41																	
41A	PF	*87.2-87.8		Nf	-2.9																		
41B	B	87.2-87.8		Nf	-2.9	27	8	1.80															2.7 SG
41C	G	87.2-87.8		Nf	-2.9																		0=10‰
41D	PW	87.2-87.8		Nf	-2.9																		S
42A	PF	*90.2-90.6		Nf	-2.9																		
42B	B	90.2-90.6	CL	Nf	-2.9	21	6	1.81	49	23	43	56	1	0									
43A	B	*93.3-93.7		Nf	-2.4	26																	0=8‰
43B	G	93.3-93.7		Nf	-2.4																		
43C	PW	93.3-93.7		Nf	-2.4																		S

LEGEND AND NOTES

- B Bag Sample
- G Gas Sample
- L Liner Sample
- P Piston Sample
- NR No Recovery
- NS No Sample Remaining
- PF Permafrost Sample
- PW Porewater Sample
- T Sample Stored in Tube
- W Waxed Sample
- RC Radiocarbon Sample
- MV Minivane
- FC Fall Cone
- TV Torvane
- PV Pilcon Vane
- RV Remote Vane
- UU Unconsolidated Undrained Triaxial
- UUp UU Triaxial with Pore Pressure Measurements
- CU Consolidated Undrained Triaxial
- CUp CU Triaxial with Pore Pressure Measurements
- CD Consolidated Drained Triaxial
- O Organic Content
- S Salinity
- TS Thaw Strain
- SG Specific Gravity

1982 OFFSHORE GEOTECHNICAL SITE INVESTIGATION
NATIAK O-44, BEAUFORT SEA

Project Number: 101-3605

Reviewed By: _____ P.Eng.

2143