Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

Report To
CYPRUS ANVIL MINING CORPORATION
On
1982
PERFORMANCE MONITORING
Of The
DOWN VALLEY TAILINGS PROJECT
Faro Yukon

VOLUME 2

IN DRAFT

DRAFT

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DATA PACKAGE AND CALENDAR PLOTS

VOLUME 2

Intermediate Dam
- Thermistors
- Piezometers

Cross Valley Dam
- Thermistors
- Piezometers
- Weir Flows
- Falling Head Tests
- Canal Thermistors
- 1979/80 Drilling and Investigation
- Canal Dyke
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Canal Piezometers

Canal Slope Indicators

Canal Incremental Settlements

Vertical and Horizontal Movement Hubs
- Intermediate Dam
- Cross Valley Dam
- Canal Dyke
- Canal Backslope
- Canal Spoil Piles
- Survey Control Stations

Field Procedures

Intermediate Dam

Thermistors

BH 79-29

ID7-0+740 (Sth Abutment)

Piezometers

Station 0+240

0+450

0+630

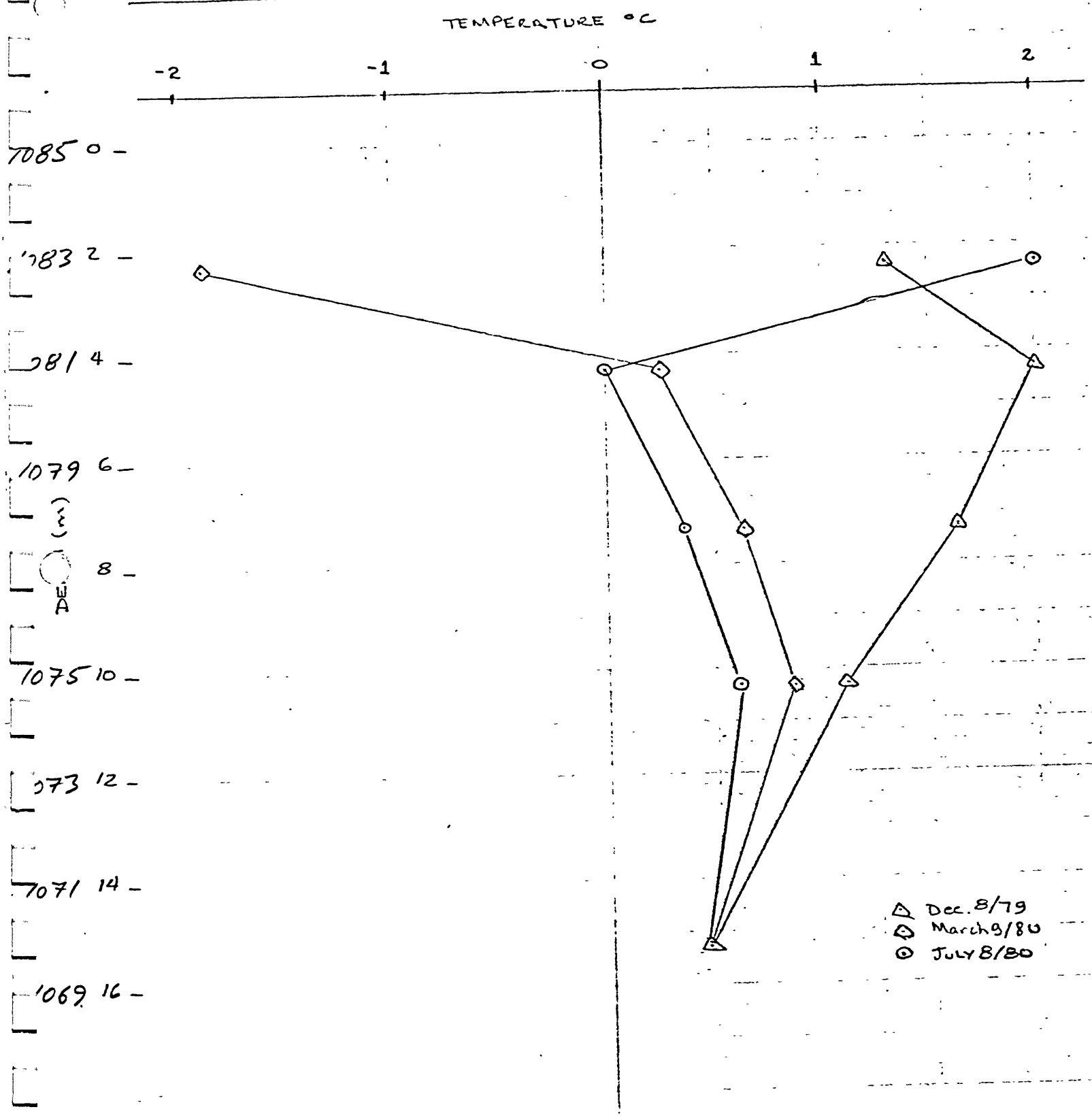
0+690

0+737 (Sth Abutment)

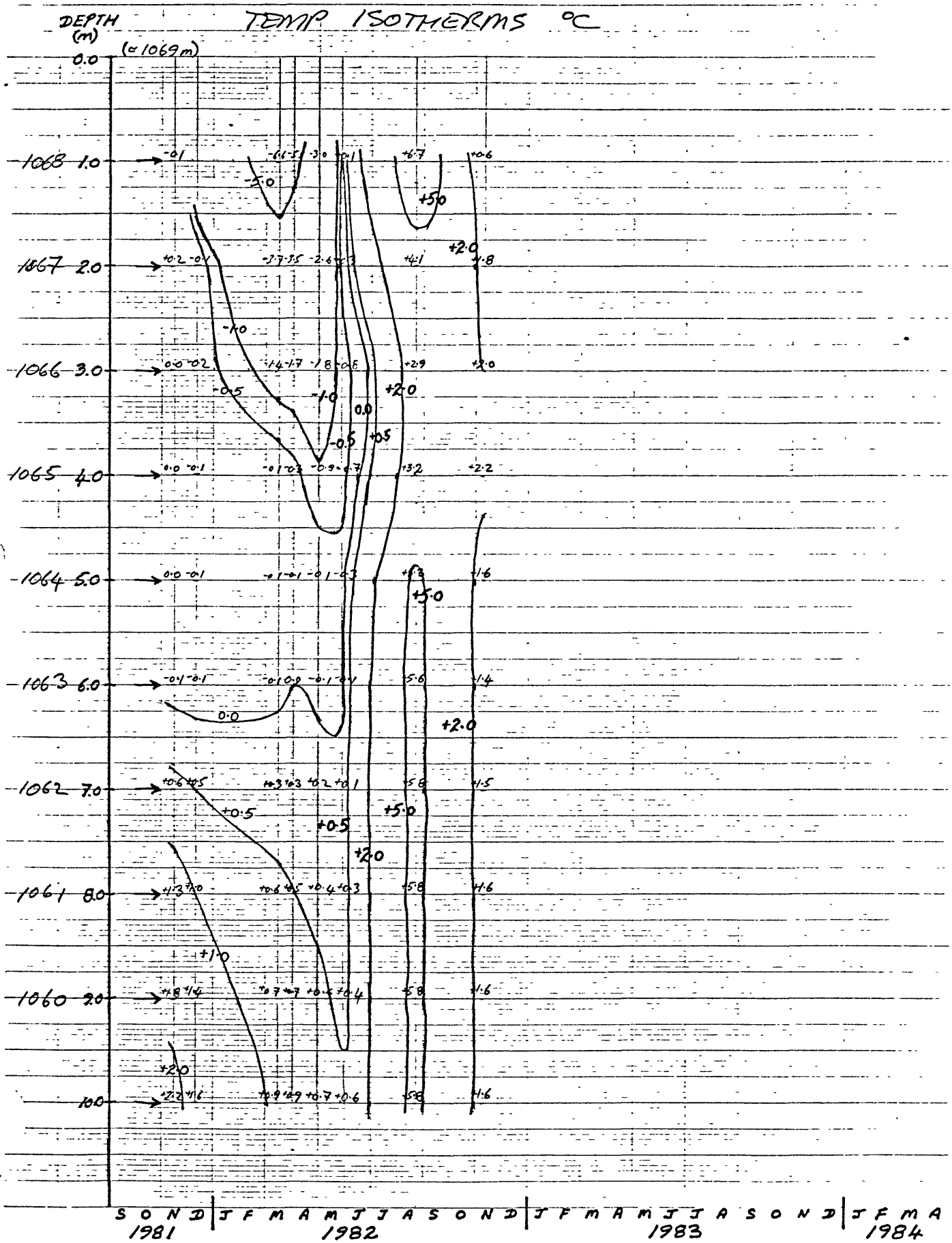
I.D. Sta 0+090
on I.D. ultimate dam &

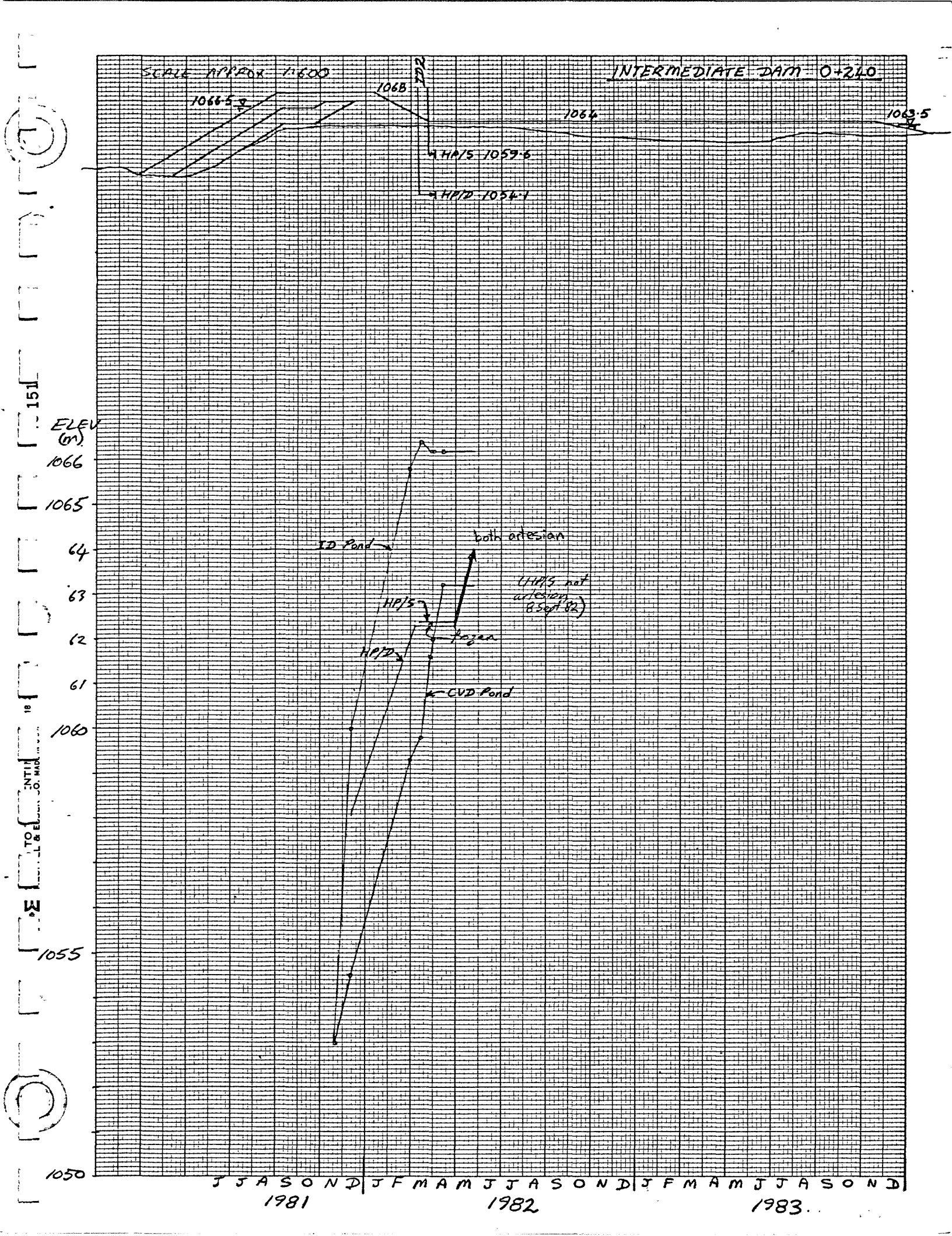
CYPRUS ANVIL
792-2025
THERMISTOR READINGS

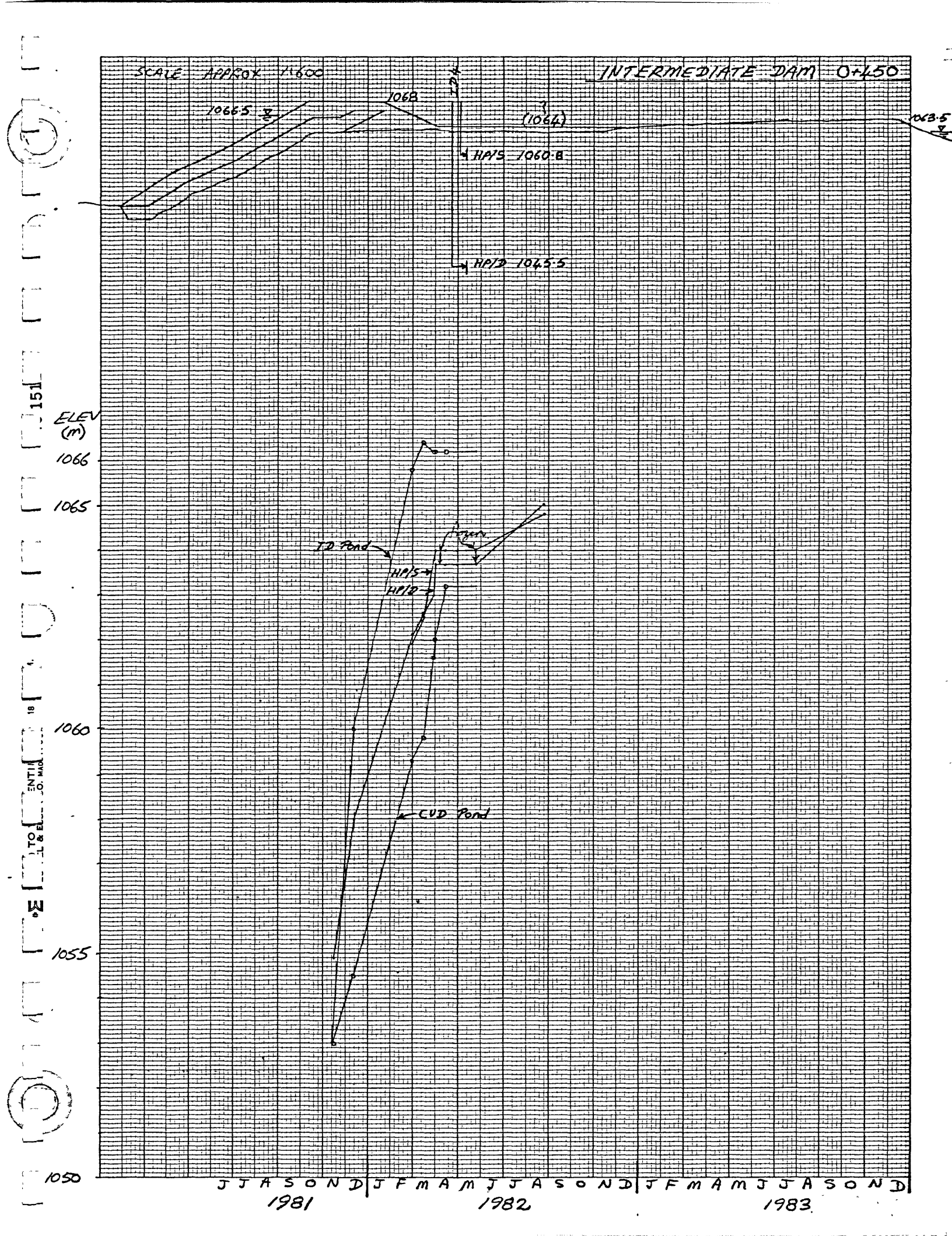
BH 79-29

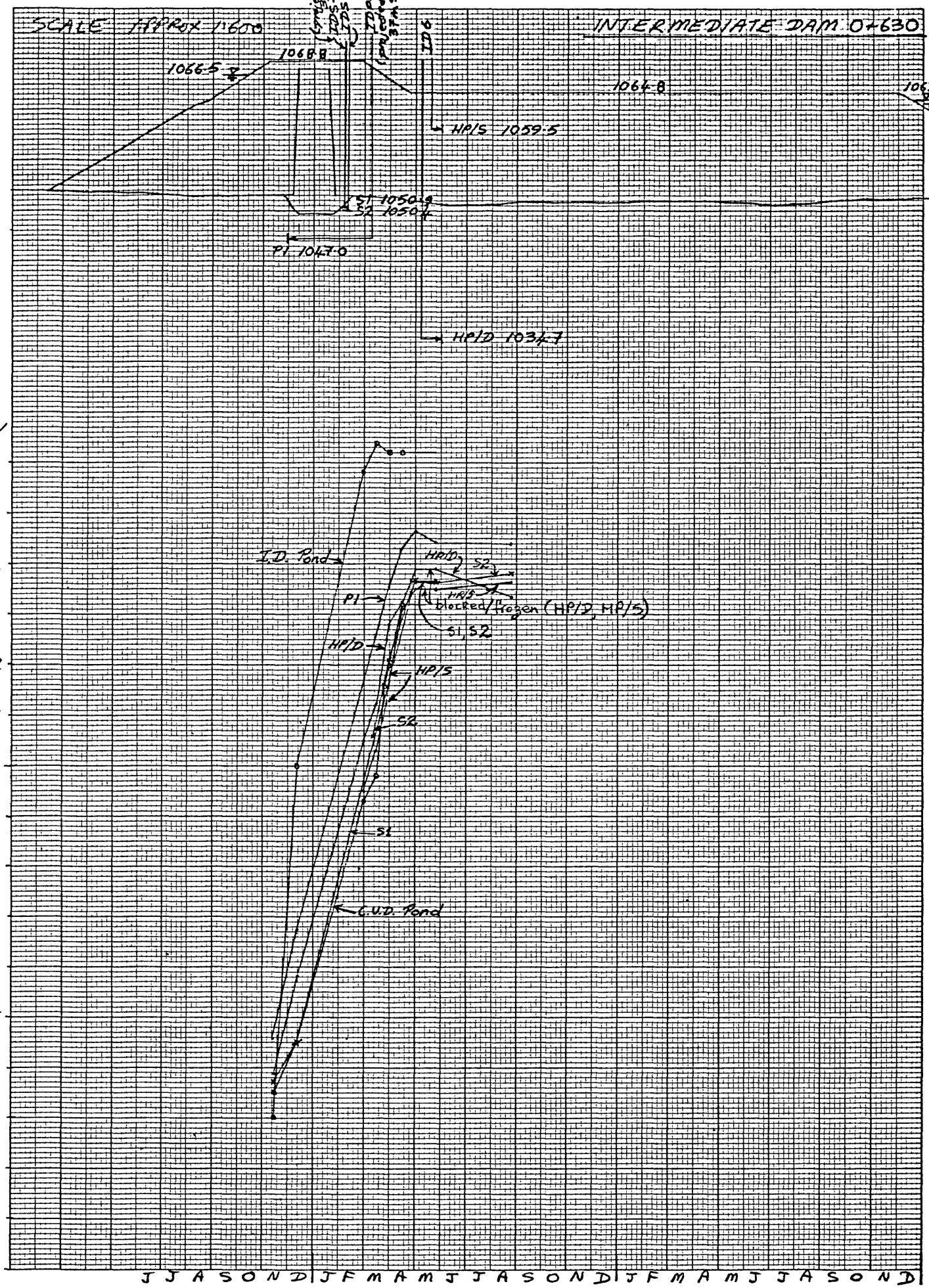


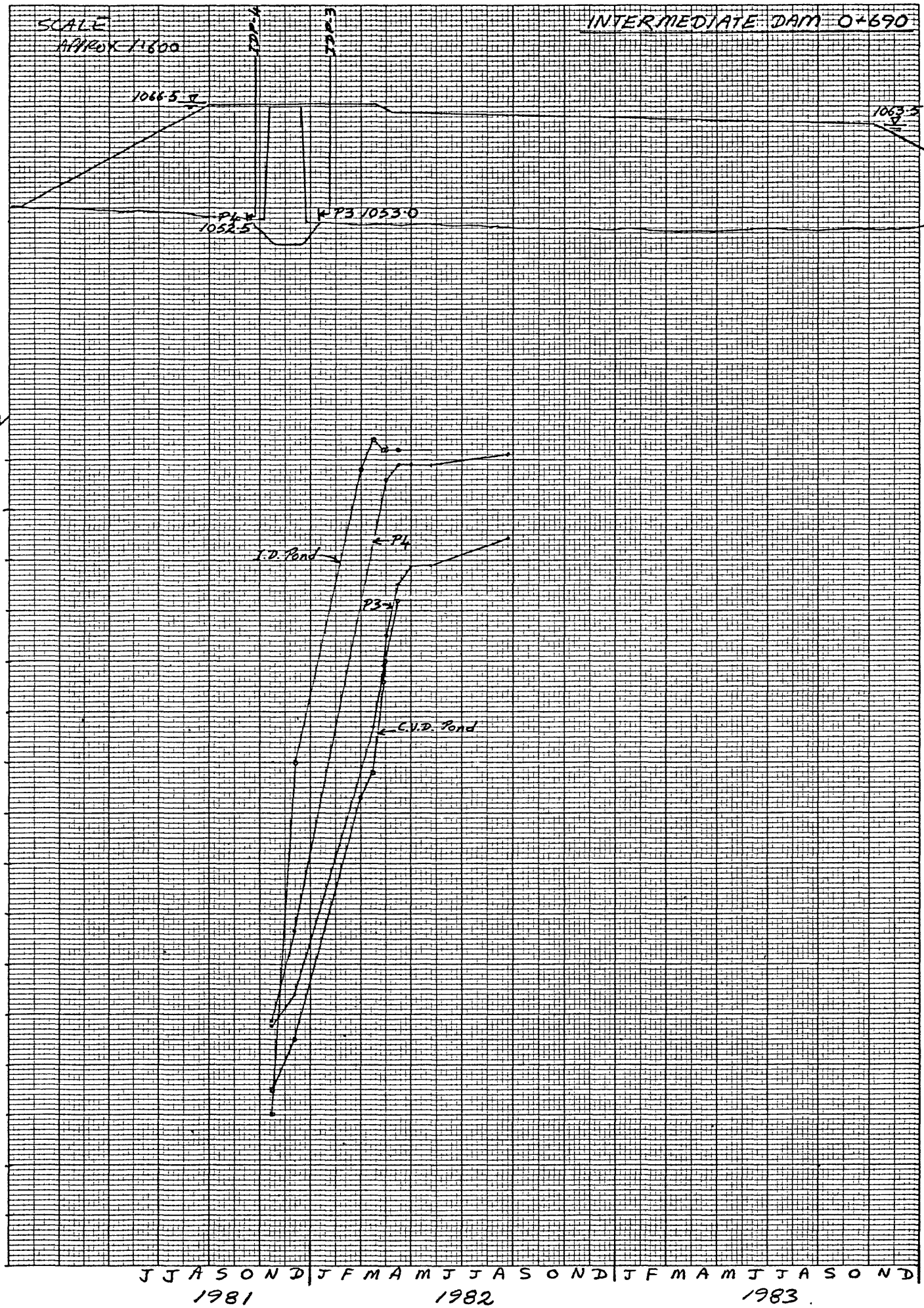
INTERMEDIATE DAM
ID7-0+740
(STH ABUTMENT)

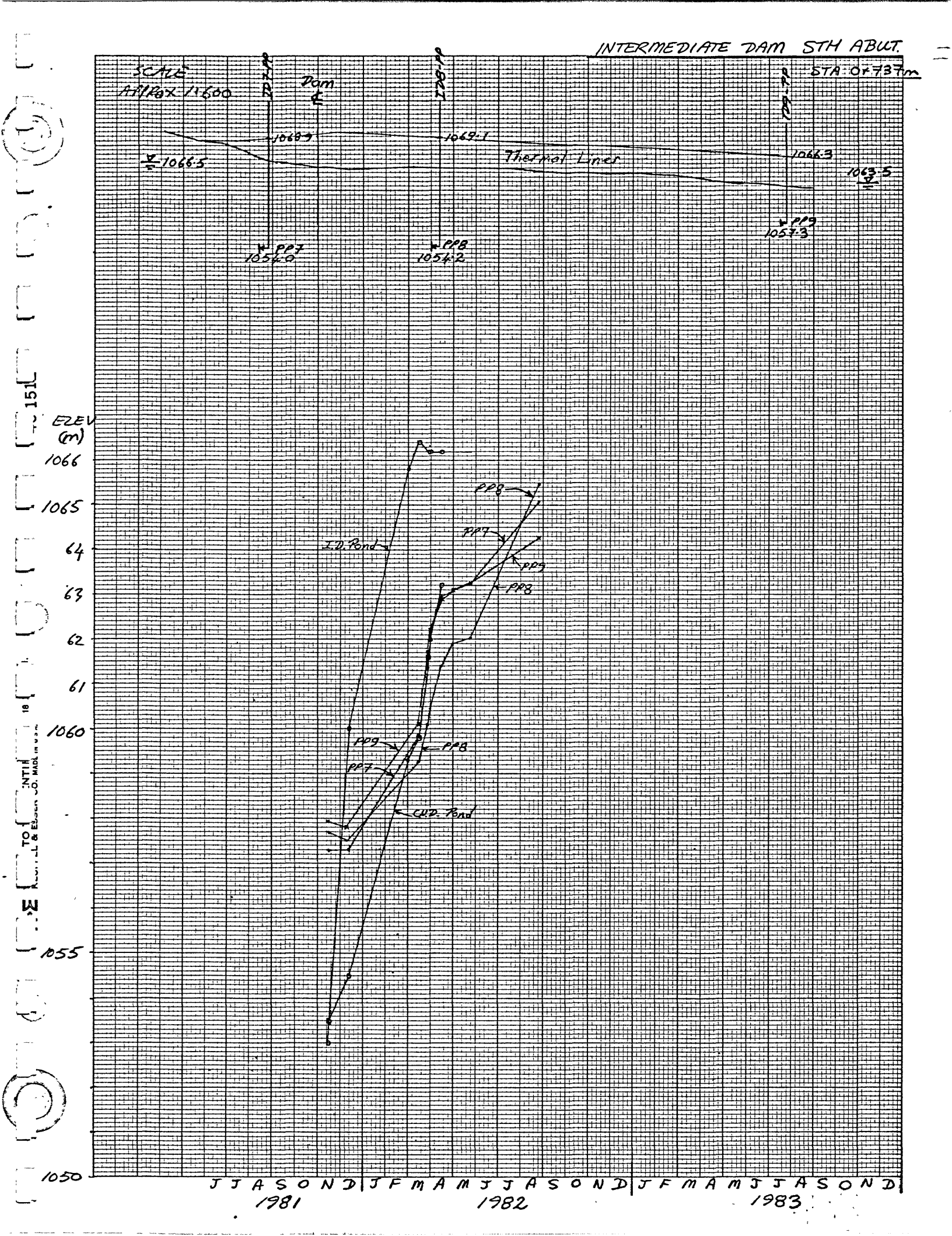



INTERMEDIATE DAM 0+240
SCALE APPROX 1:600
106B
1066.5
1064
1063.5
HP/S 1059.6
HP/D 1054.1
ELEV (m)
1066
1065
64
63
62
61
1060
1055
1050
ID Pond
both artesian
UHP/S not artesian (8 Sept 82)
HP/S
frozen
HP/D
CVD Pond
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


INTERMEDIATE DAM 0+450
SCALE APPROX 1:600
1066.5
1068
(1064)
1063.5
HP/S 1060.8
HP/D 1045.5
ELEV (m)
1066
1065
1060
1055
1050
TD Pond
HP/S
HP/D
CVD Pond
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


SCALE APPROX 1"=600'
INTERMEDIATE DAM 0+630
1066.5
1068.8
1064.8
1063.5
HP/S 1059.5
S1 1050.9
S2 1050.4
P1 1047.0
HP/D 1034.7
ELEV (m)
1066
1065
64
63
62
61
1060
1055
1050
I.D. Pond
P1
HP/D
HP/S
S2
S1
C.U.D. Pond
HP/D, S2
HP/S blocked/frozen (HP/D, HP/S)
S1, S2
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


INTERMEDIATE DAM 0+690
SCALE
APPROX 1:600
1066.5
1063.3
1052.5
P3 1053.0
ELEV (m)
1066
1065
1060
1055
1050
I.D. Pond
C.V.D. Pond
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


INTERMEDIATE DAM STH ABUT.
STA 0+737m
SCALE
APPROX 1:600
Dam
1068.9
1069.1
1066.3
1066.5
1063.5
Thermal Liner
PP7
1054.0
PP8
1054.2
PP9
1057.3
ELEV (m)
1066
1065
64
63
62
61
1060
1055
1050
I.D. Pond
PP8
PP7
PP9
PP8
PP9
PP7
C.I.D. Pond
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983

Cross Valley Dam

Thermistors

BH 79-16
BH 79-18
BH 79-20 (Nth Abutment)
CVDC1-0+050 (N.V.W.I.D.)
CVDC6-0+340
CVDC11-0+645 (Sth Abutment)
CVDT4-0+630 (Sth Abutment toe)

Piezometers

Nth Abutment
Station 0+210
0+360
0+450
0+570
Sth Abutment

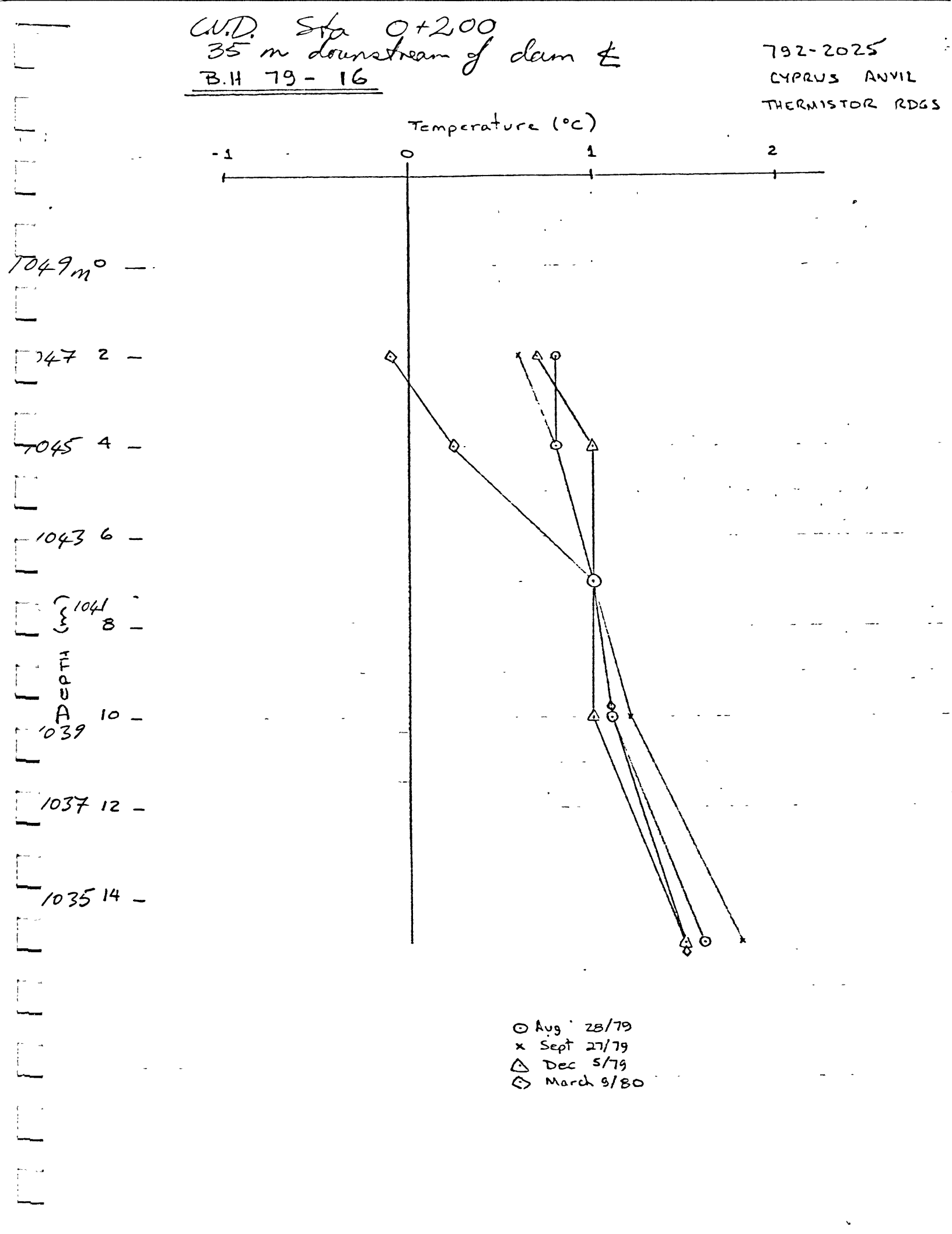
Weir Flows

Downstream Toe Drain

Falling Head Permeability Testing

C.D. Sta 0+200
35 m downstream of dam ℄
B.H 79-16

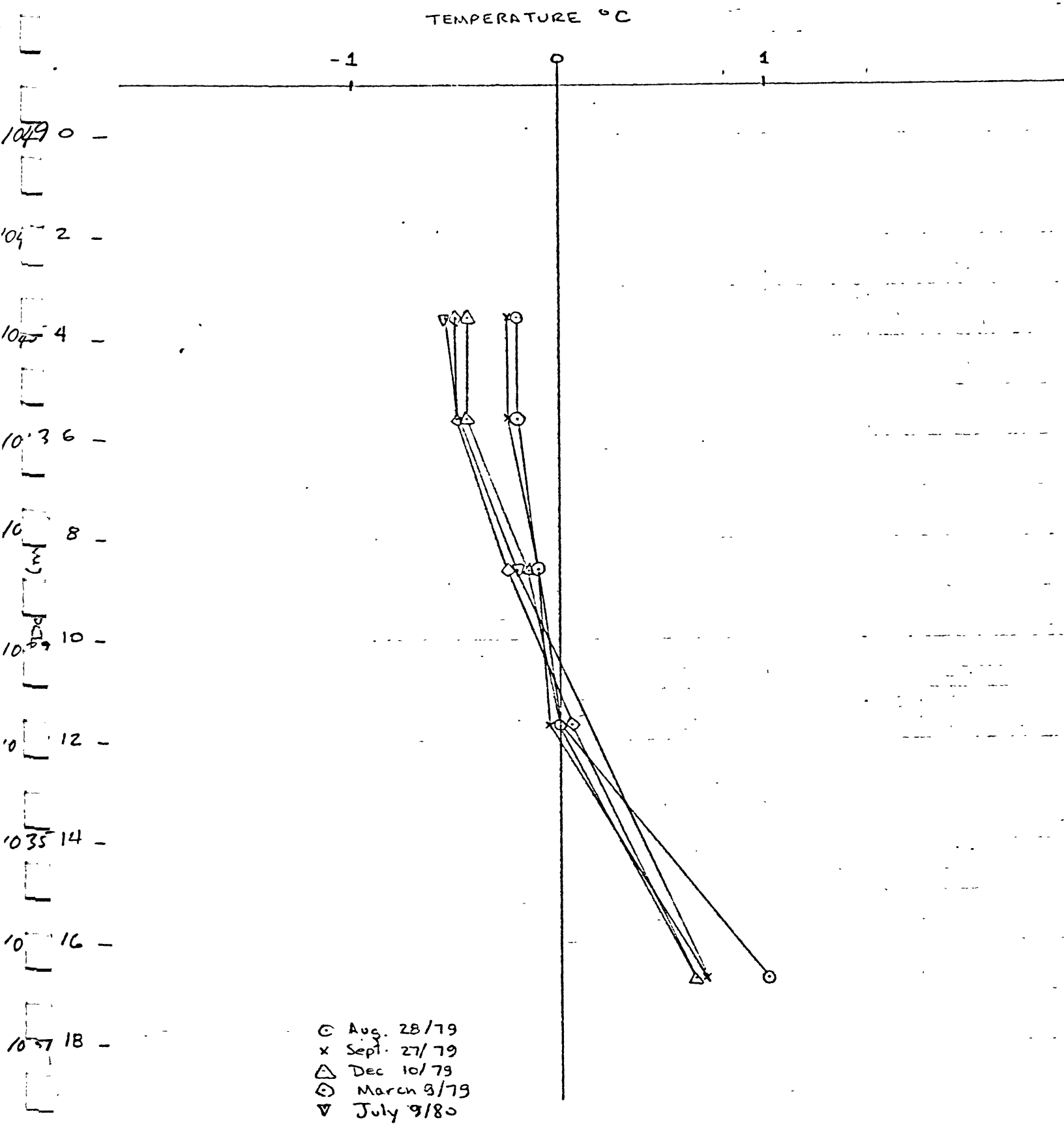
792-2025
CYPRUS ANVIL
THERMISTOR RDGS

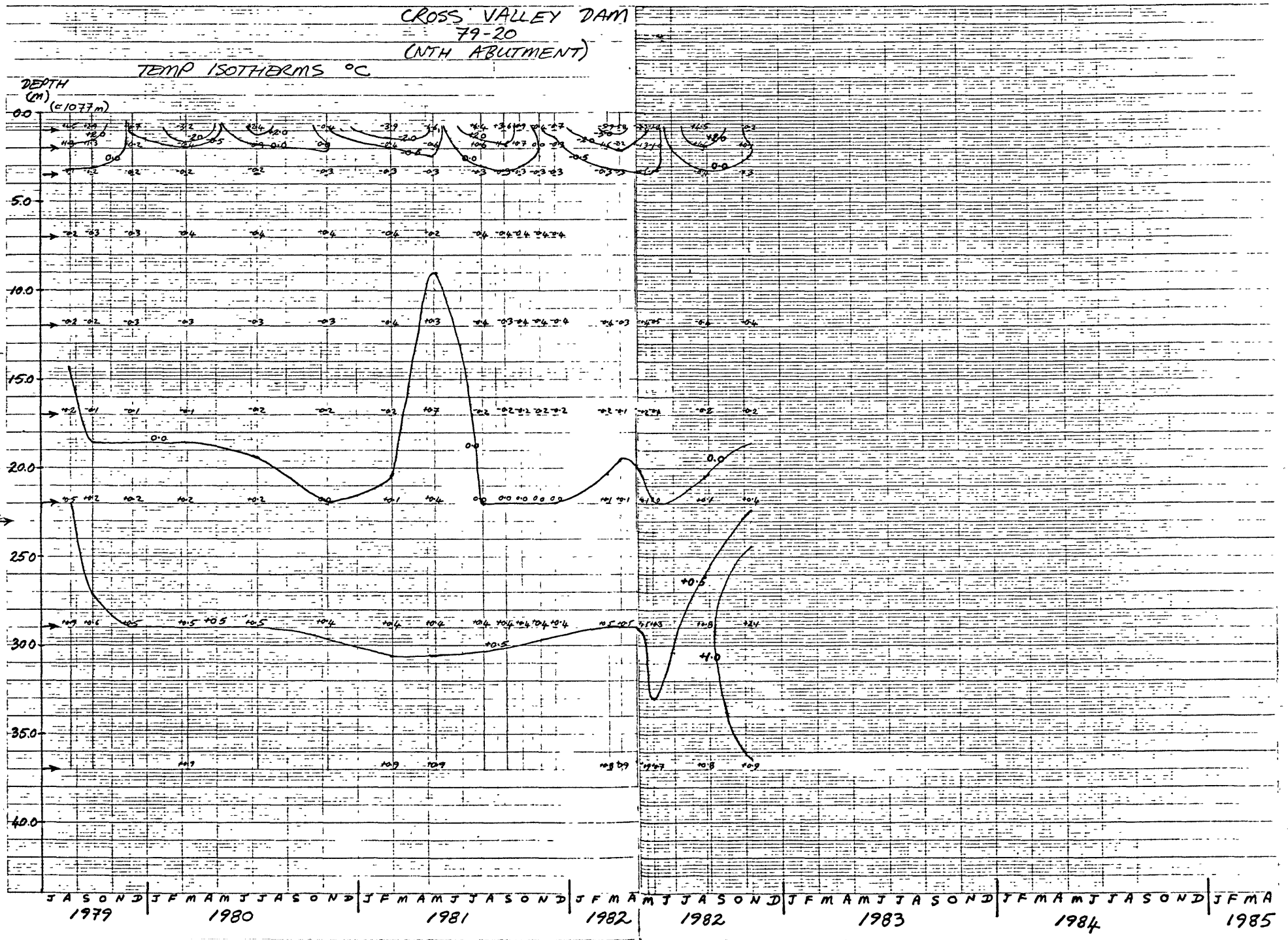


C.V.D. Sta 0+300
50 m upstream of dam ℄

792-2025
CYPRUS ANVIL
THERMISTOR RDGS

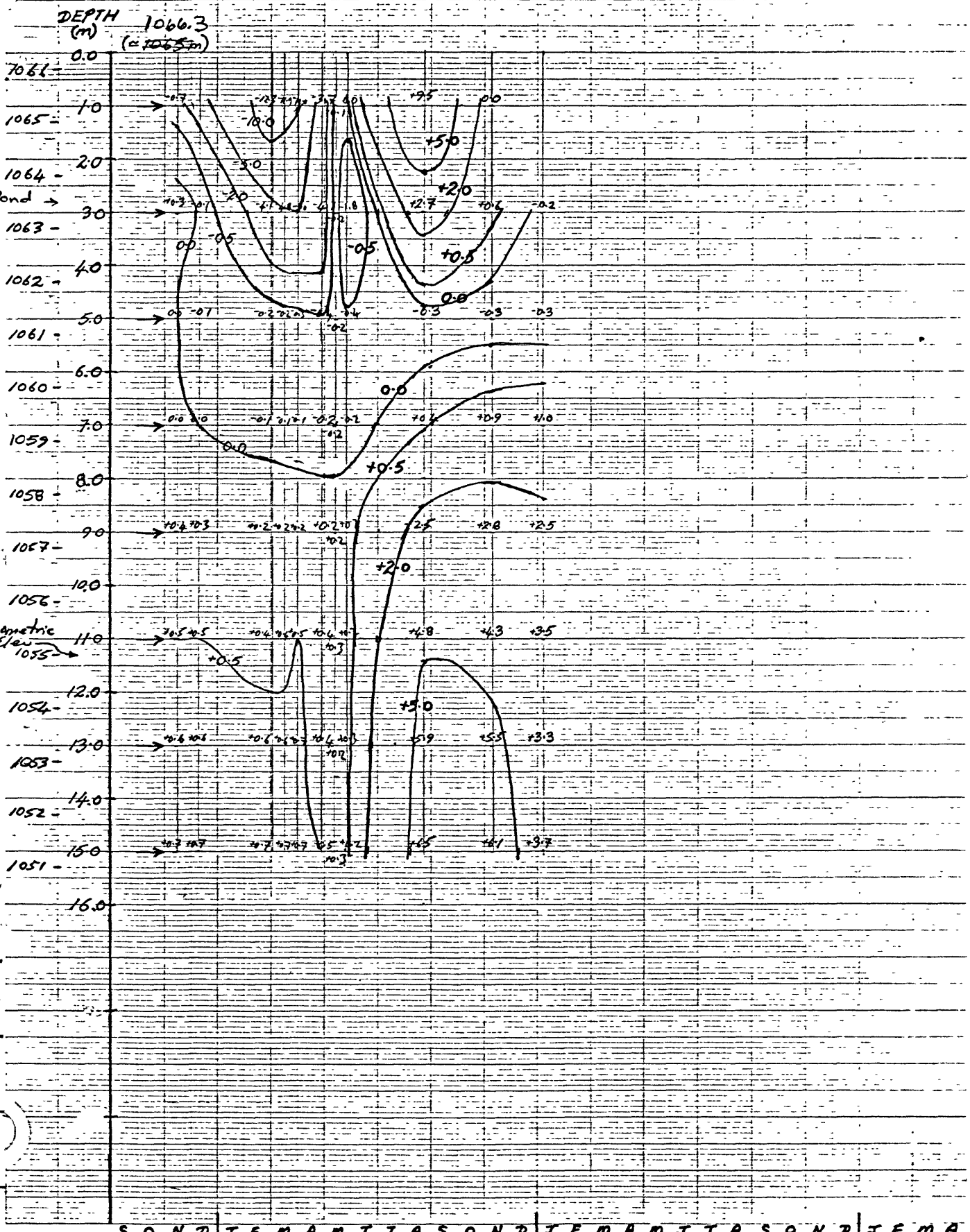
BH. 79-18




CROSS VALLEY DAM
79-20
(NTH ABUTMENT)
TEMP ISOTHERMS °C
DEPTH (M)
(≈1077m)
0.0
1072
5.0
1067
10.0
1062
15.0
1057
20.0
1052
25.0
1047
30.0
1042
35.0
40.0
approx piezometric level
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1979
1980
1981
1982
1982
1983
1984
1985

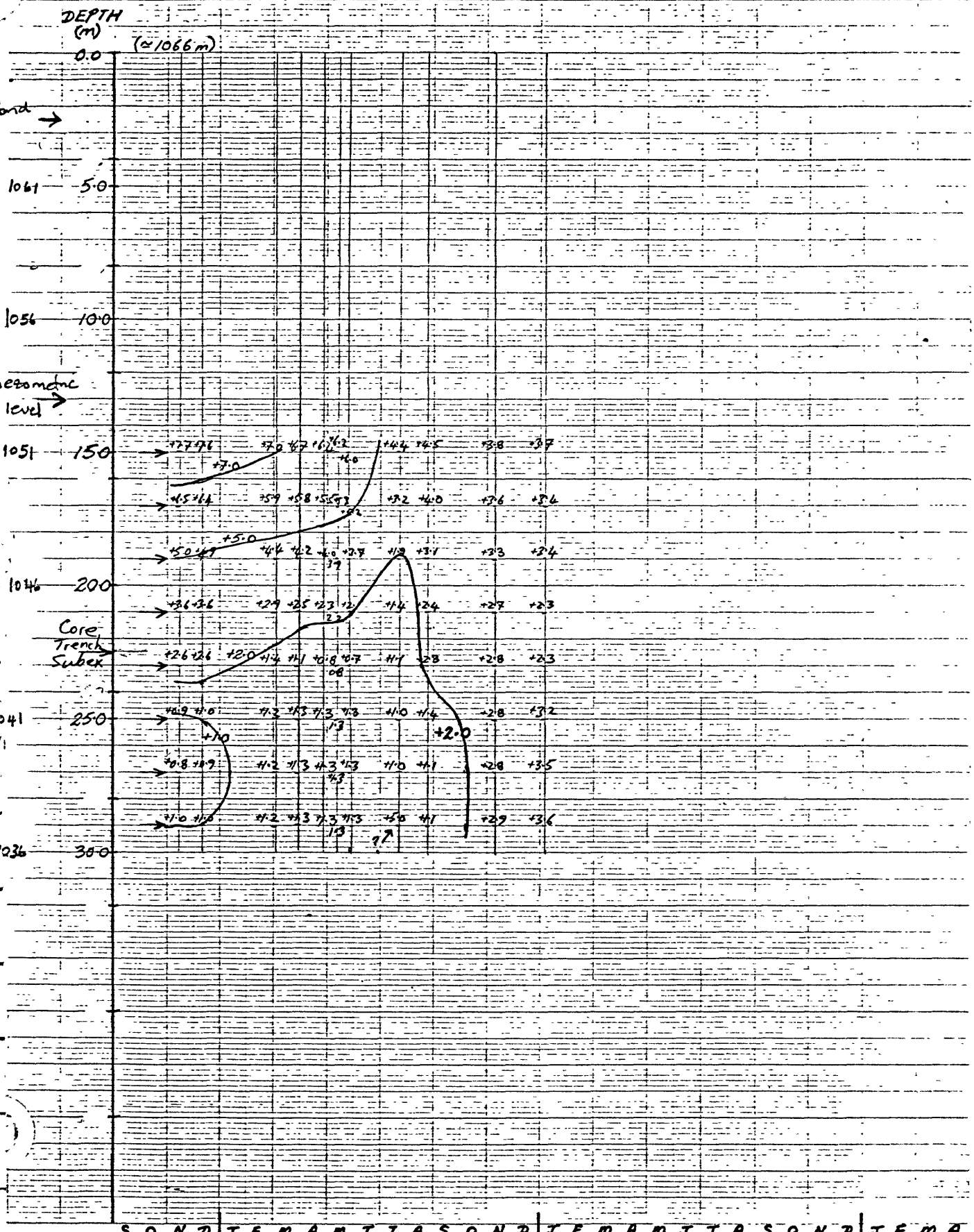
CROSS VALLEY DAM
CVDC1-0+050
(N.V.W.I.D.)

TEMP. ISOTHERMS °C



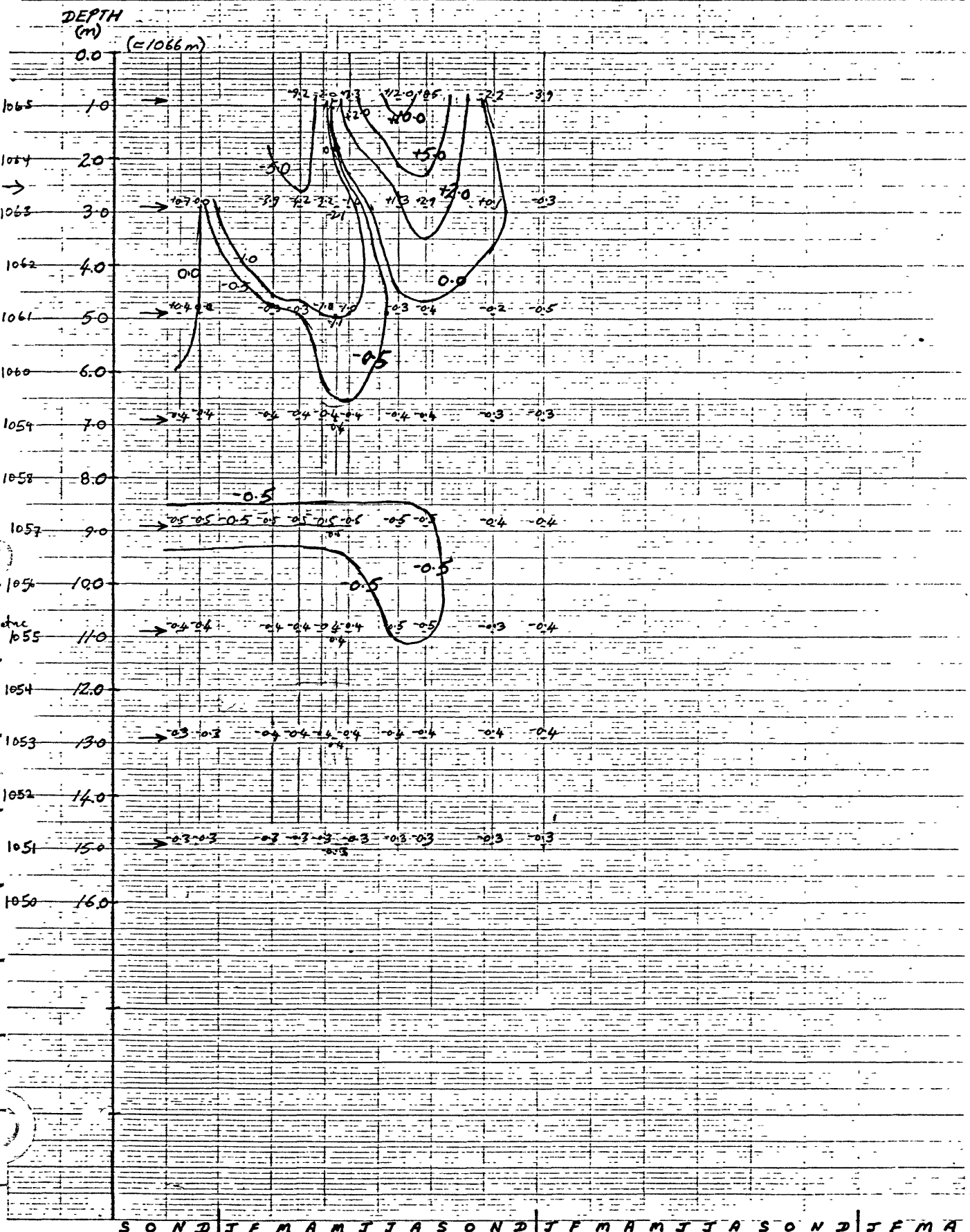
CROSS VALLEY DAM
CVDC6-0+340

TEMP ISOTHERMS °C



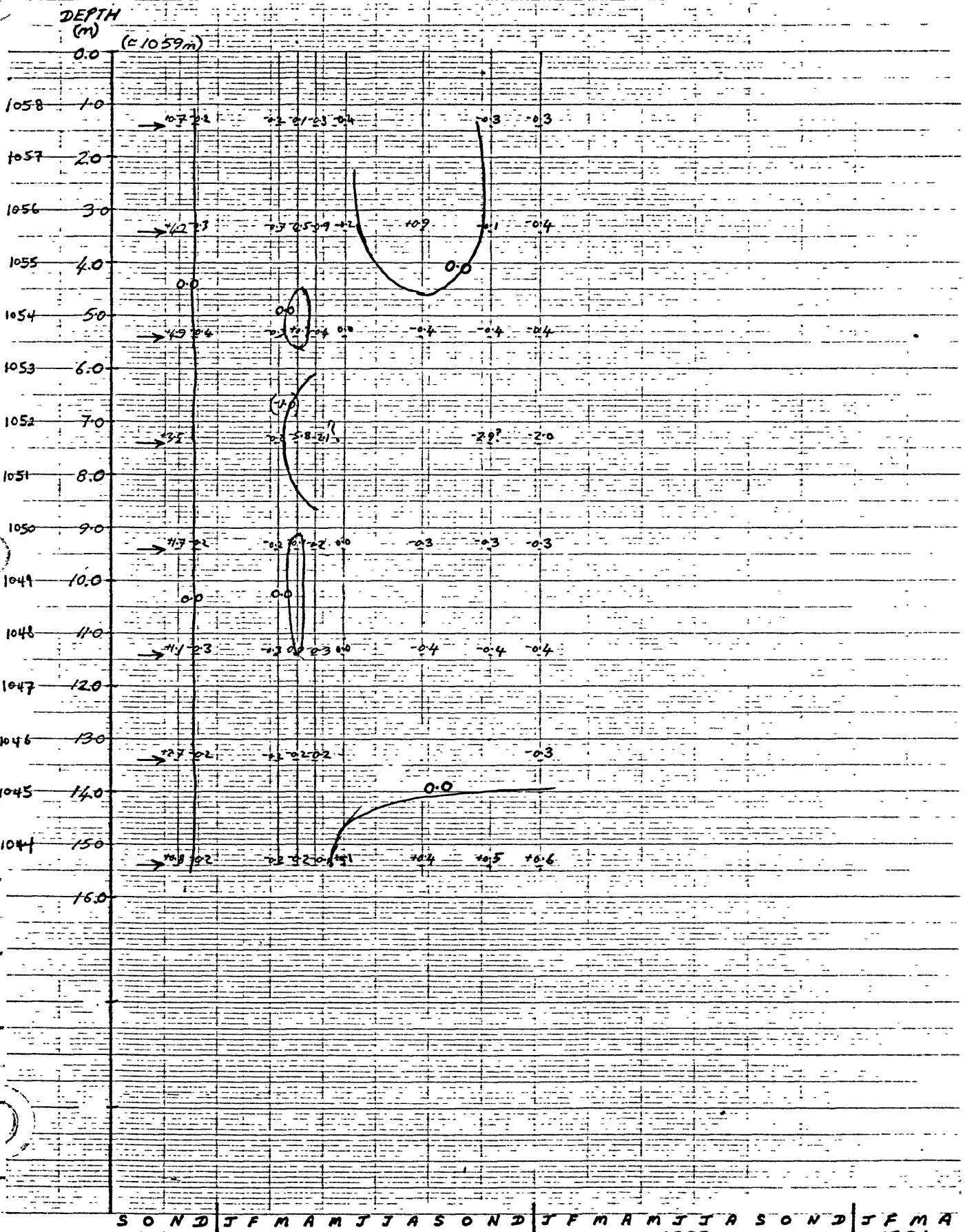
CROSS VALLEY DAM
CVDC11-0+645
(STH ABUTMENT)

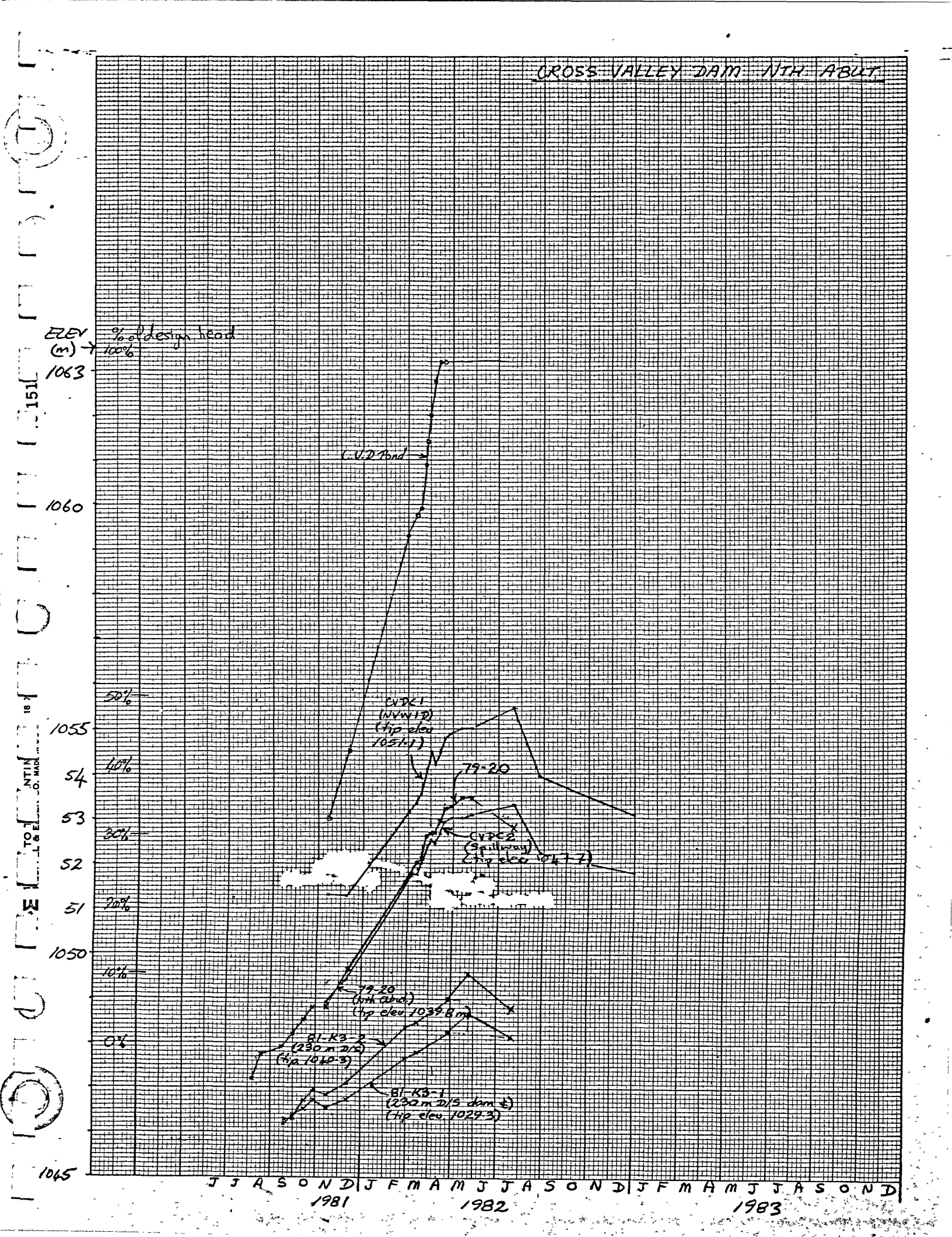
TEMP. ISOTHERMS °C

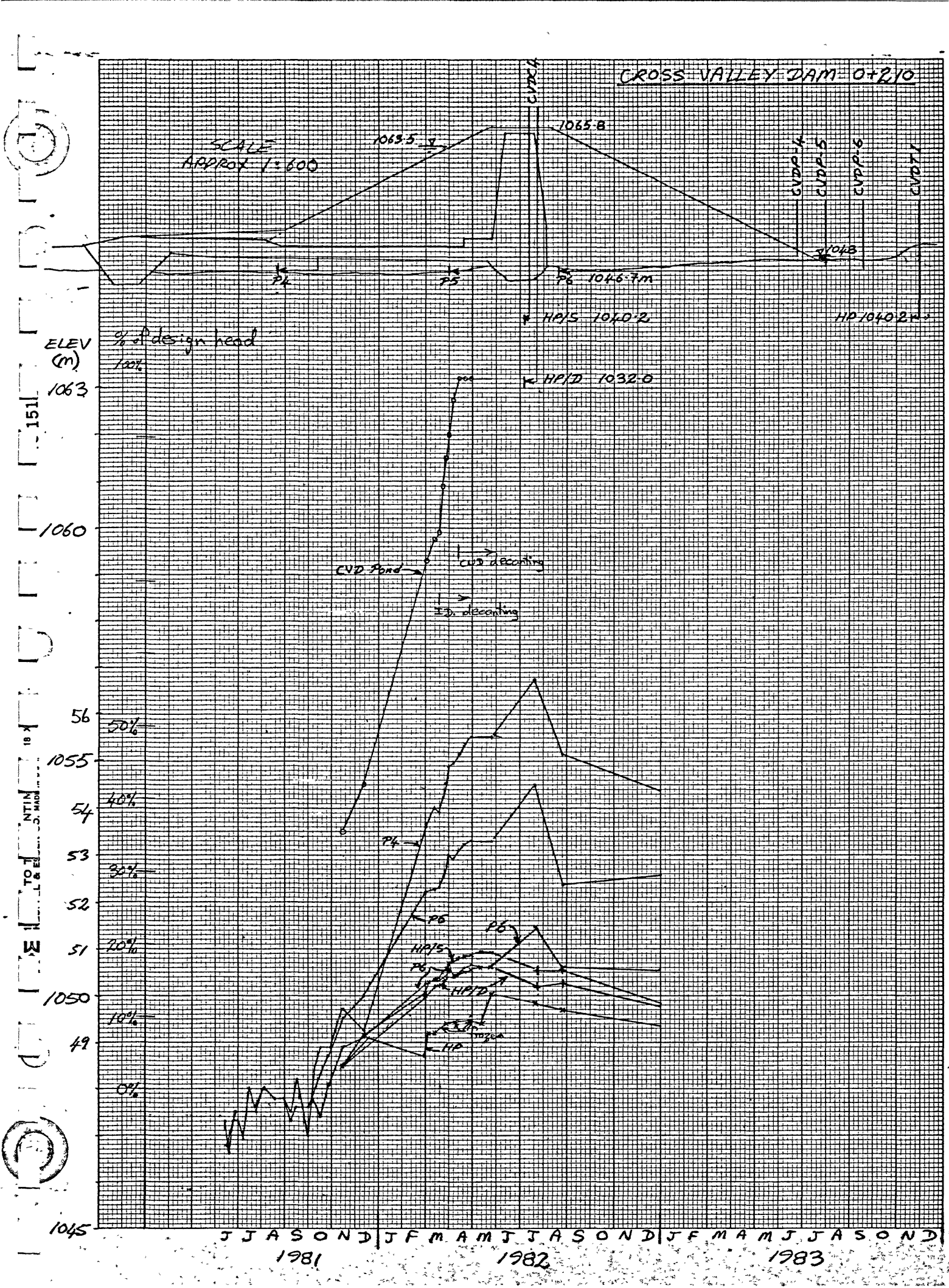


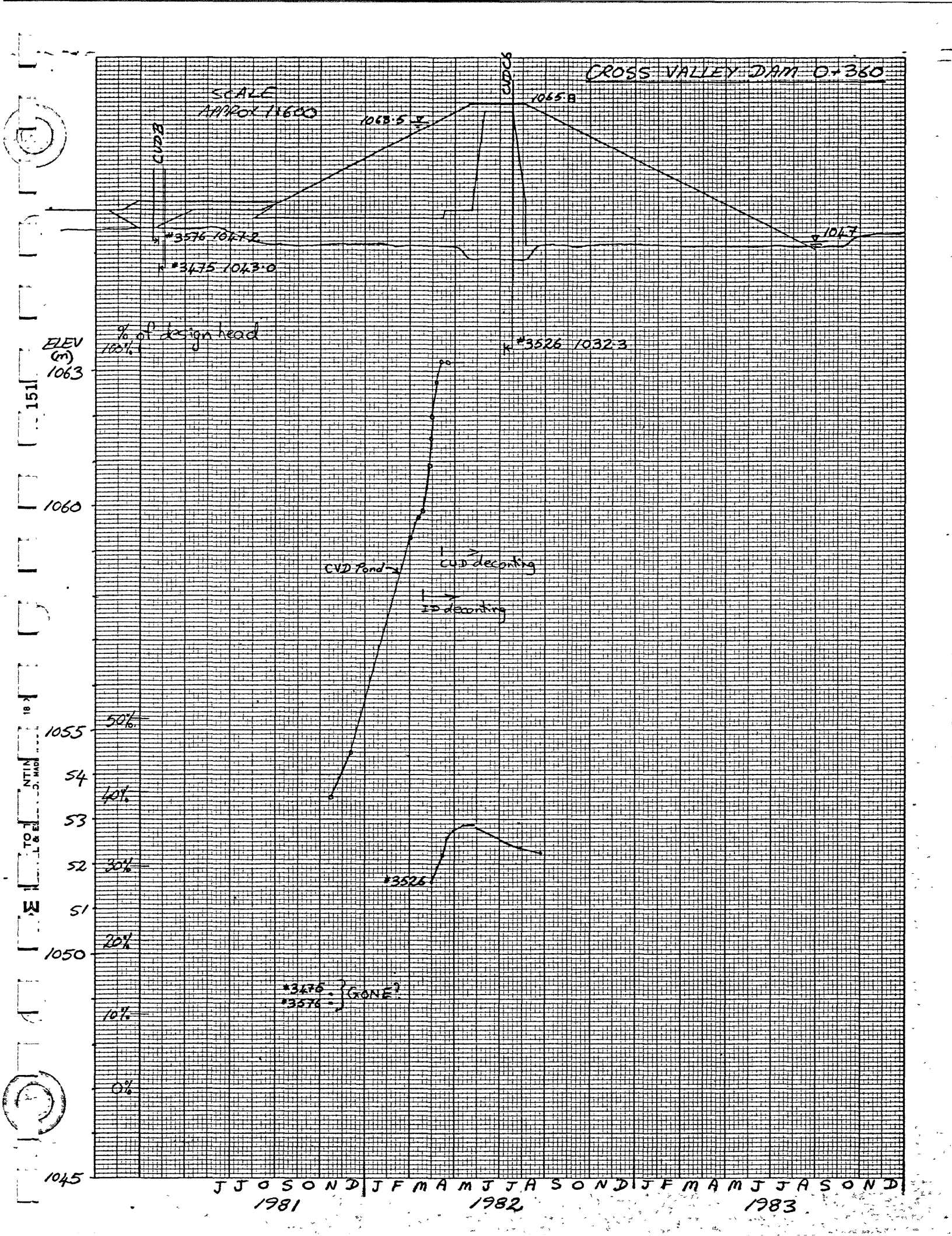
CROSS VALLEY DAM
CVDT4-0+630
(CSTH ABUTMENT 'TOE')

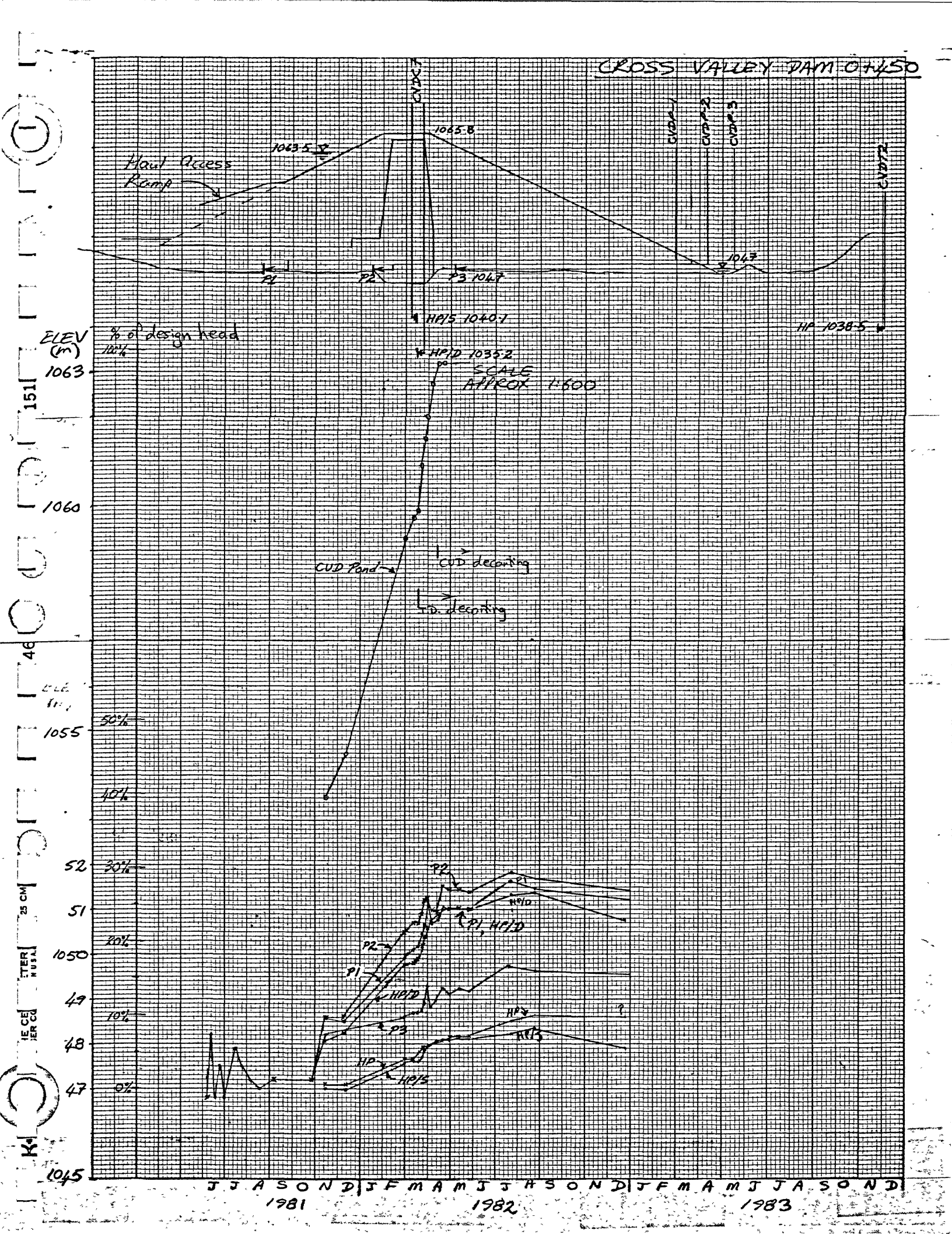
TEMP. ISOTHERMS °C

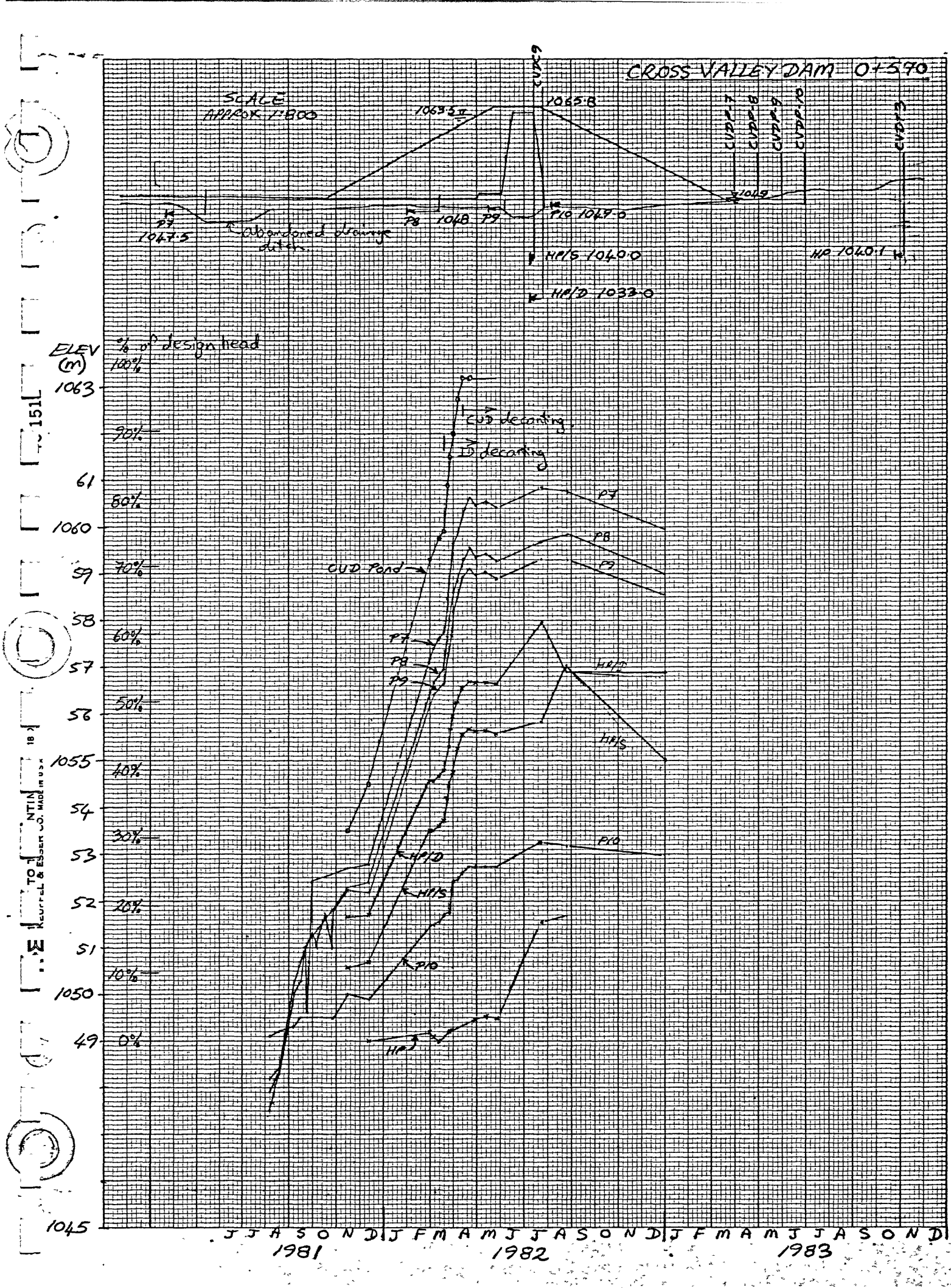


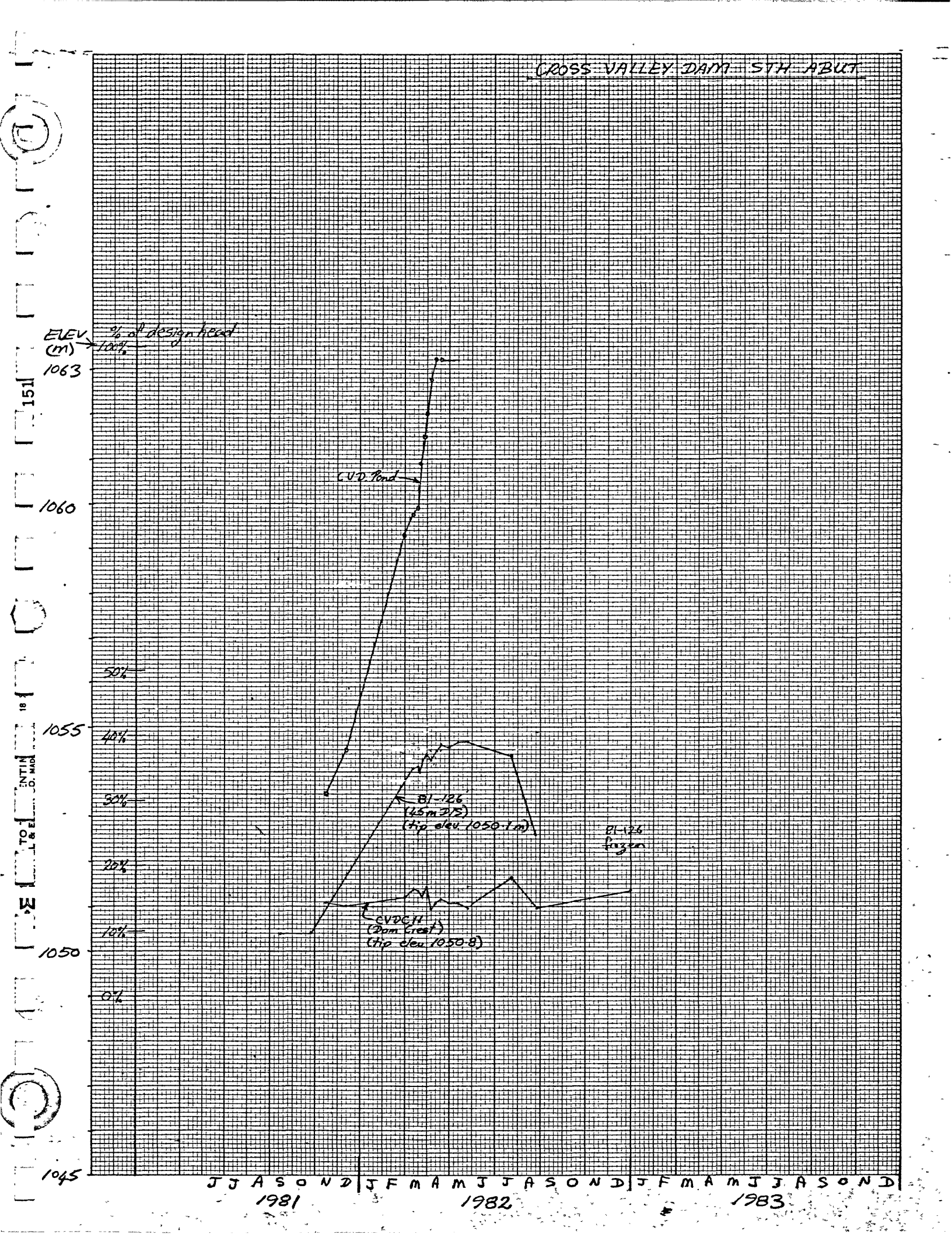

CROSS VALLEY DAM NTH ABUT
ELEV (m)
% of design head
100%
1063
C.U.D. Pond
1060
50%
1055
CVPC-1 (NVWTP) (tip elev 1051.1)
40%
54
79-20
53
30%
CVPC-2 (Spillway) (tip elev 1047.1)
52
20%
51
1050
10%
79-20 (Nth Abut) (tip elev 1039.8 m)
0%
81-K3-2 (230 m D/S) (tip 1040.3)
81-K3-1 (230 m D/S dam ℄) (tip elev 1029.3)
1065
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CROSS VALLEY DAM 0+210
SCALE APPROX 1:600
1063.5
1065.8
CVD-4
CVD-5
CVD-6
CVD-7
1048
P4
P5
P6
1046.7m
HP/S 1040.2
HP/D 1032.0
ELEV (m)
% of design head
100%
1063
1060
CVD Pond
CVD decanting
I.D. decanting
56
50%
1055
40%
54
53
30%
52
P6
20%
51
HP/S
P6
HP/D
1050
10%
49
I.D.
0%
1045
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983

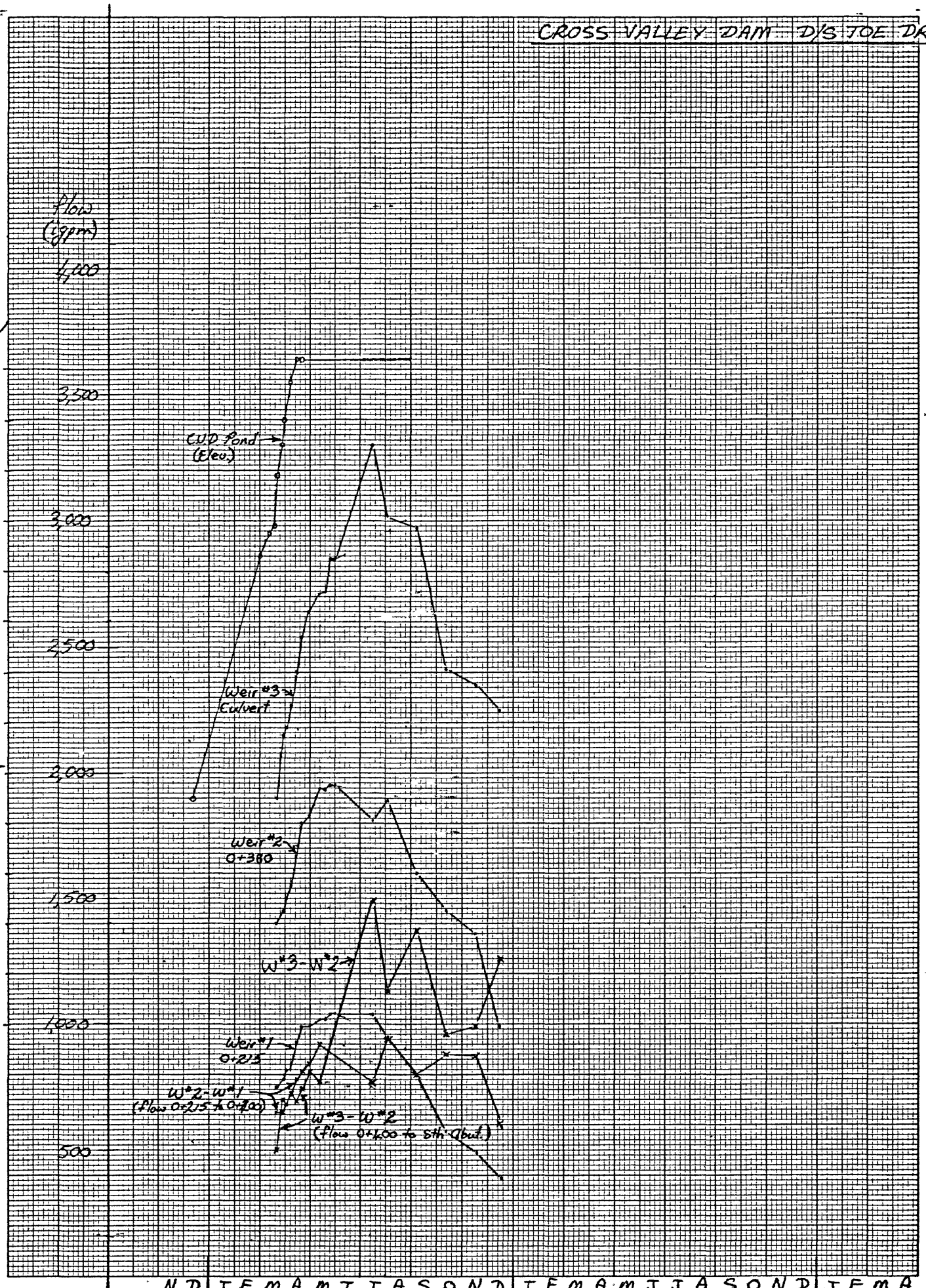

CROSS VALLEY DAM 0+360
SCALE
APPROX 1:600
CVDB
1068.5
1065.8
#3576 1047.2
#3475 1043.0
1047
#3526 1032.3
% of design head
ELEV (m)
100%
1063
1060
CVD Pond
CVD decanting
ID decanting
50%
1055
54
40%
53
#3526
52
30%
51
20%
1050
#3475 -
#3576 - GONE?
10%
0%
1045
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CROSS VALLEY DAM 0+450
CVD-1
CVD-2
CVD-3
CVD-4
1065.8
1063.5
Haul Access Ramp
P1
P2
P3 1047
1047
HP/S 1040.1
HP 1038.5
HP/D 1035.2
SCALE APPROX 1:600
ELEV (m)
% of design head
100%
1063
1060
1055
50%
40%
30%
20%
10%
0%
1050
1045
CUD Pond
CUD decanting
S.D. decanting
P2
P1
HP/D
P1, HP/D
P2
P1
HP/D
P3
HP
HP/S
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CROSS VALLEY DAM 01570
SCALE
APPROX 1:800
1065.8
1065.5
CVD-9
CVD-7
CVD-8
CVD-6
CVD-10
CVD-3
1049
P7
1047.5
abandoned drainage ditch
P8
1048
P9
P10 1049.0
HP/S 1040.0
HP/D 1033.0
HP 1040.1
ELEV (m)
% of design head
100%
1063
90%
61
80%
1060
70%
59
58
60%
57
50%
56
1055
40%
54
30%
53
1050
20%
52
51
10%
49
0%
1045
CVD decanting
D decanting
CVD Pond
P7
P8
P9
P10
HP/D
HP/S
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CROSS VALLEY DAM STH ABUT
EL EV (m)
% of design head
100%
1063
1060
50%
1055
40%
30%
20%
10%
1050
0%
1045
C.V.D. Pond
BL-126
(45m D/S)
(tip elev 1050.1m)
BL-126
frozen
CVDC11
(Dam Crest)
(tip elev 1050.8)
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983

CROSS VALLEY DAM D/S JOE DRAIN



Falling Head Permeability Testing

Field falling head permeability tests were conducted by a Golder Associates field engineer and a Cyprus Anvil technician in April 1982, during the period of increased monitoring of the dams. Tests were conducted by raising the water level inside the standpipes located along the crest of the dam at stations 0+215, 0+450 and 0+565 and monitoring the subsequent water level decrease with time. The horizontal permeabilities (k_h) thus obtained were:

CVDS4-0+215 HP/S tip death 25 m, tip elevation 1040 m
2×10^{-3} cm/s (range 0.5 to 2.6×10^{-3} cm/s).
HP/D tip depth 34 m, tip elevation 1032 m
1×10^{-3} cm/s (range 0.6 to 1.0×10^{-3} cm/s).

CVDC7-0+450 HP/S tip depth 26 m, tip elevation 1040 m
2×10^{-3} cm/s (range 1.4 to 3.3×10^{-3} cm/s).
HP/D tip depth 31 m, tip elevation 1035 m
3×10^{-3} cm/s (range 2.5 to 5×10^{-3} cm/s).

CVDC9-0+565 HP/S tip depth 26 m, tip elevation 1040 m
1.5×10^{-5} cm/s (range 1.5 to 1.6×10^{-5} cm/s)
HP/D tip depth 33 m, tip elevation 1033 m
3×10^{-4} cm/s (range 2.5 to 4.6×10^{-4} cm/s).

Canal Thermistors

1979/80 Drilling and Investigation

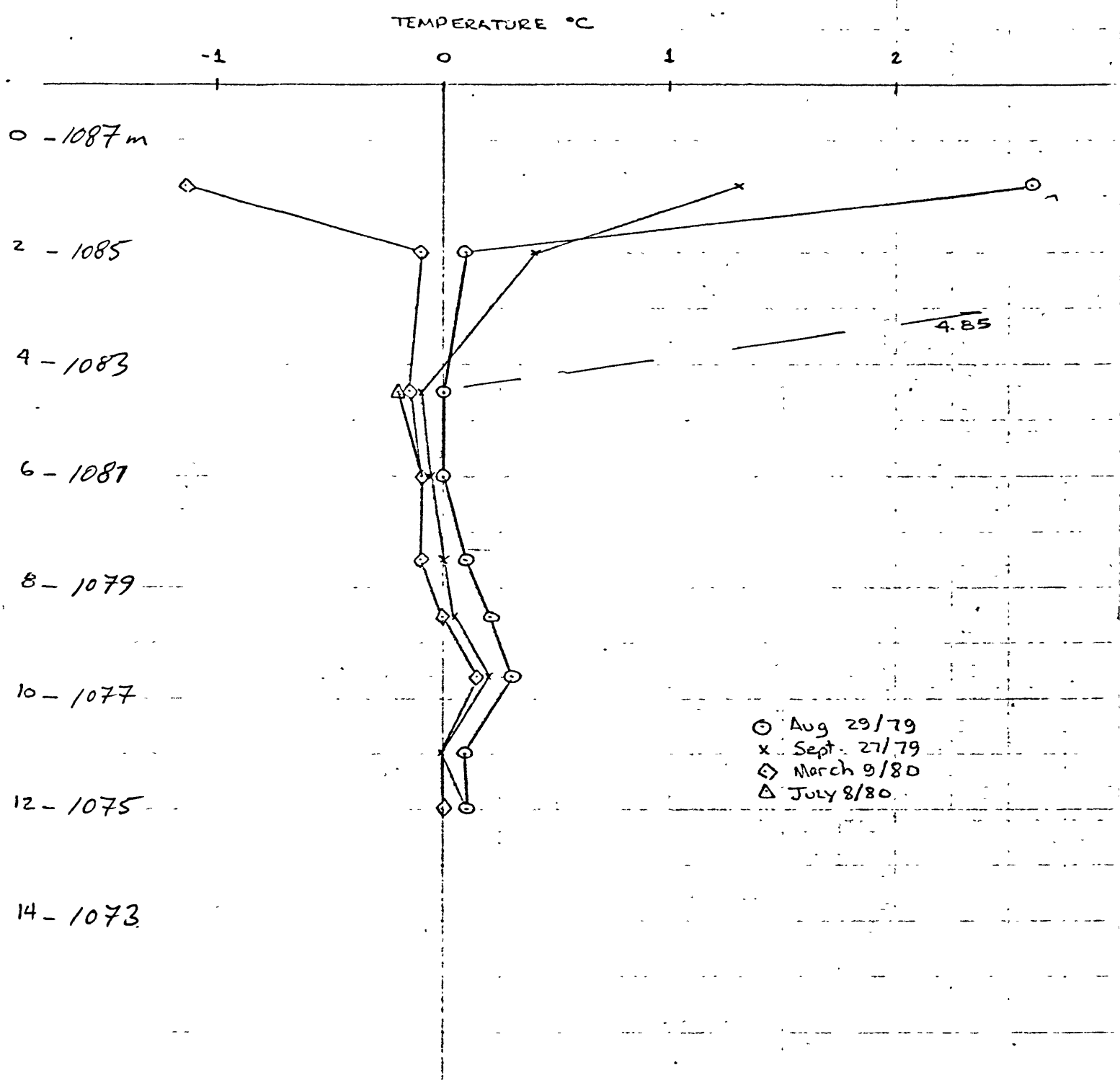
BH 79-25
BH 79-24
T.E. 5
BH 80-51
BH 79-22A

Canal Dyke	Canal Backslope
CD4-0+400	BS2-0+400
CD5-0+510	BS4-0+710 (Goodall Creek)
CD10-0+990	BS5-0+960
CD15-1+530	BS9-1+530
CD17-1+705	BS10-1+900
CD19-1+900	82-6 (Sta. 2+100)
CD20-2+000	BS11-2+100
CD21-2+100	BS12-2+260
81-125 (Sta 2+100)	BS15-2+760
CD24-2+365	BS16-2+900 (lower)
CD25-2+460	BS17-2+900 (upper)
CD26-2+600	BS18-3+000
CD27-2+765	
CD28-2+900	Canal Spoilpiles
81-96 (Sta 2+900)	SP2-1+530
CD29-3+000	SP3-1+900
CD30-3+130	SP5-2+950

Reference Line Chainage 1+090 m.
5m R of Canal ℄

792-2025
CYPRUS ANVIL
THERMISTOR RDGS.

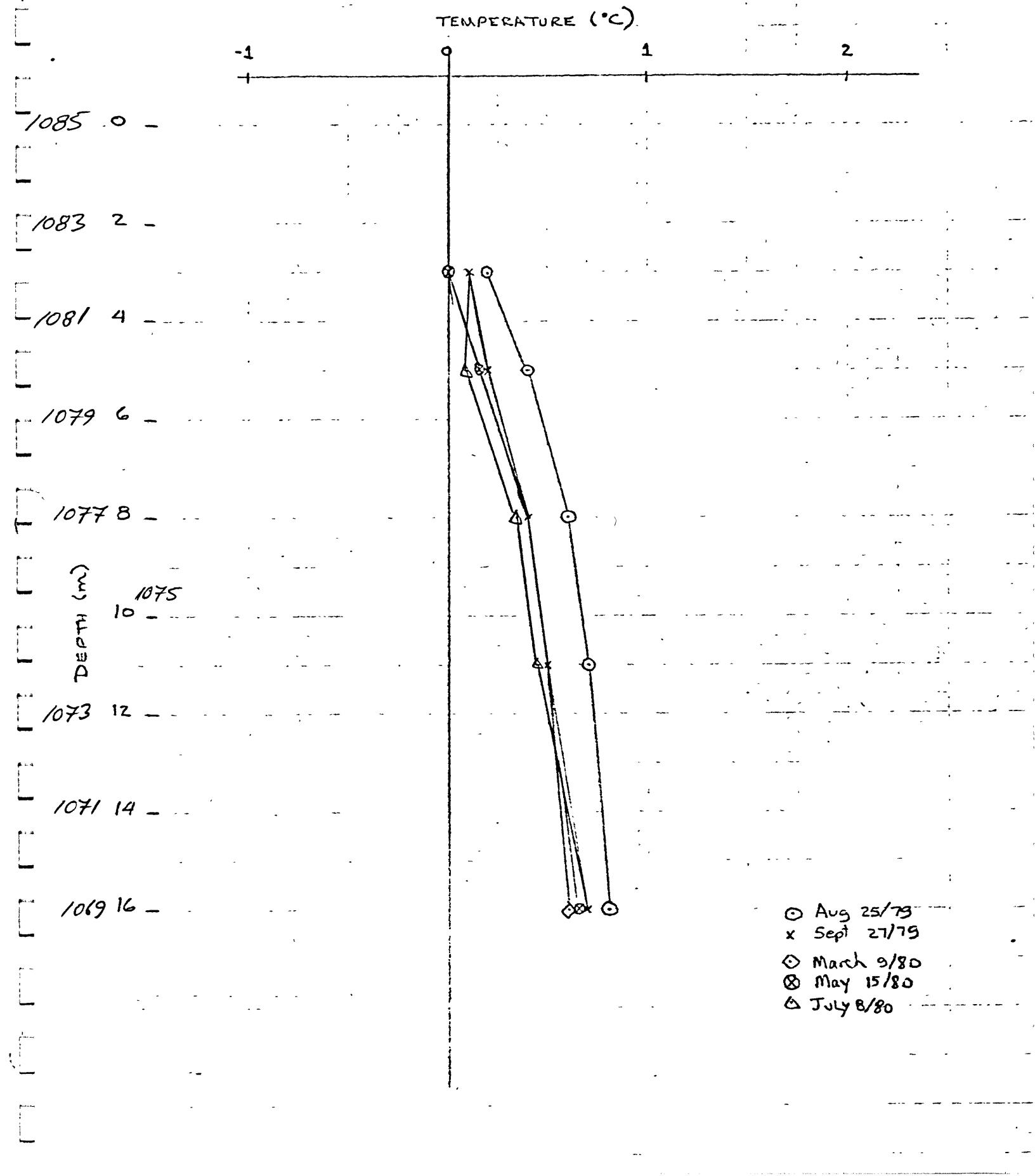
B.H. 79-25



Reference Line Chainage 1+320 m.
20 m R of Canal ℄

792-2025
CYPRUS ANVIL
THERMISTOR RDGS

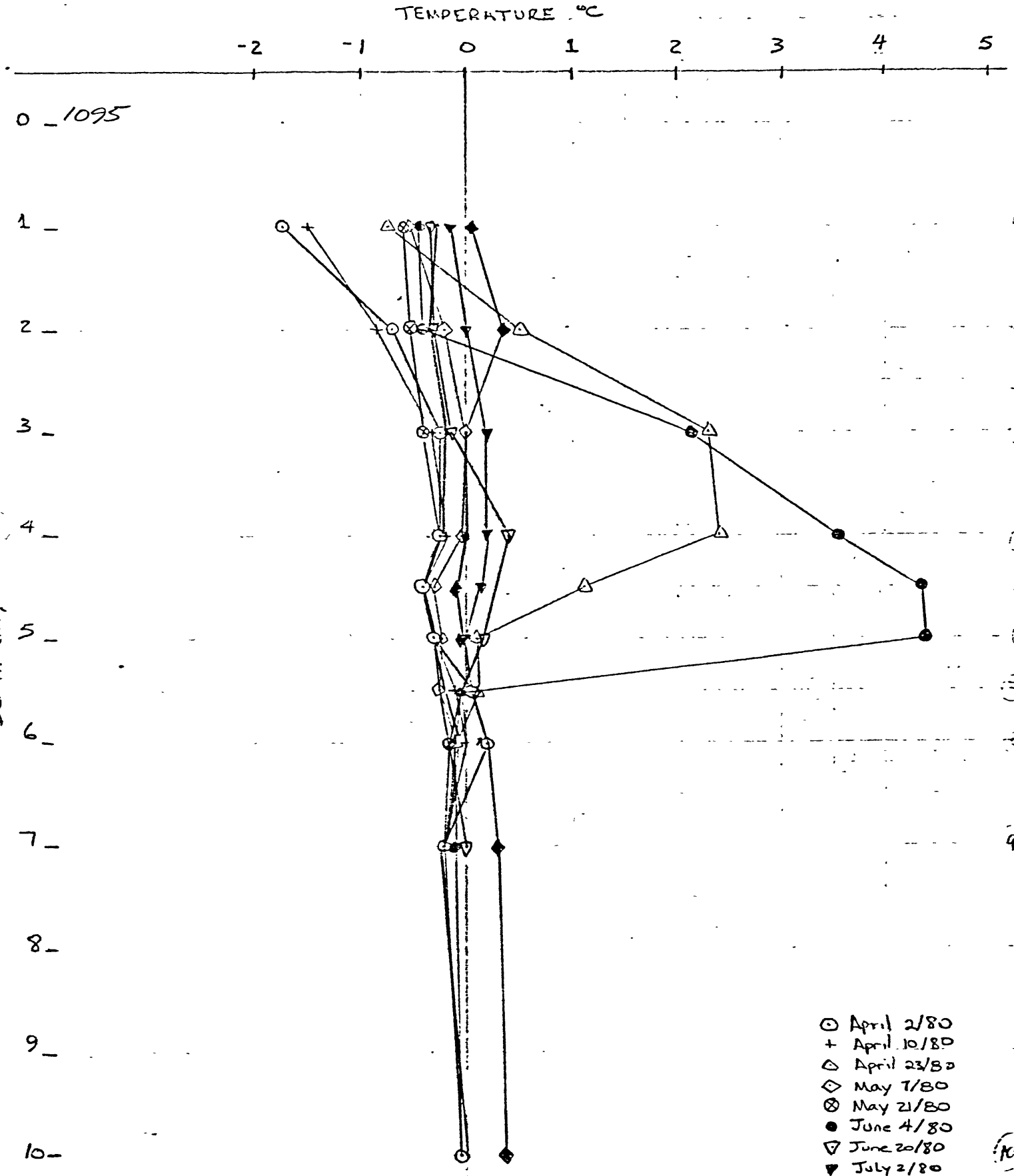
BH 79-24



Test Excavation 1050
ie Reference line chainage 1+960 on backslope

BC2-2005
CYPRUS ANVIL
THERMISTOR READINGS

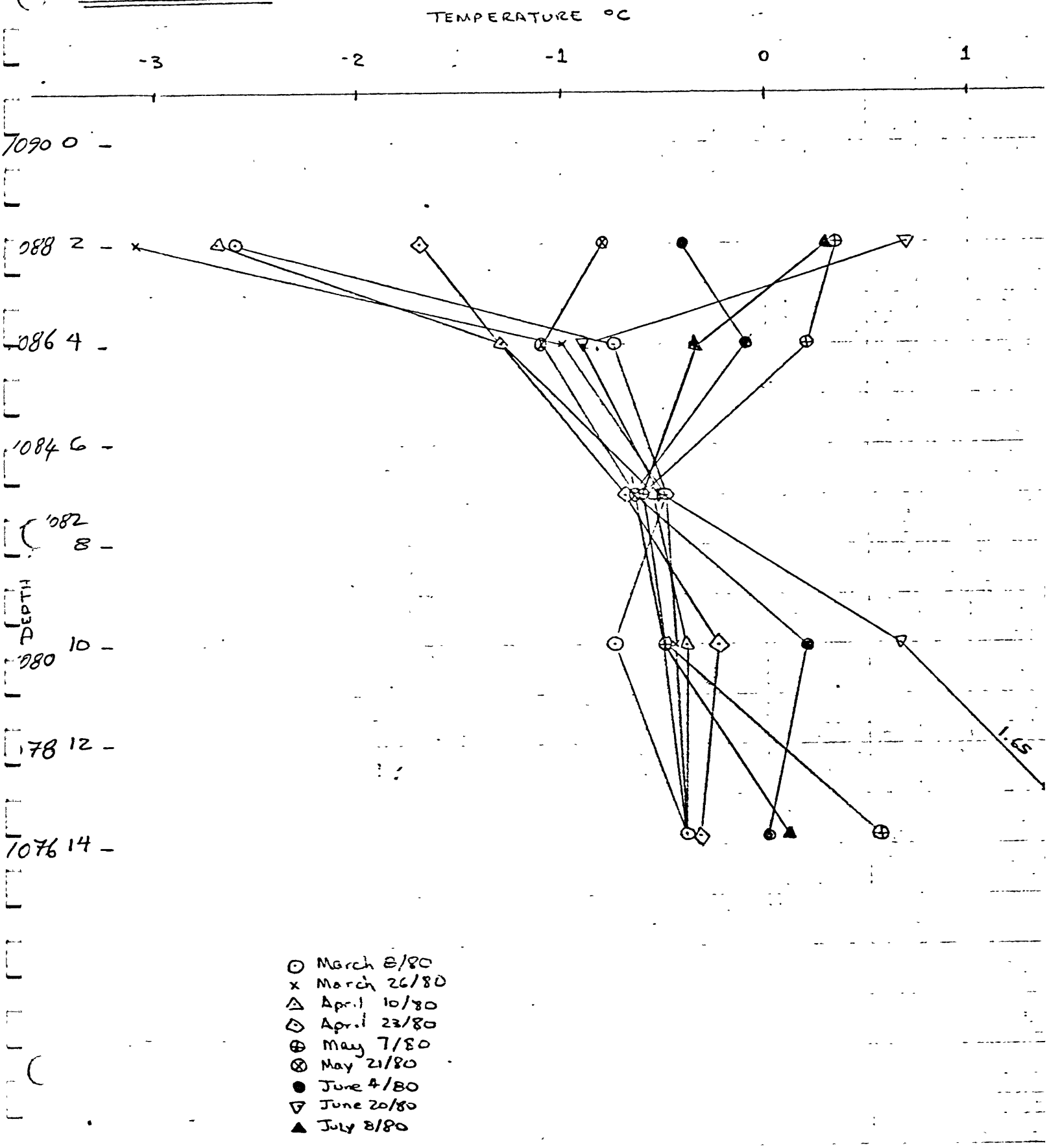
T.E.5



Reference Line Chainage 2+110.
2 m ℄ of Canal ℄

792-2025
CYPRUS ANVIL
THERMISTOR READINGS

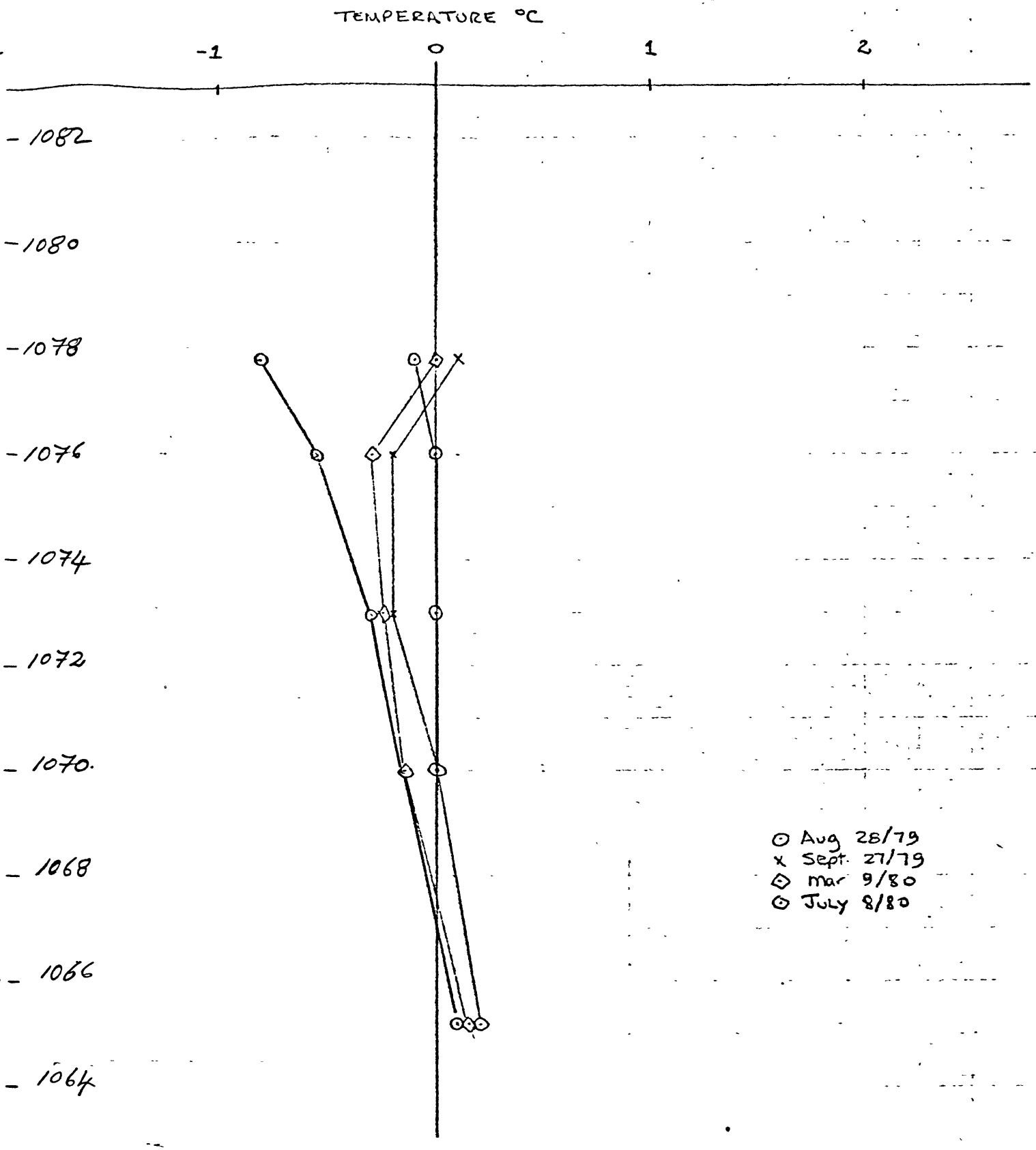
B.H 80-51



Reference Line Chainage 2+910 m.
4 m L of Canal ℄

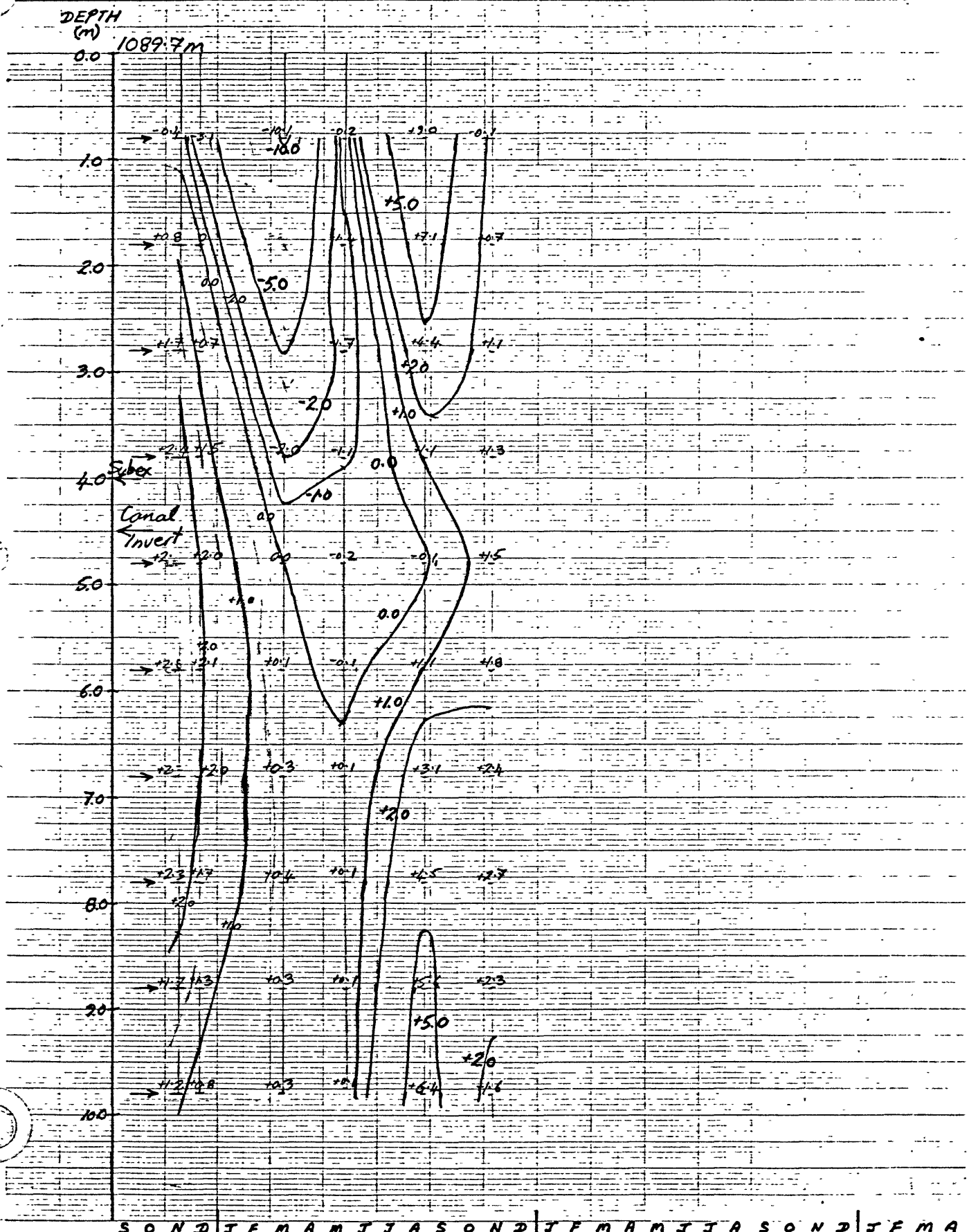
792-2025.
CYPRUS ANVIL
THERMISTOR READINGS

B.H. 79-22 A



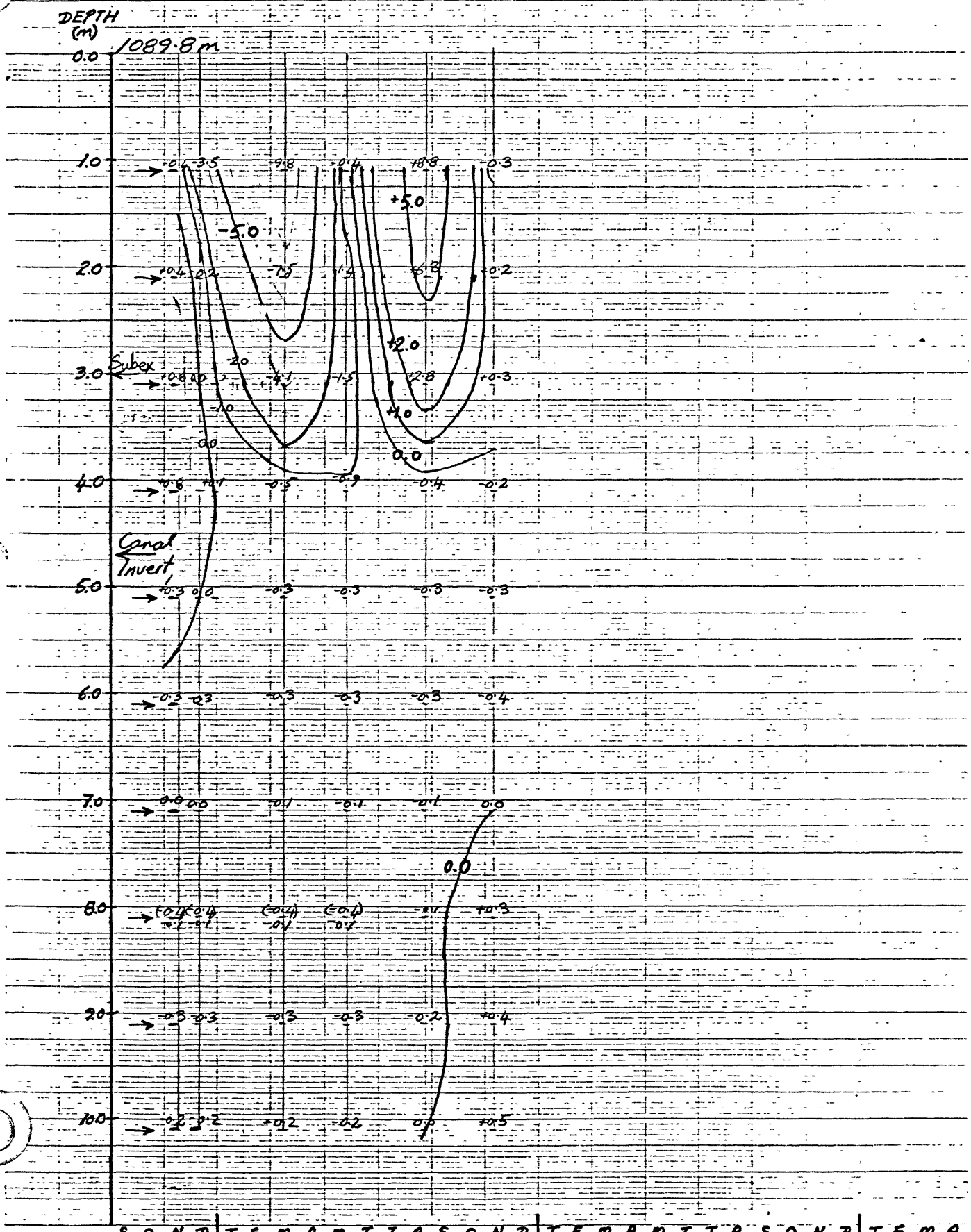
CANAL DYKE
CD4-0+400

TEMP ISOTHERMS °C



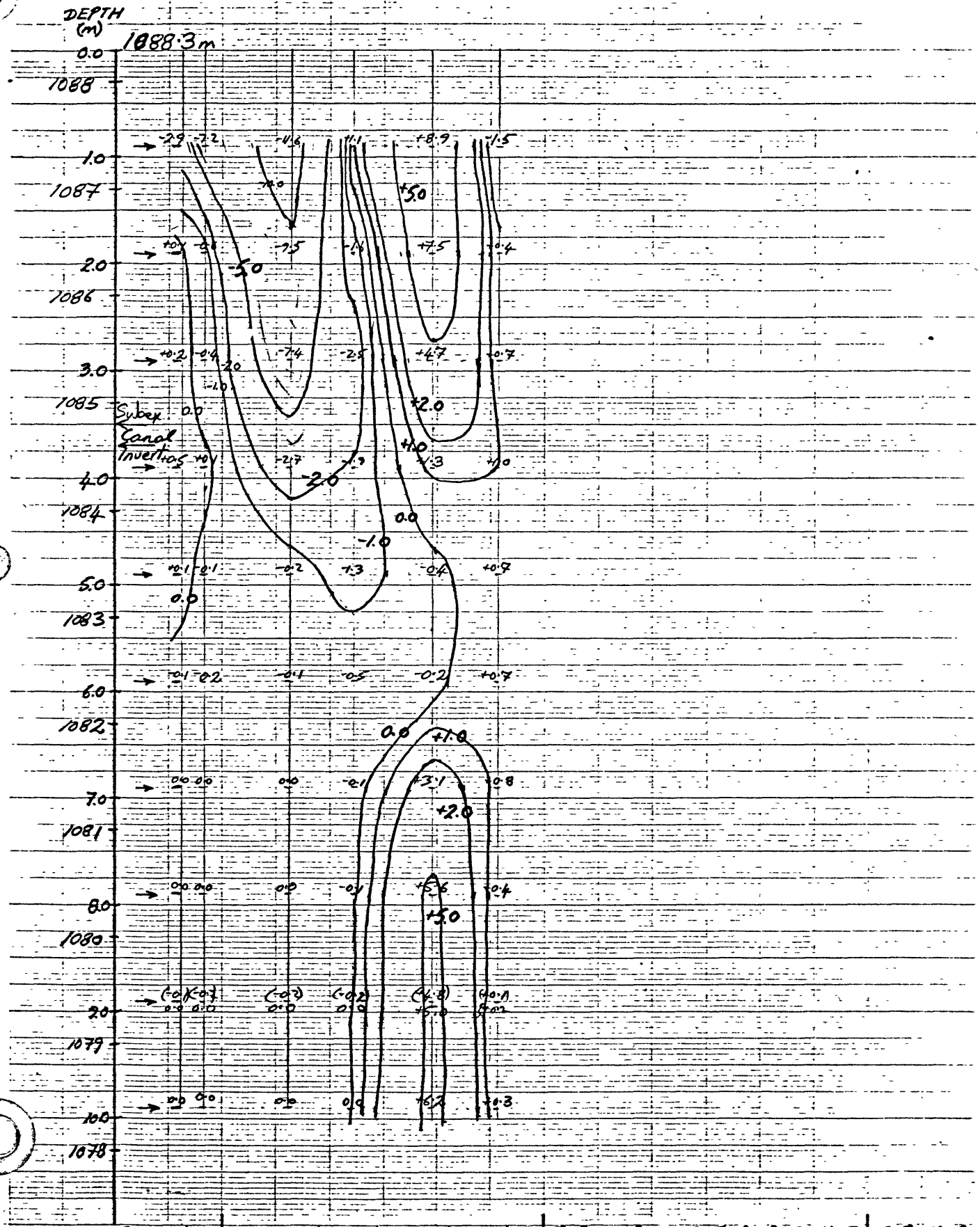
CANAL DYKE
CO5 - 0+570

TEMP ISOTHERMS °C



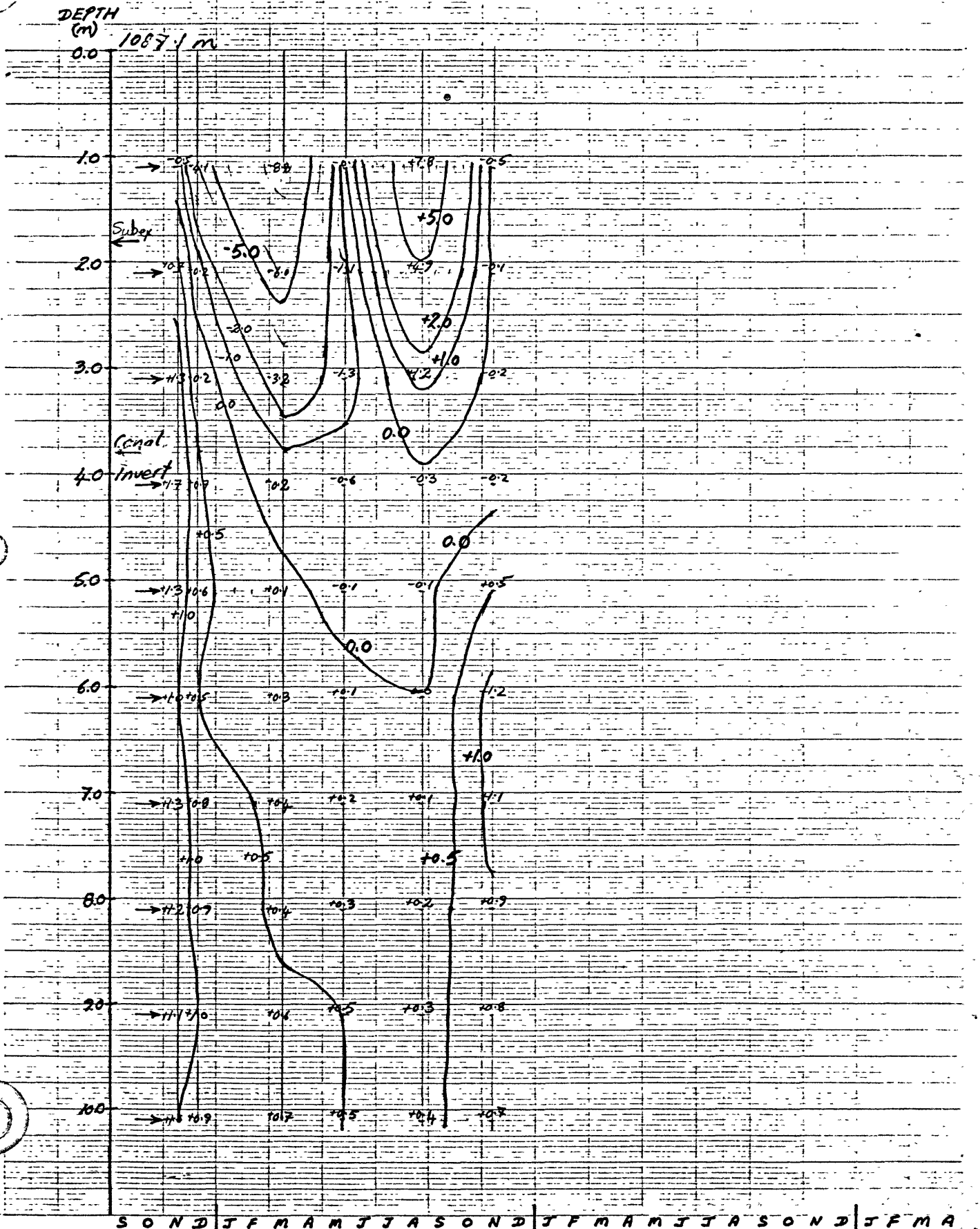
CANAL DYKE
CD10-0+990

TEMP. ISOTHERMS °C



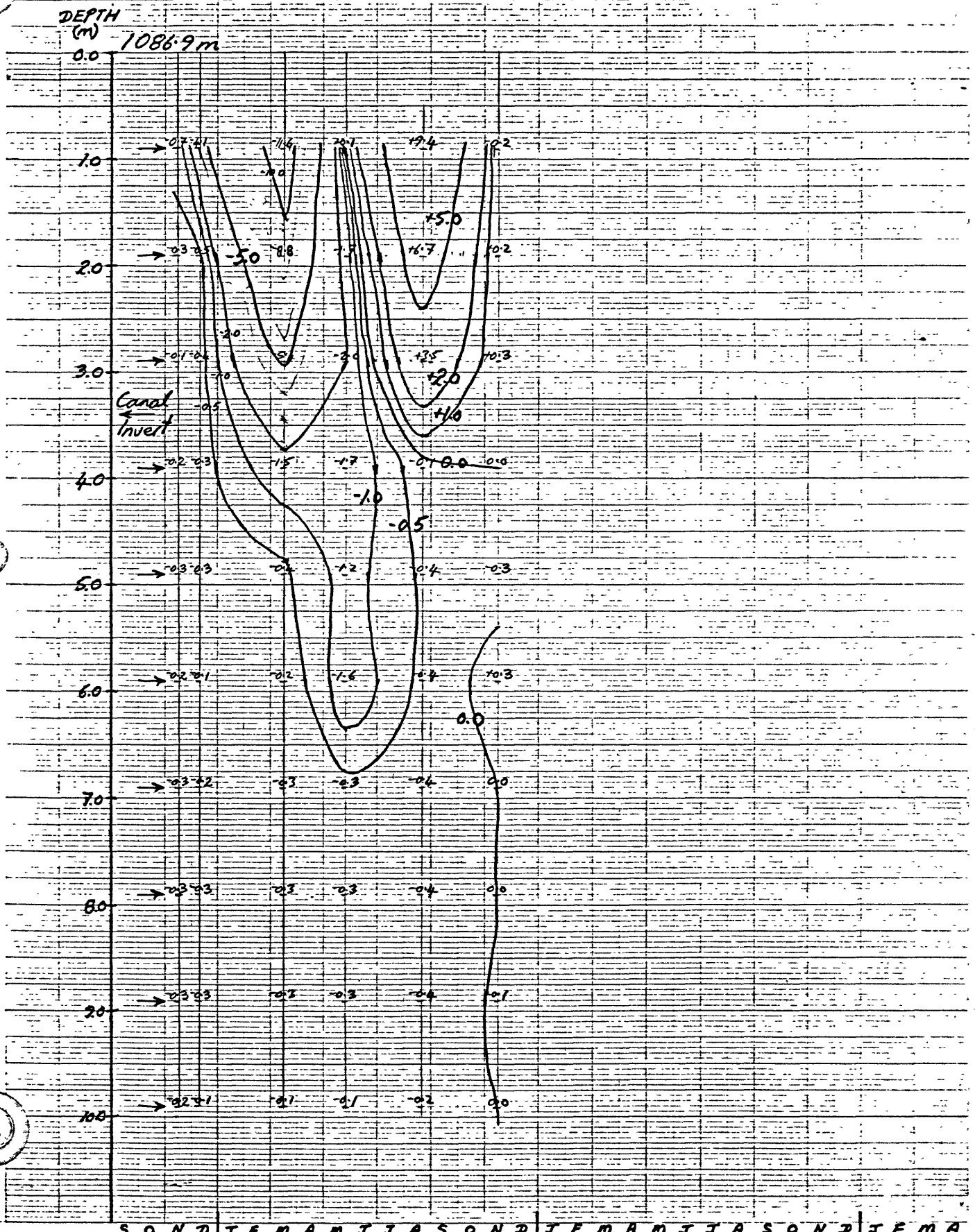
CANAL DYKE
CD15 - 1+530

TEMP. ISOTHERMS °C



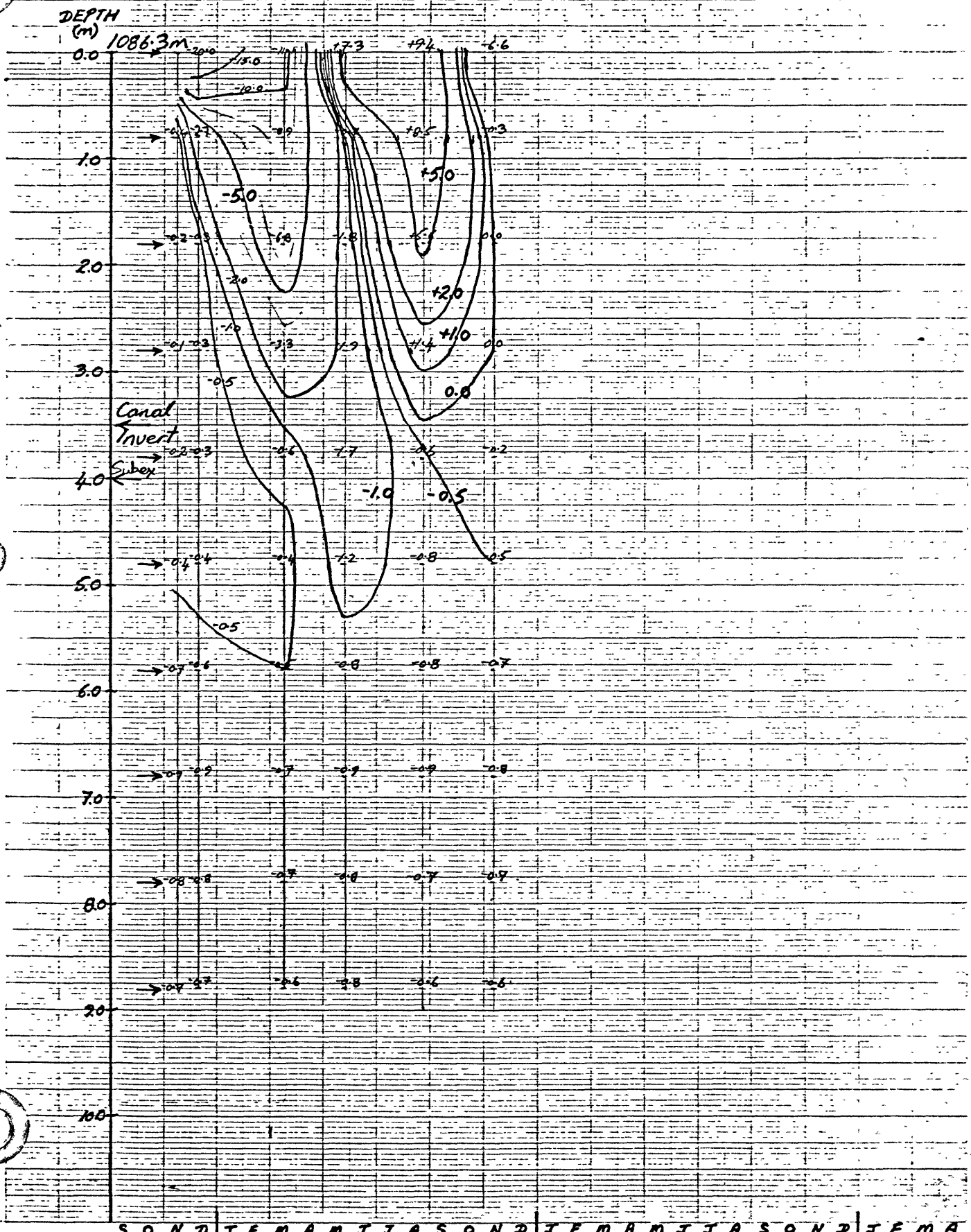
CANAL DYKE
CD17 - 1+705

TEMP ISOTHERMS °C



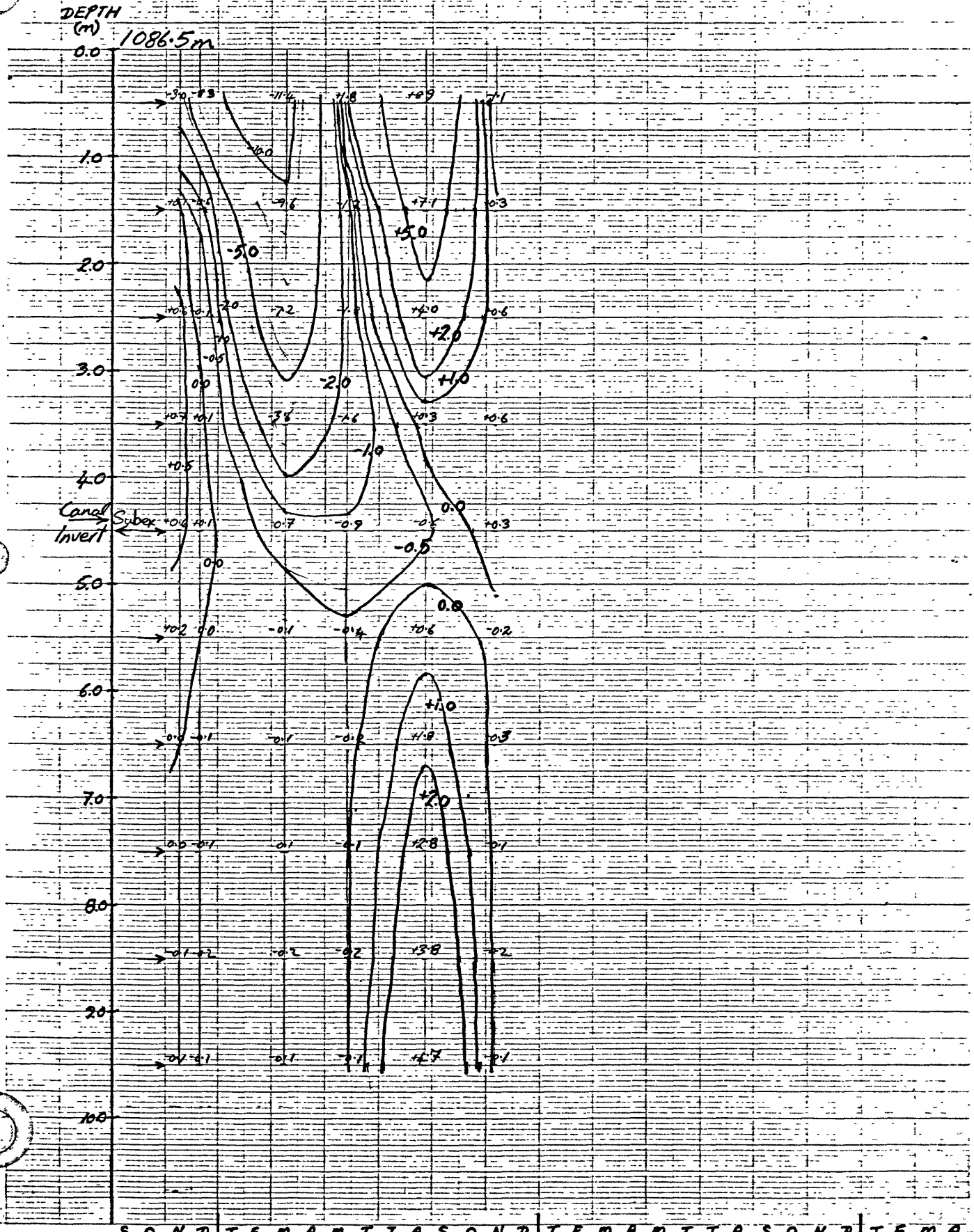
CANAL DYKE
CD19-1+900

TEMP ISOTHERMS °C



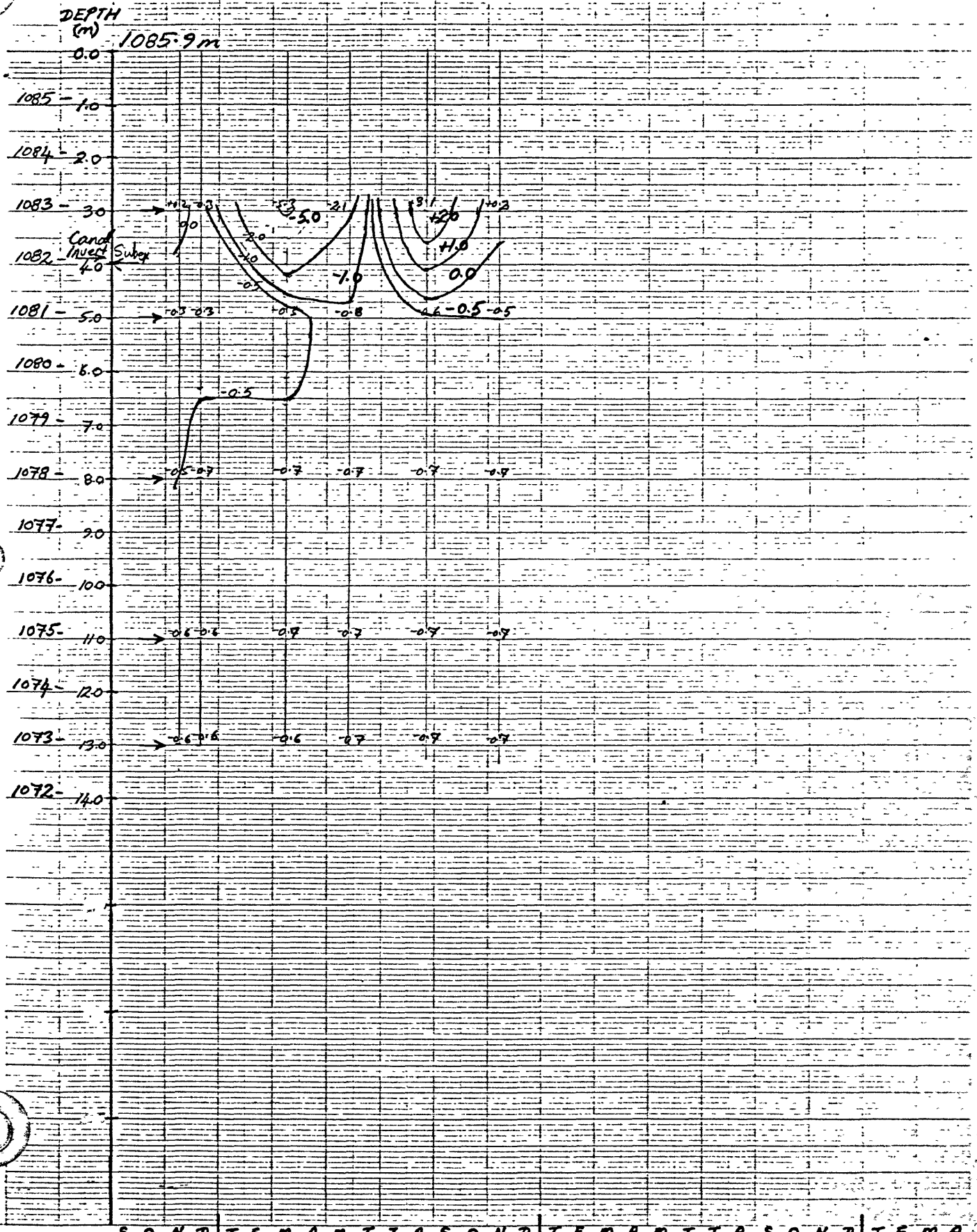
CANAL DYKE
CD20 - 2+000

TEMP ISOTHERMS °C



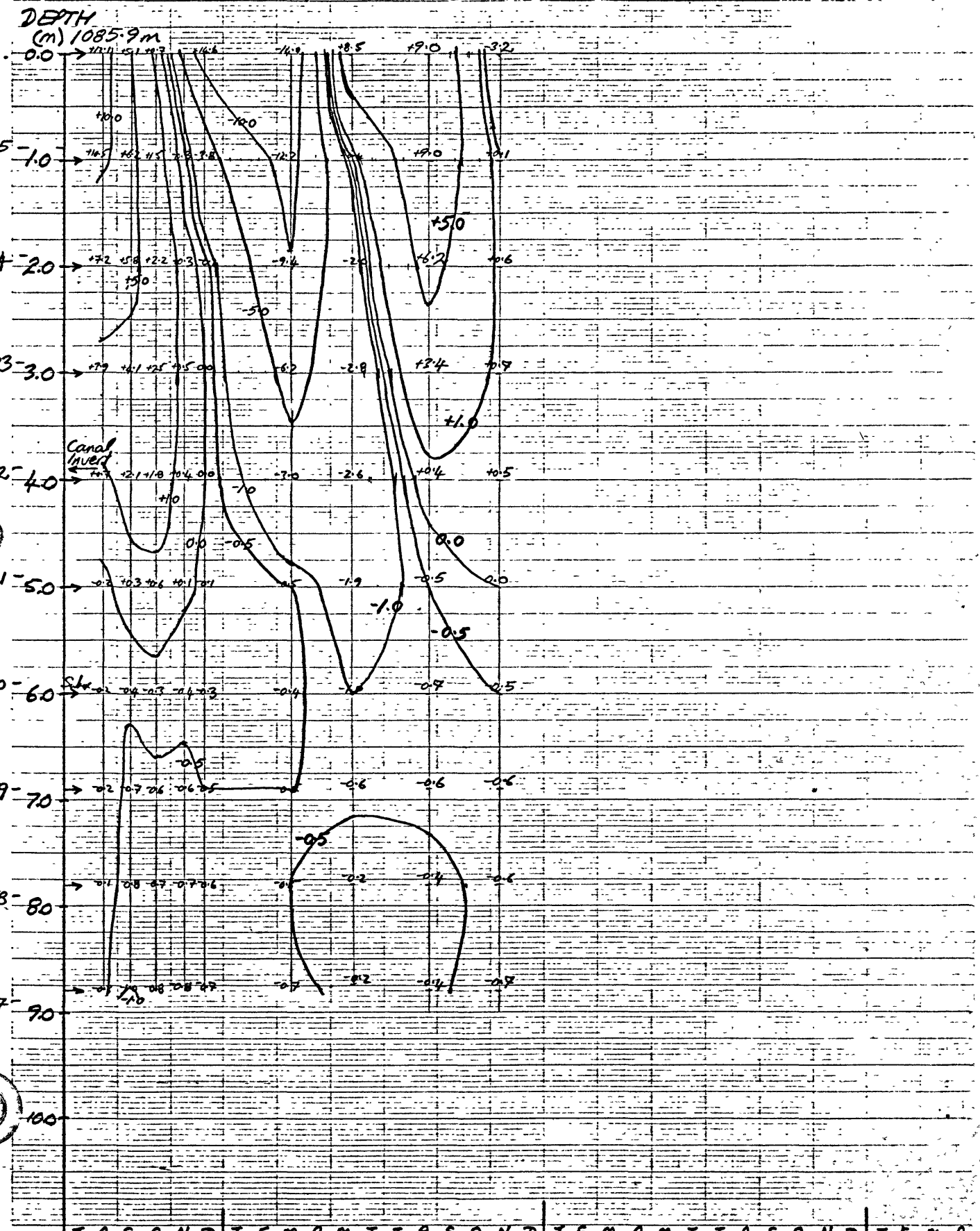
CANAL DYKE
CD21 – 2+100
(L.H.S. of dyke)

TEMP ISOTHERMS °C



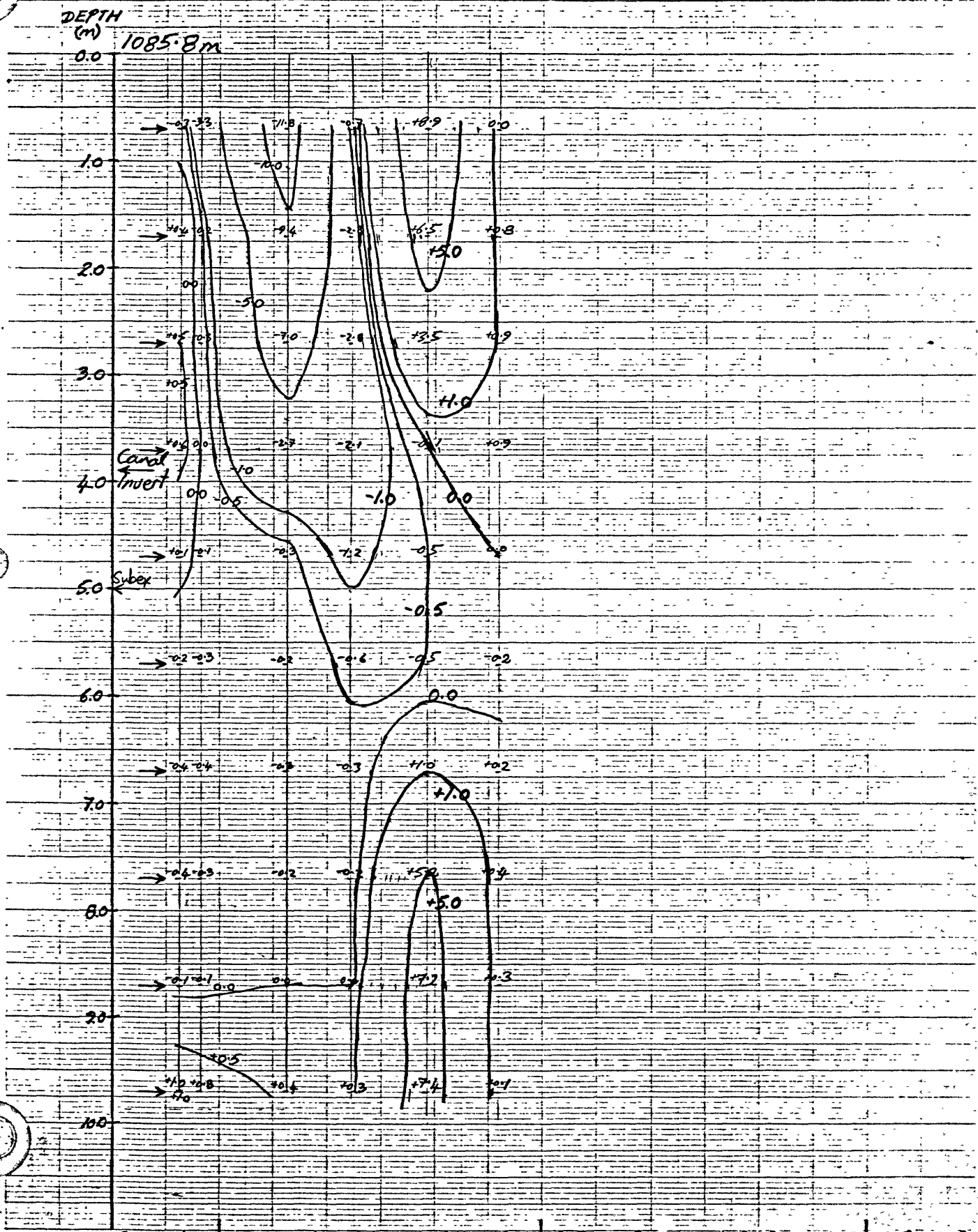
CANAL DYKE
81-125 (STA 2+100)
(R.H.S. of dyke)

TEMP ISOTHERMS °C



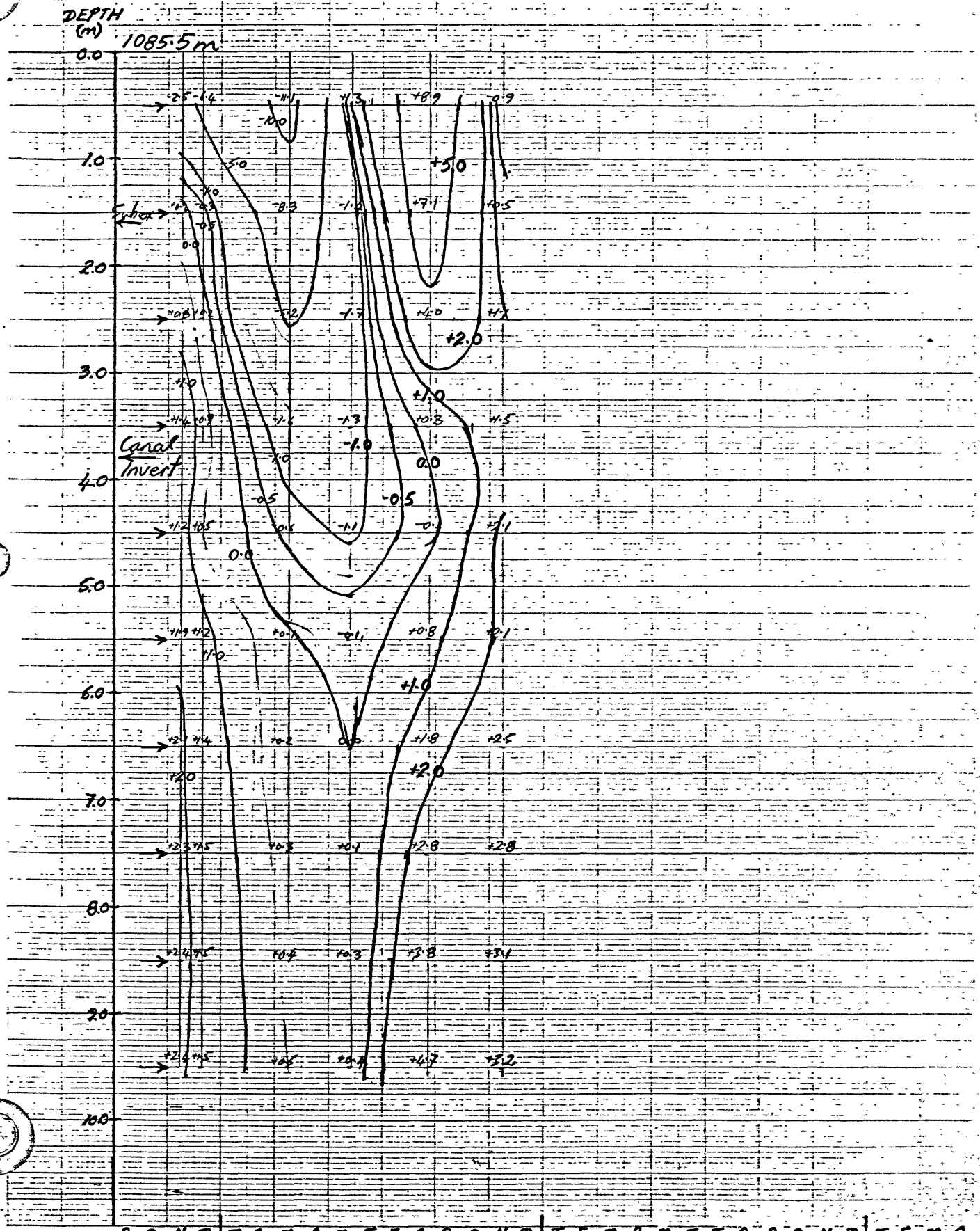
CANAL DYKE
CD24-2+365

TEMP ISOTHERMS °C



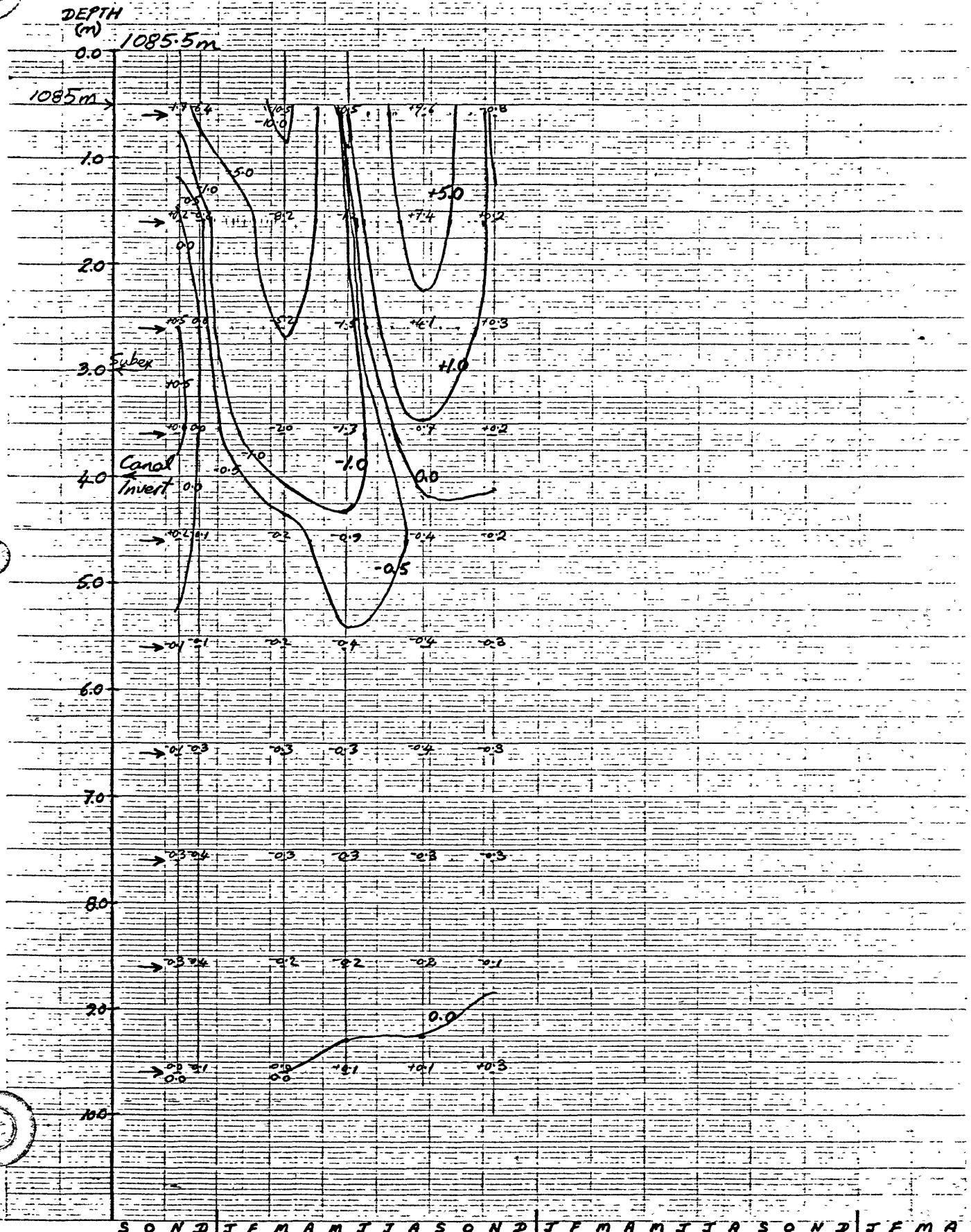
CANAL DYKE
CD25-2+460

TEMP ISOTHERMS °C



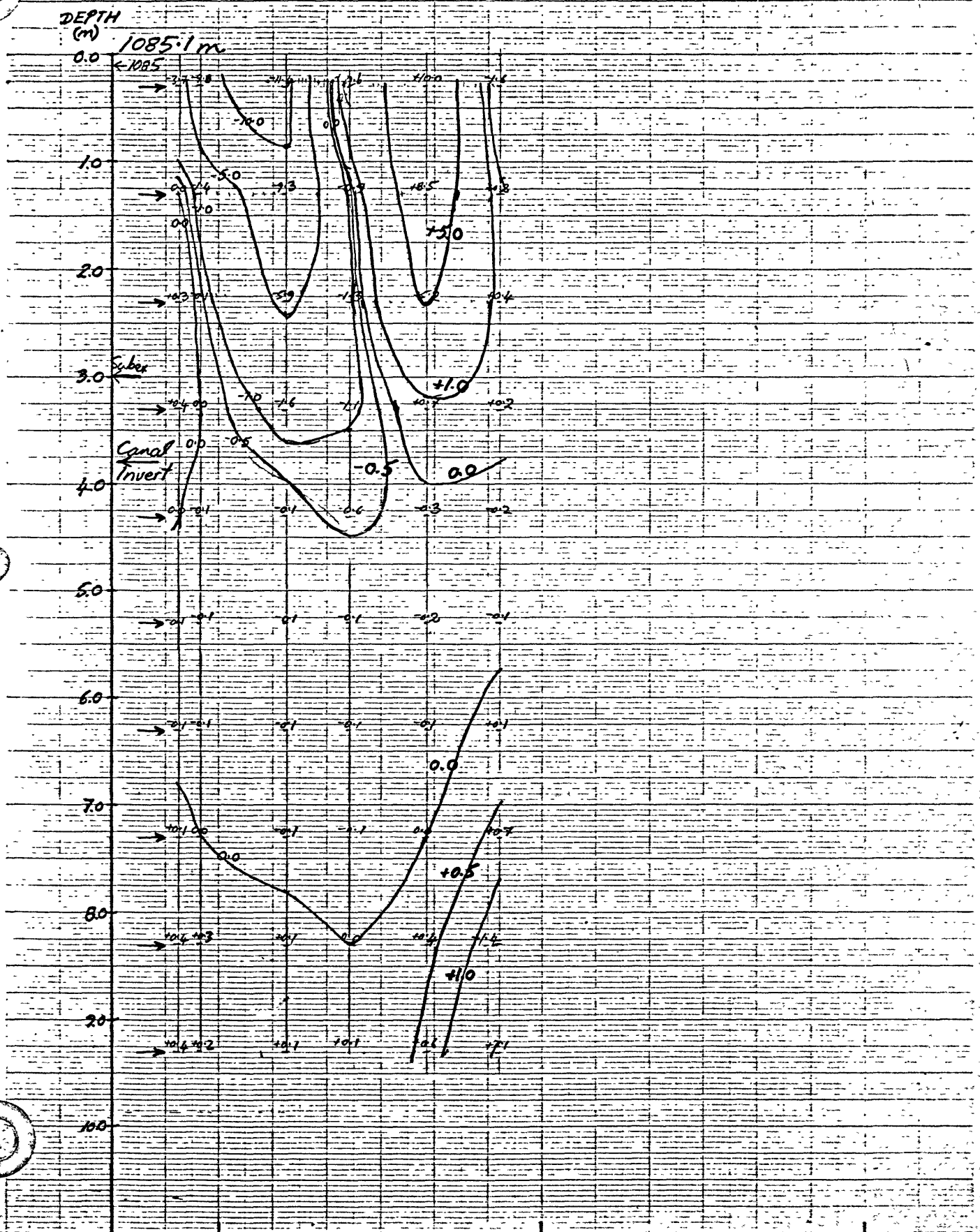
CANAL DYKE
CD26 - 2+600

TEMP ISOTHERMS °C



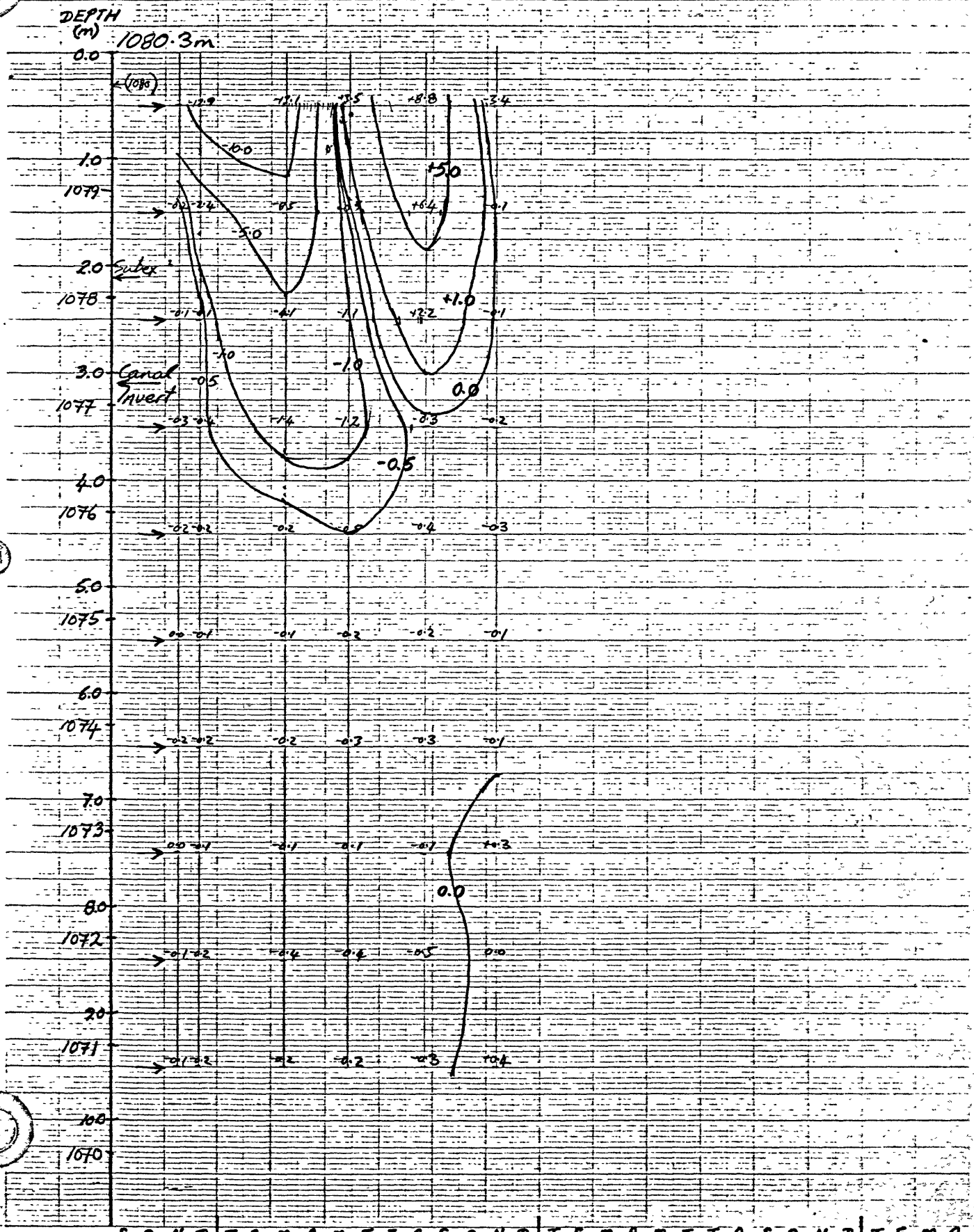
CANAL DYKE
CD27 - 2+765

TEMP ISOTHERMS °C



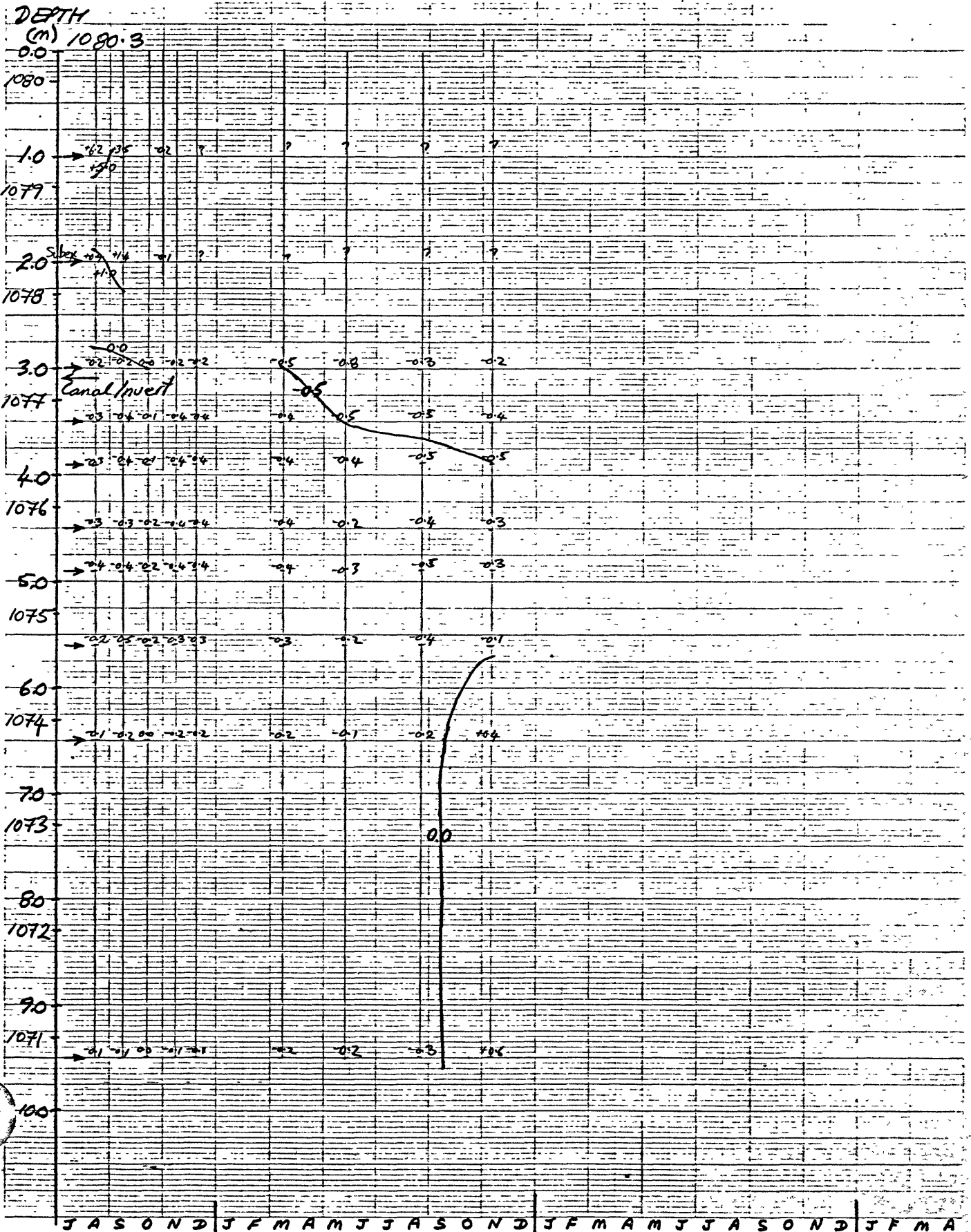
CANAL DYKE
CD28 - 2+900

TEMP ISOTHERMS °C



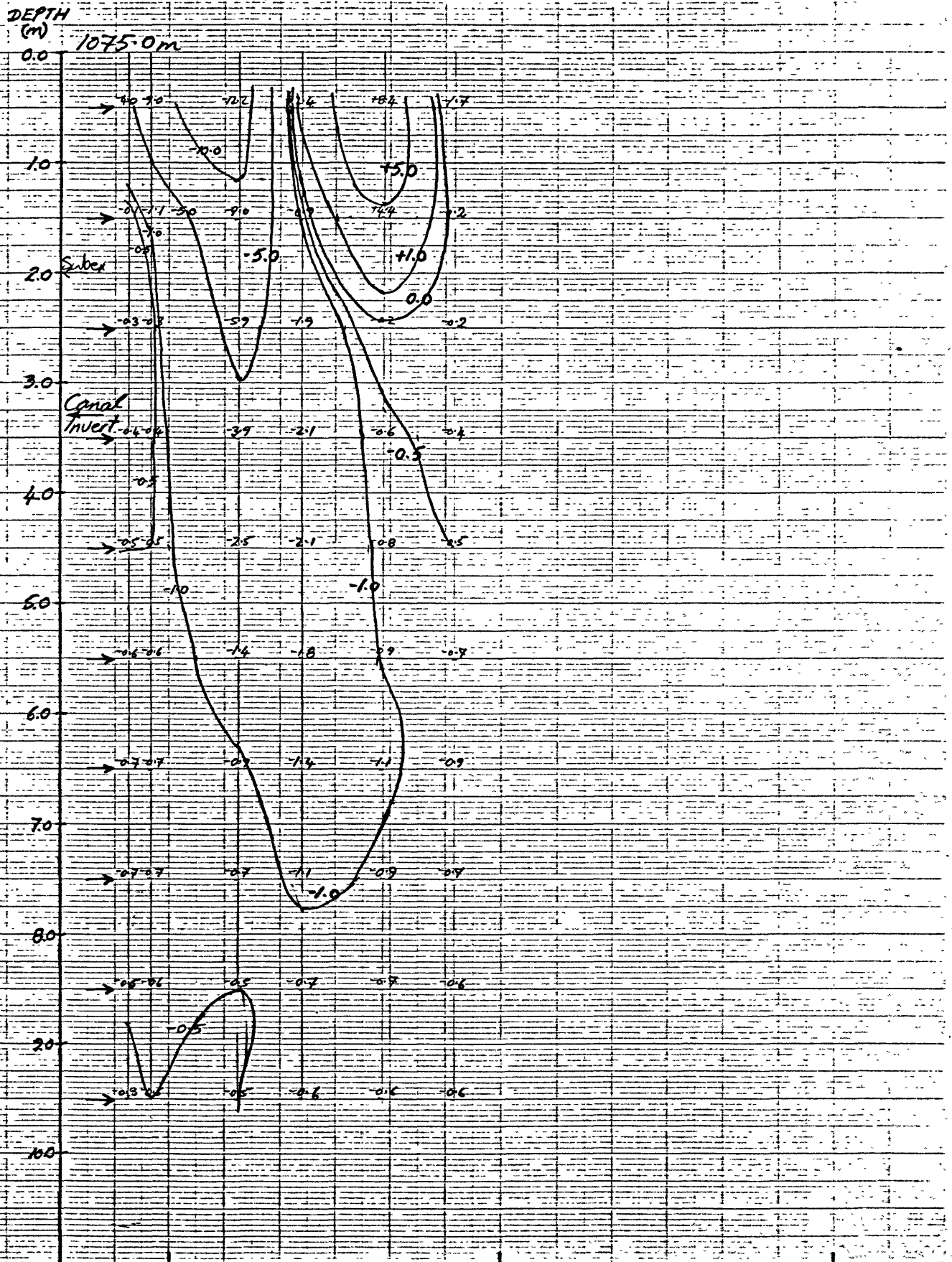
CANAL DYKE
81-96 (STA 2+900)

TEMP ISOTHERMS °C



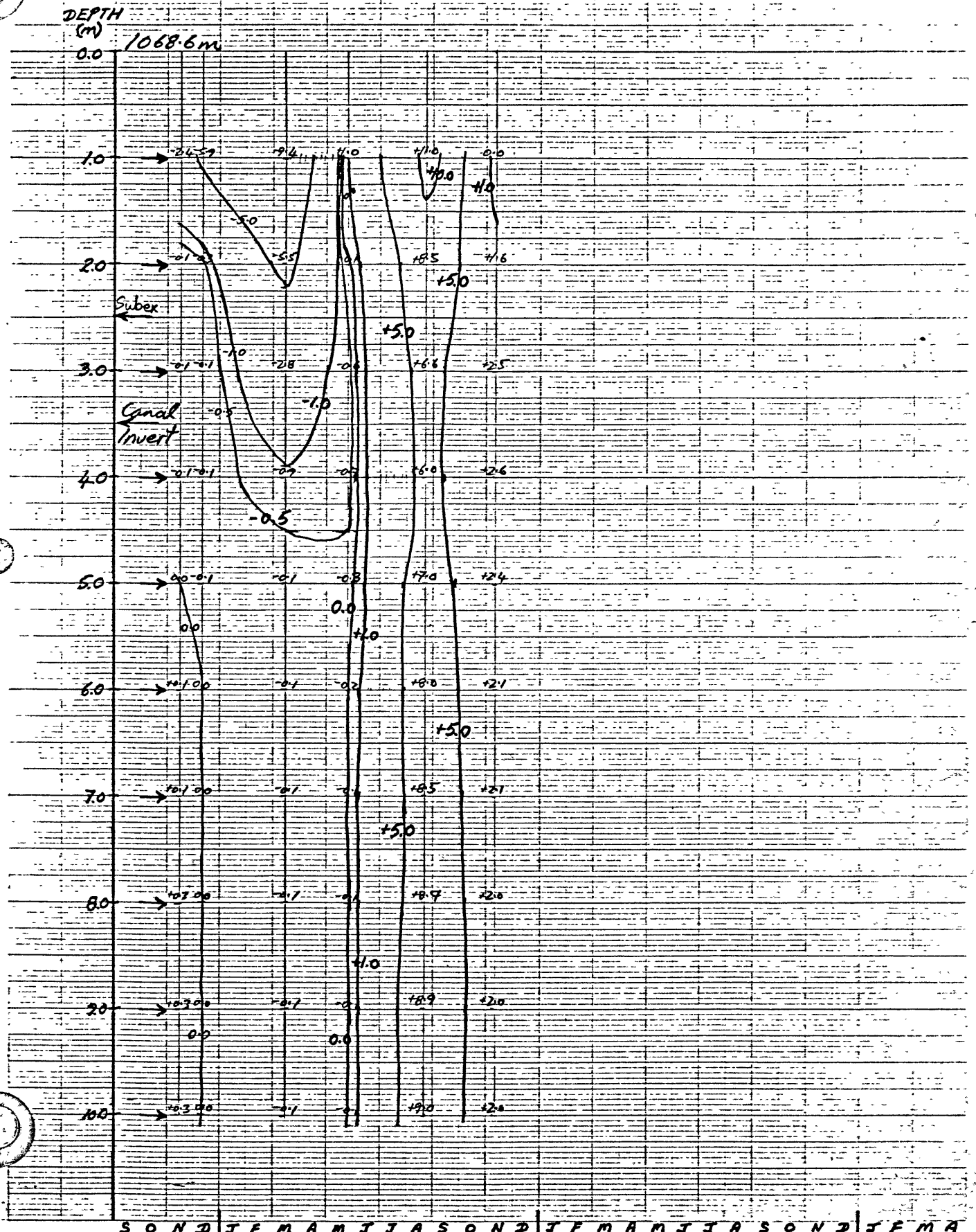
CANAL - DYKE
CD29 - 3+000

TEMP ISOTHERMS °C



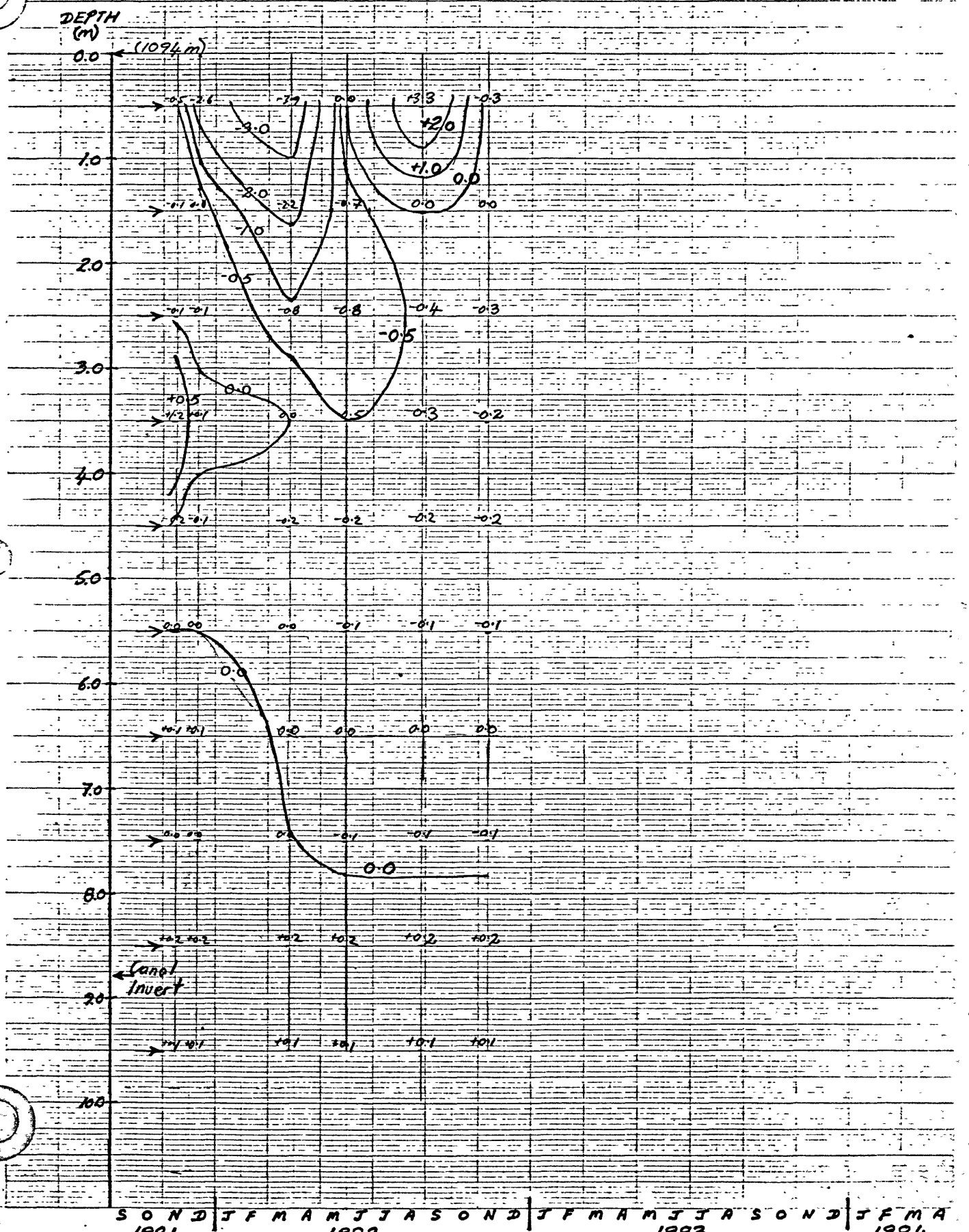
CANAL DYKE
CD30-3+130

TEMP ISOTHERMS °C



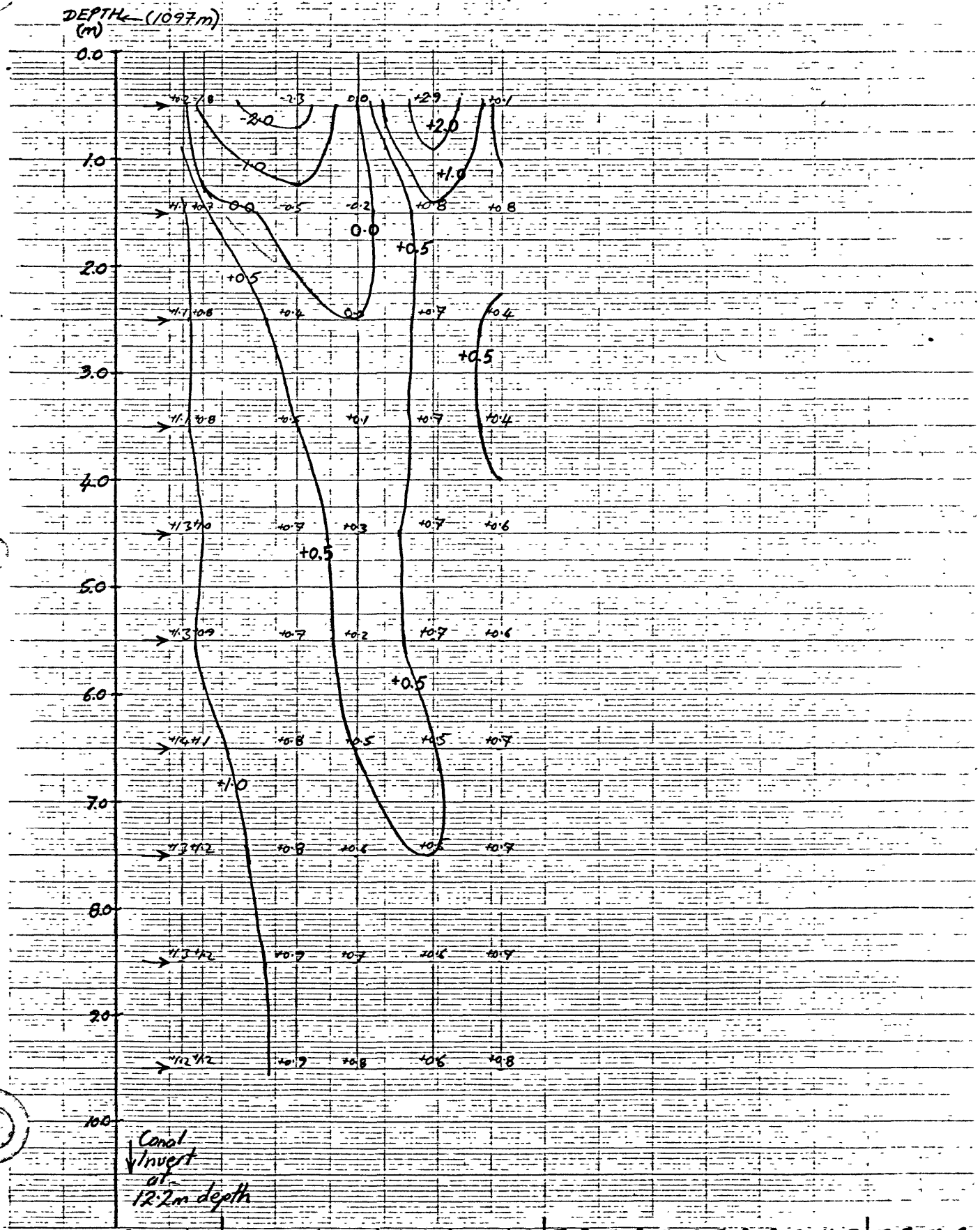
CANAL BACKSLOPE
BS2-04+00

TEMP. ISOTHERMS °C



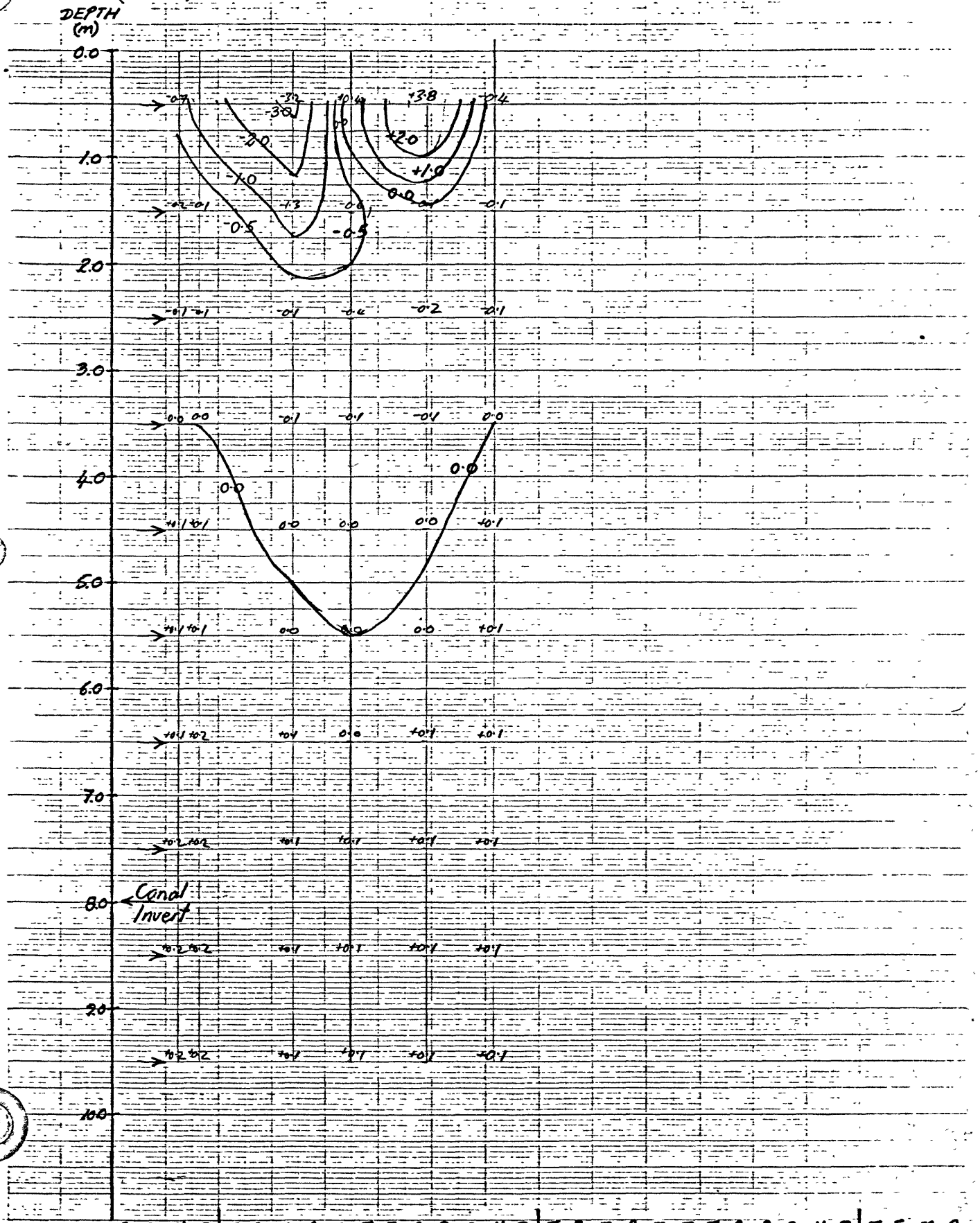
CANAL BACKSLOPE
BS4-0+710
(GOODALL CREEK)

TEMP. ISOTHERMS



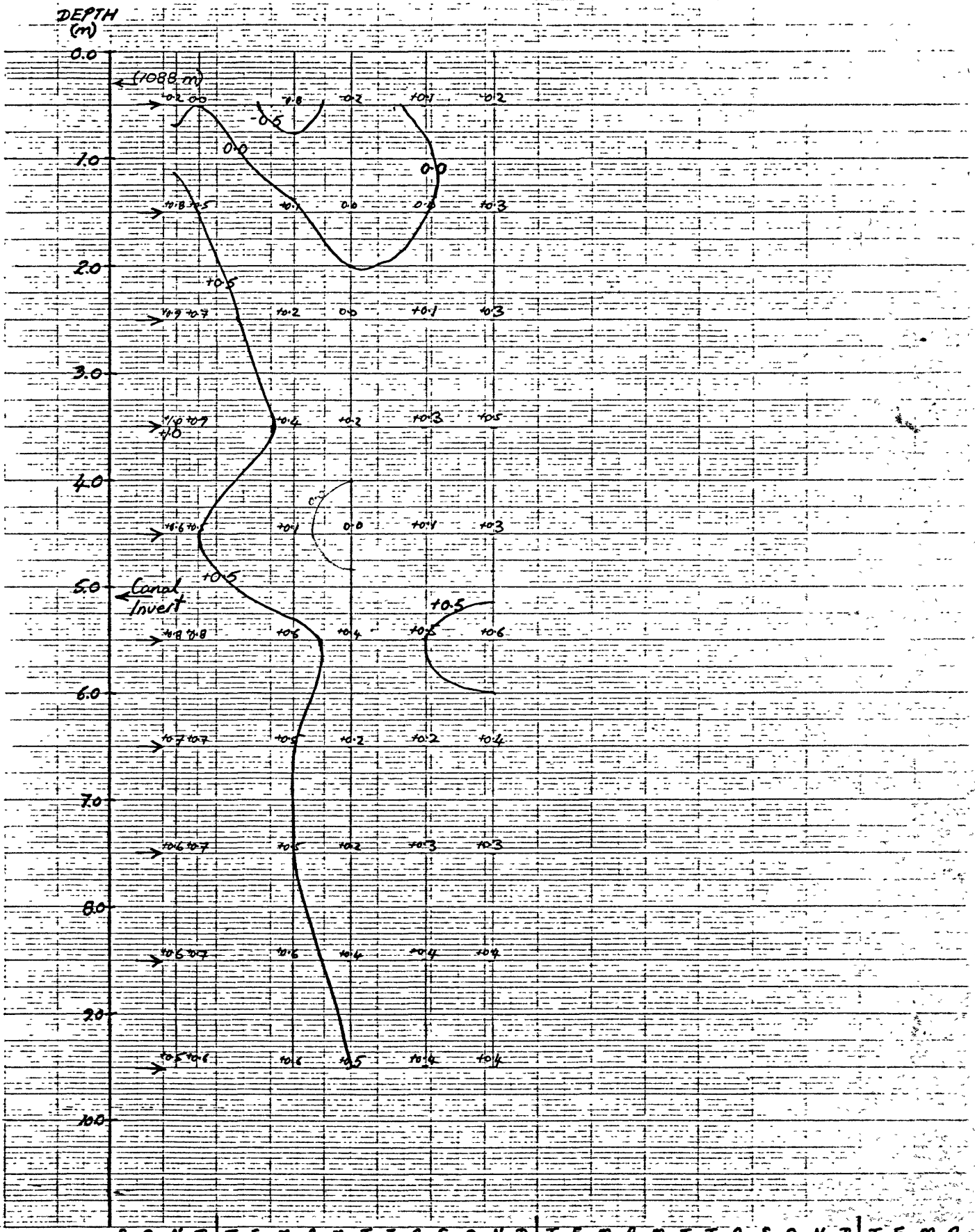
CANAL BACKSLOPE
BS5-0+960

(1093m) TEMP. ISOTHERMS °C



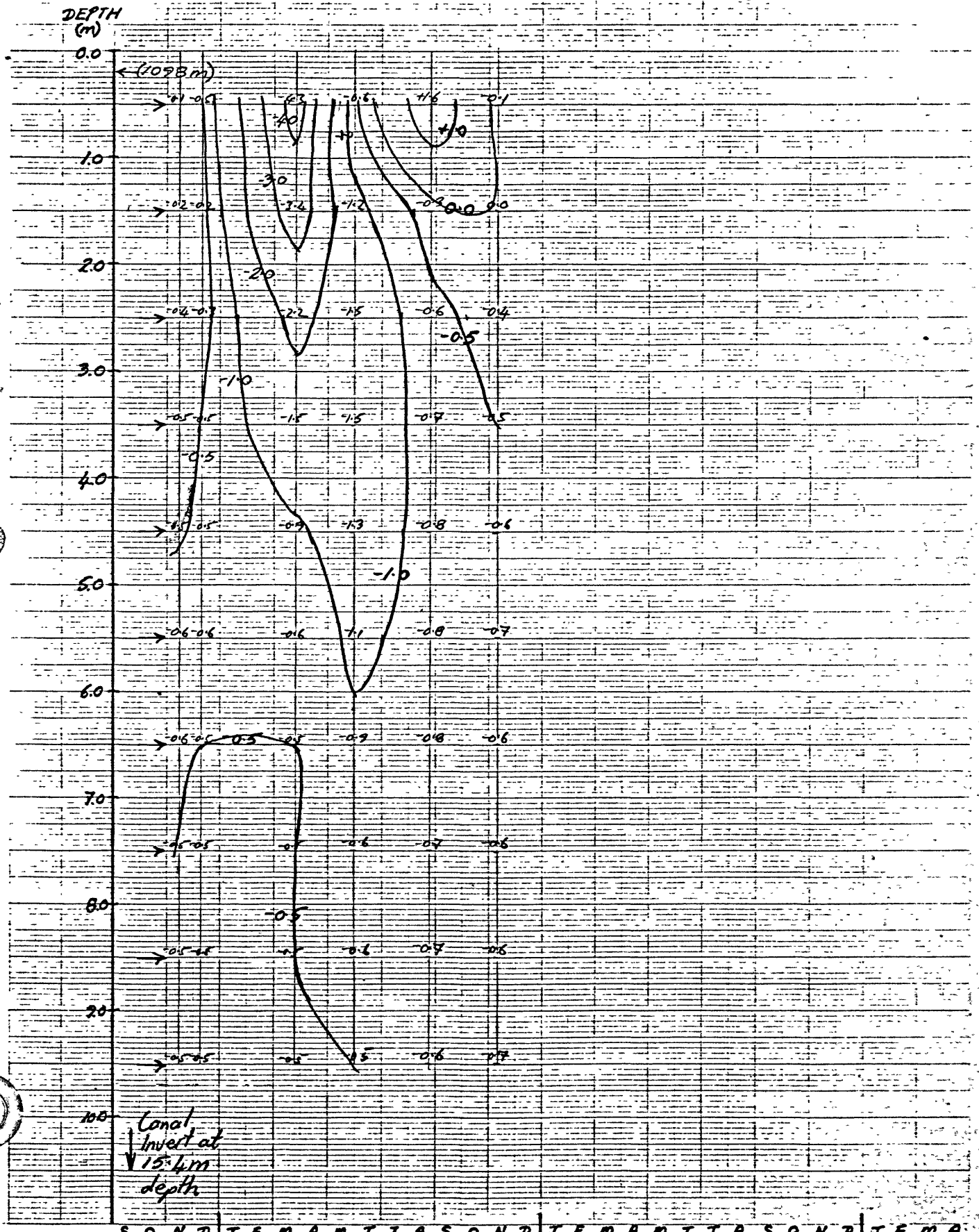
CANAL BACKSLOPE
BS9 -1+530

TEMP. ISOTHERMS.



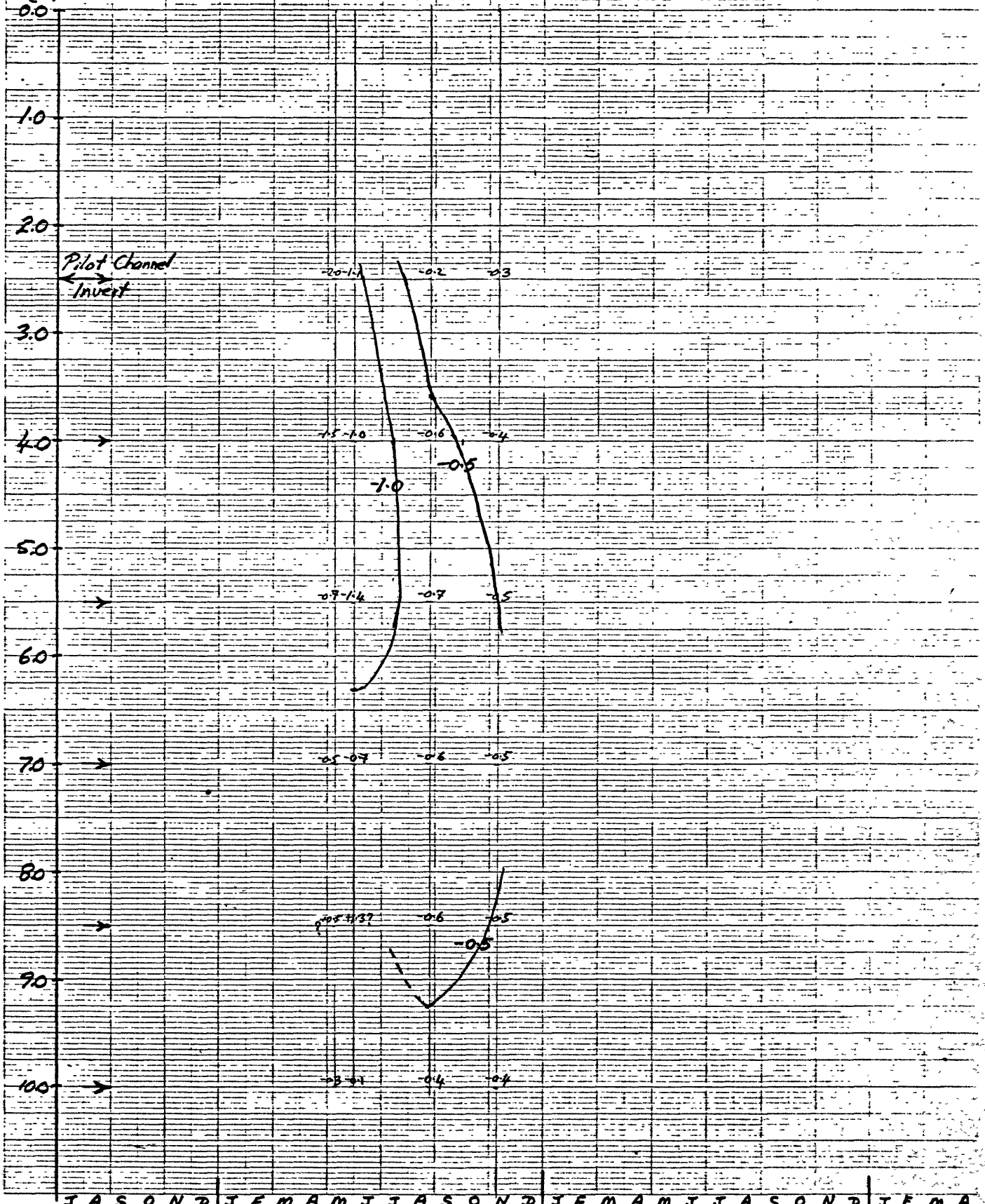
CANAL BACKSLOPE BS10-1+900

TEMP ISOTHERMS °C



CANAL BACKSLOPE
82-6 (Sta 2+100)
(2.5 m above pilot channel invert)
(installed 4 MAY '82)

TEMP. ISOTHERMS °C

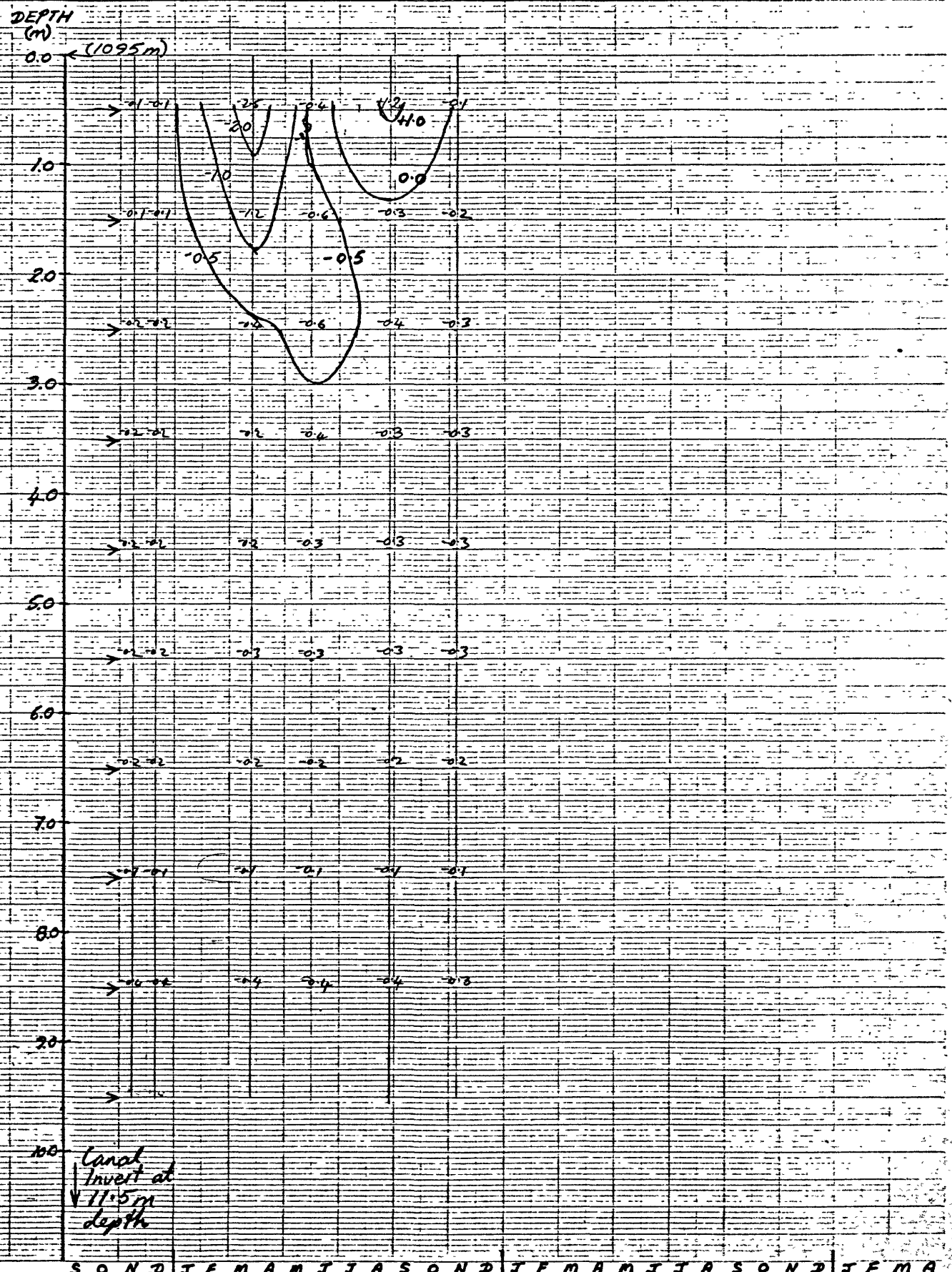


46 1512

10 X 10 TO THE CENTIMETER
KEUFFEL & ESSER CO.

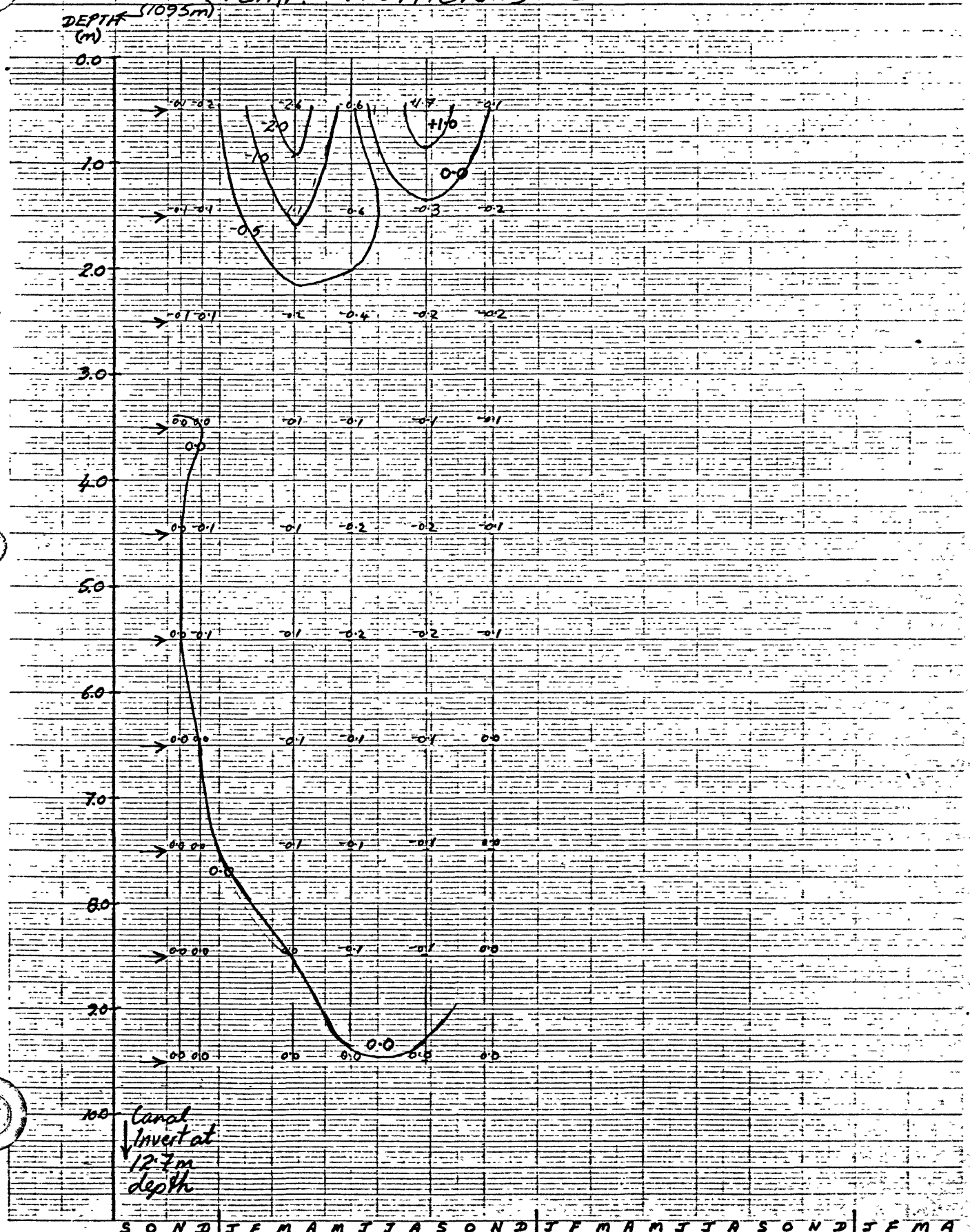
CANAL BACKSLOPE
BS11-2+100

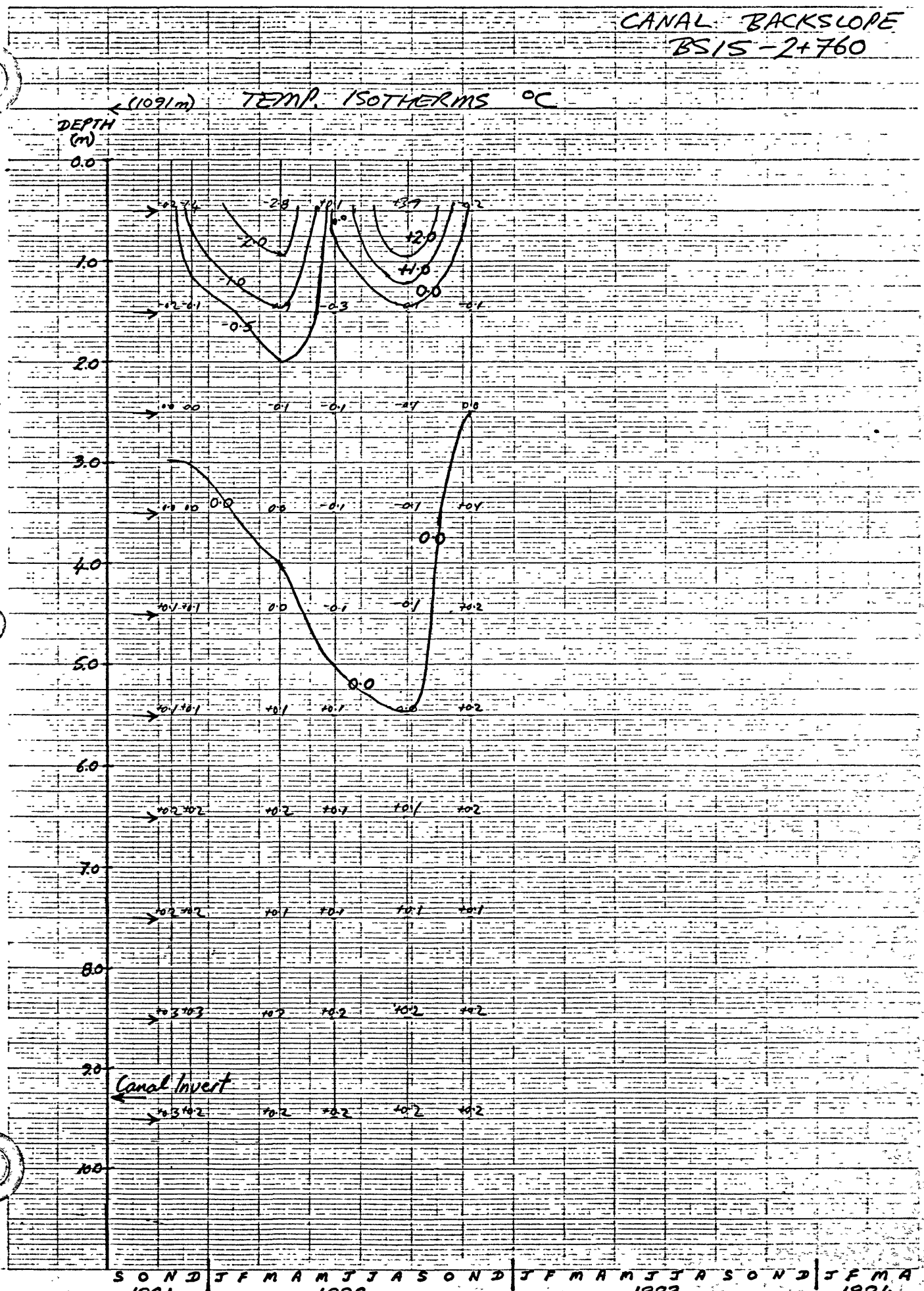
TEMP. ISOTHERMS °C



CANAL BACKSLOPE
BS12-2+260

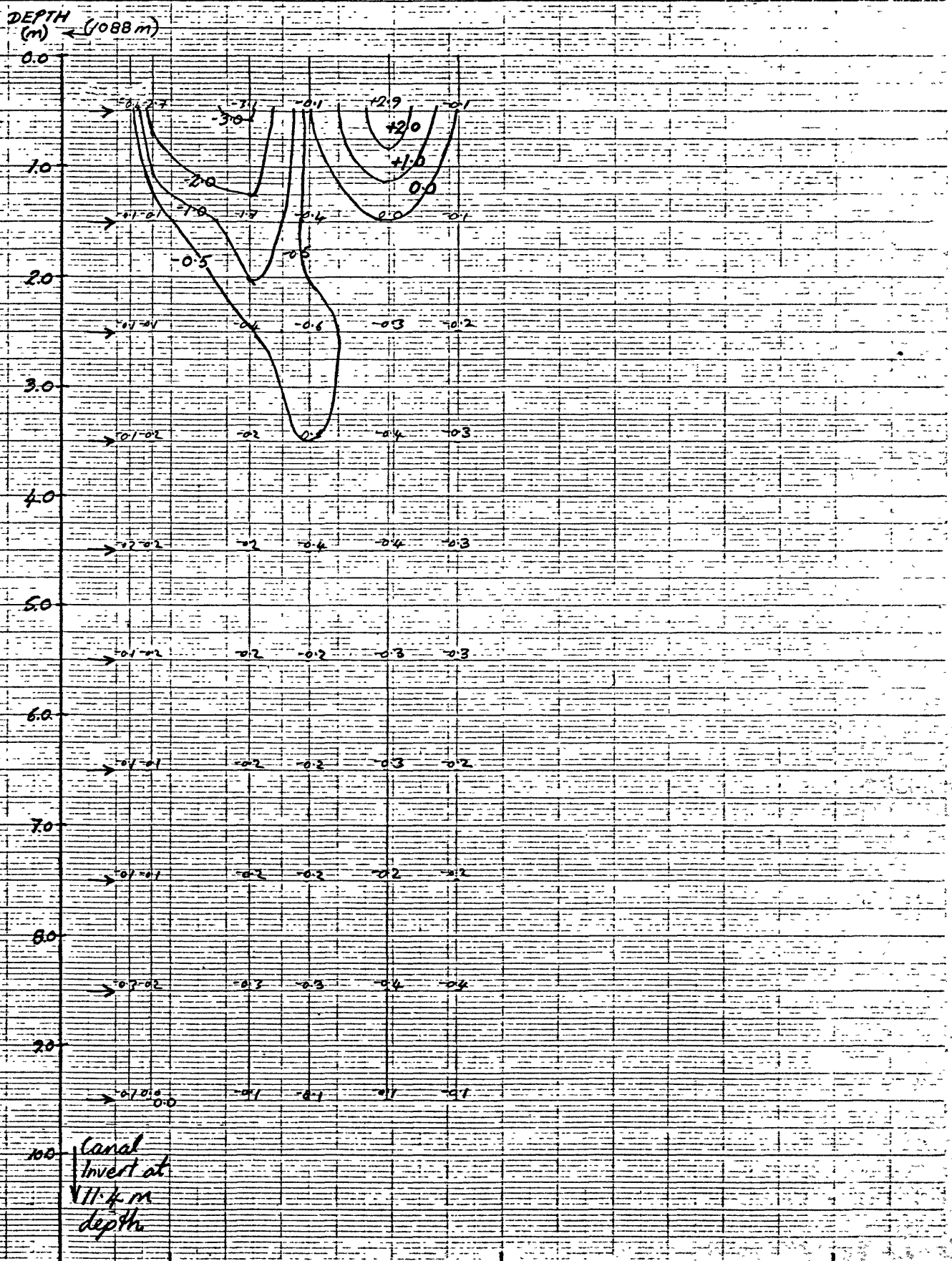
TEMP ISOTHERMS °C




CANAL BACKSLOPE
BS15 - 2+760
(1091m) TEMP. ISOTHERMS °C
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
10.0
Canal Invert
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984

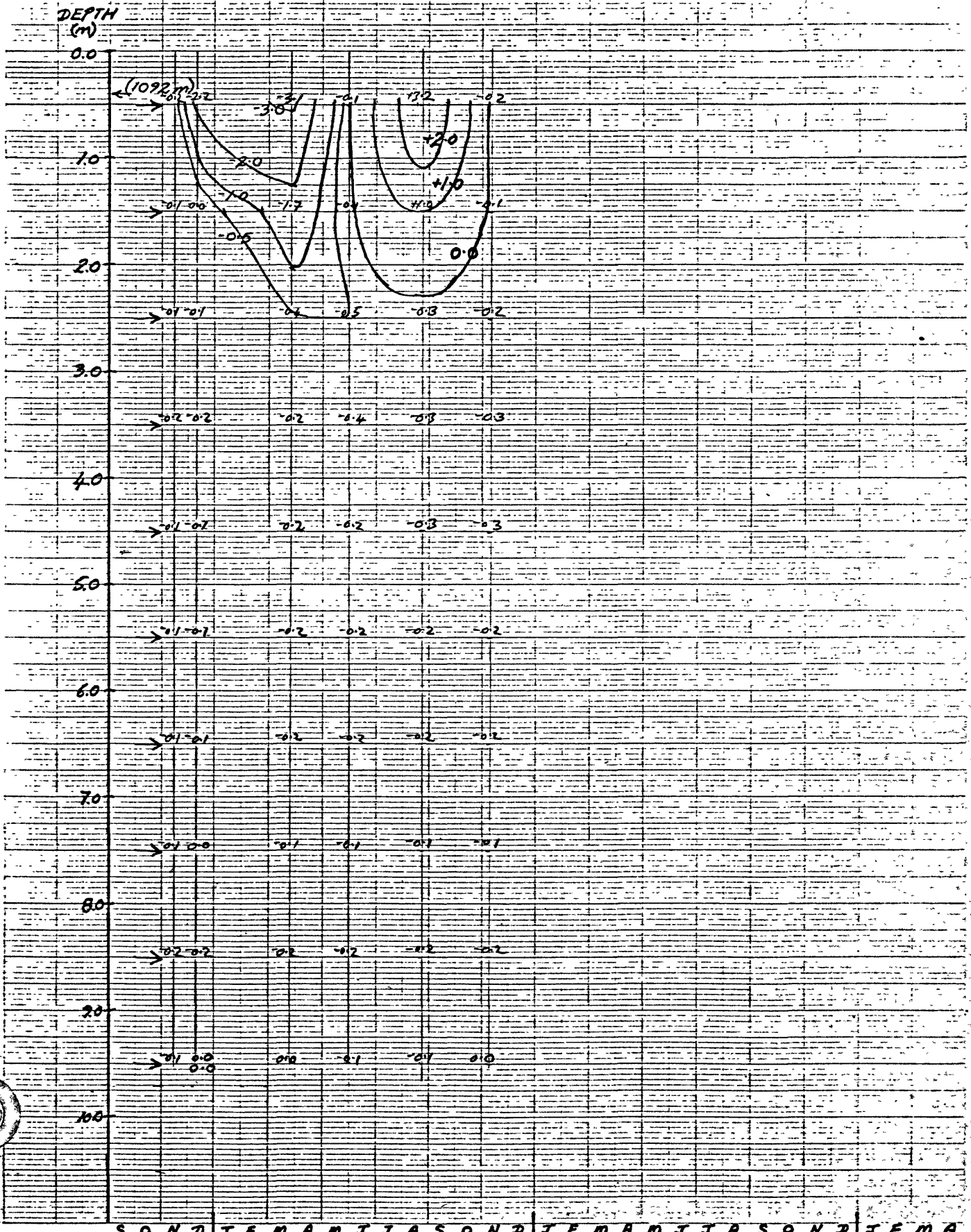
CANAL BACKSLOPE
BS16-2+900 (Lower)

TEMP. ISOTHERMS °C



CANAL BACKSLOPE
BS17-2+900 (upper)

TEMP. ISOTHERMS °C



CANAL BACKSLOPE
RS18-3+000

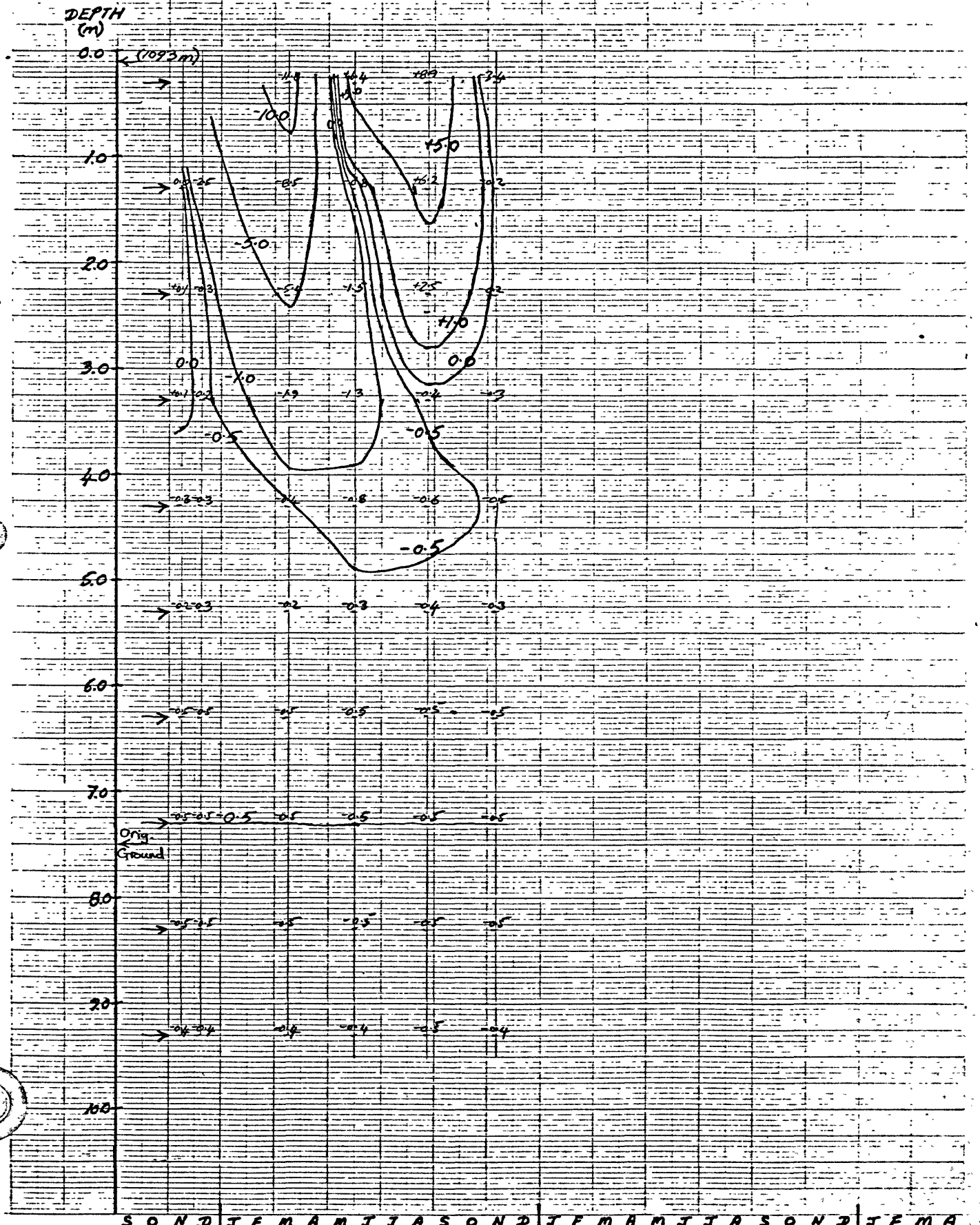
TEMP. ISOTHERMS °C

DEPTH (m)

1981 S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A

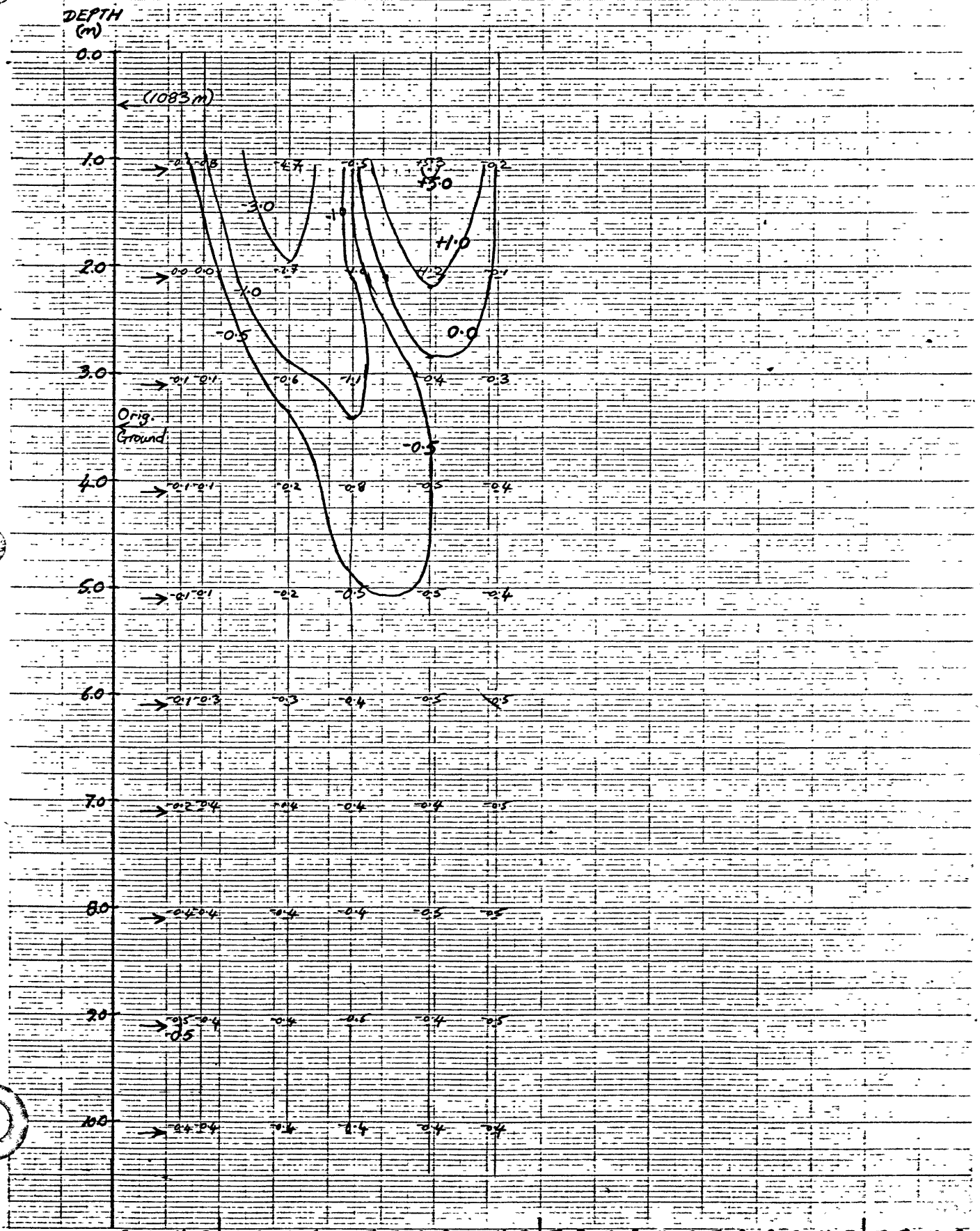
CANAL SPOIL PILES. SP2-1+530

TEMP. ISOTHERMS °C



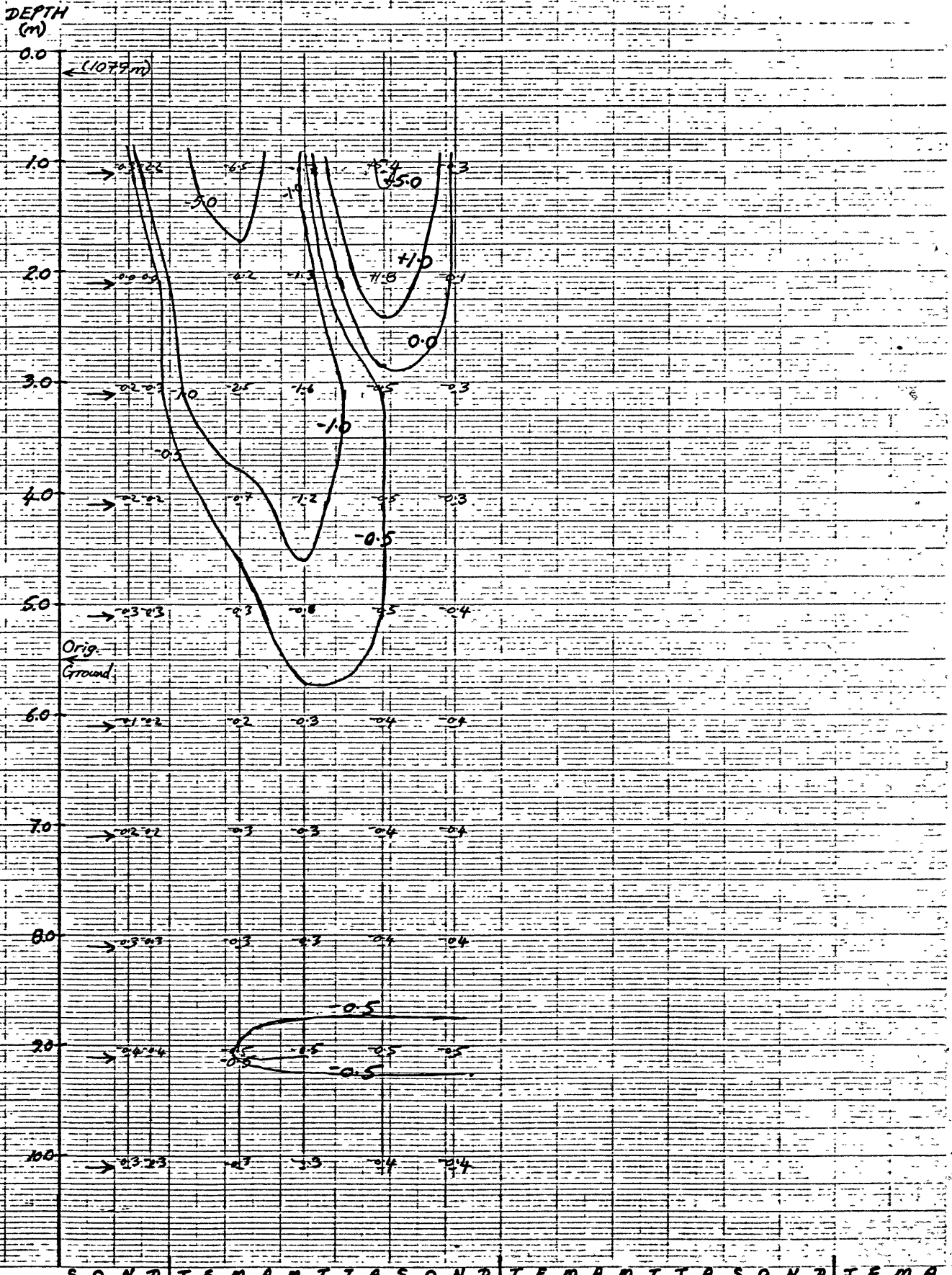
CANAL SPOIL PILES
SP3 -1+900

TEMP ISOTHERMS °C



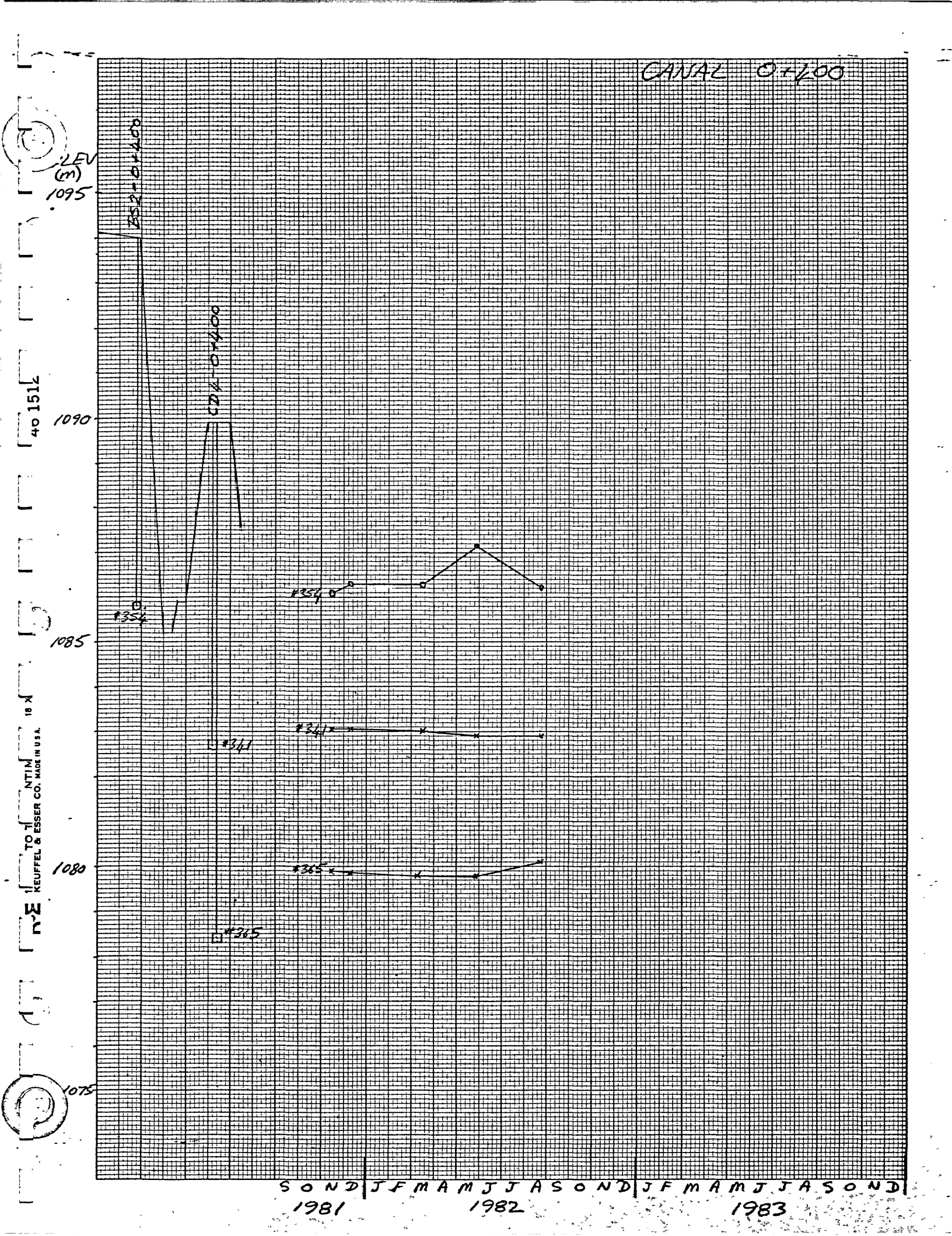
CANAL SPOIL PILES
SP5-2+950

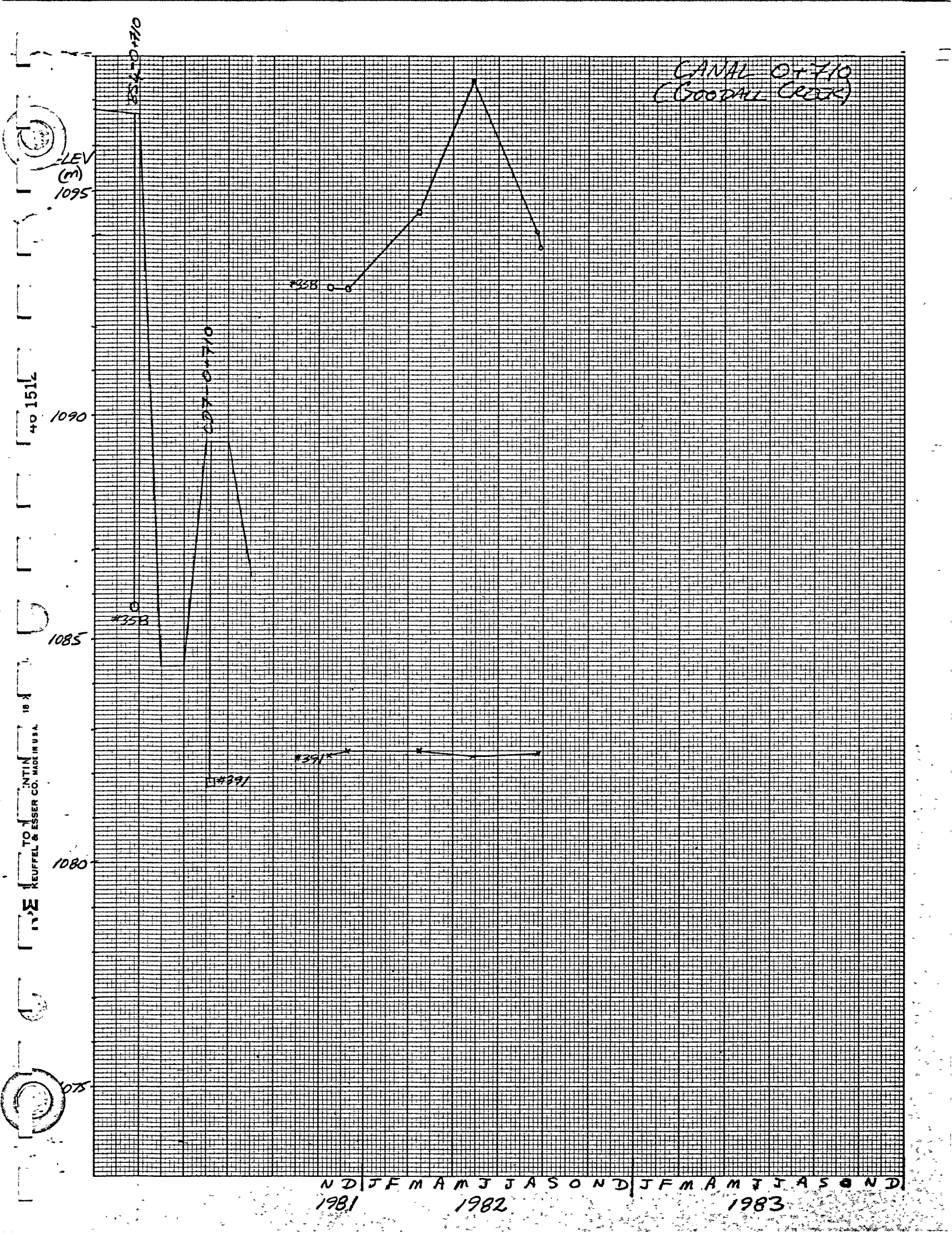
TEMP. ISOTHERMS °C

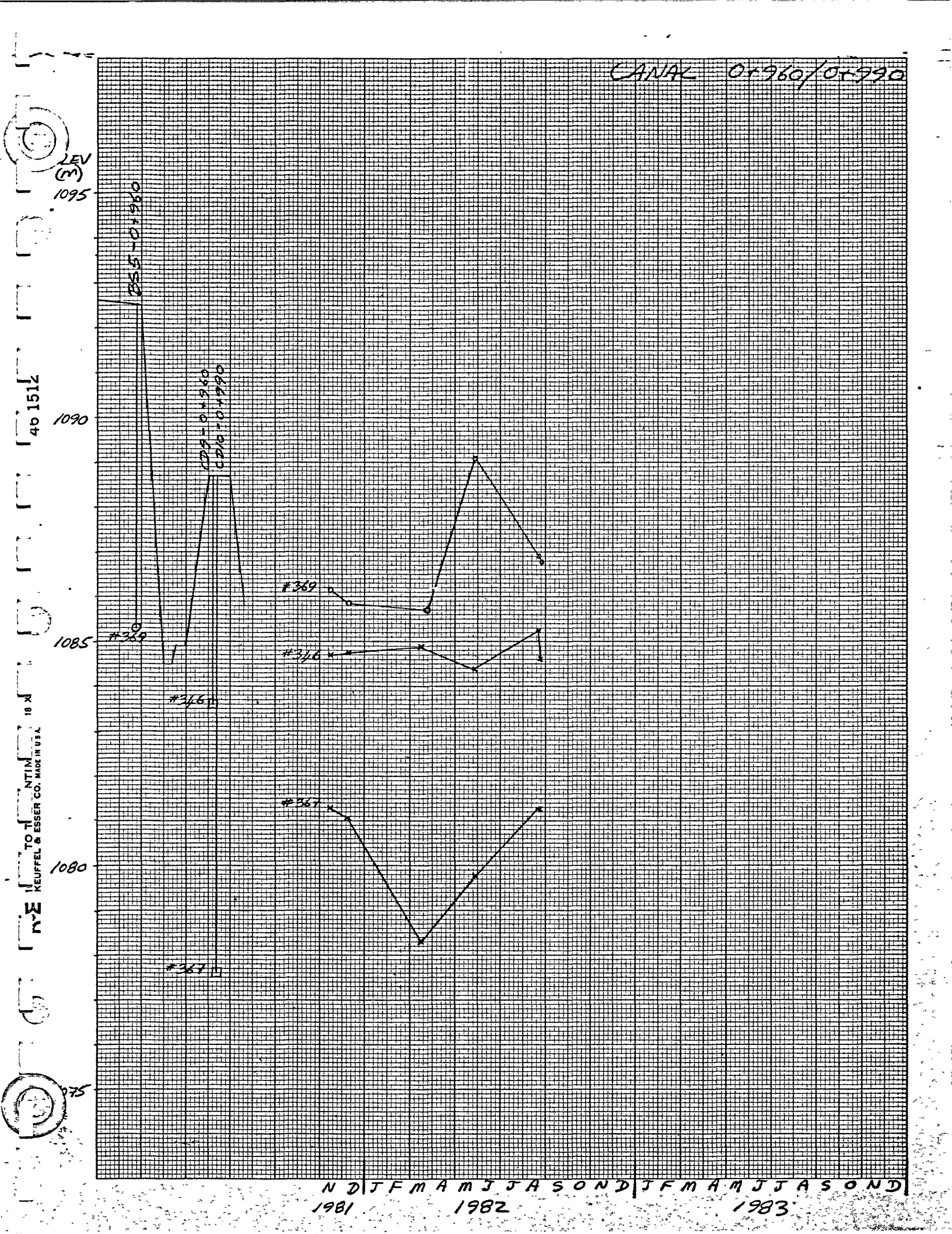


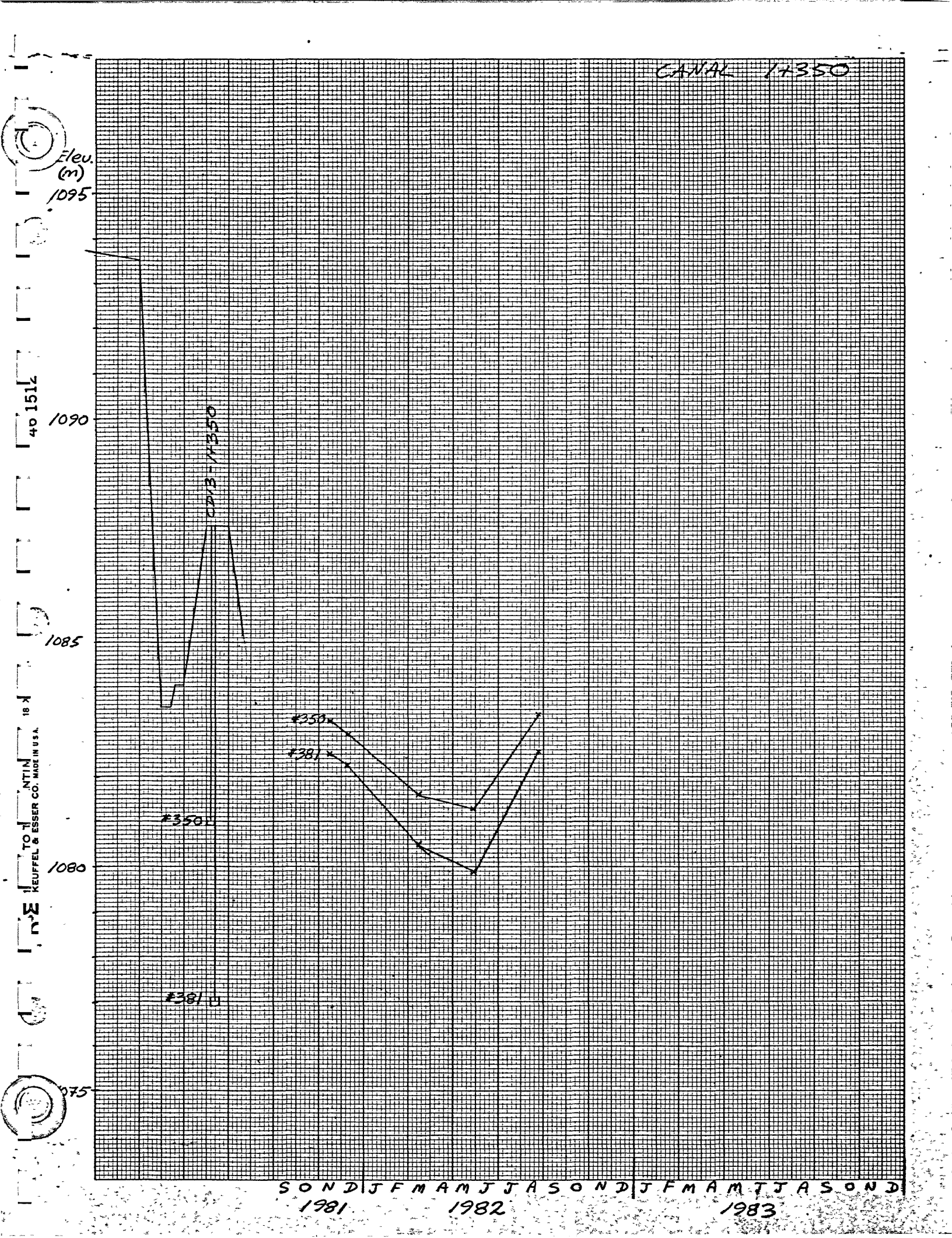
Canal Piezometers

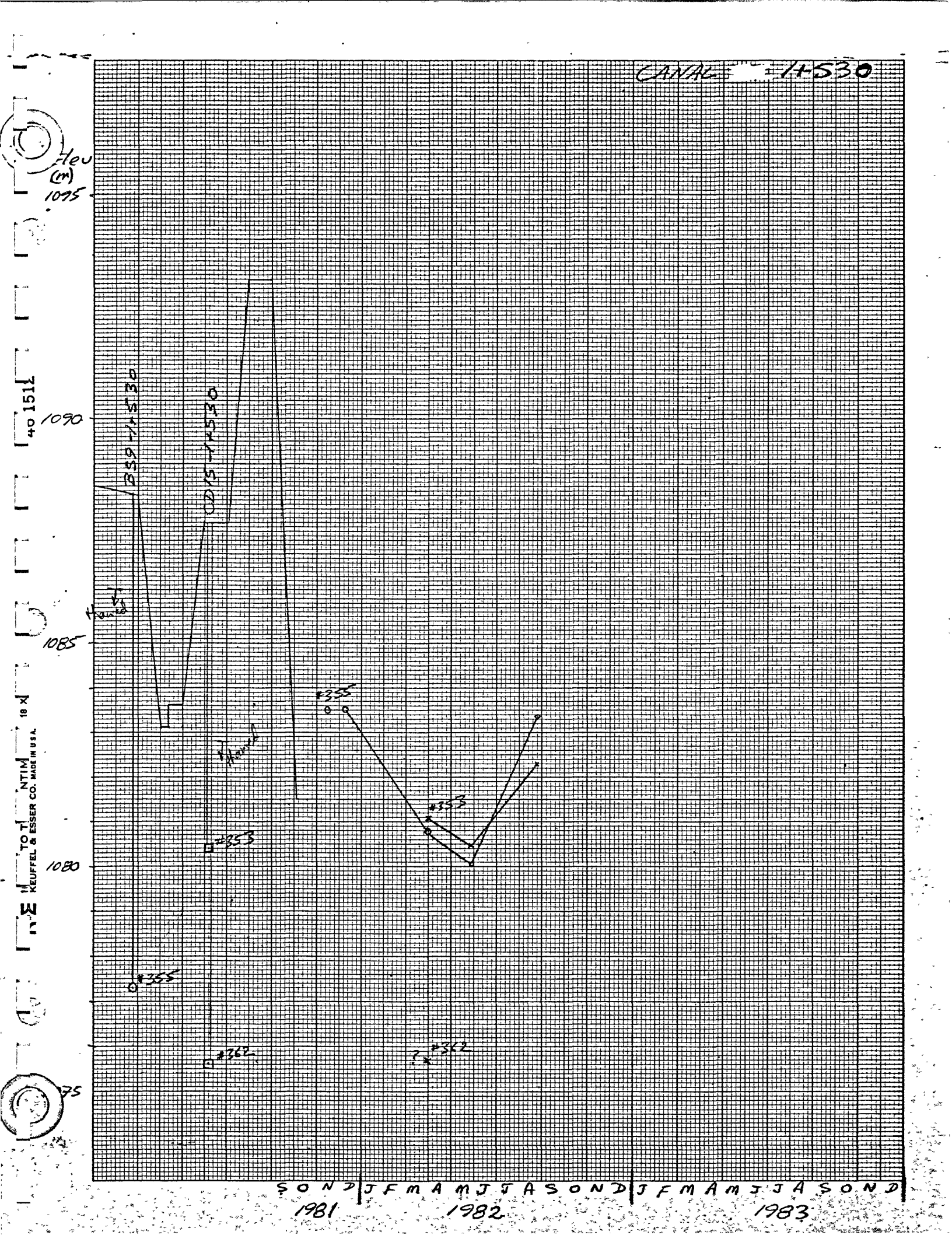
Station 0+400
0+710
0+960/0+990
1+350
1+530
1+900
2+070
2+100
2+130
2+160
2+600
2+900
3+000
3+120

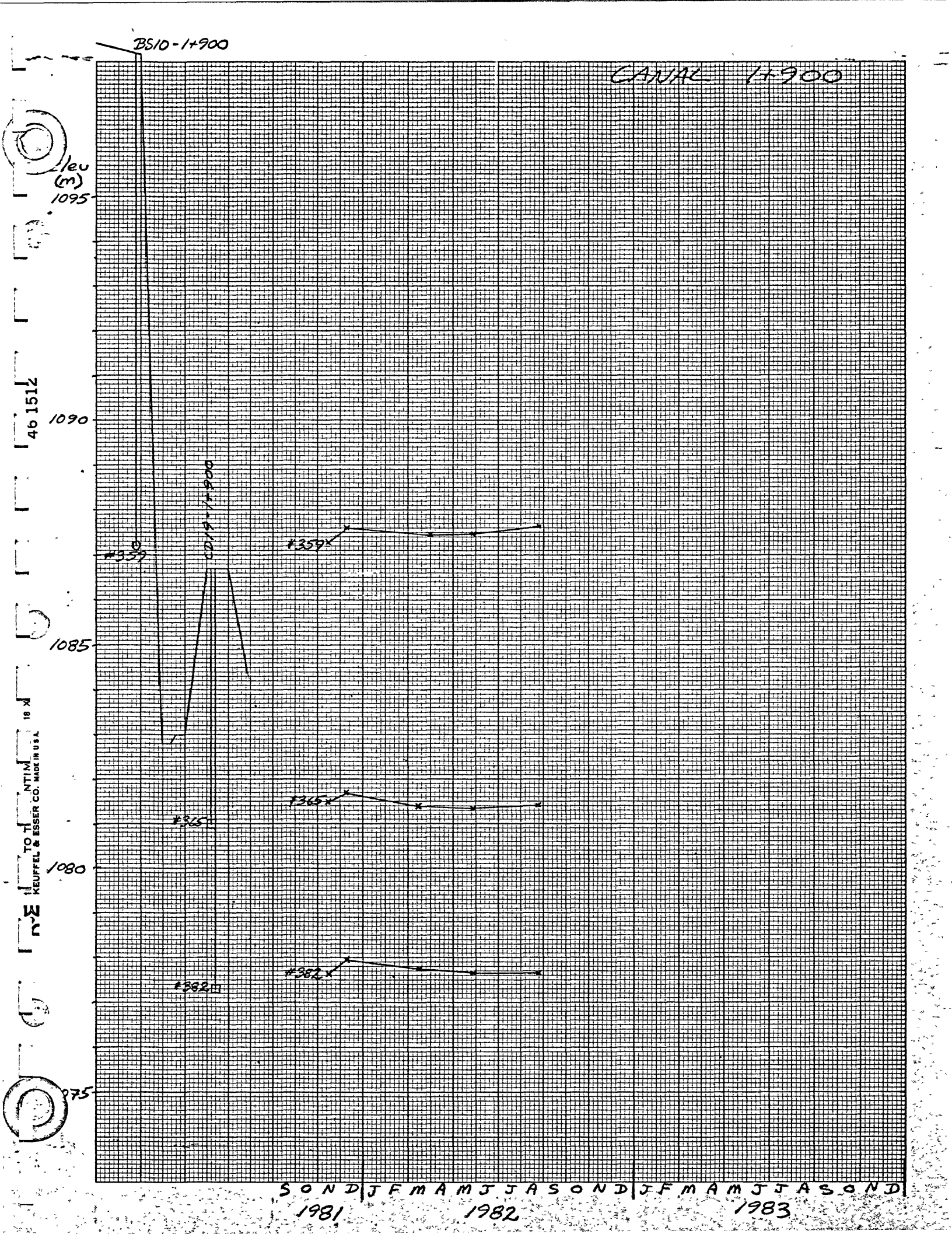

CANAL 0+400
ELEV (m)
1095
1090
1085
1080
1075
0+520
0+400
0+280
#354
#341
#365
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CANAL OT-710
(GOODALL CREEK)
-LEV
(m)
1095
1090
1085
1080
1075
#358
#391
N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL 0+960/0+990
ELEV (m)
1095
1090
1085
1080
1075
0+955
0+960
0+990
#369
#346
#367
N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL 1+350
Elev. (m)
1095
1090
1085
1080
1075
CANAL 1+350
#350
#381
#350
#381
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
40 1512
KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL = 17+530
Hau (m)
1095
1090
1085
1080
1075
40 151
1359 1+530
CD15 1+530
#355
#353
#362
?
#355
#353
#362
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
KEUFFEL & ESSER CO. MADE IN U.S.A.


BS10-1+900
CANAL 1+900
Elev (m)
1095
1090
1085
1080
1075
#359
#365
#382
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
KEUFFEL & ESSER CO. MADE IN U.S.A.

CANAL 2+070

Note: Canal configuration is vertically exaggerated 20X

1095

1090

1085

1080

1075

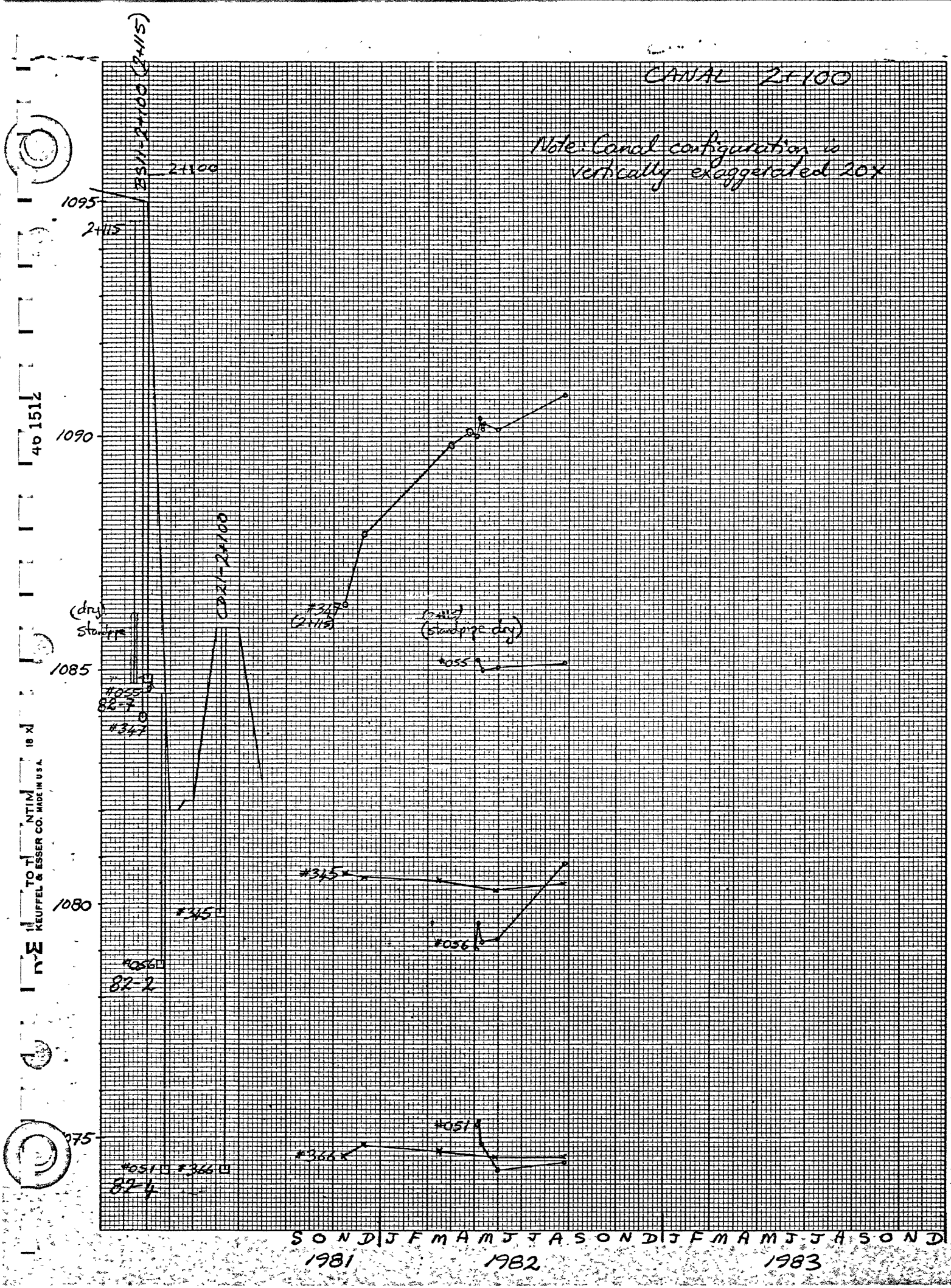
#065
82-3

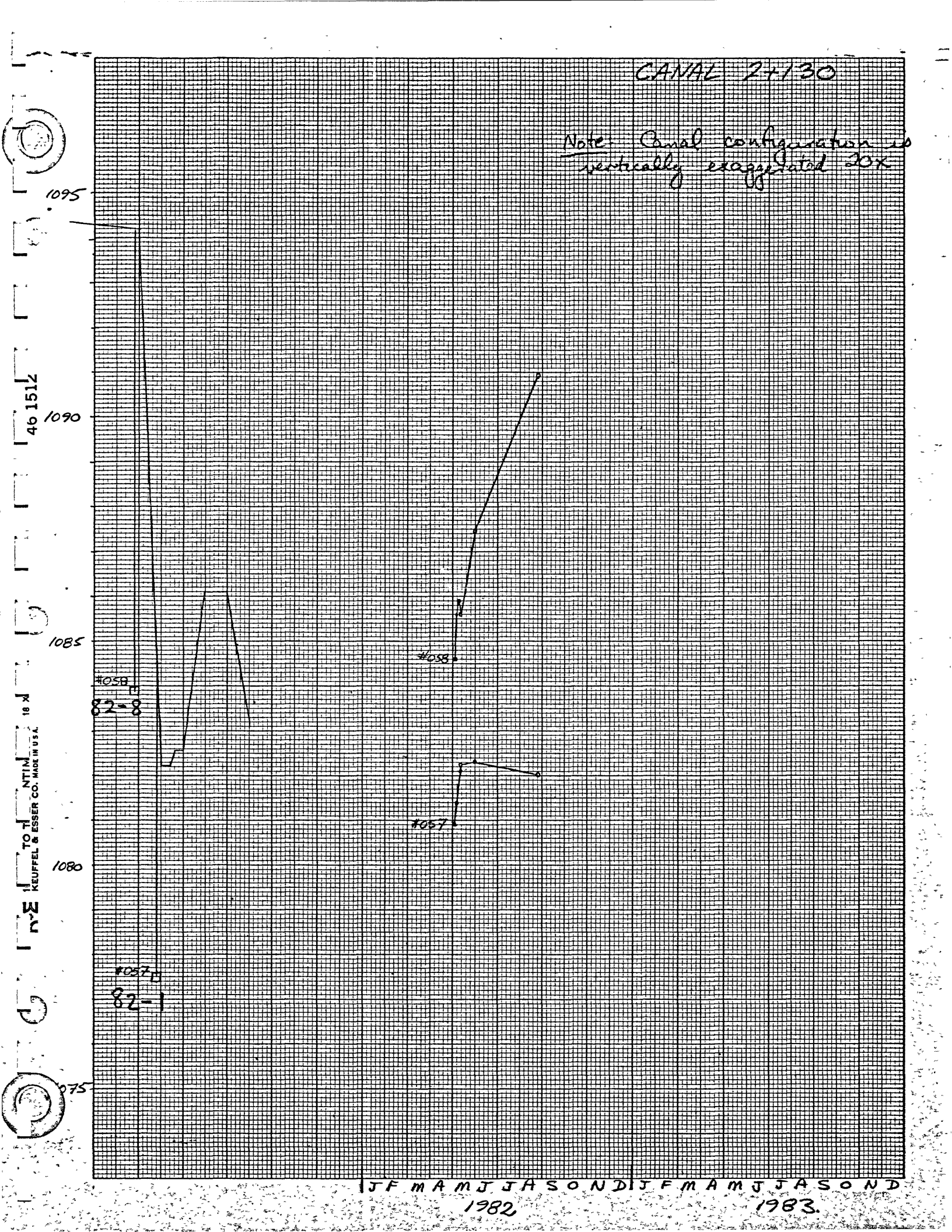
#065

J F M A M J J A S O N D | J F M A M J J A S O N D

1982 1983

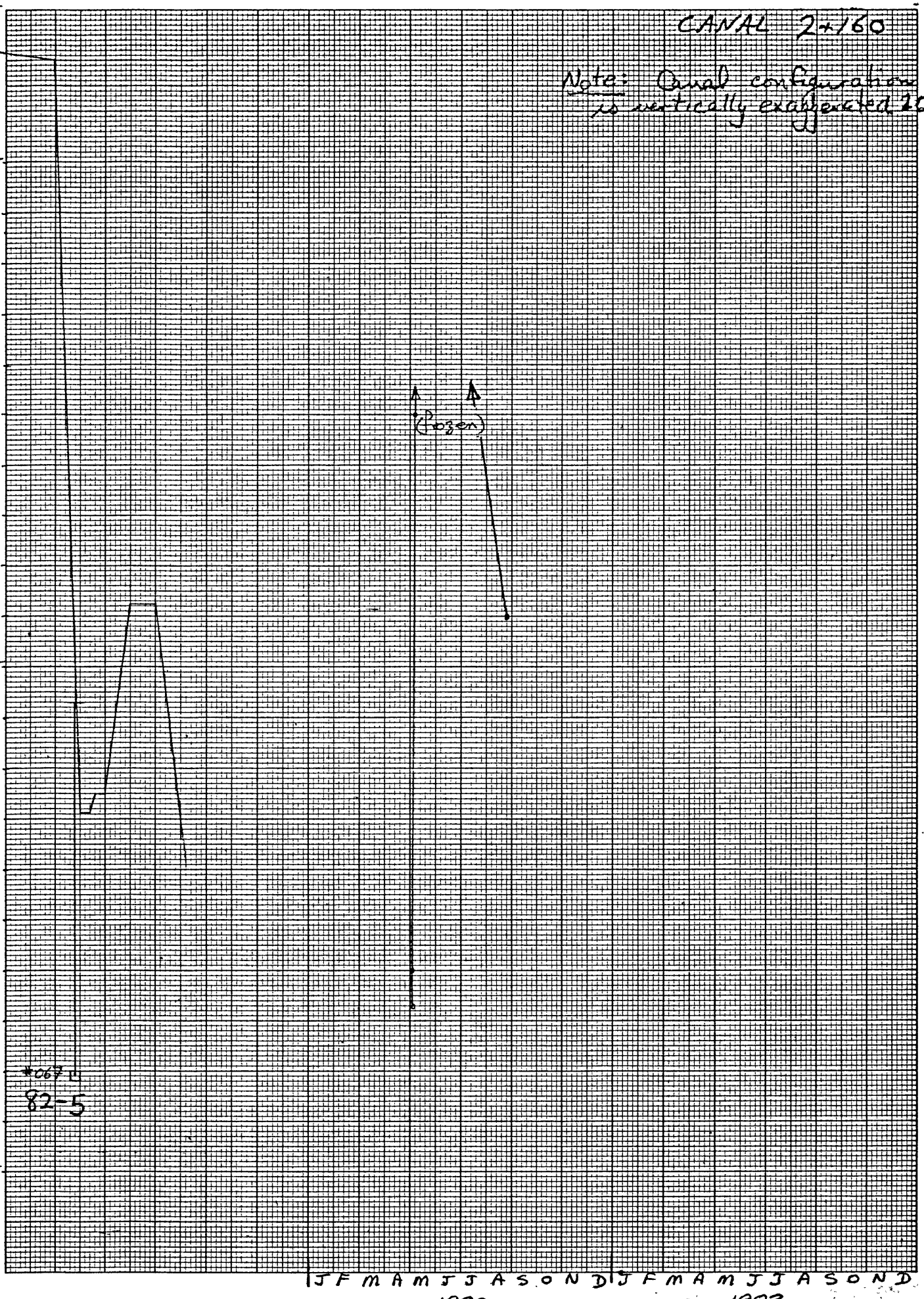
40 1512
KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL 2+100
Note: Canal configuration is vertically exaggerated 20X
BSW 2+100 (2+115)
2+100
1095
2+115
1090
4 to 1512
(dry) Standpipe
#055
82-3
#347
(2+115)
#347
(2+115)
(standpipe dry)
#055
1085
#345
#056
1080
#345
#056
82-2
#051
#366
#051
#366
82-4
1075
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CANAL 2+130
Note: Canal configuration is vertically exaggerated 20X
1095
1090
1085
1080
1075
#058
82-8
#057
82-1
#058
#057
J F M A M J J A S O N D J F M A M J J A S O N D
1982
1983.
46 1512
KEUFFEL & ESSER CO. MADE IN U.S.A.

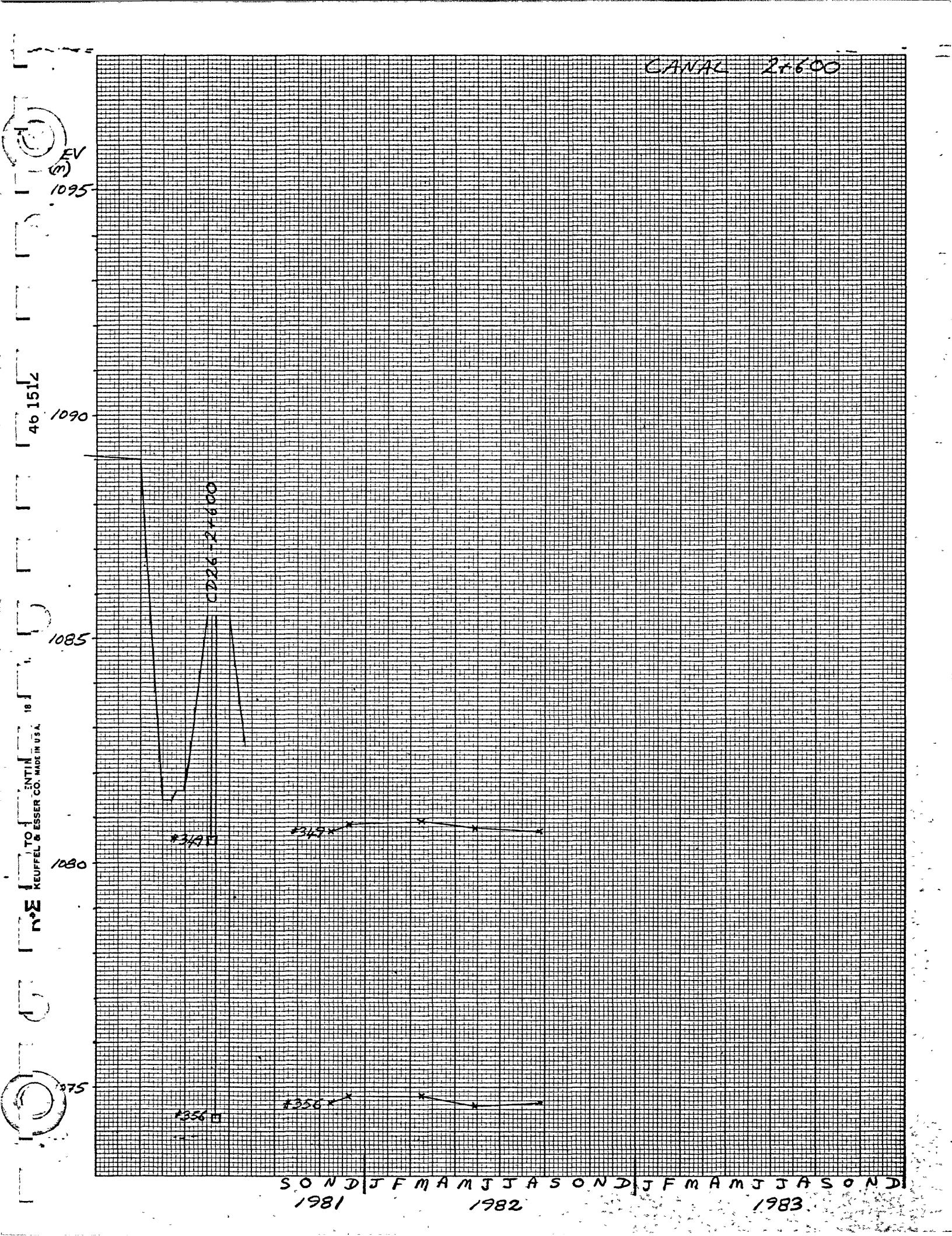
CANAL 2+160

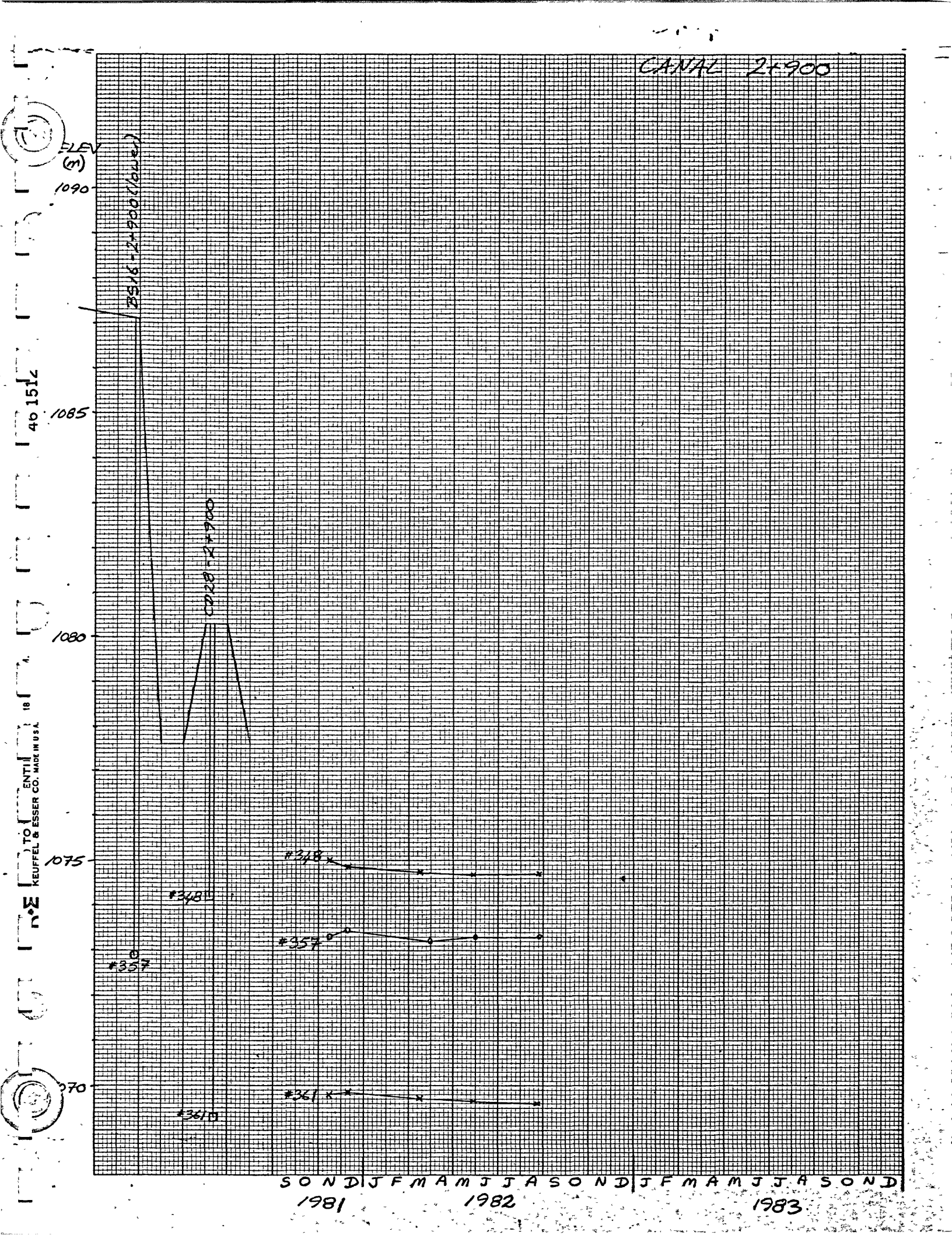
Note: Canal configuration is vertically exaggerated 20X

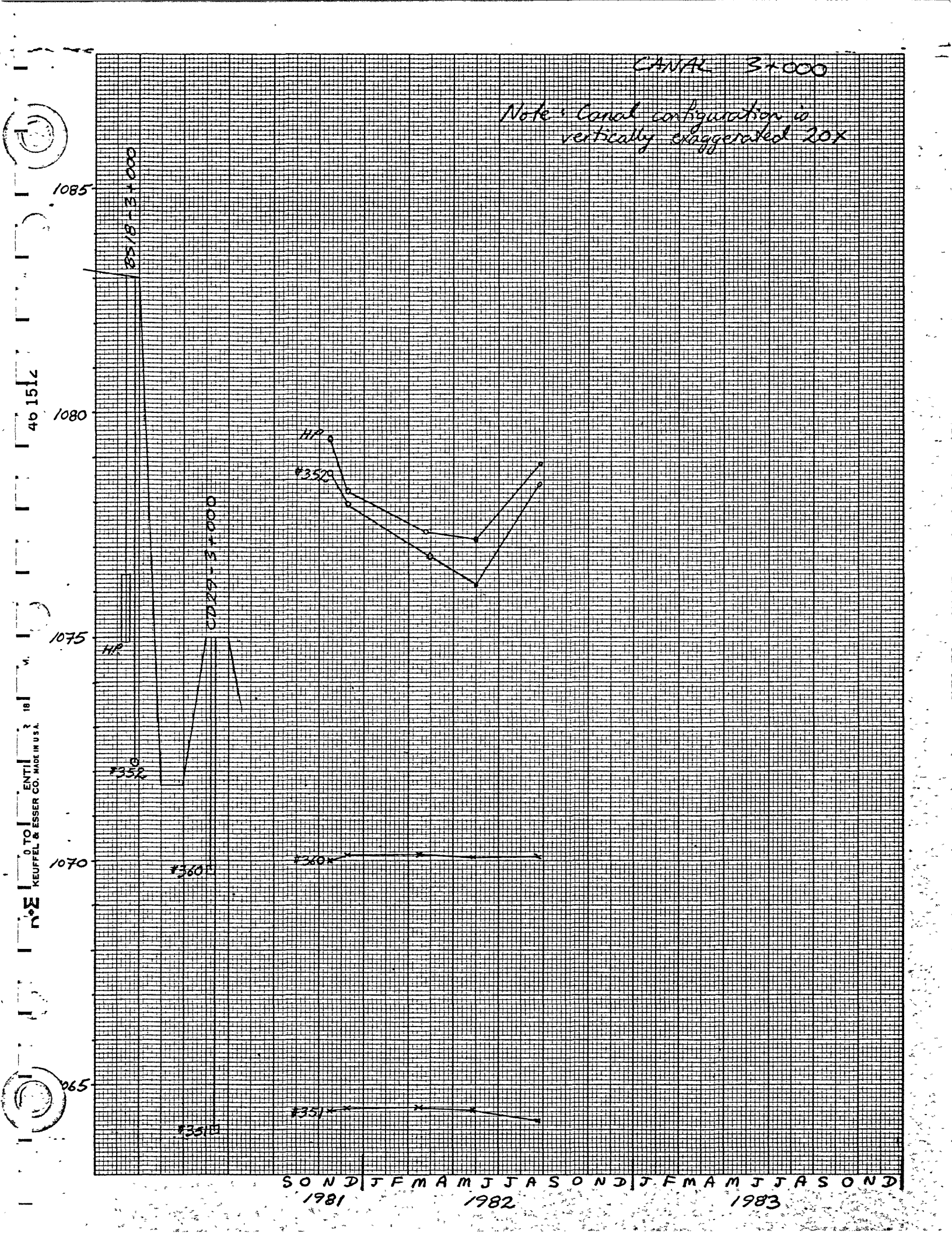


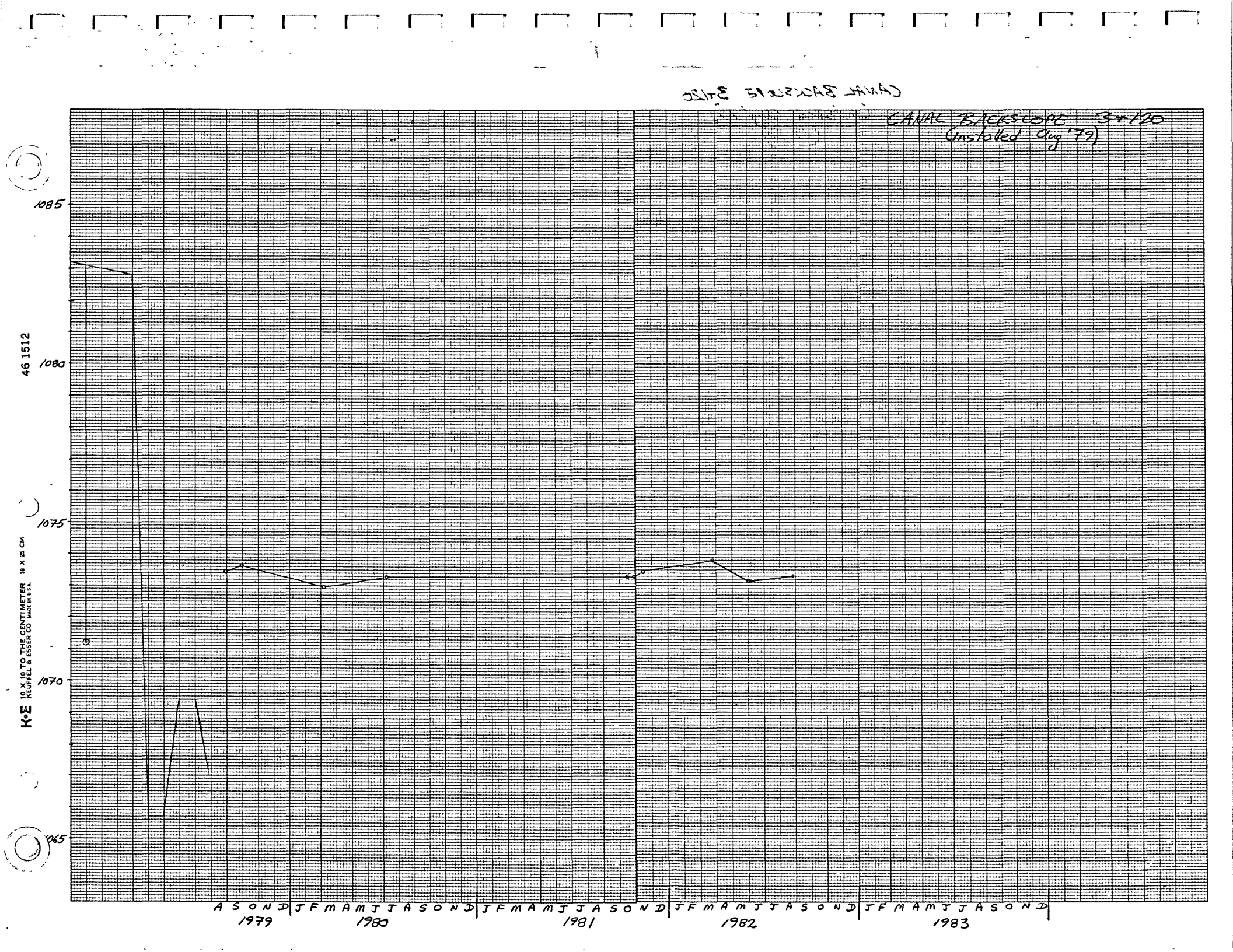
*067 U
82-5

KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL 2+600
EV (m)
1095
1090
1085
1080
1075
CD26-2+600
#349
#356
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CANAL 2+900
ELEV (m)
1090
1085
1080
1075
1070
BS16-2+900(10cm)
CD28-2+880
#348
#357
#361
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983
KEUFFEL & ESSER CO. MADE IN U.S.A.


CANAL 3+000
Note: Canal configuration is vertically exaggerated 20x
1085
1080
1075
1070
1065
HP
#352
#360
#351
#352
#360
#351
S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1981
1982
1983


CANAL BACKSCORE 3+120
(Installed Aug '79)
1085
1080
1075
1070
1065
A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1979
1980
1981
1982
1983
46 1512
K+E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO MADE IN U.S.A.

Canal Slope Indicators

Perpendicular and Parallel to Canal Centreline

Canal Dyke

CD10-0+990

CD15-1+530

CD19-1+900

CD21-2+100

CD28-2+900

CD29-3+000

Canal Backslope

BS2-0+400

BS5-0+960

BS9-1+530

BS10-1+900

BS11-2+100

BS16-2+900 (lower)

BS17-2+900 (upper)

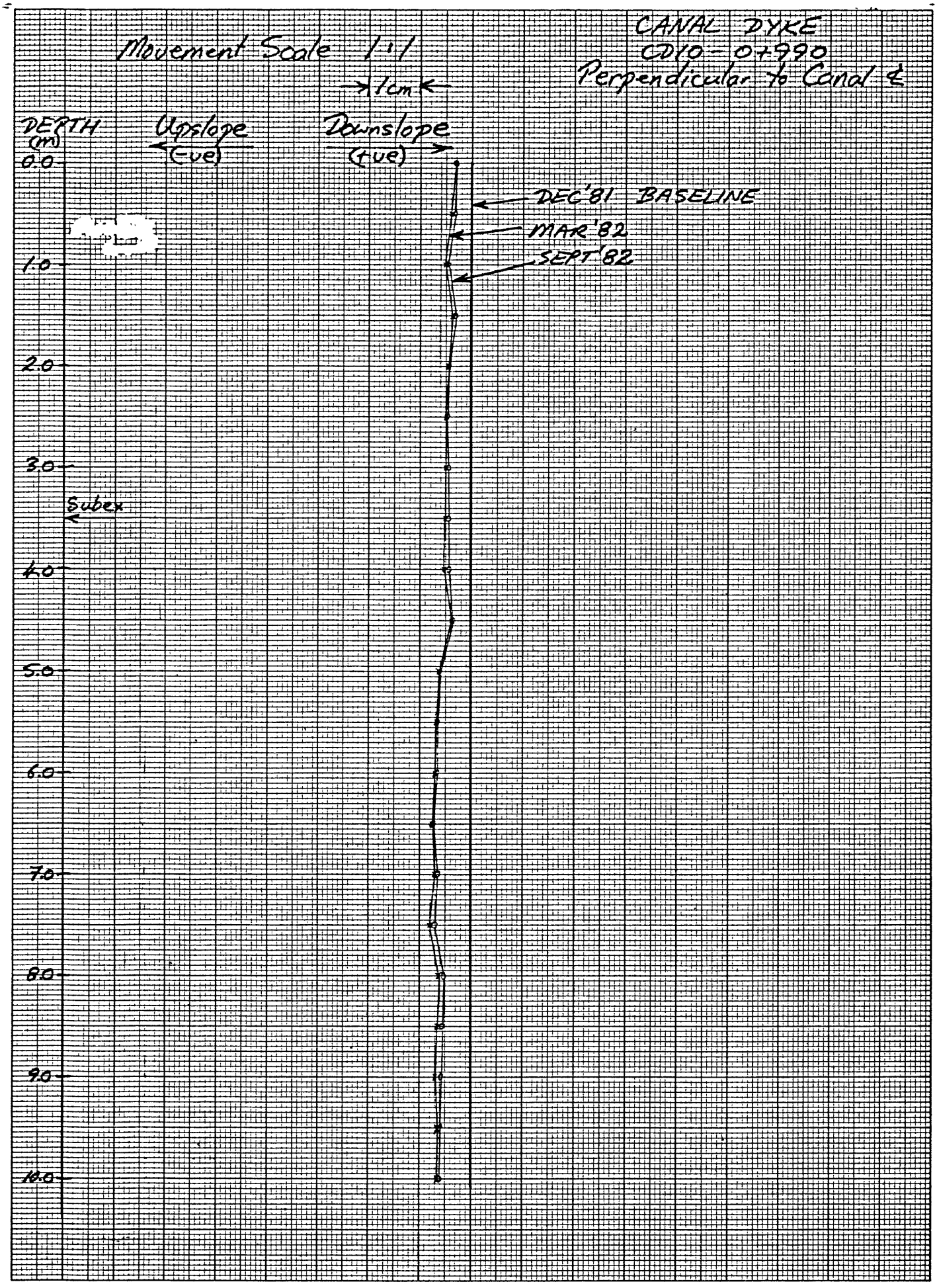
BS18-3+000

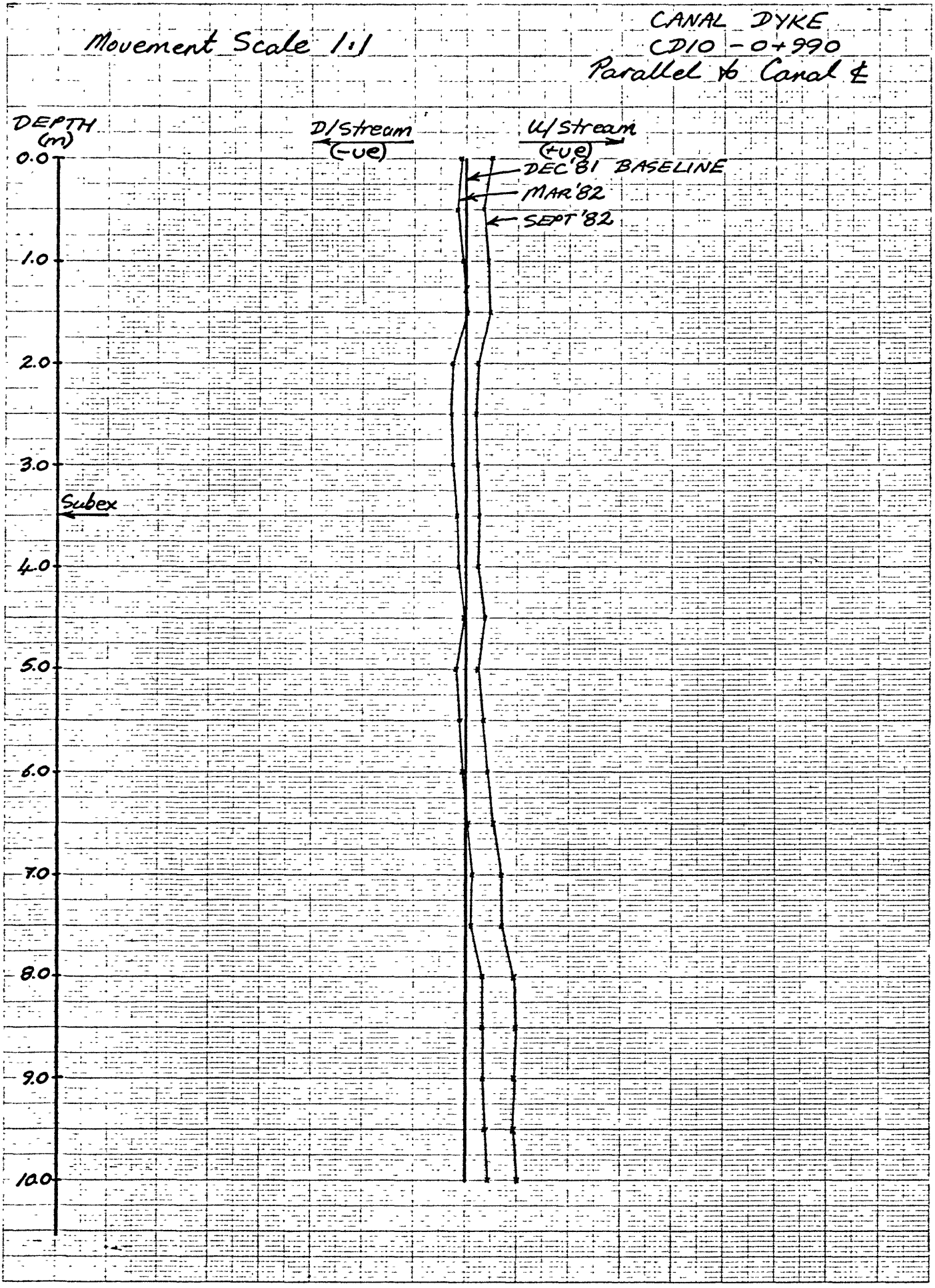
Canal Spoilpile

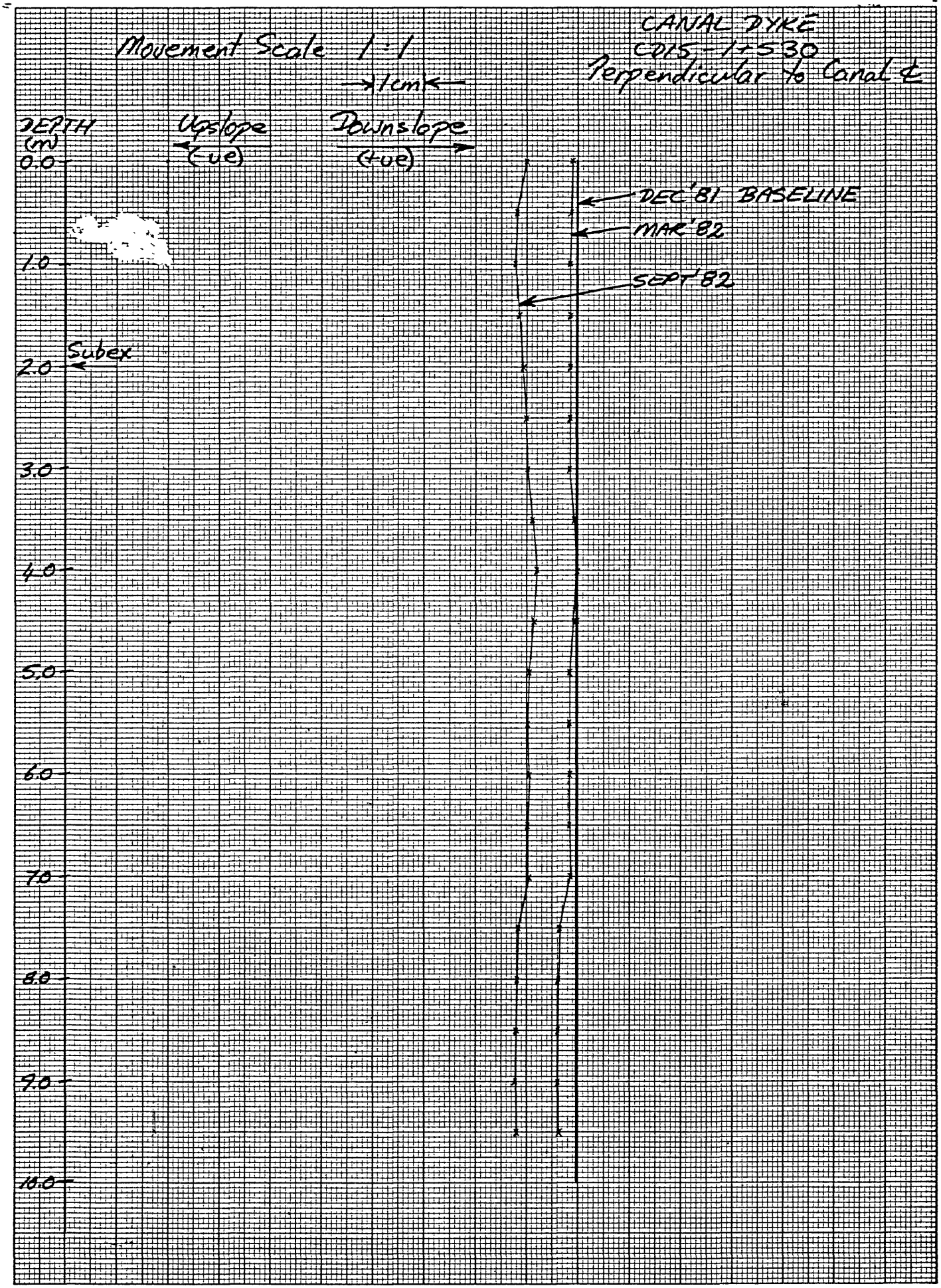
SP2-1+530

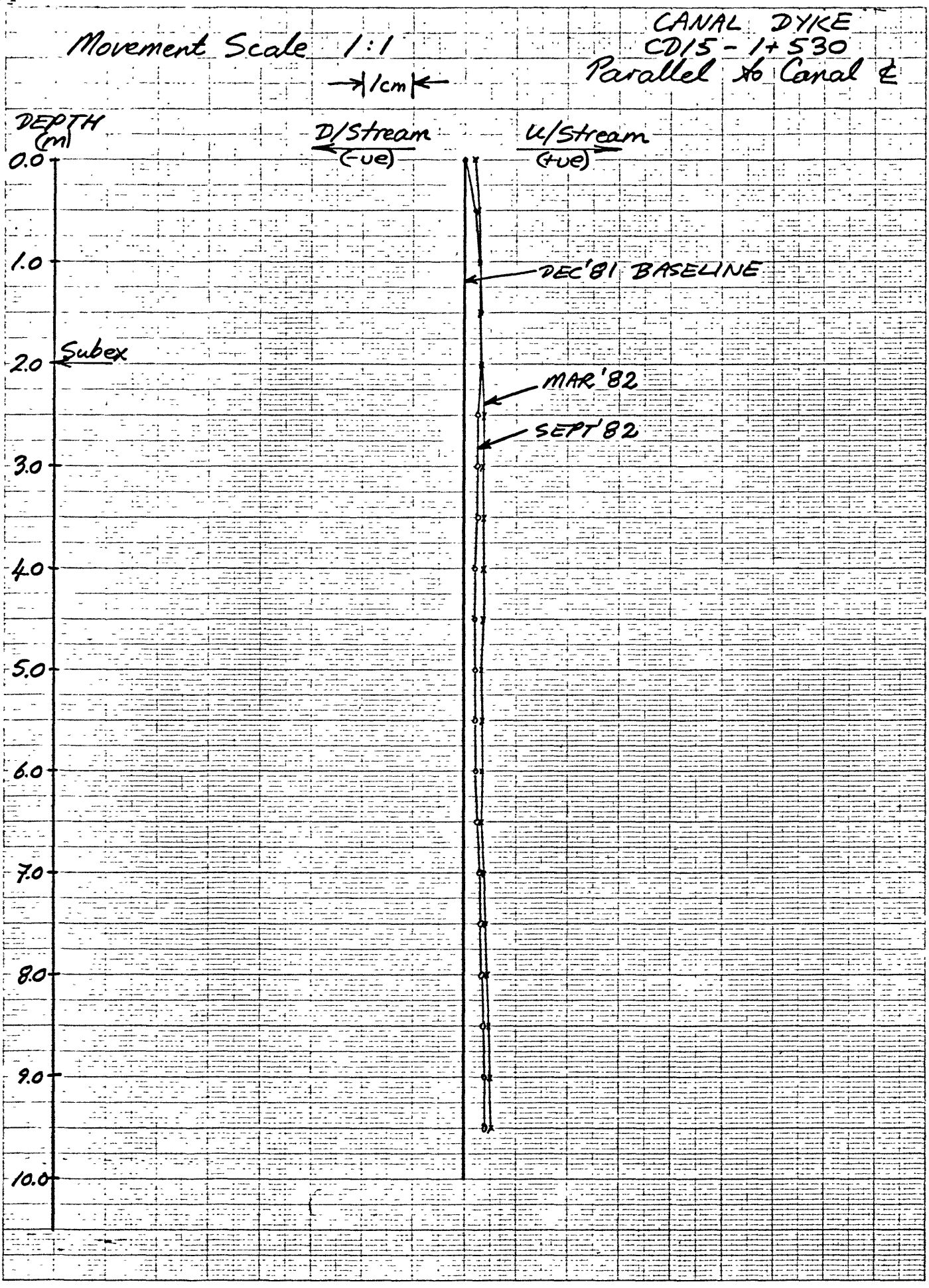
SP3-1+900

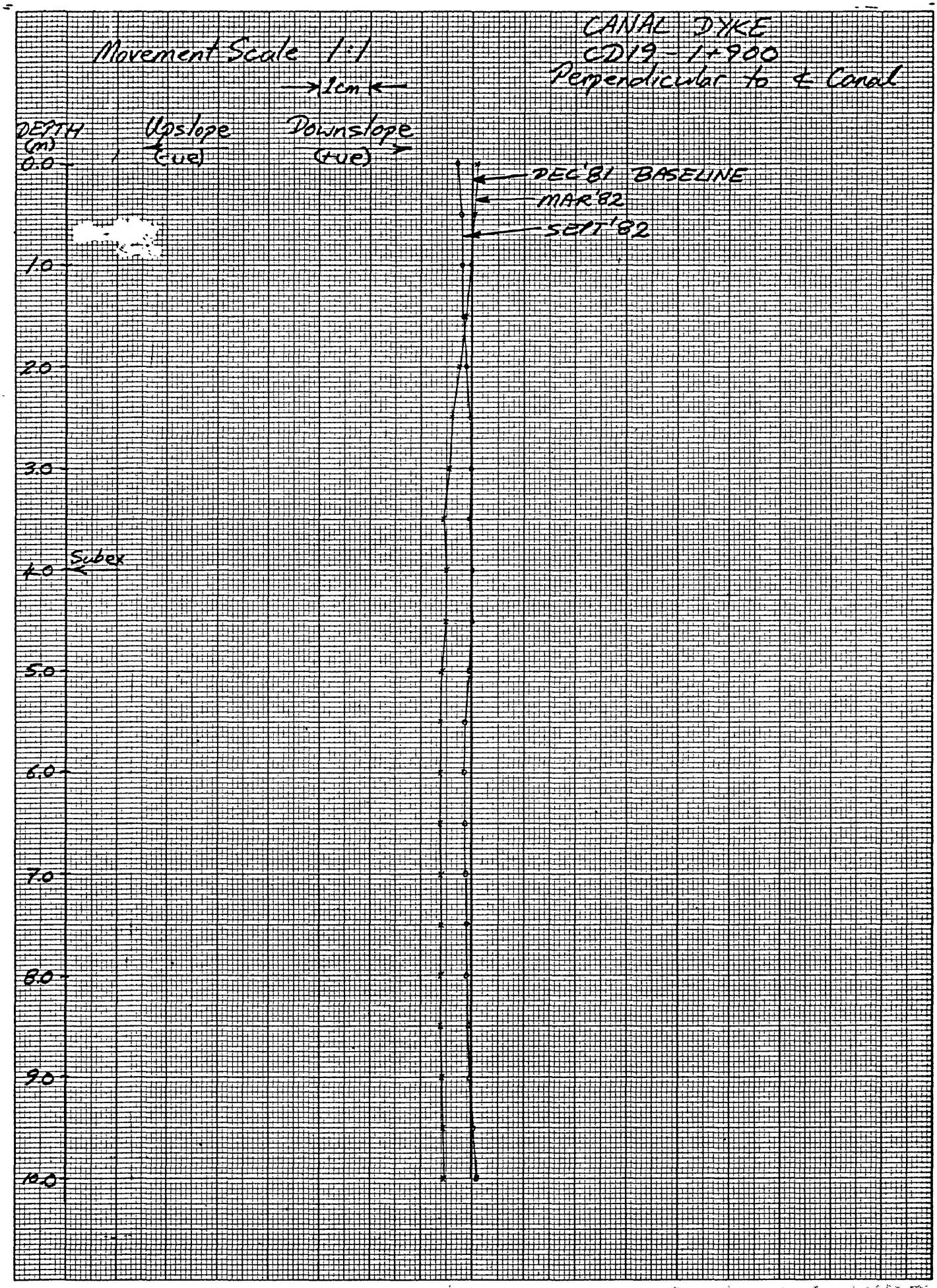
SP5-2+950

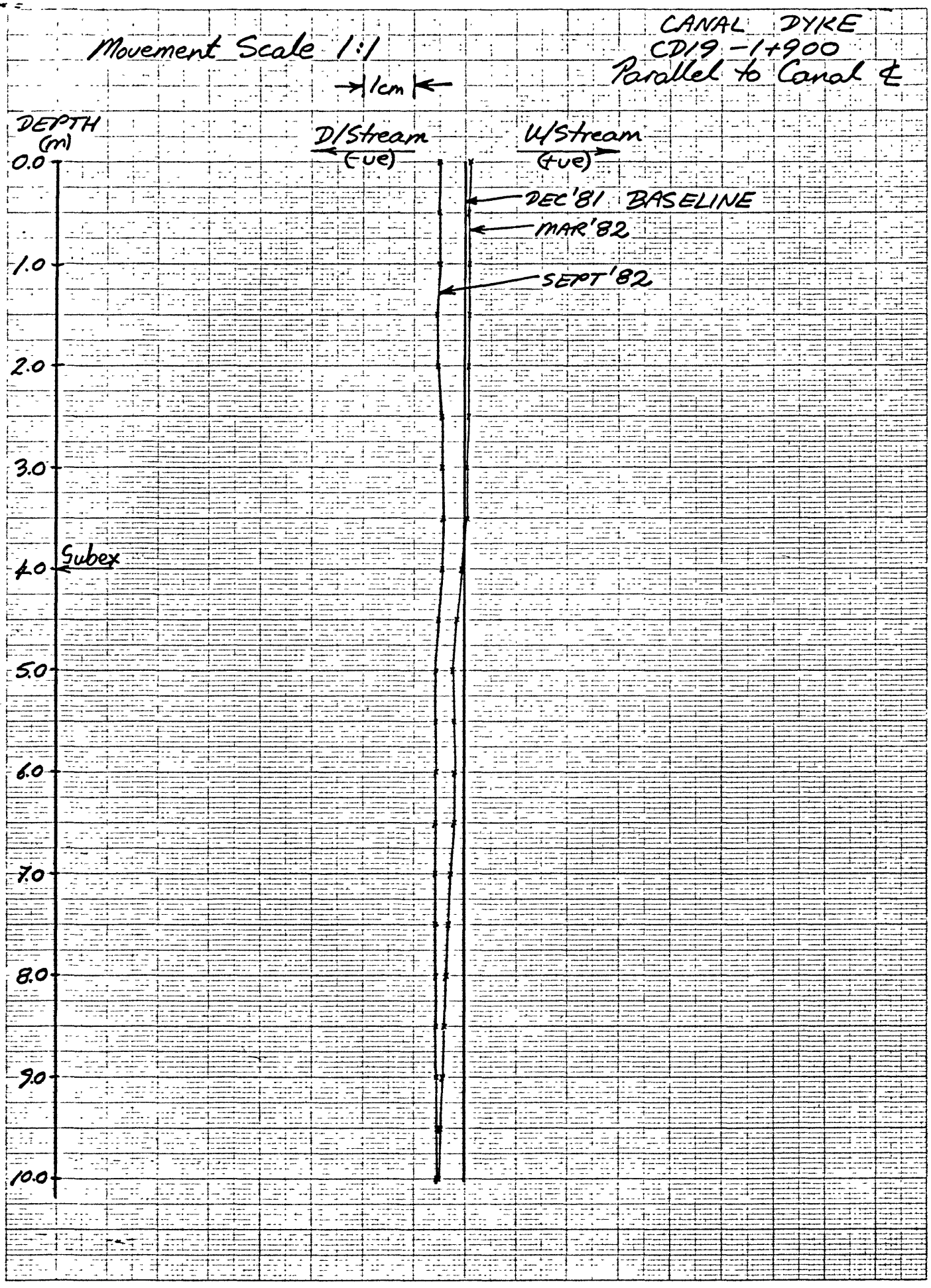

CANAL DYKE
CD10 - 0+990
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Subex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

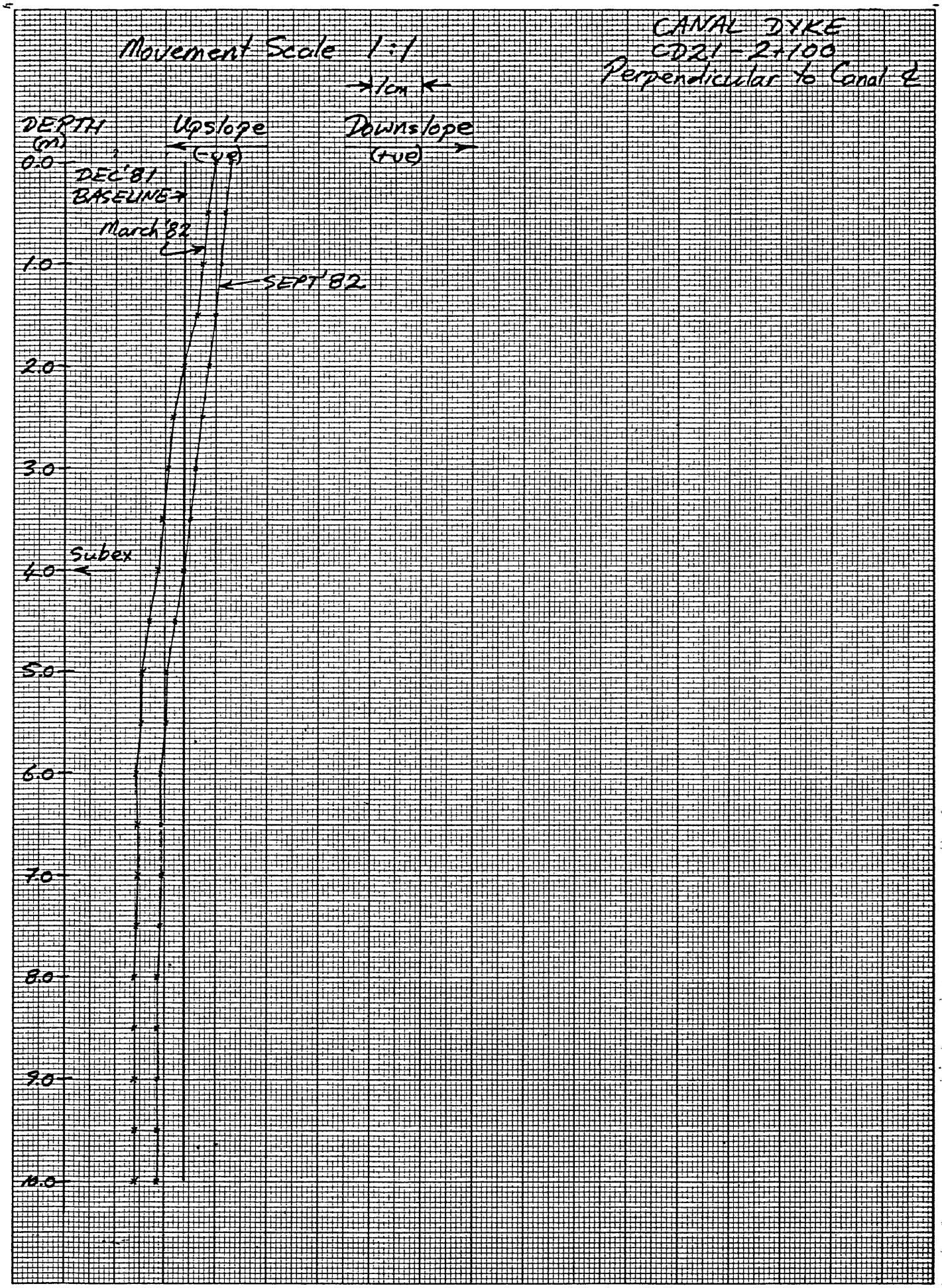

CANAL DYKE
CD10 - 0+990
Parallel to Canal ℄
Movement Scale 1:1
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Subex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

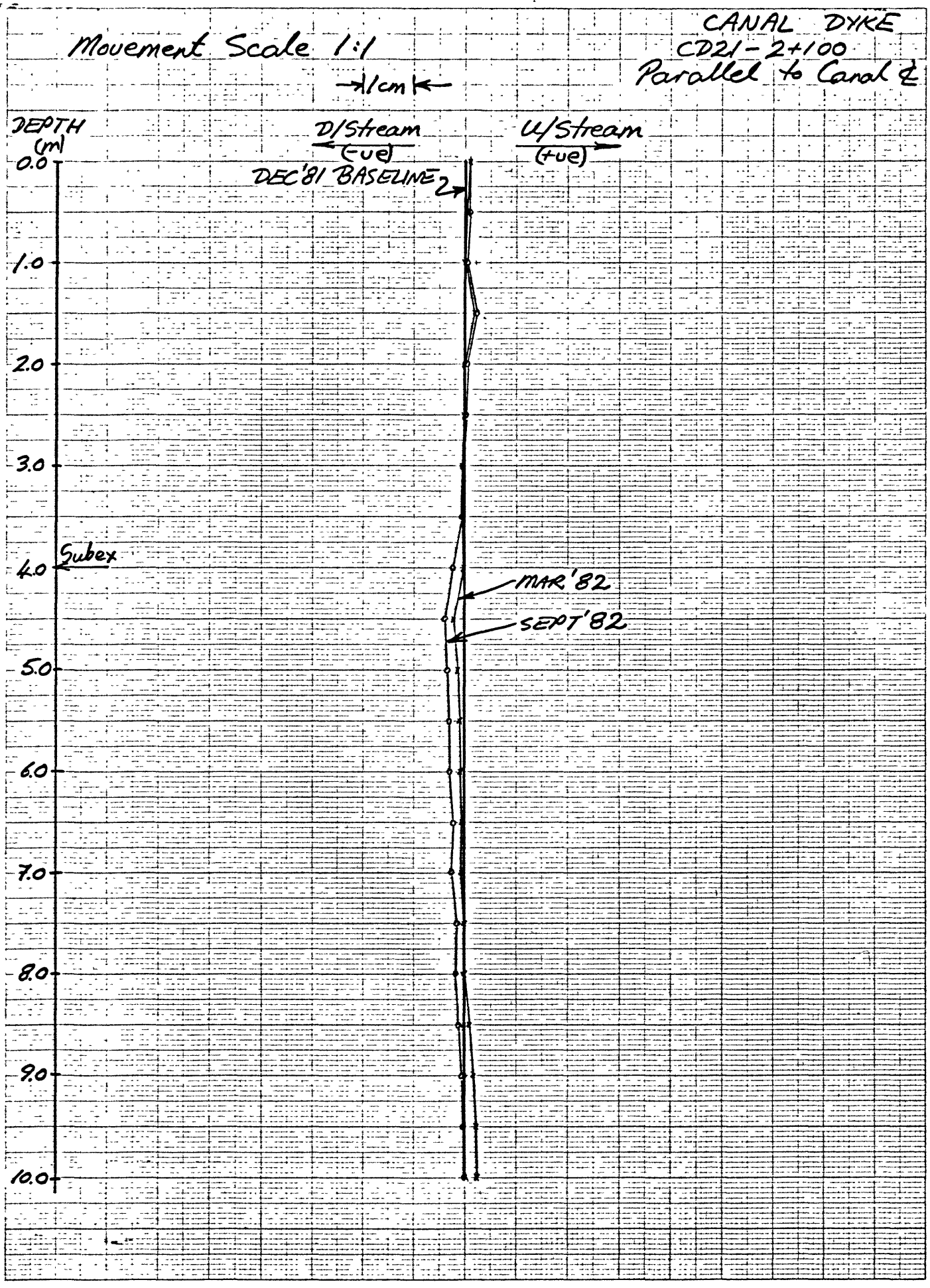

CANAL DYKE
CDIS-1+530
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
DEC'81 BASELINE
MAR'82
SEPT'82
Subex

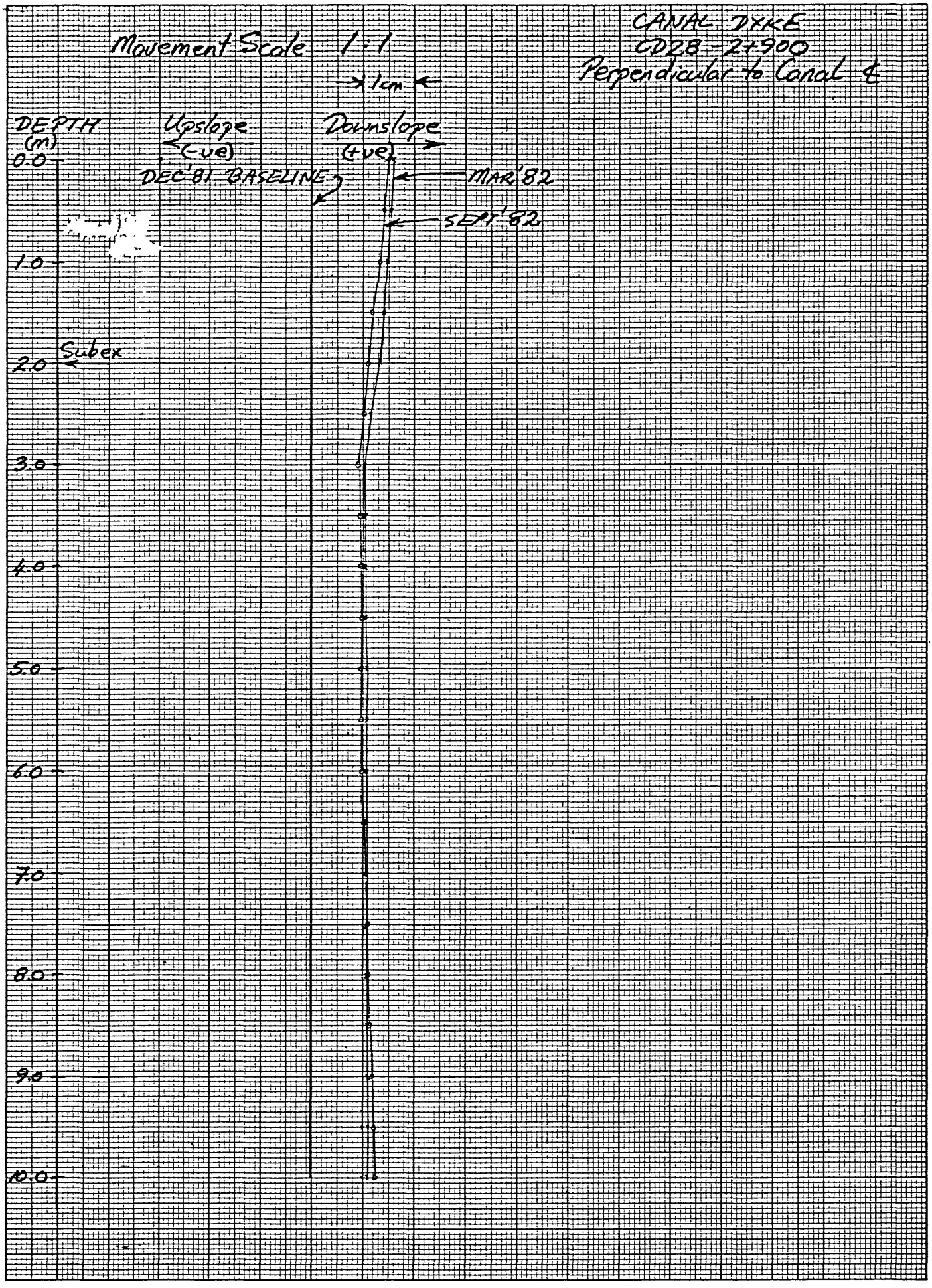

Movement Scale 1:1
1cm
CANAL DYKE
CD15 - 1+530
Parallel to Canal ℄
DEPTH (m)
D/Stream (-ue)
U/Stream (+ue)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Subex
DEC'81 BASELINE
MAR'82
SEPT'82


CANAL DYKE
CD19 - 1+900
Perpendicular to ℄ Canal
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
DEC'81 BASELINE
MAR'82
SEPT'82
Subex

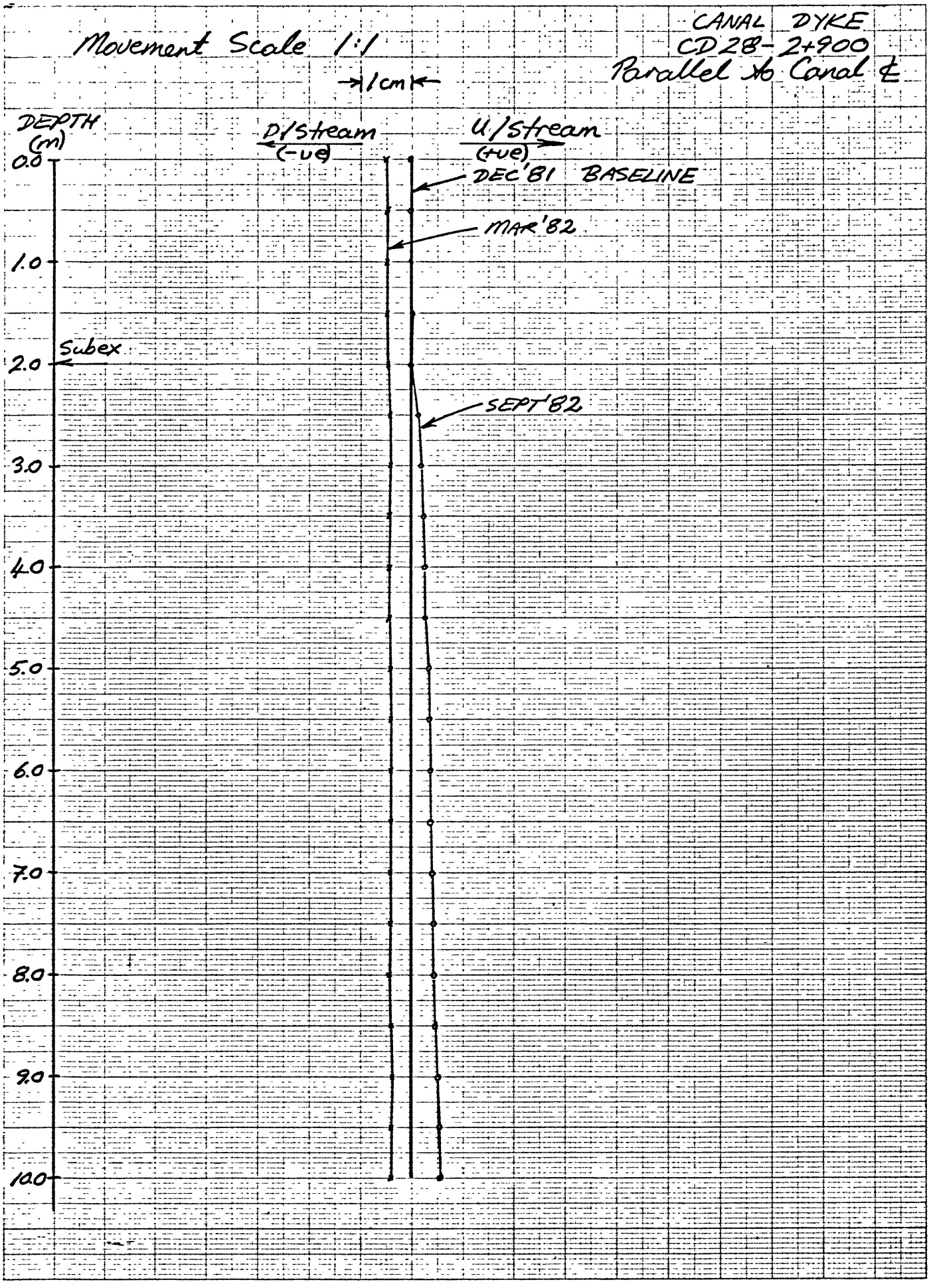

CANAL DYKE
CD19 -1+900
Parallel to Canal &
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC '81 BASELINE
MAR '82
SEPT '82
Gubex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

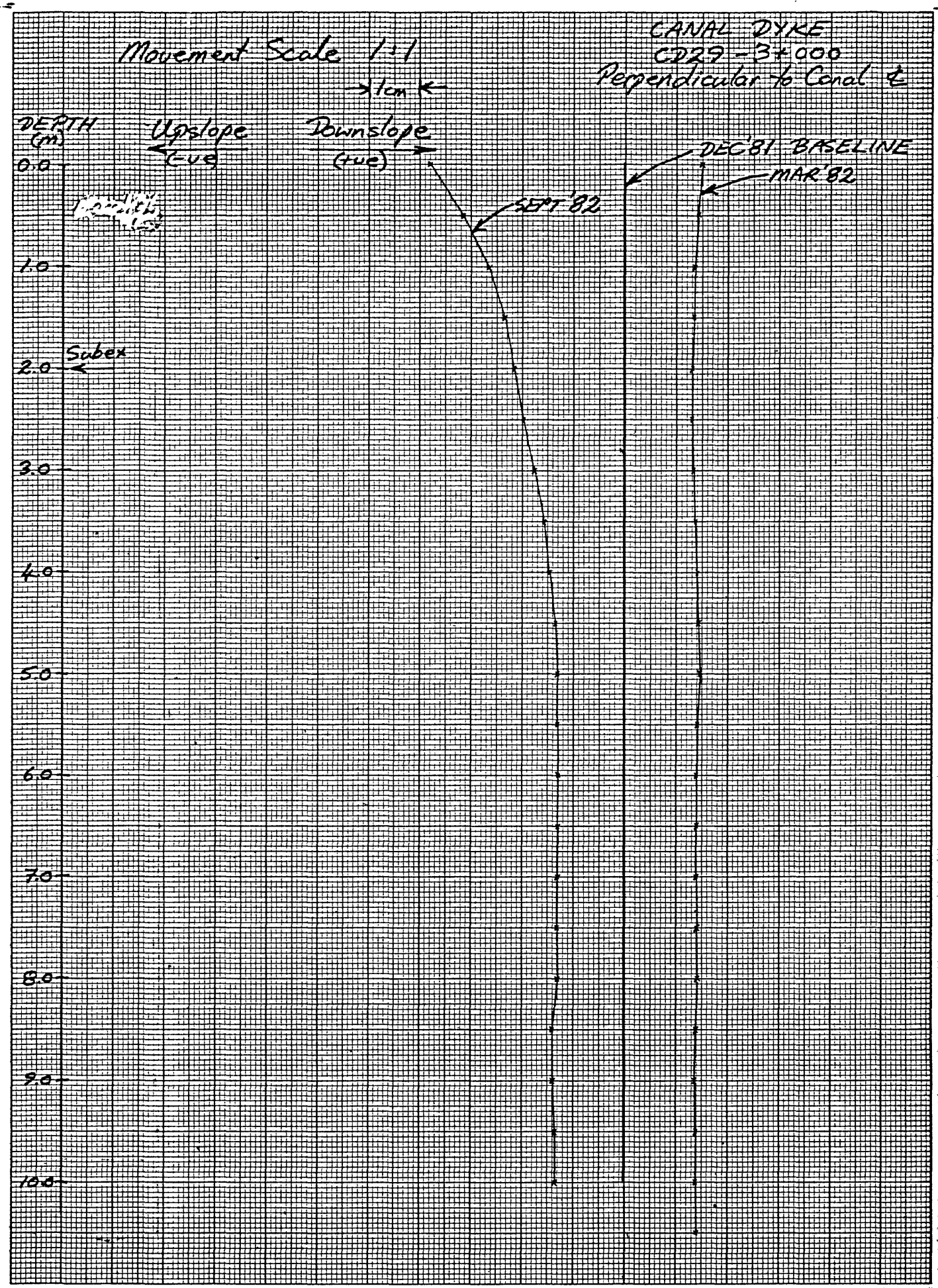

CANAL DYKE
CD2.1 - 2+100
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
0.0
DEC'81 BASELINE
March'82
SEPT'82
1.0
2.0
3.0
Subex
4.0
5.0
6.0
7.0
8.0
9.0
10.0

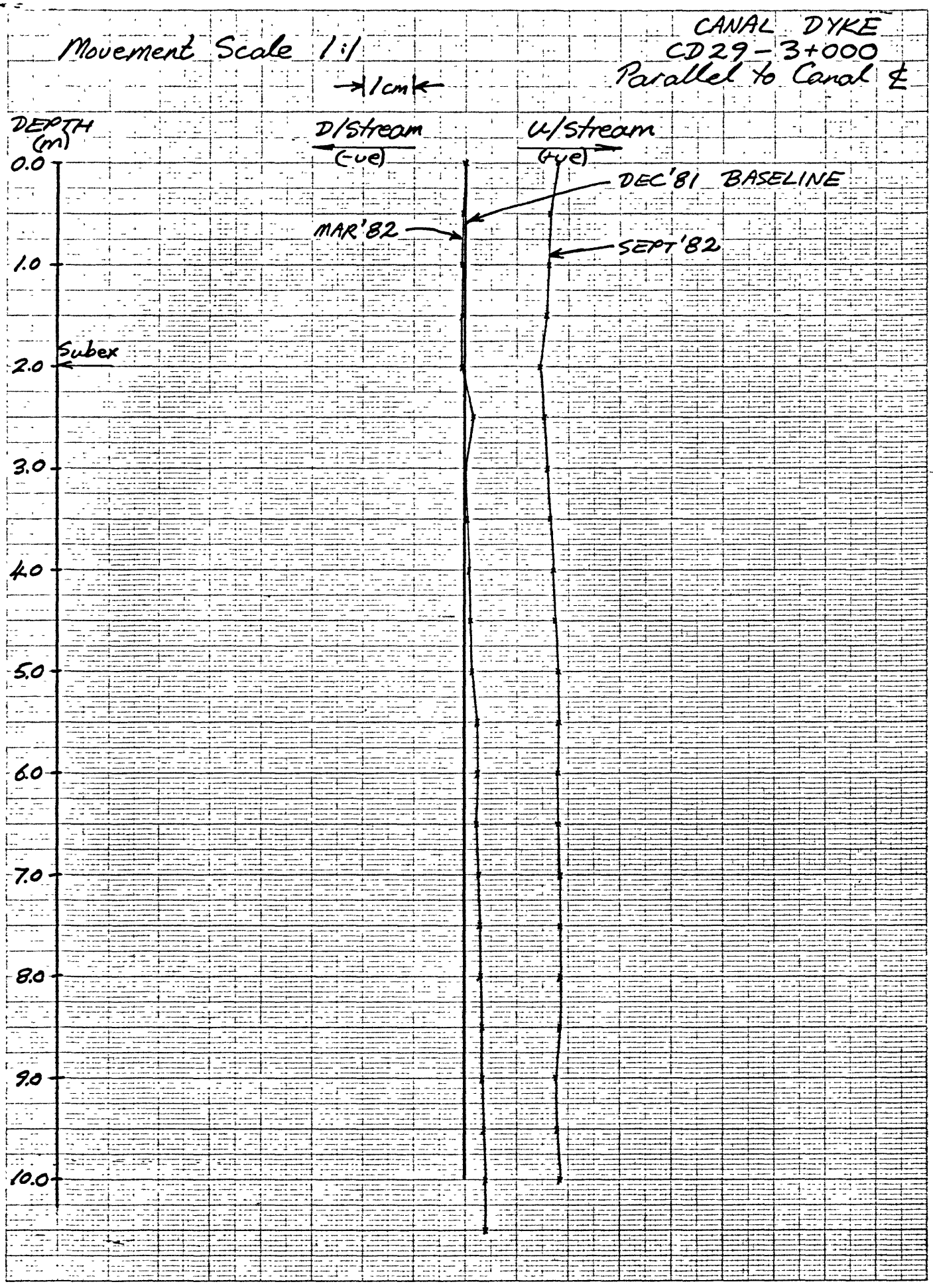

CANAL DYKE
CD21 - 2+100
Parallel to Canal &
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ue)
U/Stream (+ue)
DEC'81 BASELINE
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Subex
MAR'82
SEPT'82



K+E 10 X 10 TO THE CENTIMETER 18 X 25 CM. FEL & CO. N.Y. S.A.

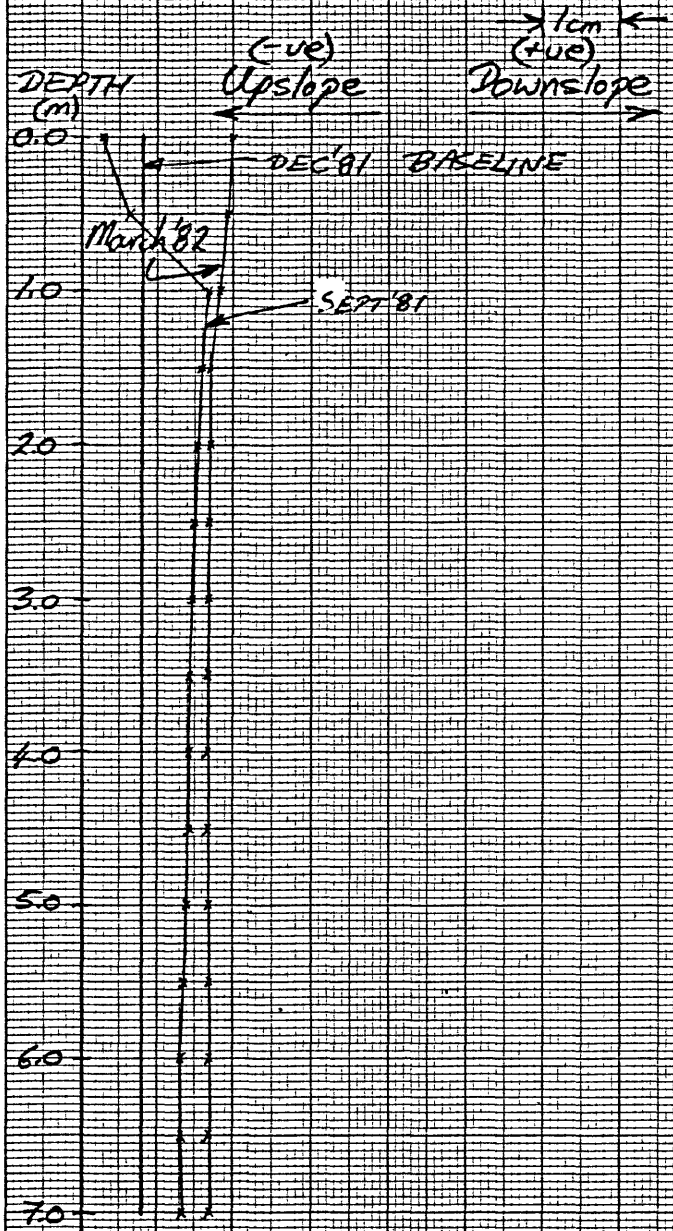

CANAL DYKE
CD 28 - 2+900
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/stream (-ve)
U/stream (+ve)
DEC '81 BASELINE
MAR '82
SEPT '82
Subex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0


CANAL DYKE
CD29 - 3+000
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Subex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

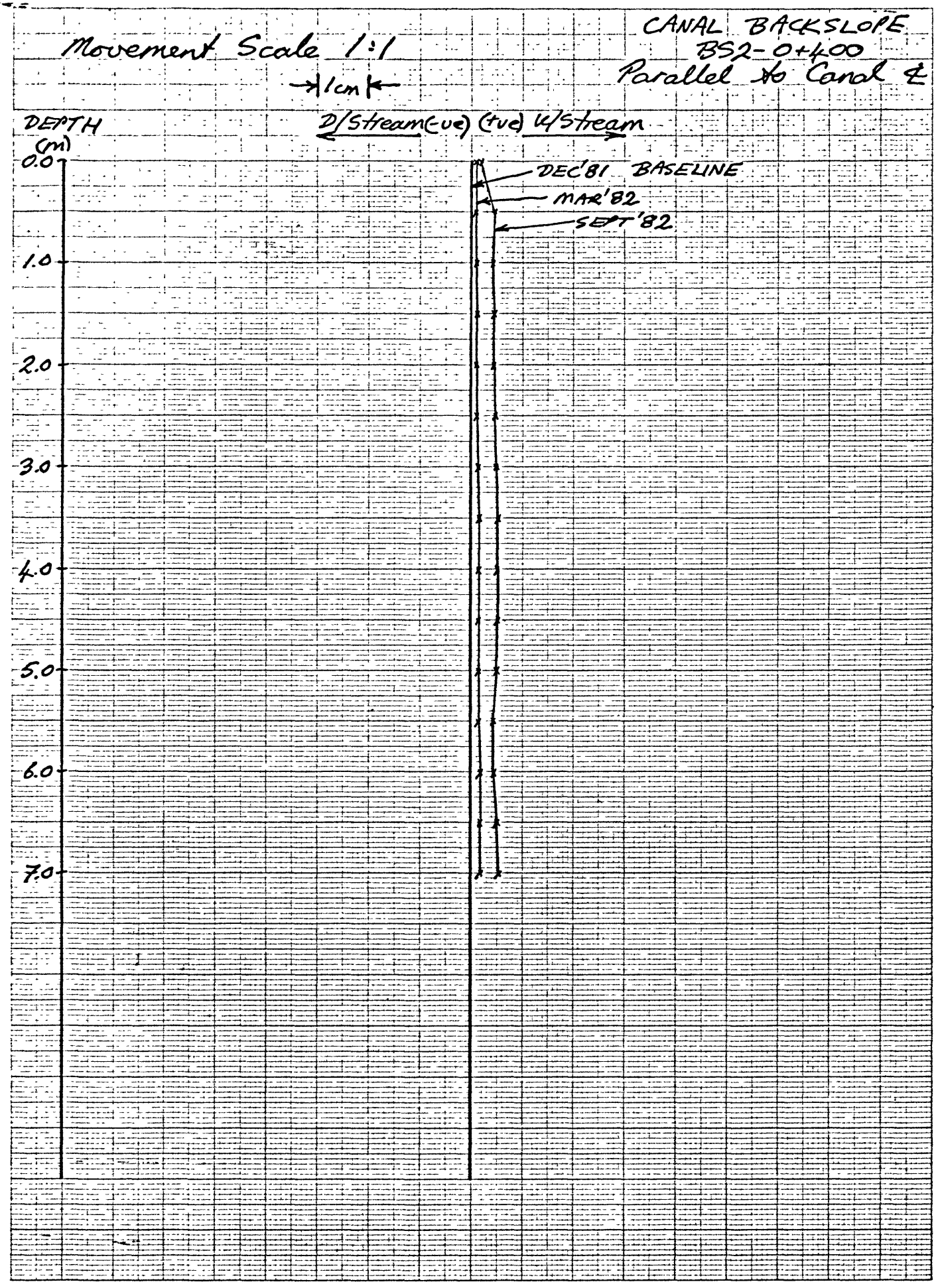

CANAL DYKE
CD29-3+000
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Subex
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

CANAL BACKSLOPE
BS2-0+400
Perpendicular to Canal ℄

Movement Scale 1:1

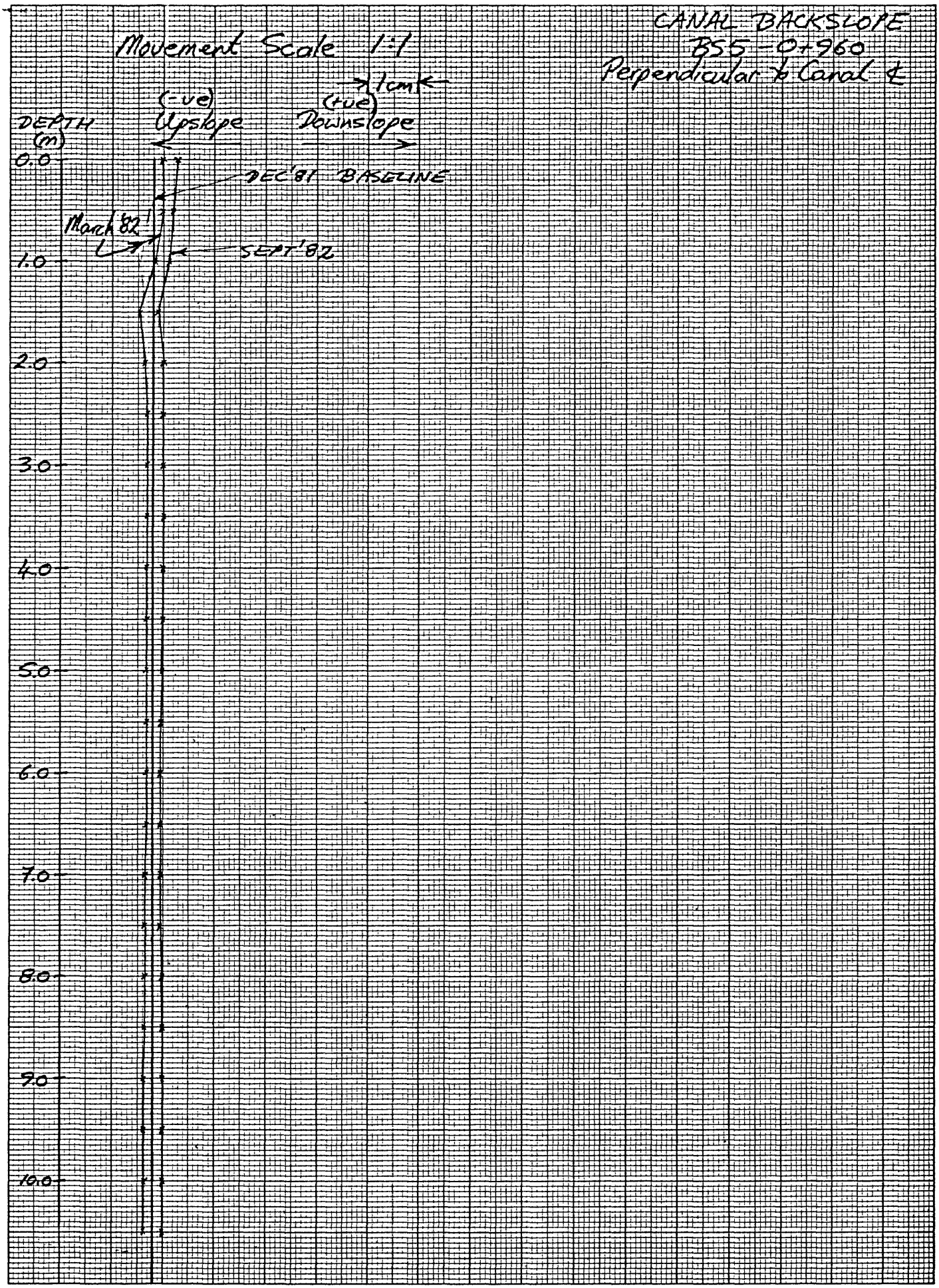


40 1512
KEUFFEL & ESSER CO. MADE IN U.S.A.

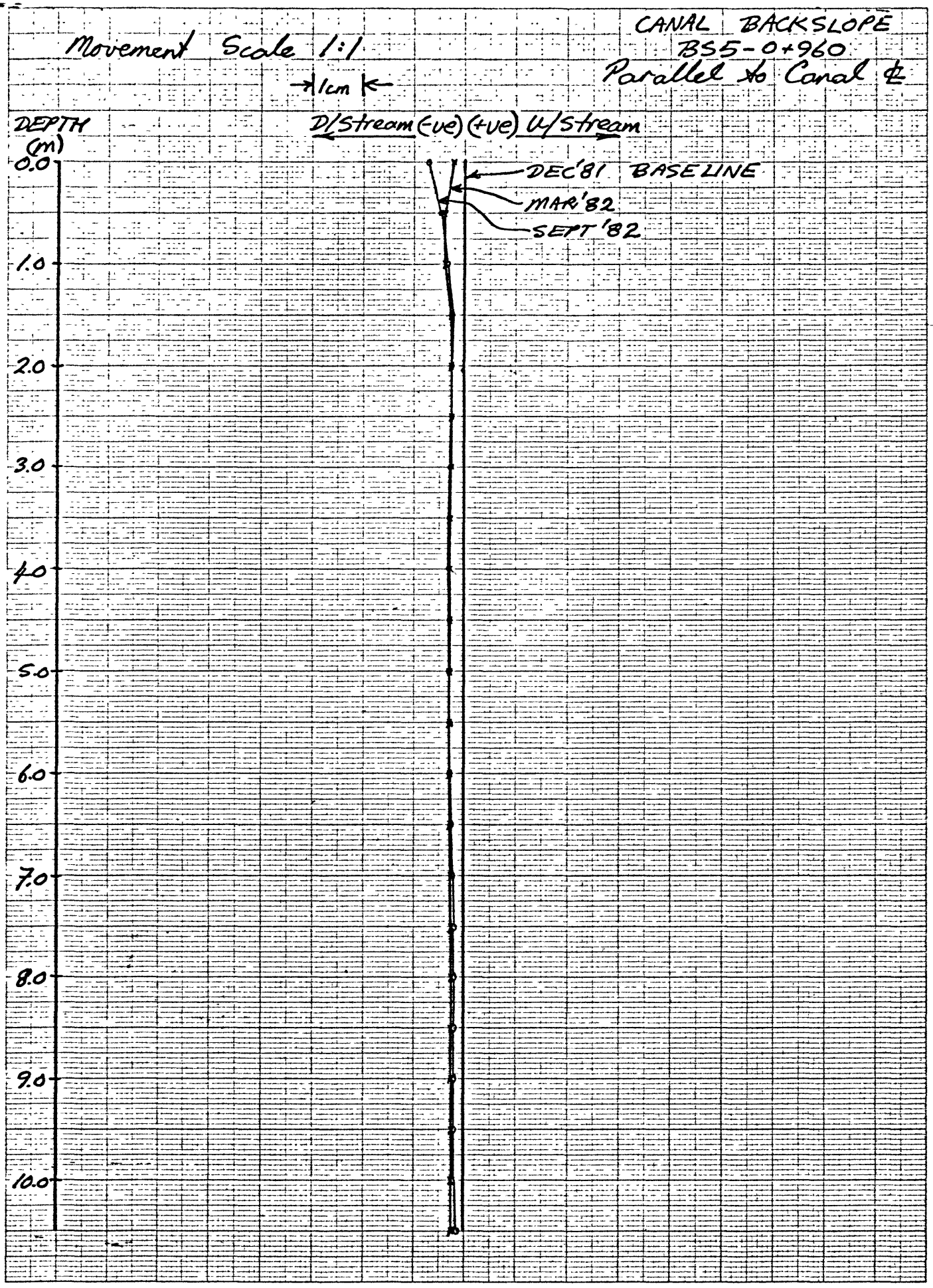


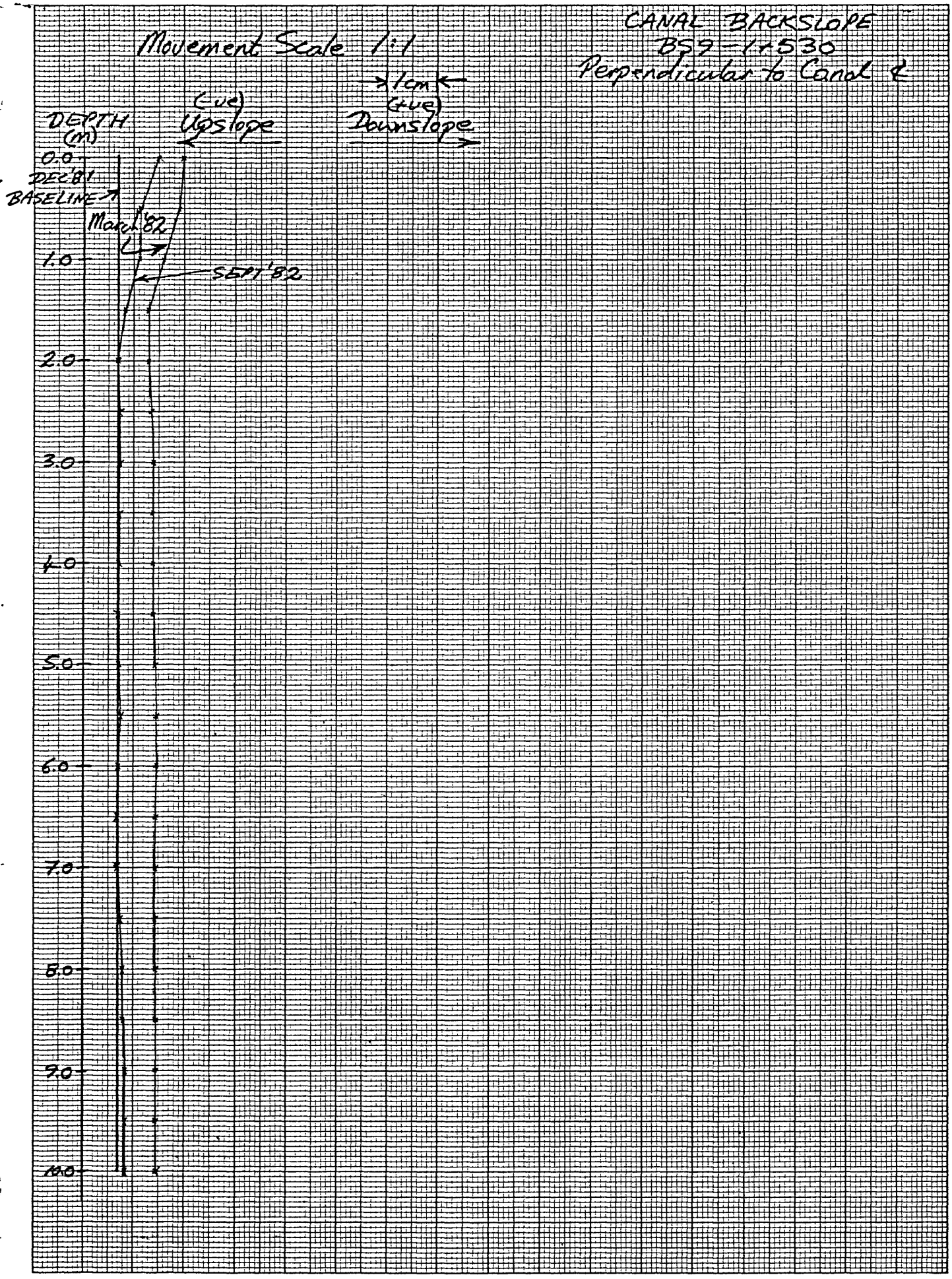
359-152
10 X 10 TO THE CENTIMETER 18 X 25 CM
EUGENE DIETZGEN CO. U.S.A.

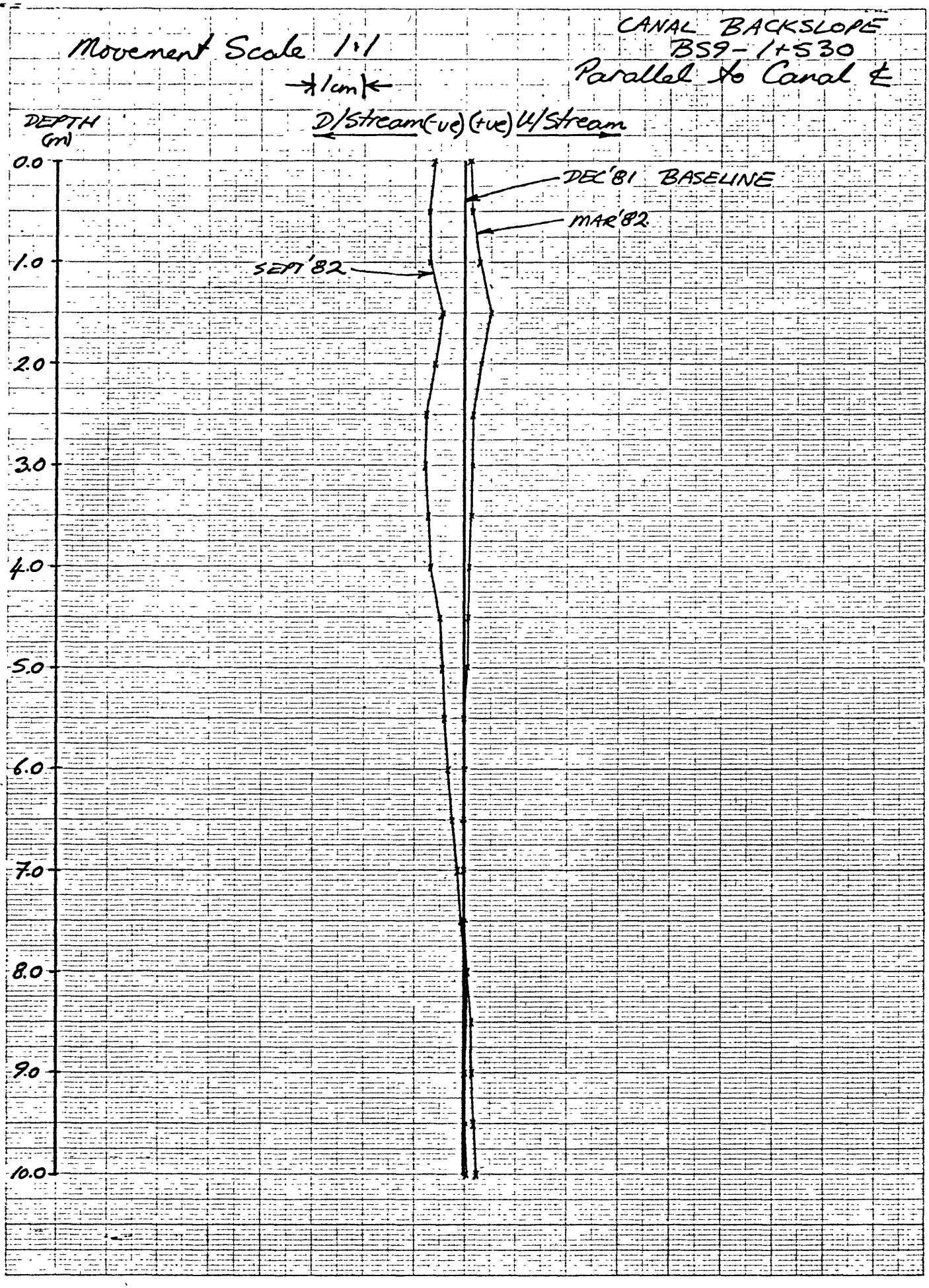
CANAL BACKSLOPE
BS5 – 0+960
Perpendicular to Canal ℄



K+E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. U.S.A.
46 1512

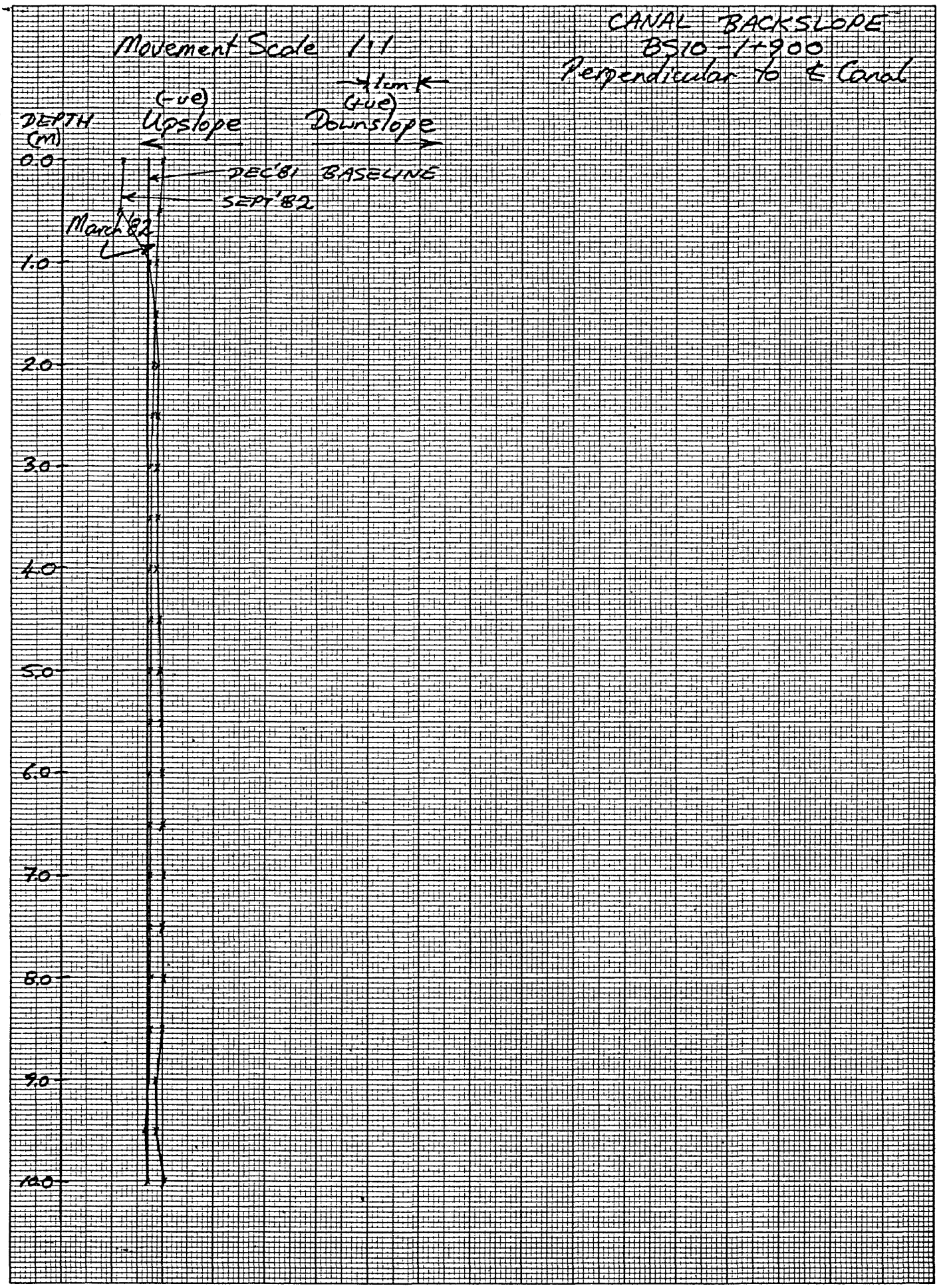

CANAL BACKSLOPE
BS5-0+960
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve) (+ve) U/Stream
DEC'81 BASELINE
MAR'82
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0


CANAL BACKSLOPE
BS7-1+530
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
(-ve)
Upslope
(+ve)
Downslope
DEPTH (m)
0.0
DEC'81 BASELINE
March '82
SEPT '82
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

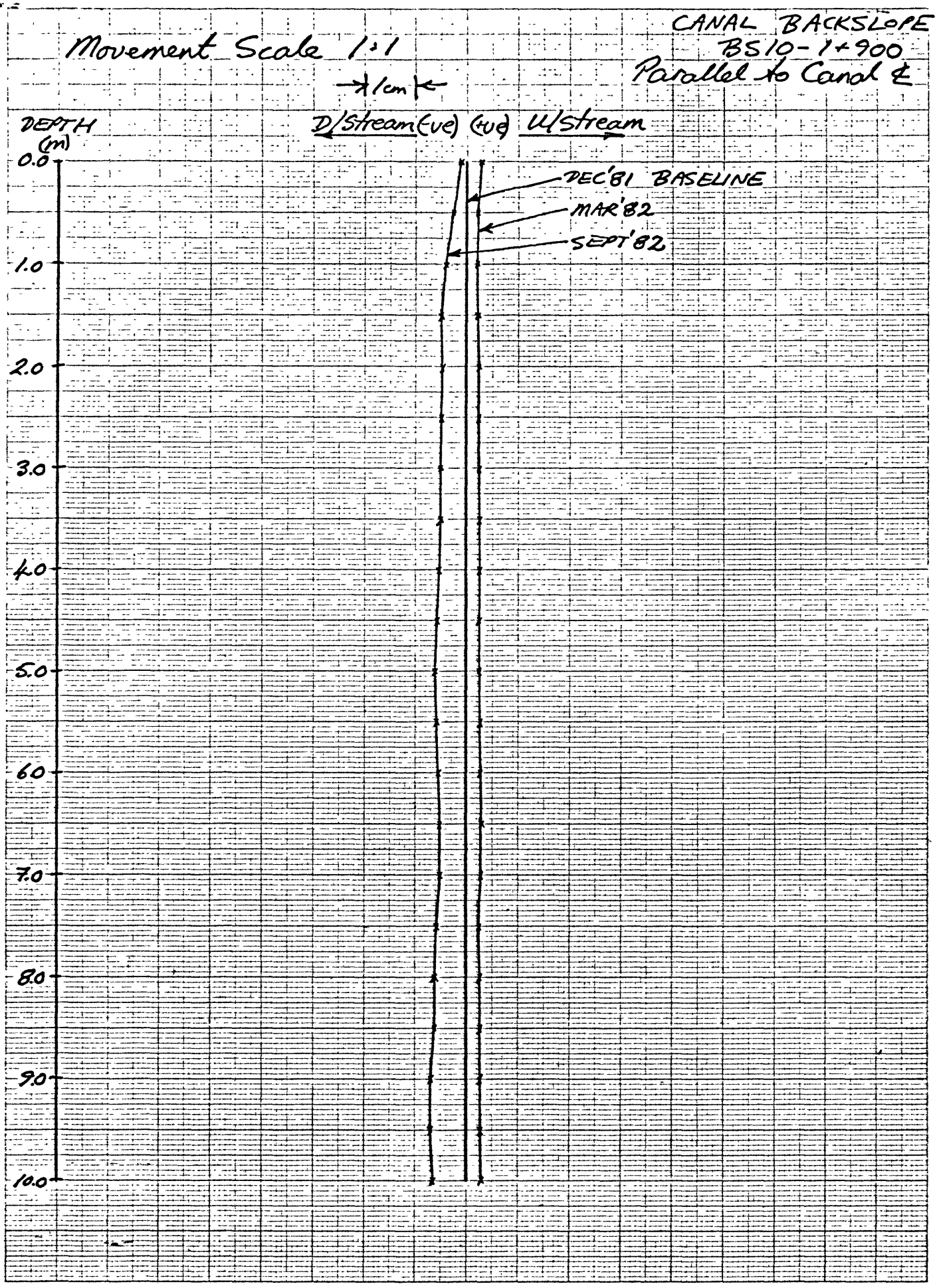

CANAL BACKSLOPE
BS9-1+530
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream(-ve) (+ve) U/Stream
DEC'81 BASELINE
MAR'82
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

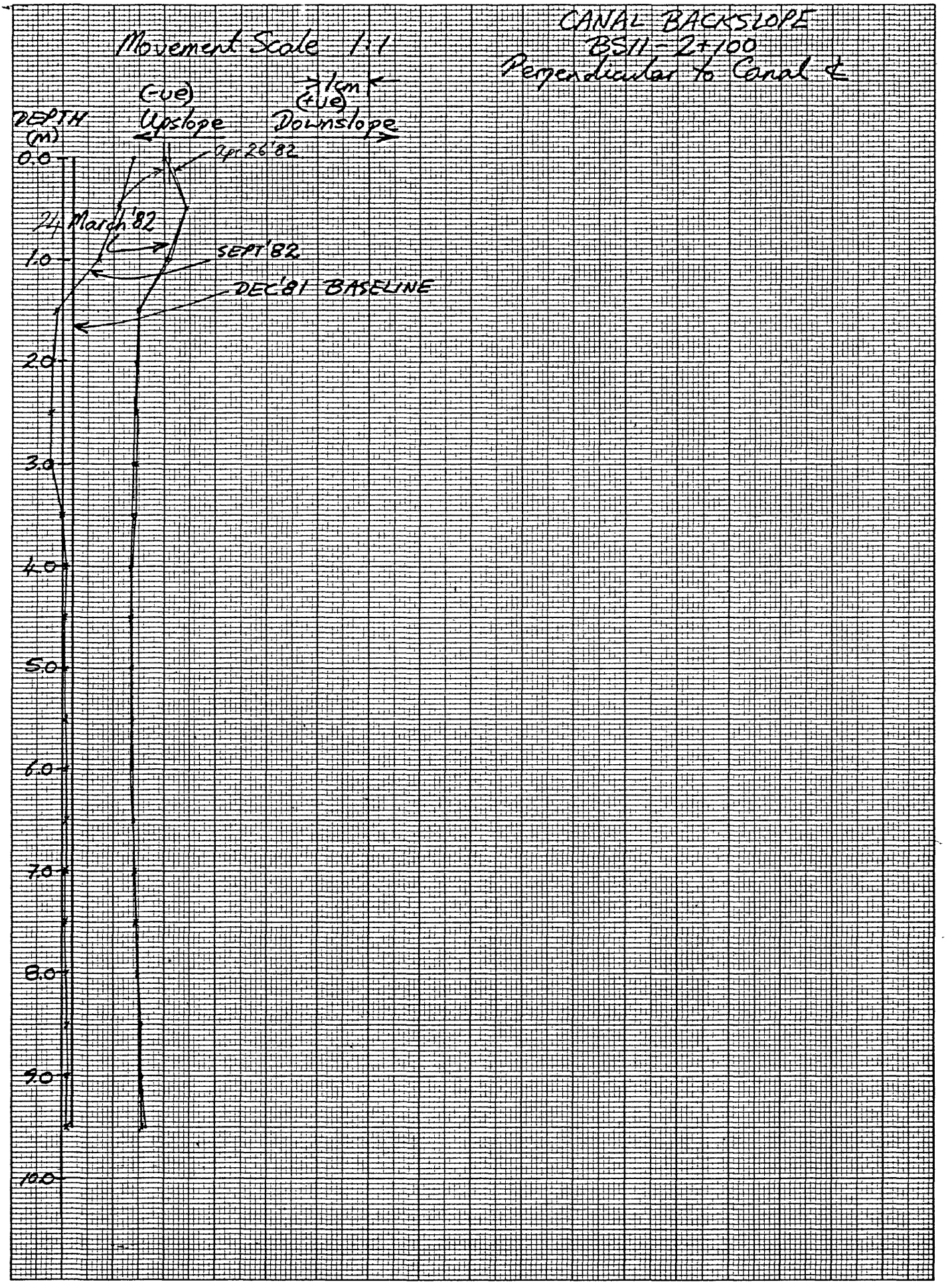
CANAL BACKSLOPE
BS10-1+900
Perpendicular to ℄ Canal

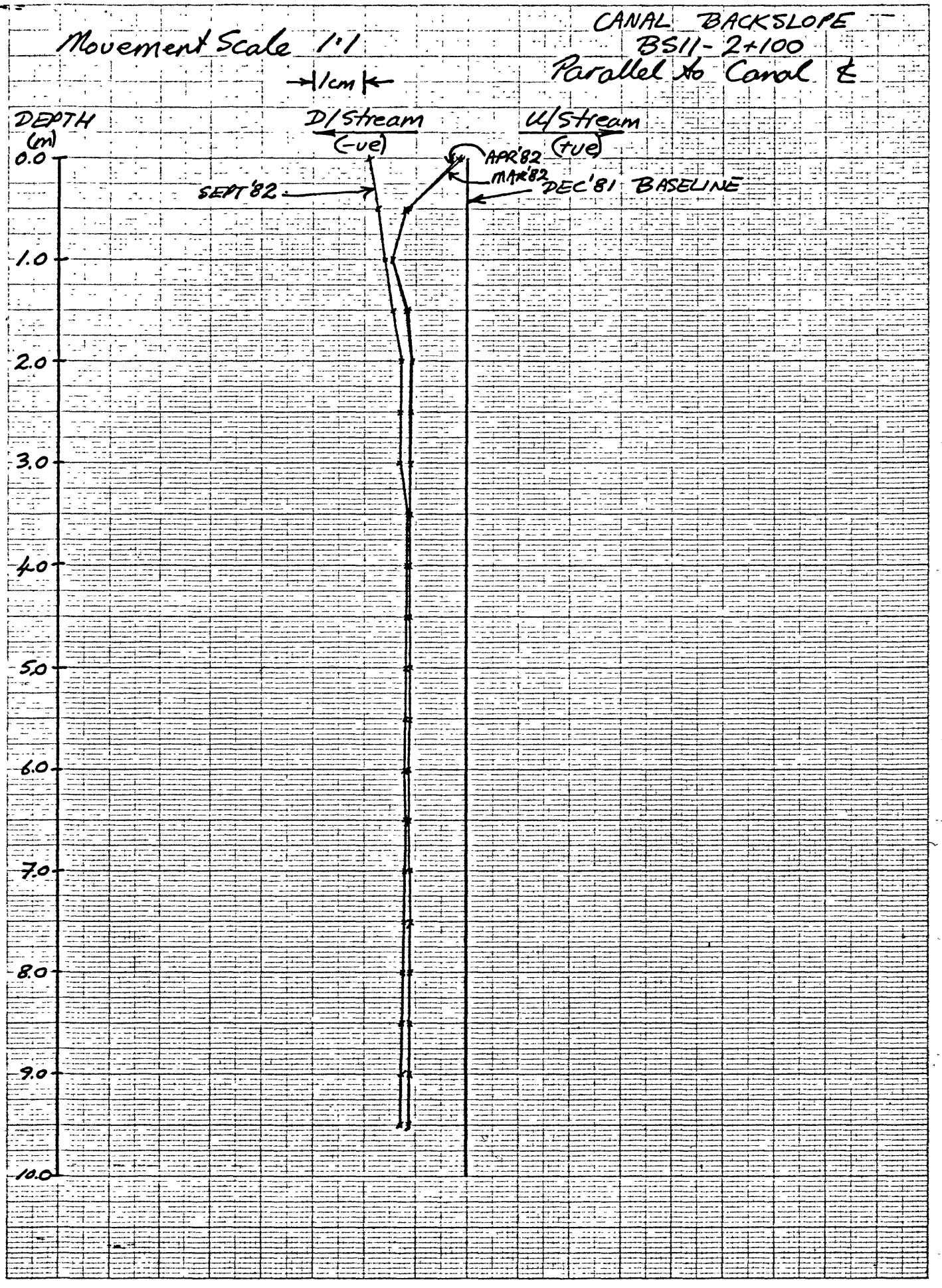
Movement Scale 1:1

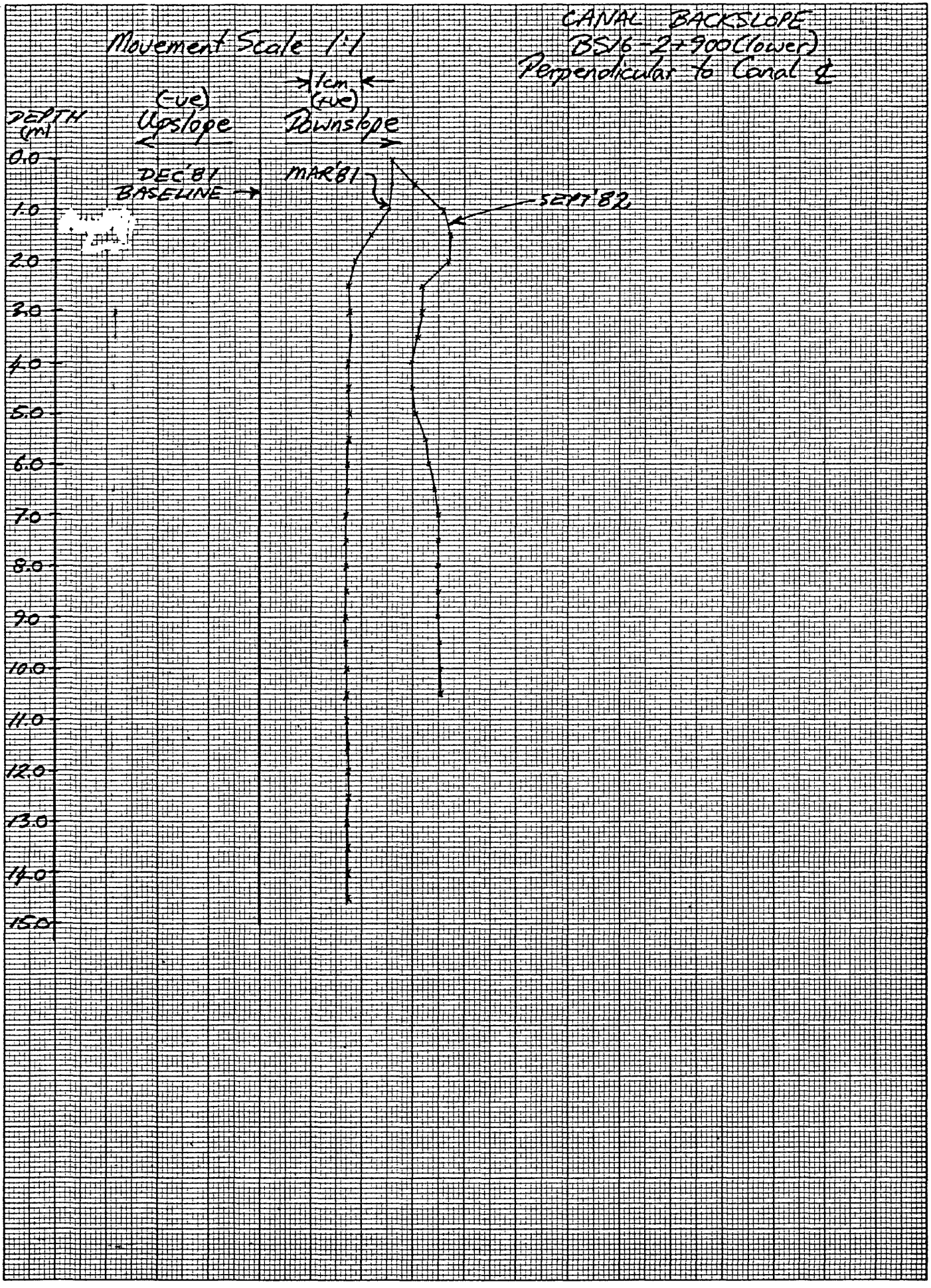


10 X 10 TO THE CENTIMETER
KEUFFEL & ESSER CO. N.Y.
18 X 25 CM.

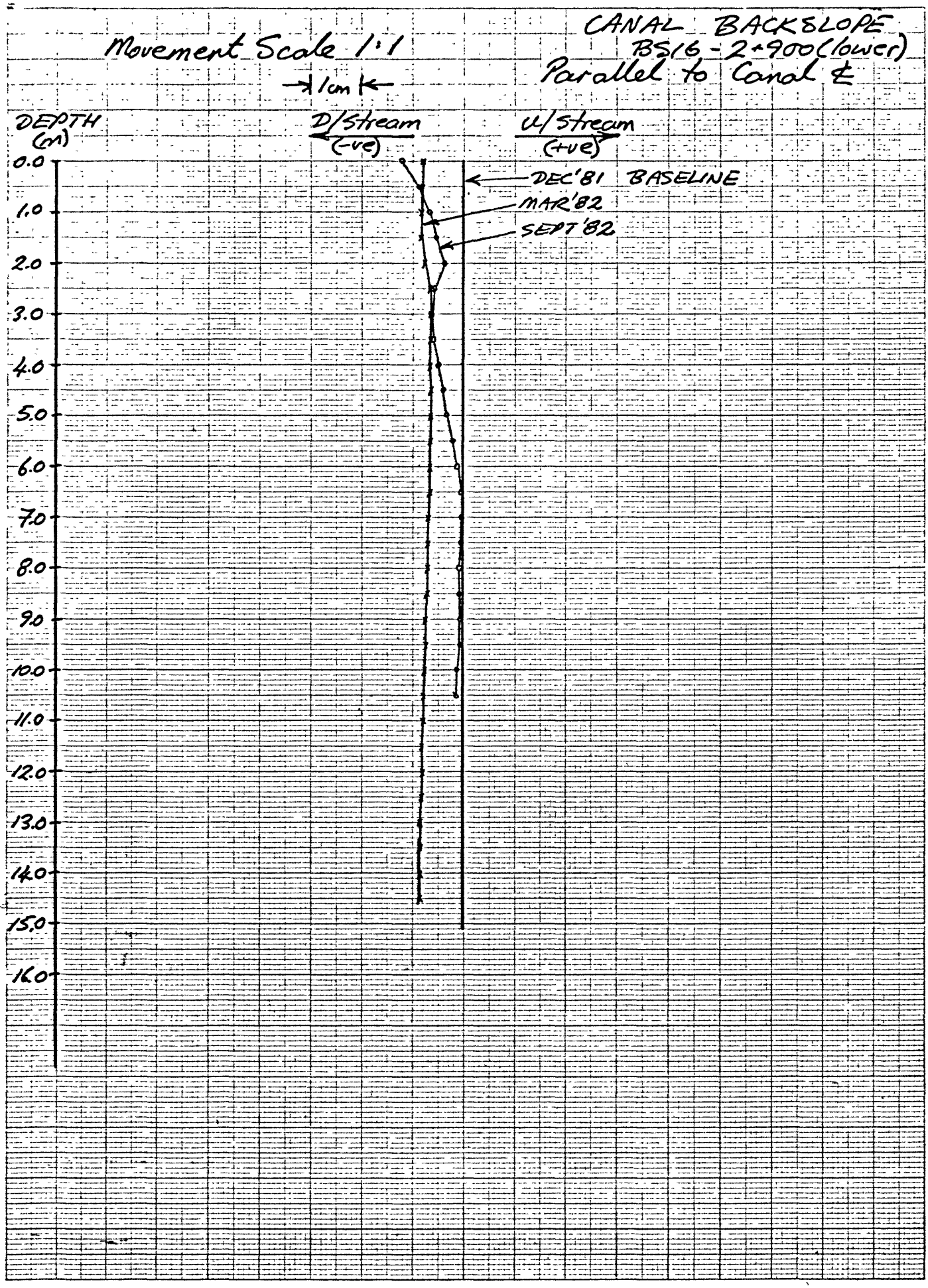

CANAL BACKSLOPE
BS10-1+900
Parallel to Canal ℄
Movement Scale 1:1
1cm
D/Stream(-ve) (+ve) U/Stream
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
DEC'81 BASELINE
MAR'82
SEPT'82


CANAL BACKSLOPE
BS11 - 2+100
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
(-ve) Upslope
(+ve) Downslope
DEPTH (m)
0.0
Apr 26'82
24 March '82
1.0
SEPT '82
DEC'81 BASELINE
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

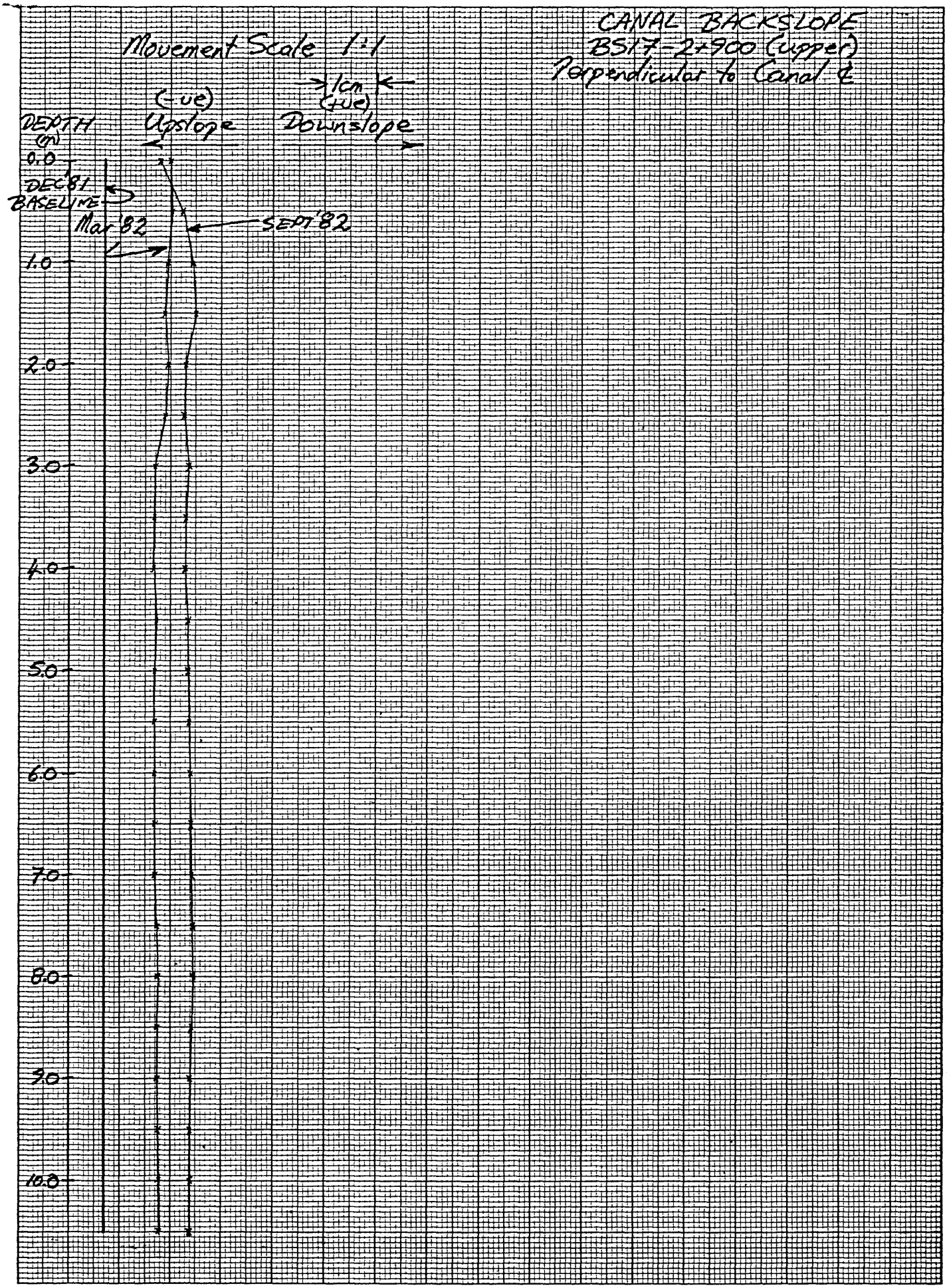

CANAL BACKSLOPE
BS11- 2+100
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
APR'82
MAR'82
DEC'81 BASELINE
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0



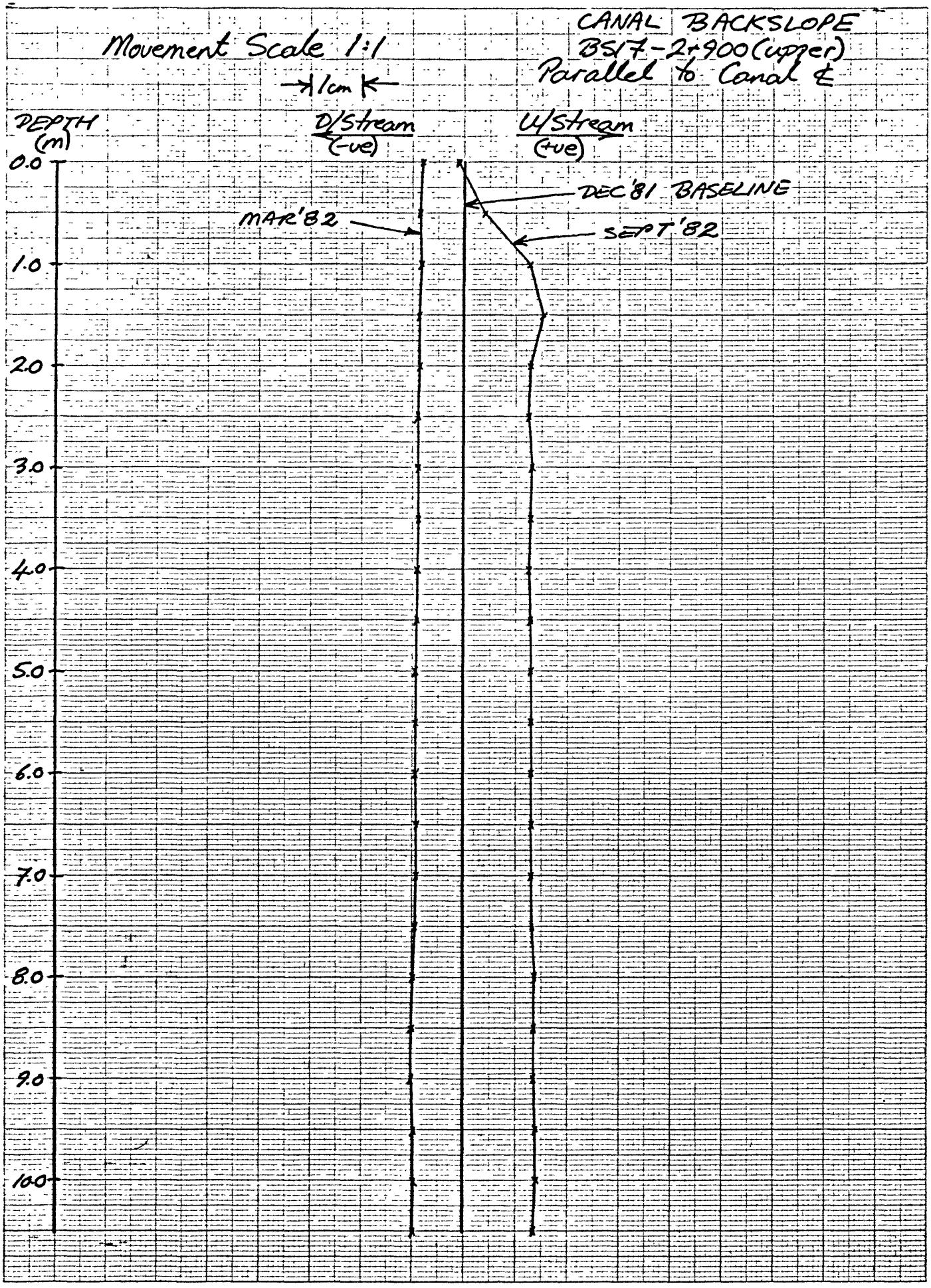
KEUFFEL & ESSER CO. N.Y. 10 X 10 TO THE CENTIMETER 18 X 25 CM.

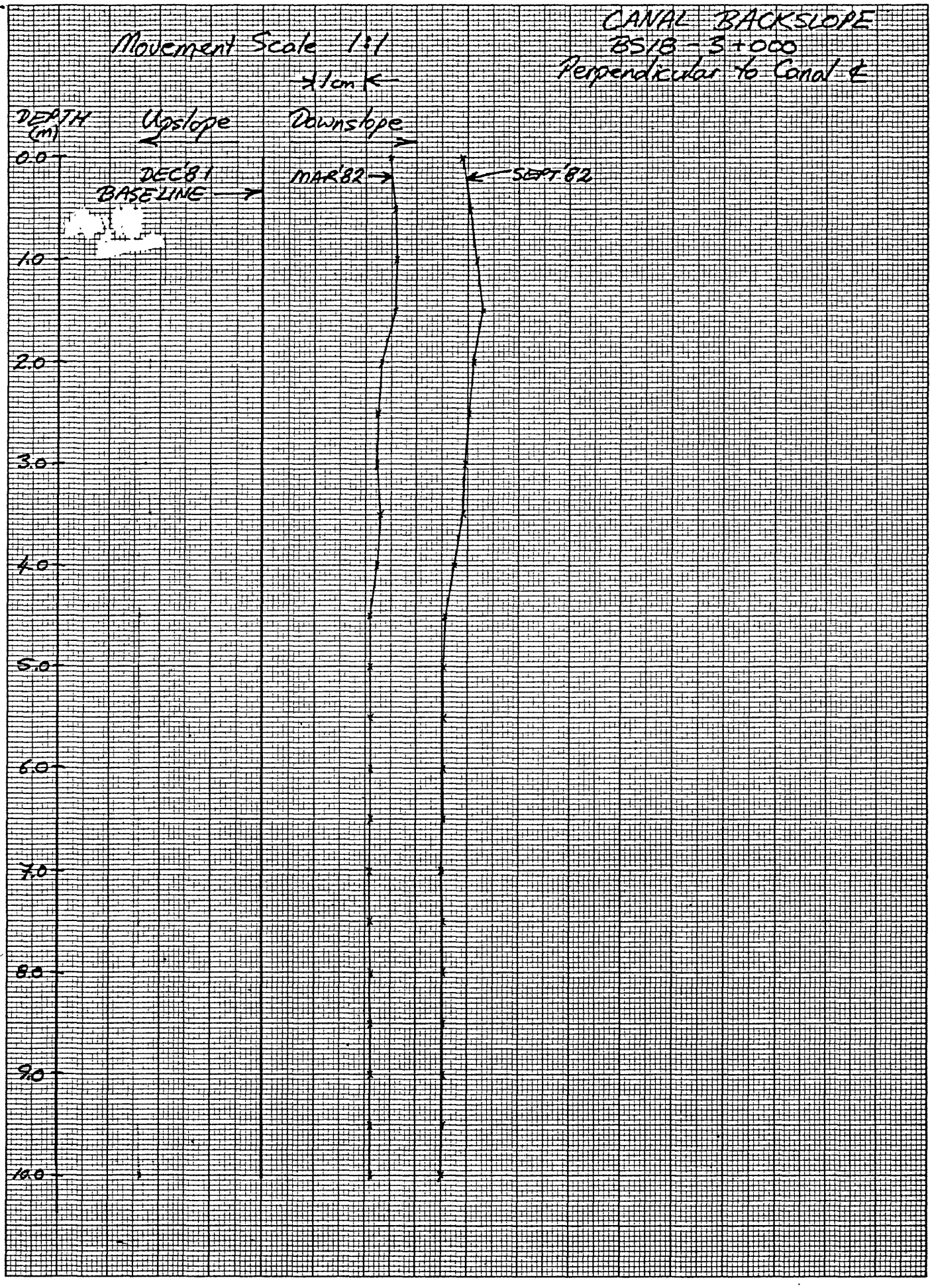

CANAL BACKSLOPE
BS16-2+900 (lower)
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0

CANAL BACKSLOPE
BS17-2+900 (Upper)
Perpendicular to Canal ℄



KEUFFEL & ESSER CO. N.Y. 10 X 10 TO THE CENTIMETER 18 X 25 CM. FEL & E. 1512

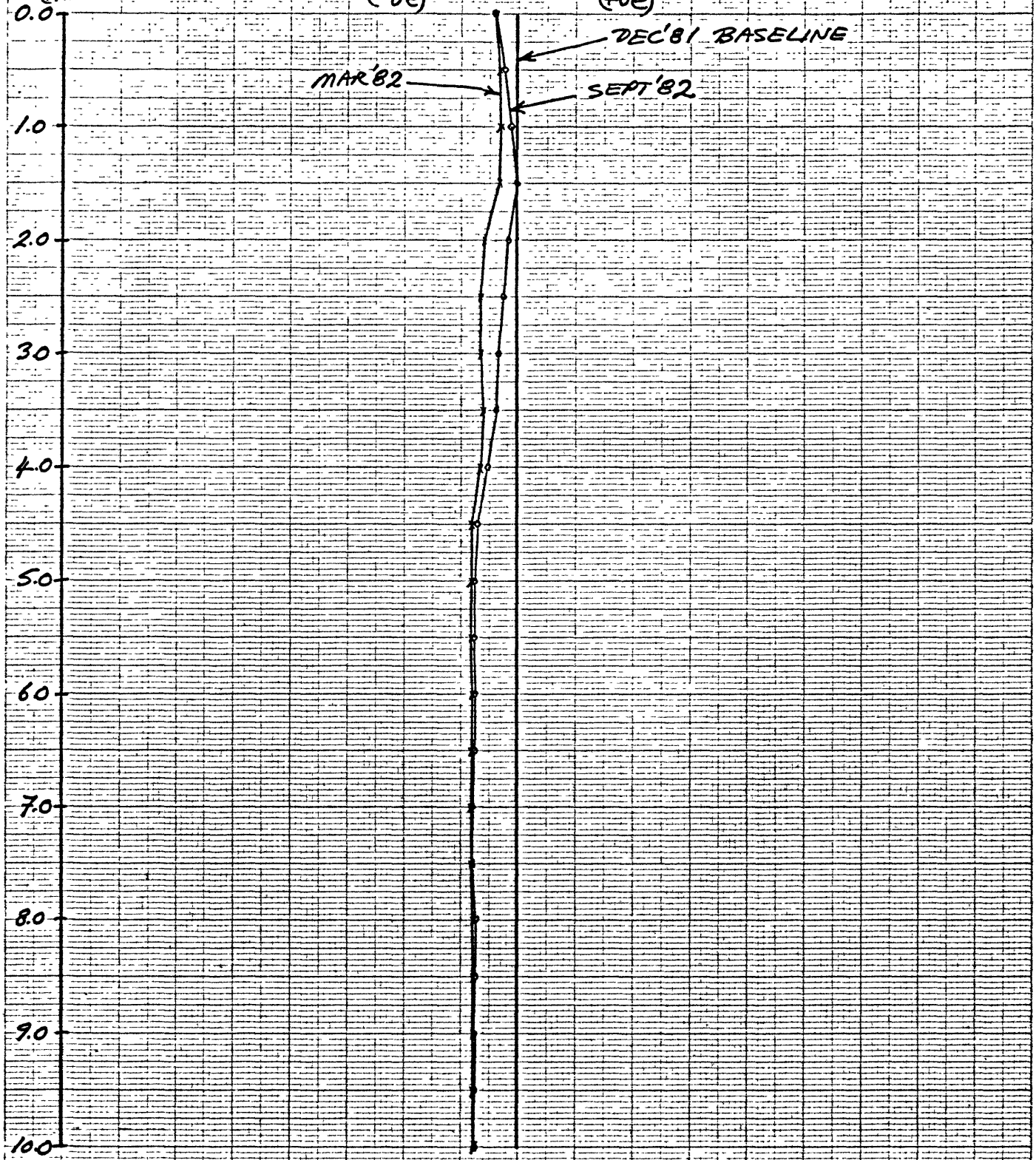

CANAL BACKSLOPE
BS17-2+900 (upper)
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

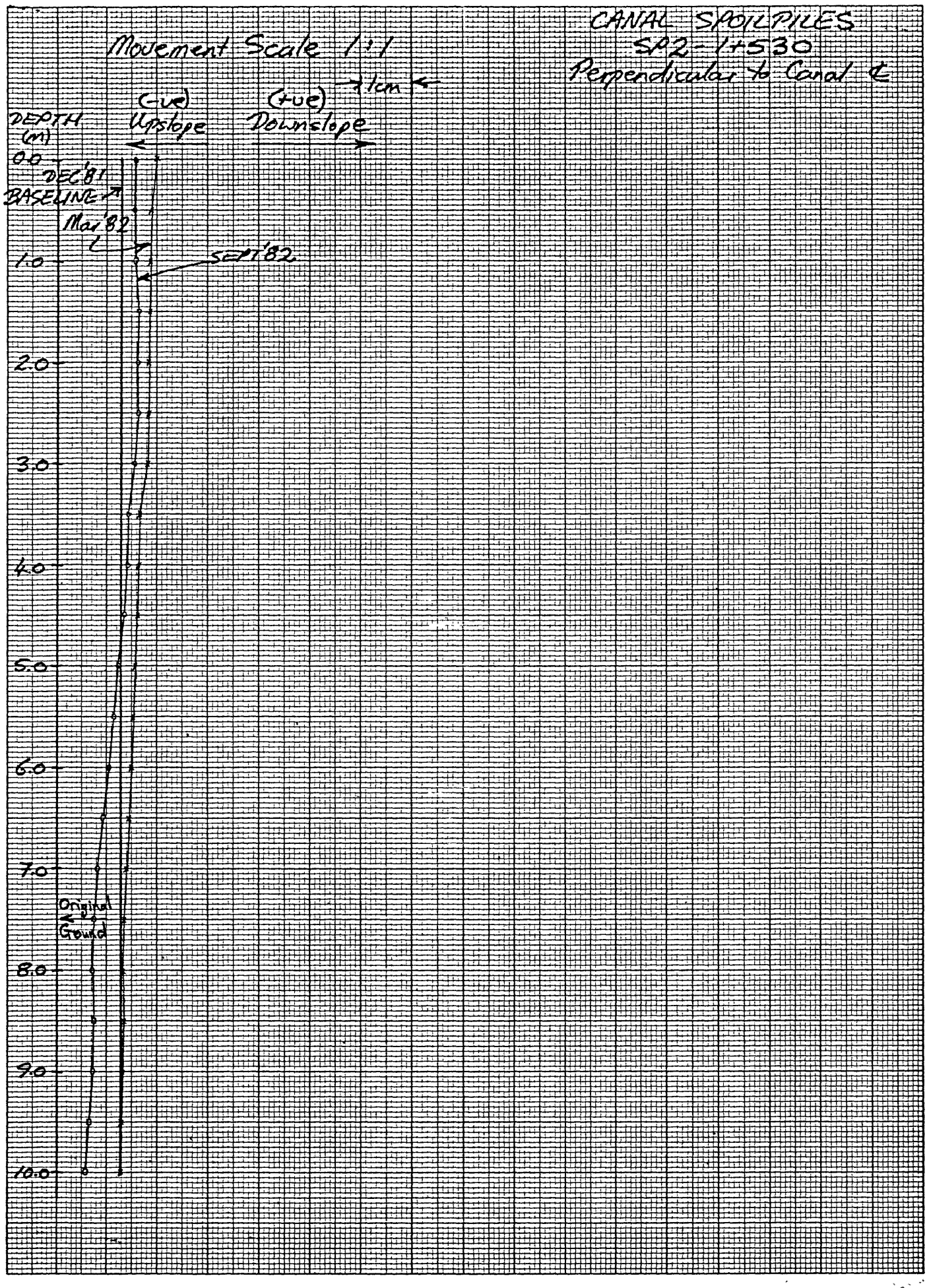

CANAL BACKSLOPE
BS18 - 3+000
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope
Downslope
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
DEC'81 BASELINE
MAR'82
SEPT'82

CANAL BACKSLOPE
BS18-3+000
Parallel to Canal &

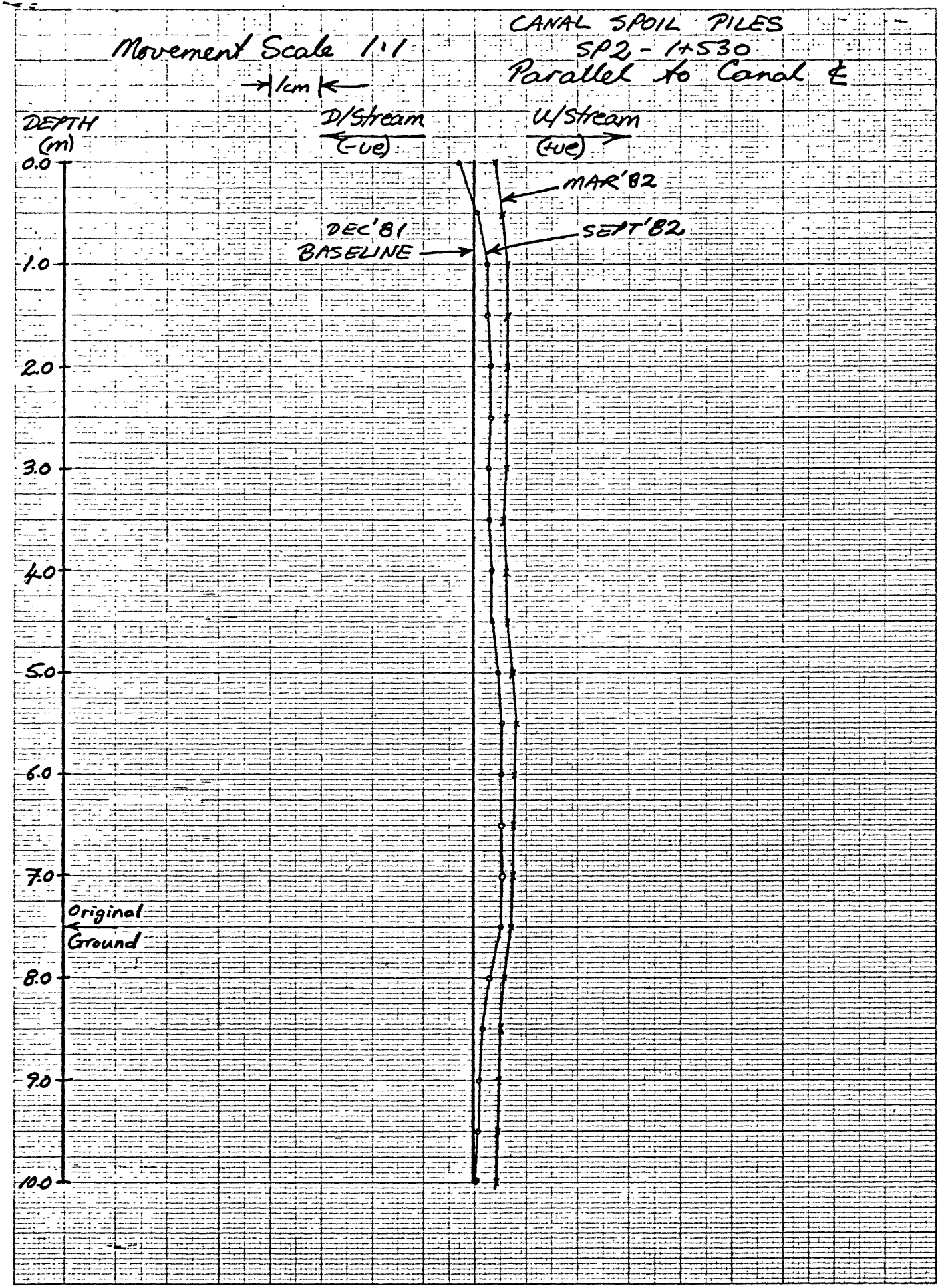
Movement Scale 1:1

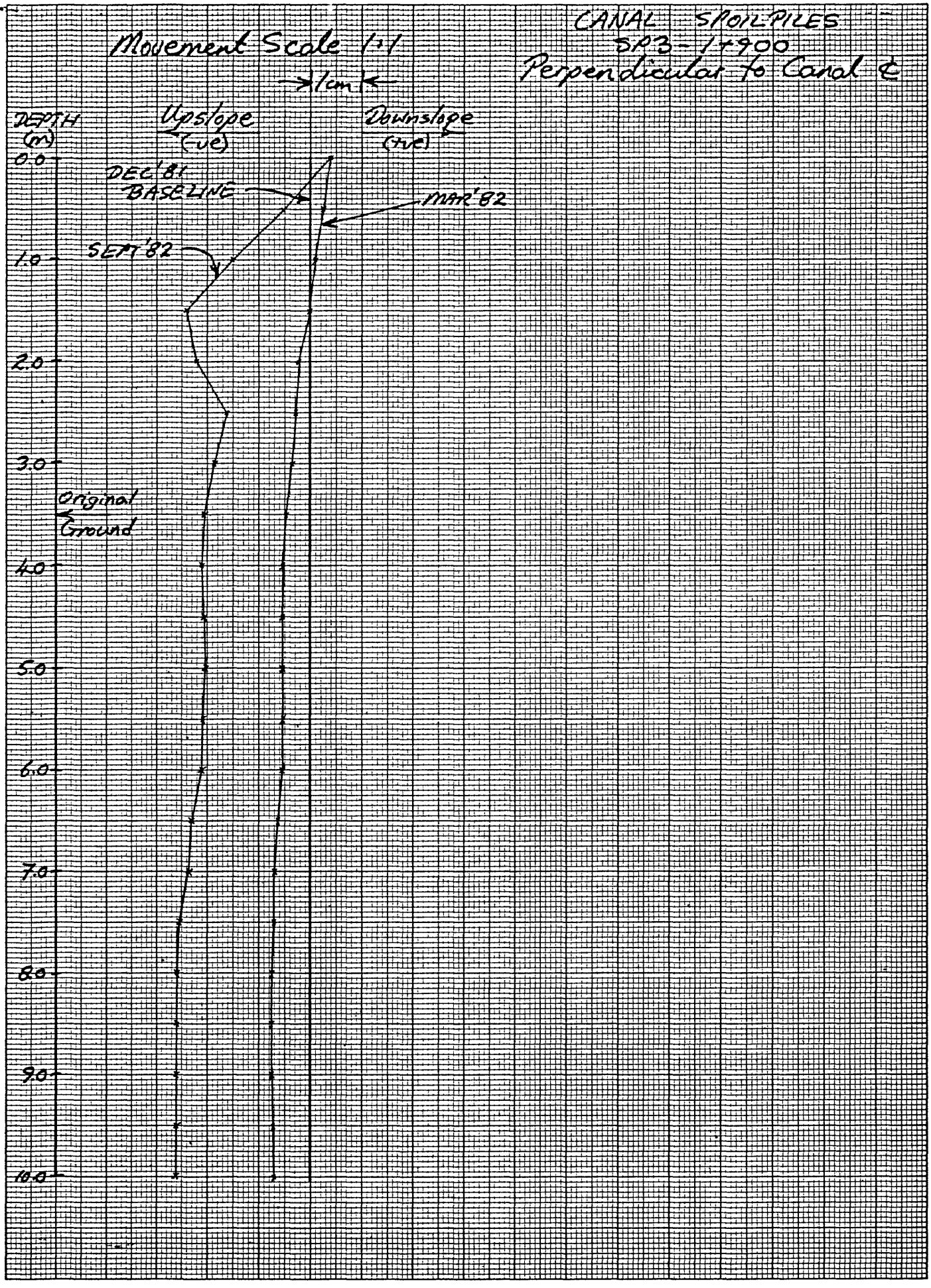
→1cm←

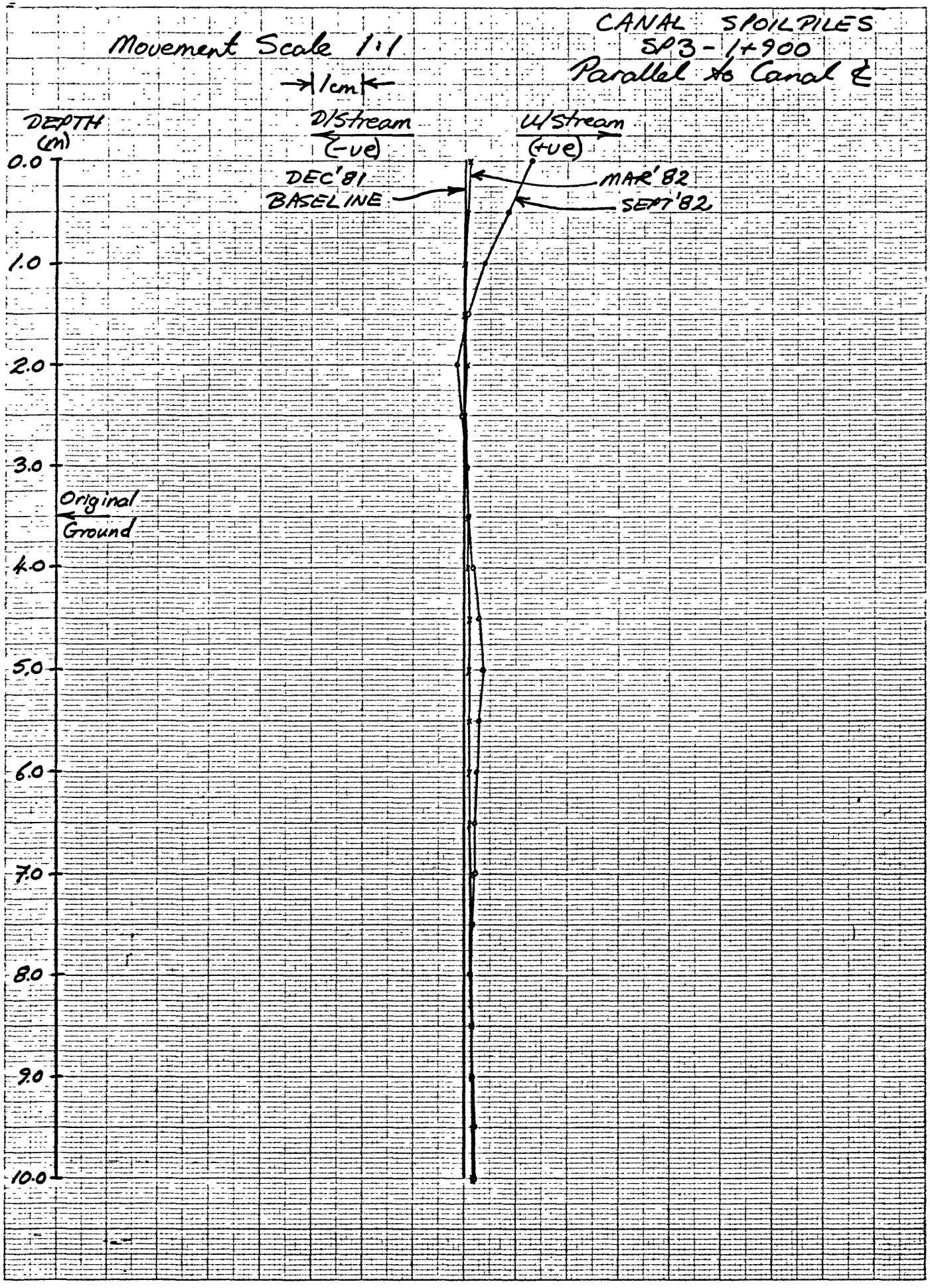


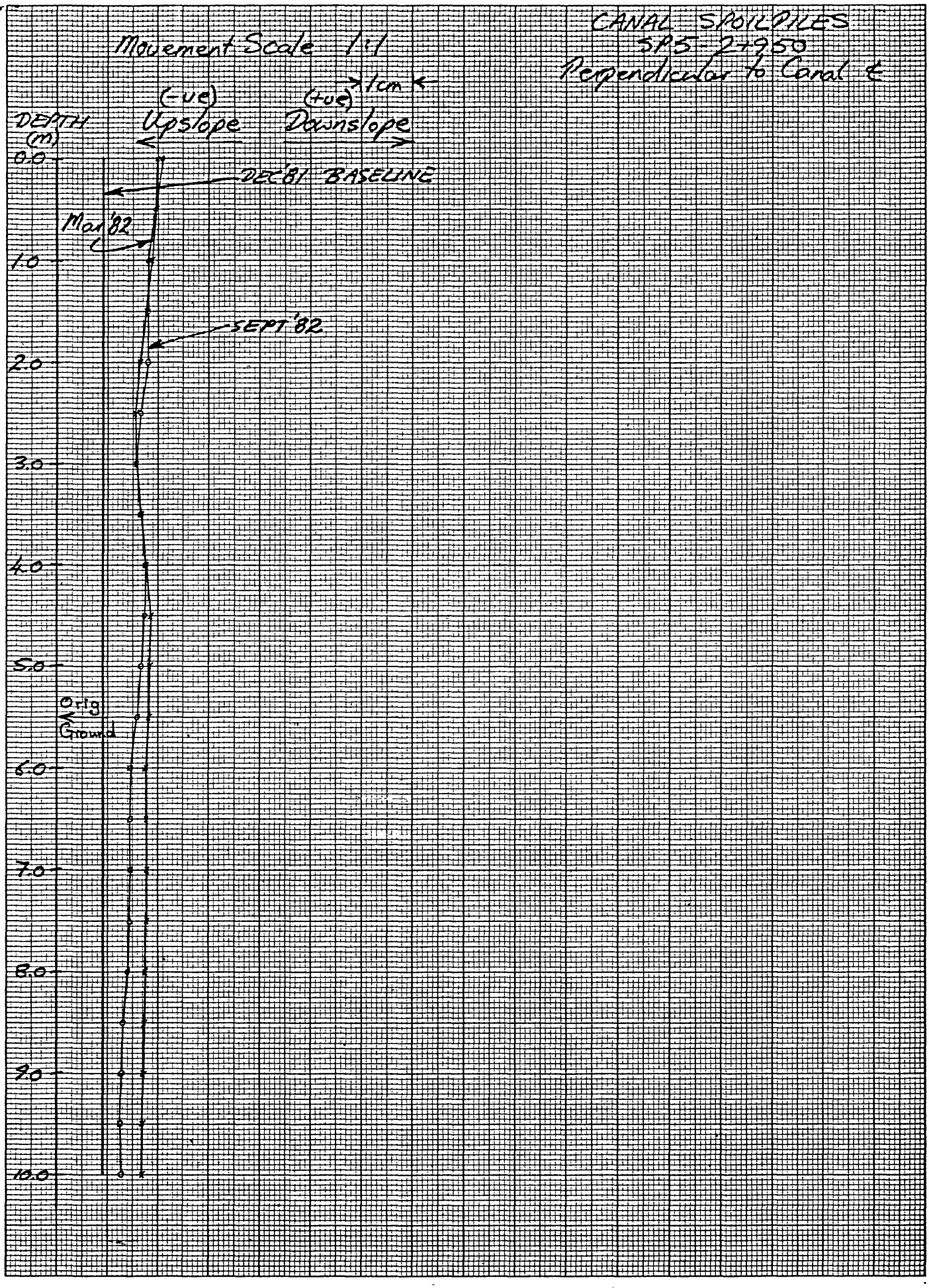


46 1512
10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

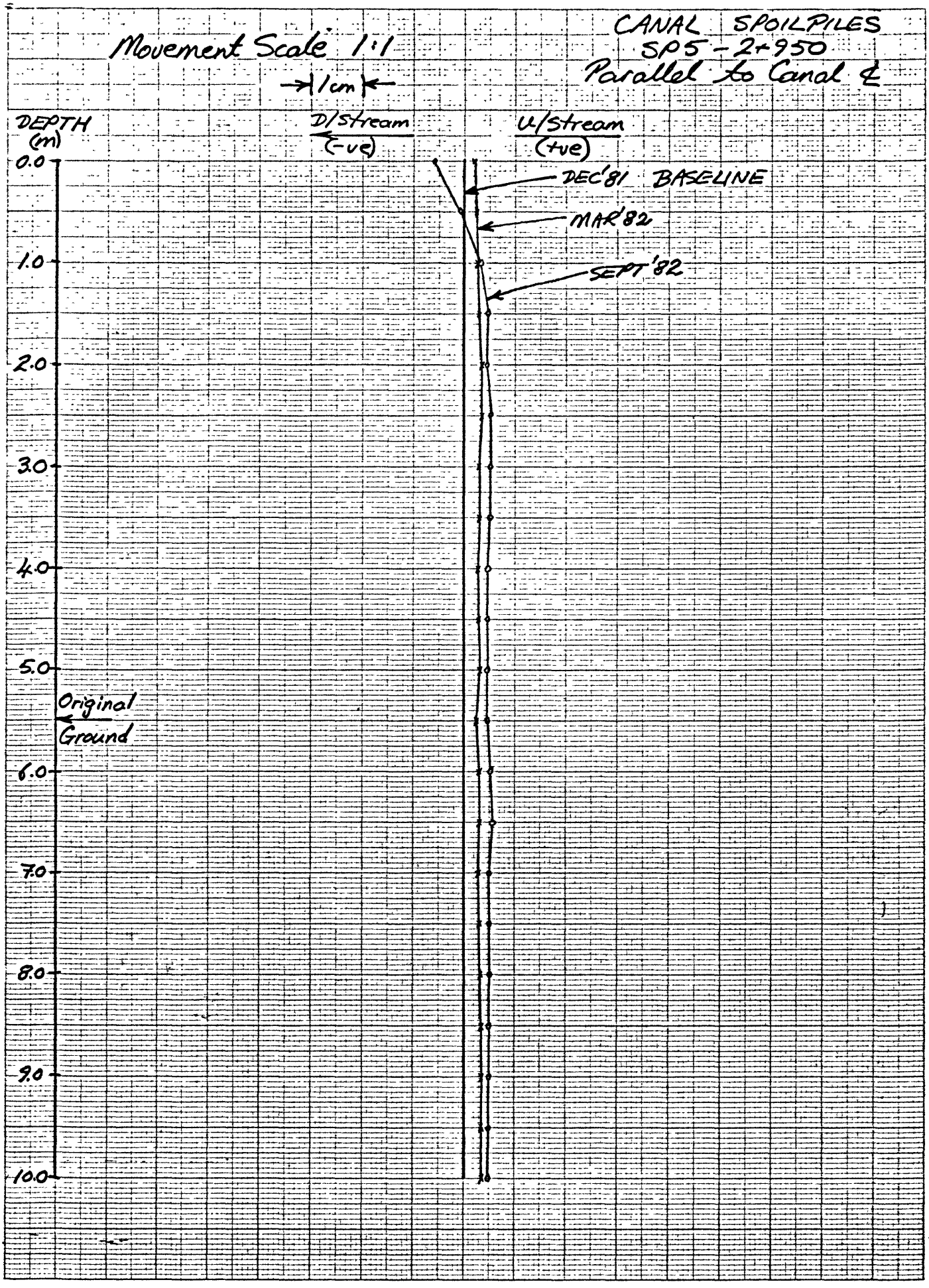

CANAL SPOIL PILES
SP2 - 1+530
Parallel to Canal &
Movement Scale 1:1
1cm
D/Stream
(-ve)
U/Stream
(+ve)
DEPTH
(m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
MAR'82
SEPT'82
DEC'81
BASELINE
Original
Ground


CANAL SPOIL PILES
SP3-1+900
Perpendicular to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
Upslope (-ve)
Downslope (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Original Ground
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0


CANAL SPOILPILES
SP3 - 1+900
Parallel to Canal &
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
Original Ground
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0



K+E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
FEL & CO. N.Y. S.A.
46 1512


CANAL SPOILPILES
SP5 - 2+950
Parallel to Canal ℄
Movement Scale 1:1
1cm
DEPTH (m)
D/Stream (-ve)
U/Stream (+ve)
DEC'81 BASELINE
MAR'82
SEPT'82
0.0
1.0
2.0
3.0
4.0
5.0
Original Ground
6.0
7.0
8.0
9.0
10.0

Canal Intermental Settlements

Canal Dyke

CD4-0+400

CD10-0+990

CD15-1+530

CD19-1+900

CD21-2+100

CD27-2+765

CD28-2+900

CD29-3+000

Canal Backslope

BS2-0+400

BS5-0+960

BS9-1+530

BS10-1+900

BS11-2+100

BS17-2+900 (upper)

BS18-3+000

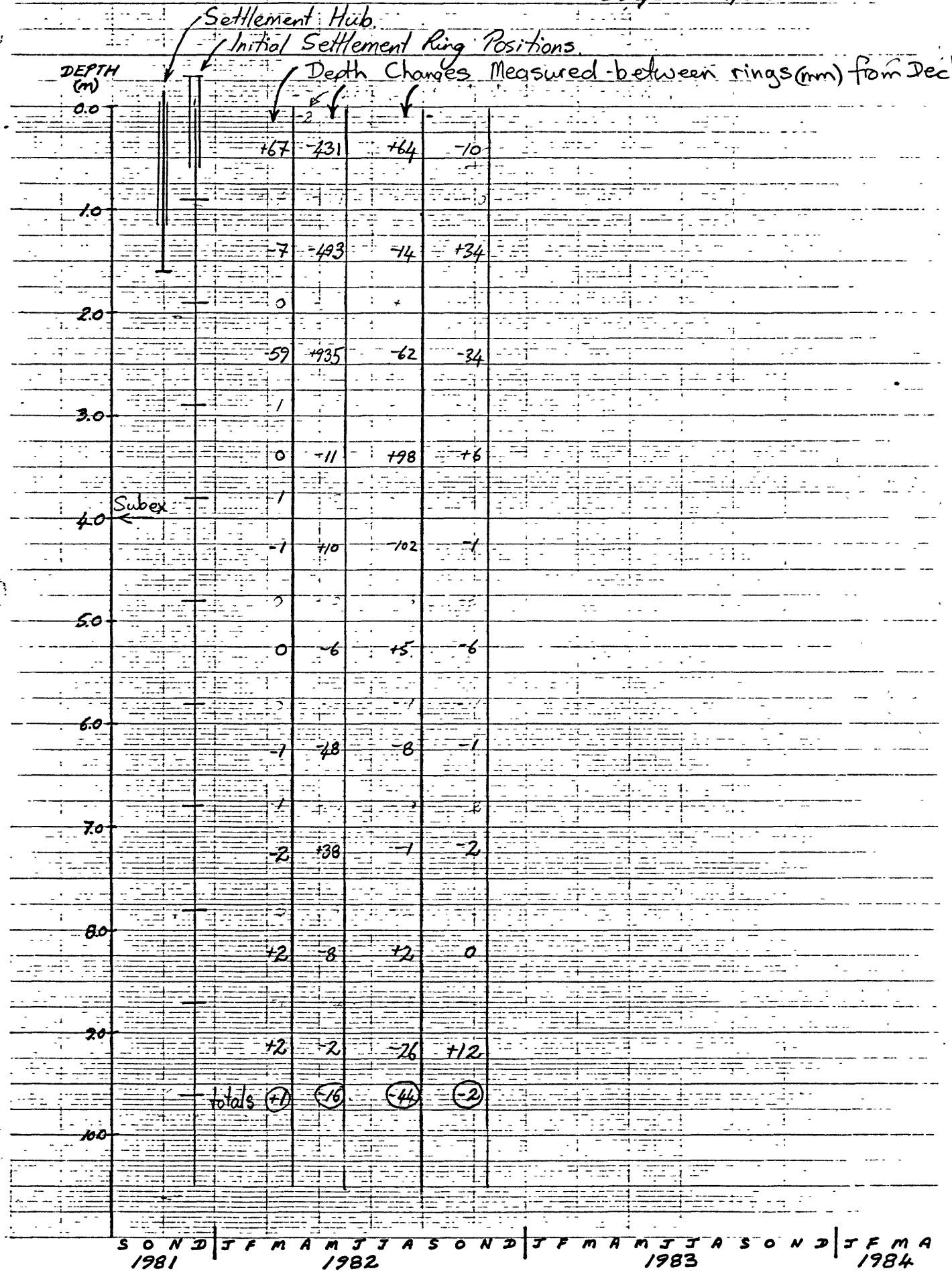
Canal Spoilpiles

SP2-1+530

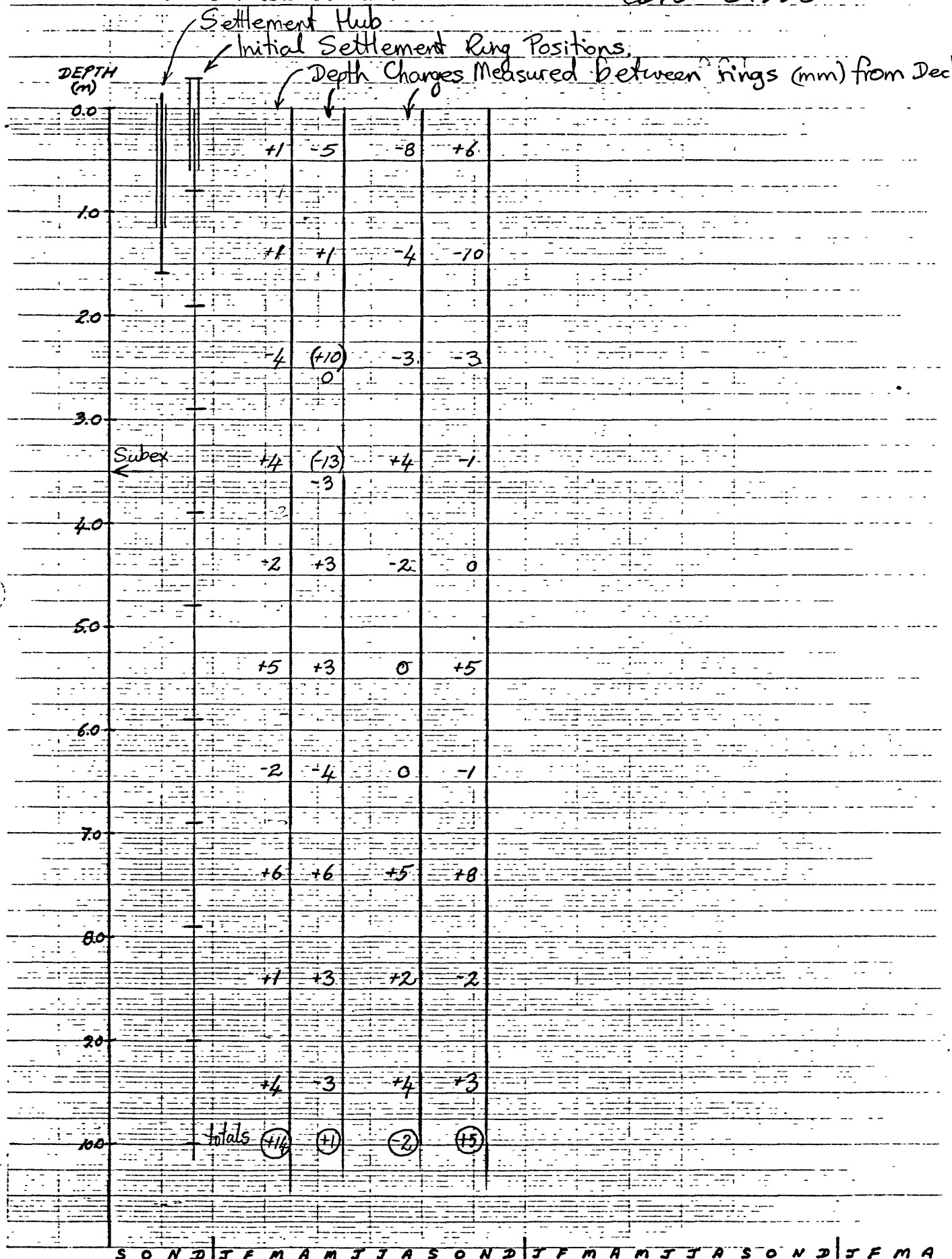
SP3-1+900

SP5-2+950

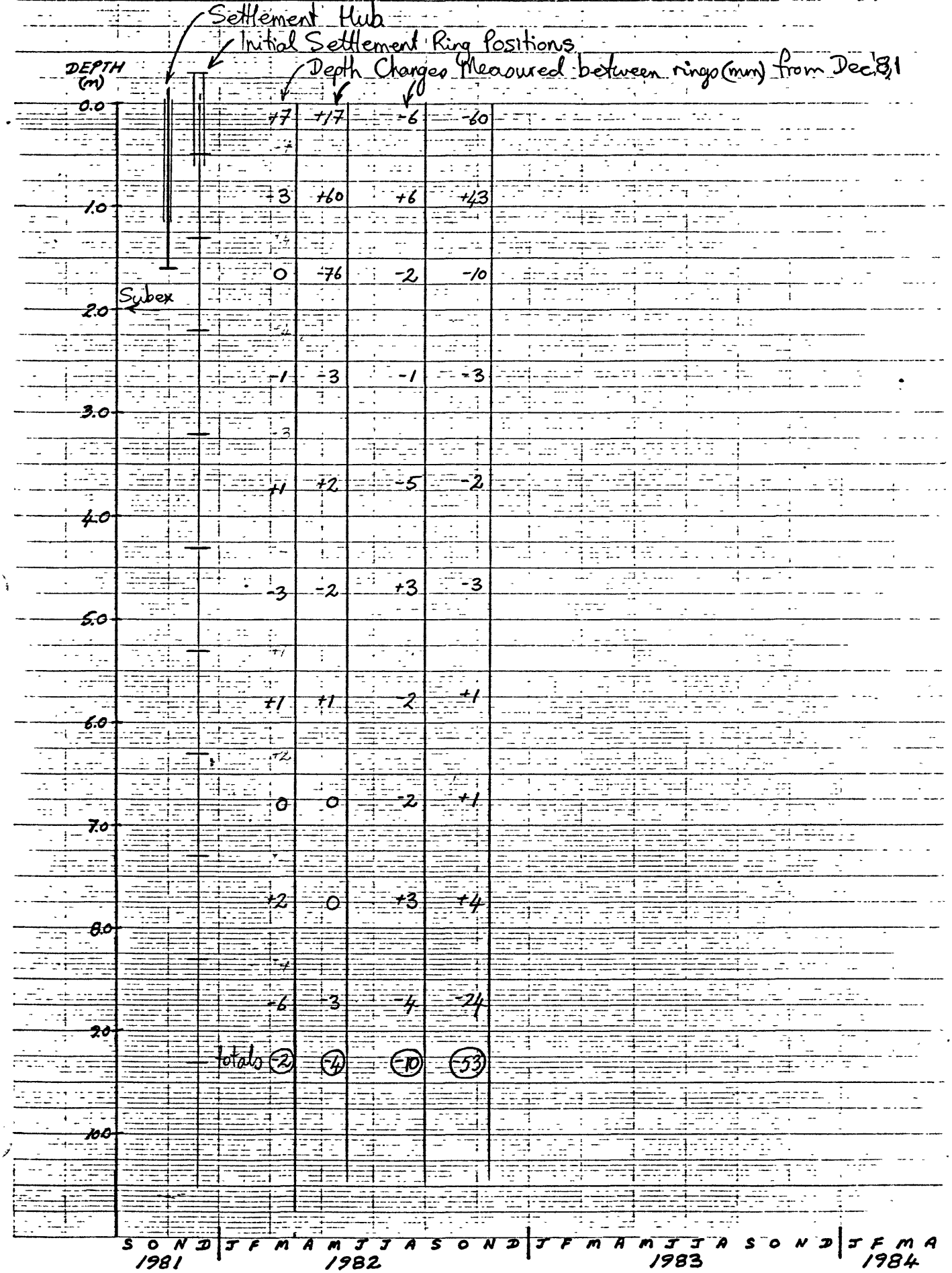
CANAL DYKE
CD4-0+400



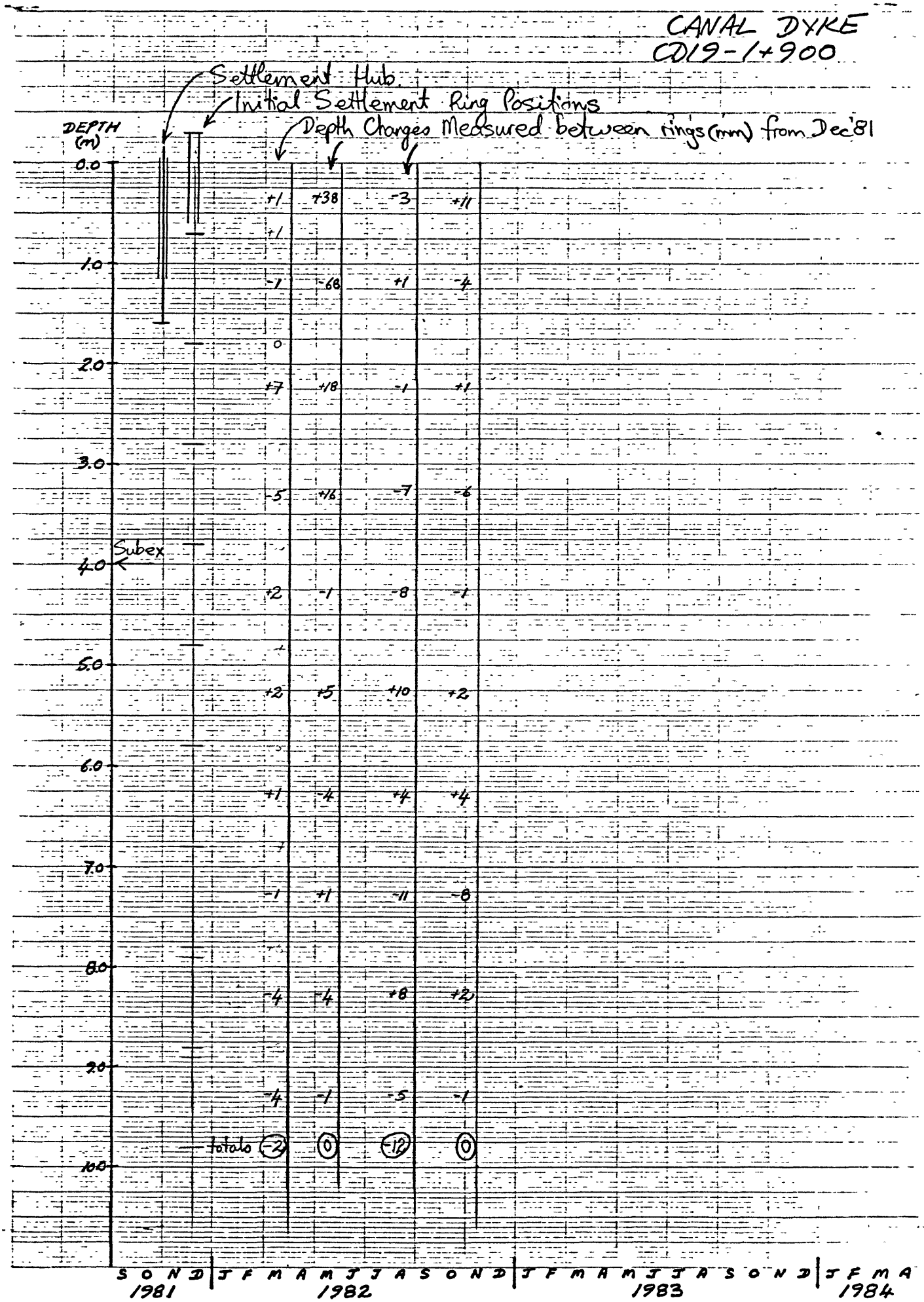
CANAL DYKE
CD10 - 0+990

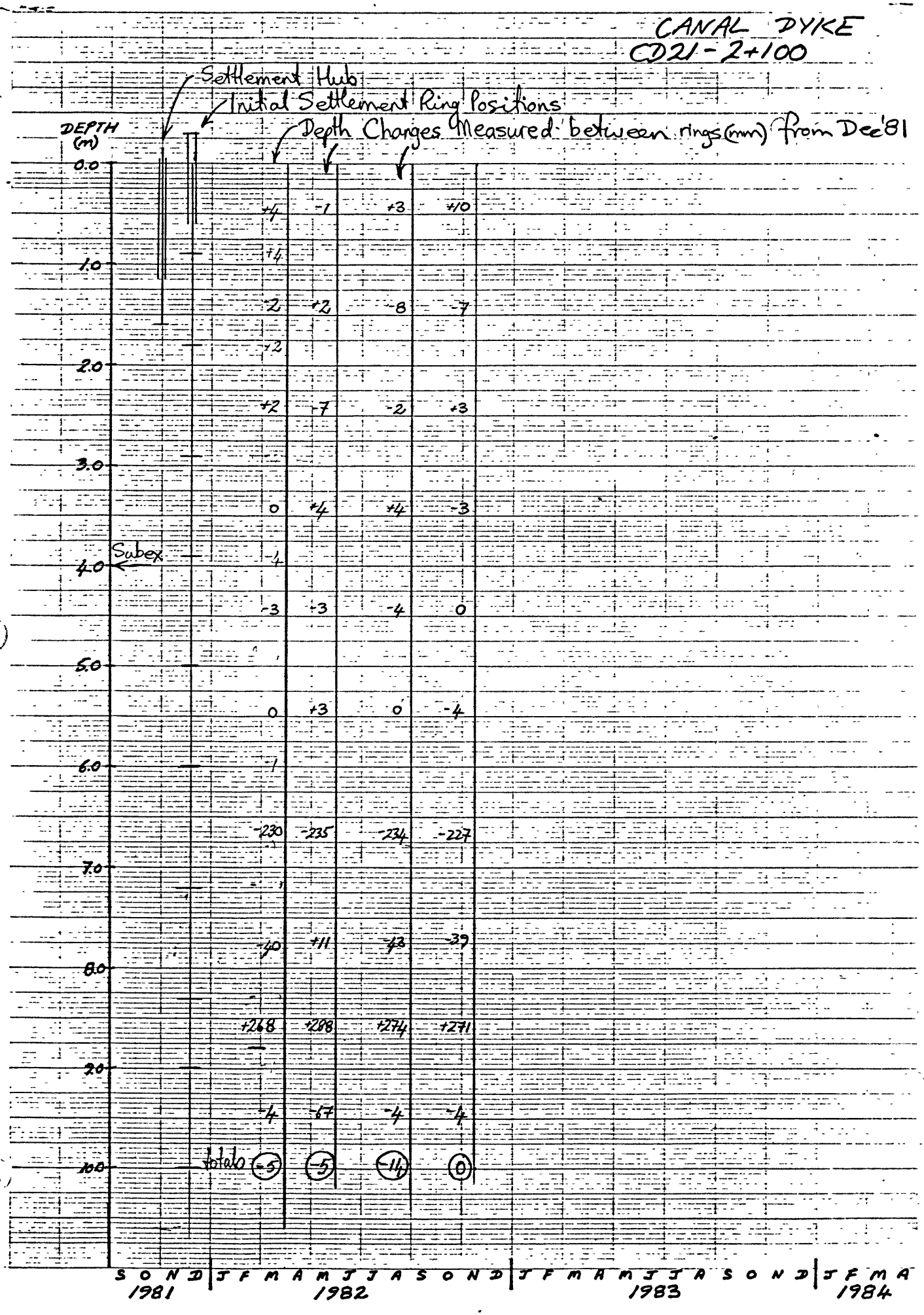


CANAL DYKE
CD15 - 1+530

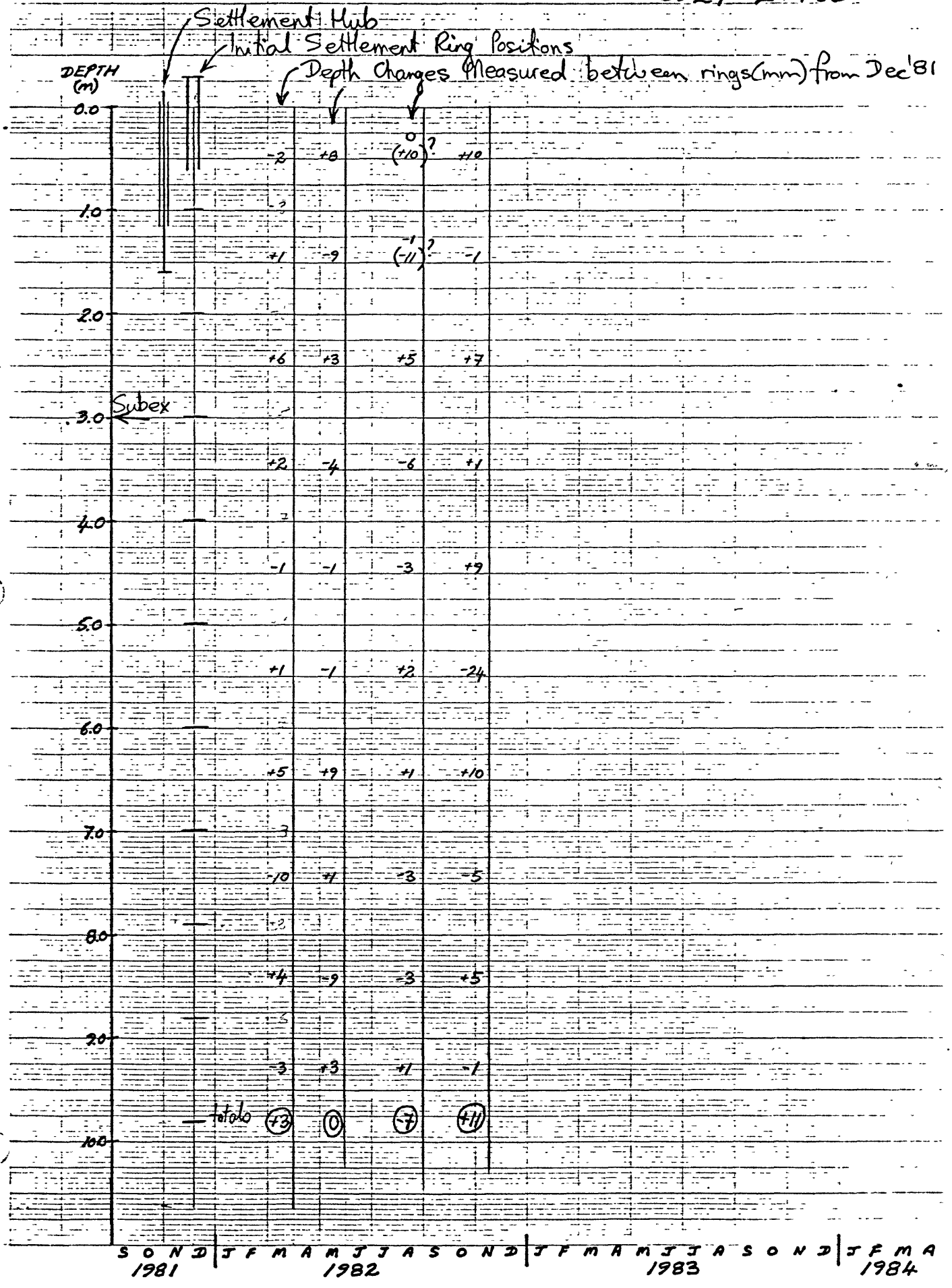


CANAL DYKE
CD19-1+900

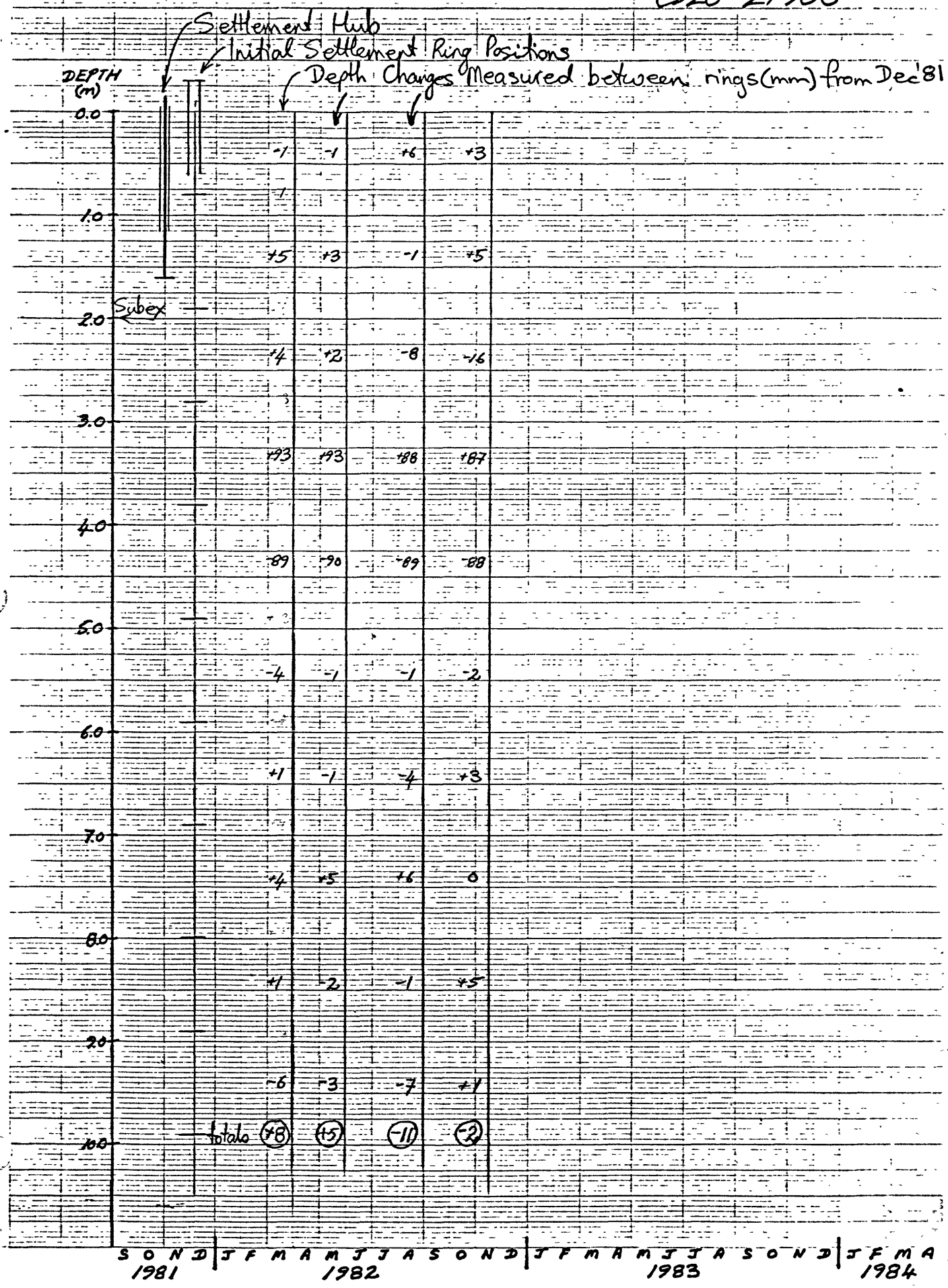



CANAL DYKE
CD21 - 2+100
Settlement Hub
Initial Settlement Ring Positions
Depth Changes Measured between rings (mm) from Dec'81
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
100
Subex
+4 -1 +3 +10
+4
-2 +2 -8 -7
+2
+2 -7 -2 +3
0 +4 +4 -3
-4
-3 +3 -4 0
0 +3 0 -4
-1
-230 -235 -234 -227
-40 +11 -43 -39
+268 +288 +274 +271
-4 -67 -4 -4
totals -5 -5 -14 0
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984

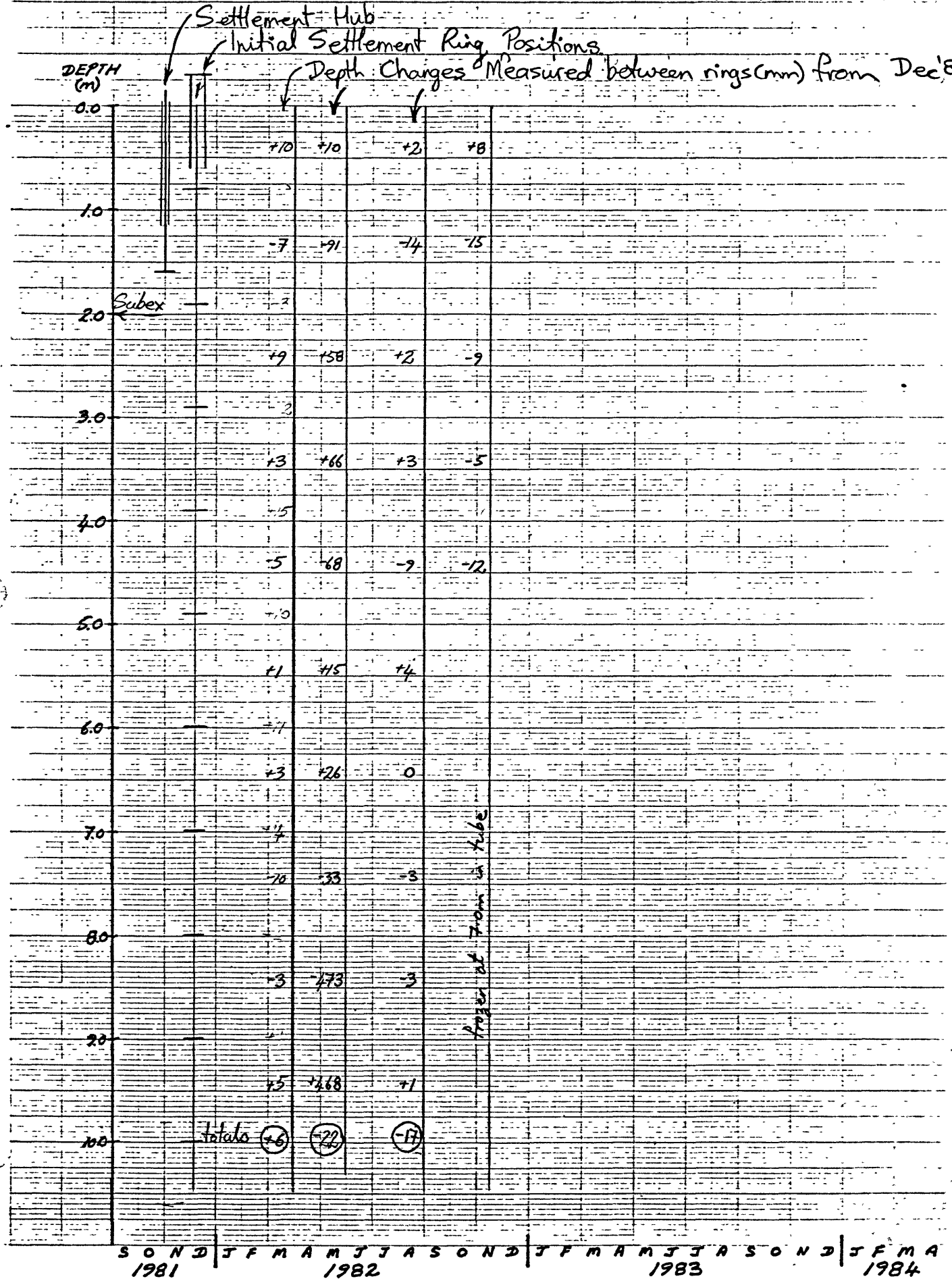
CANAL DYKE
CD27-2+765

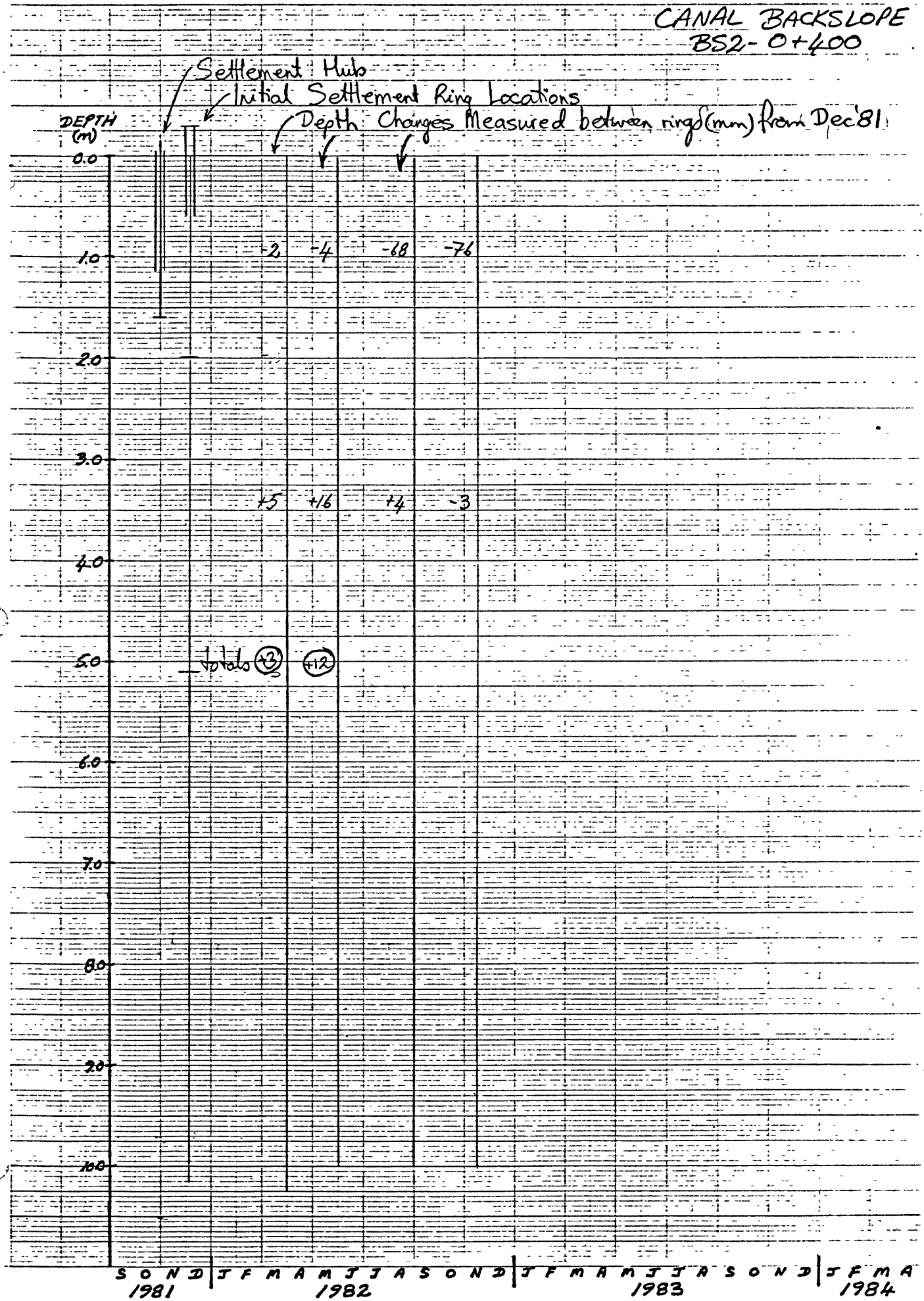


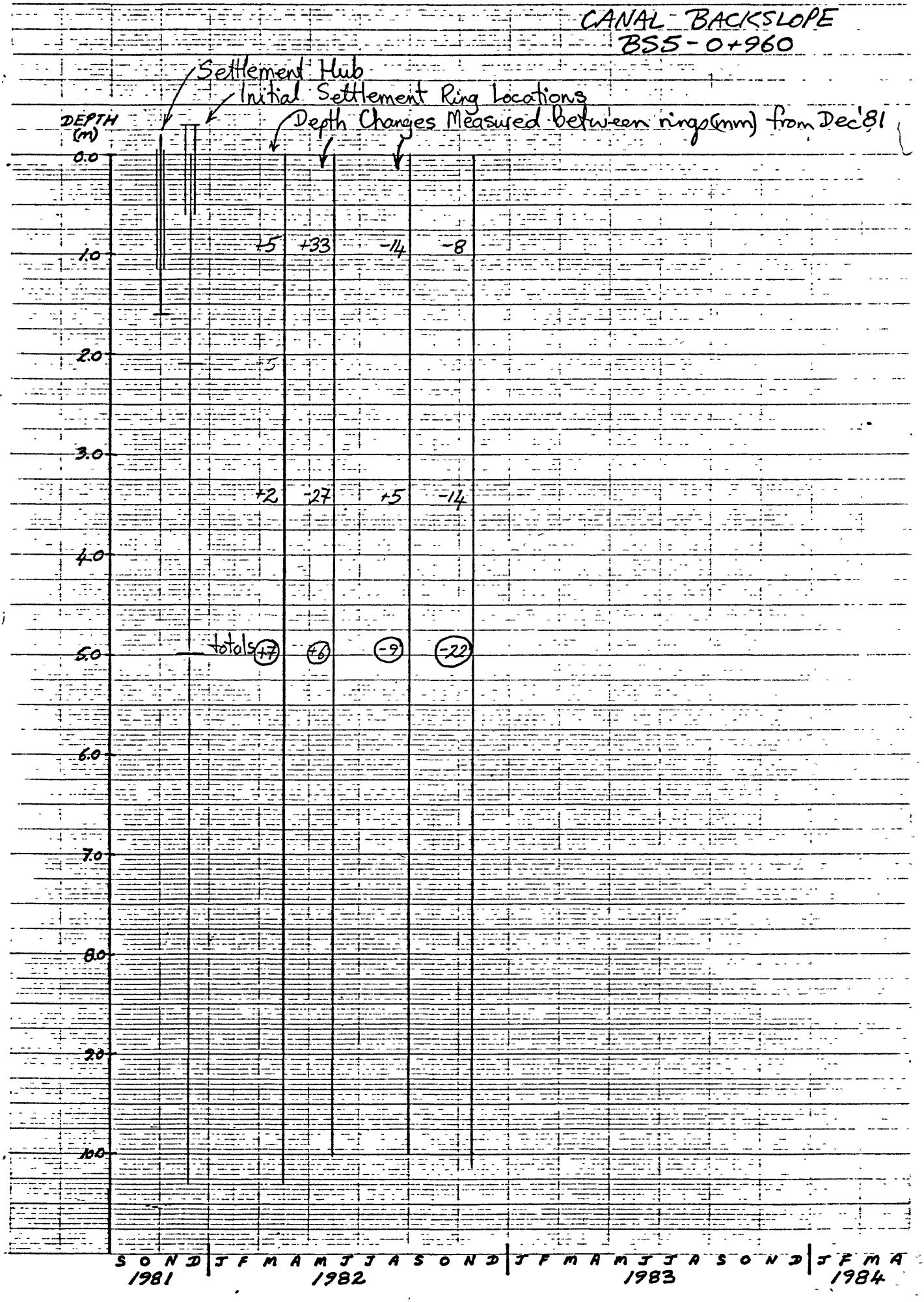
CANAL DYKE
CD28-2+900



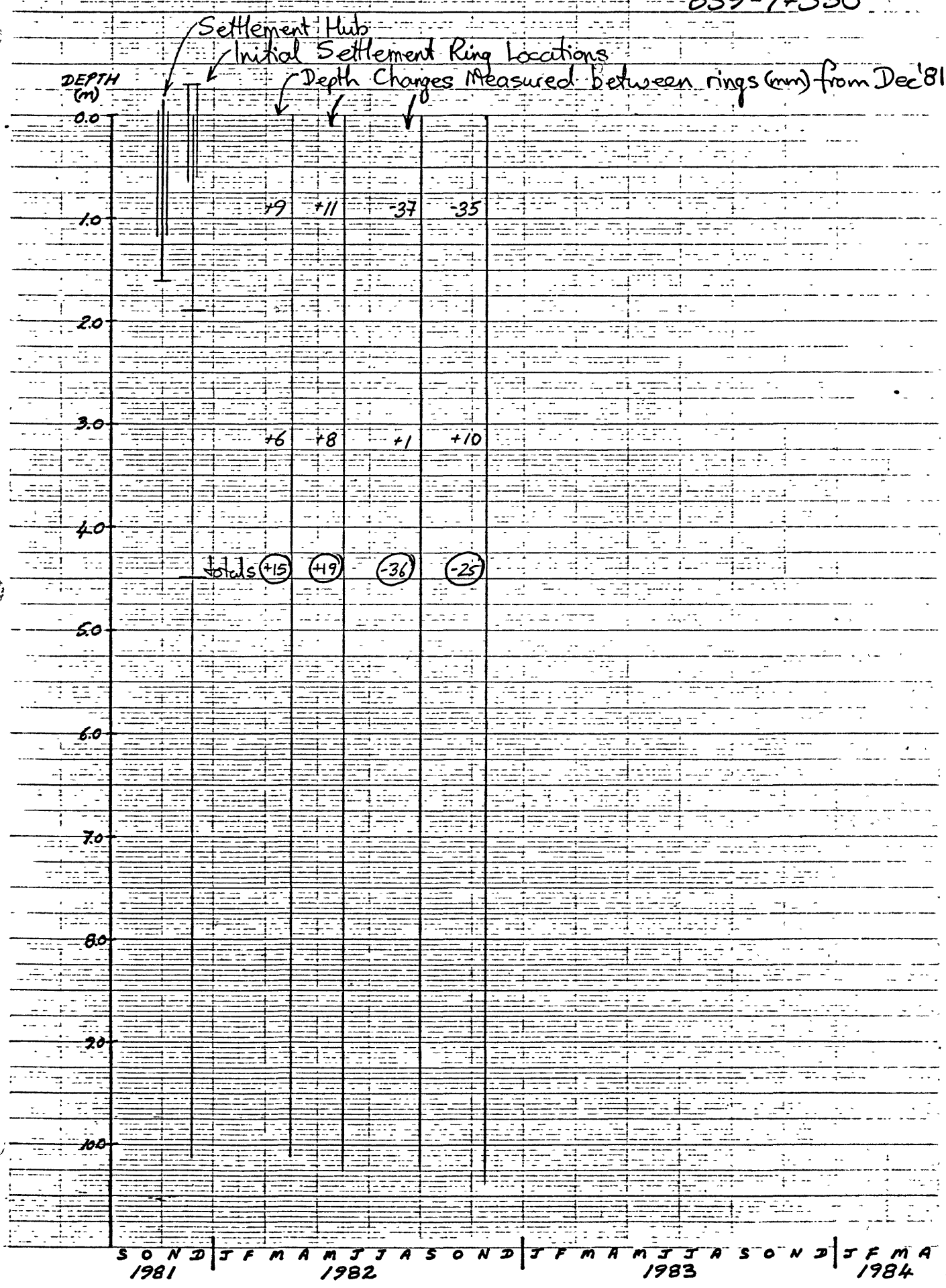
CANAL DYKE
CD29 - 3+000

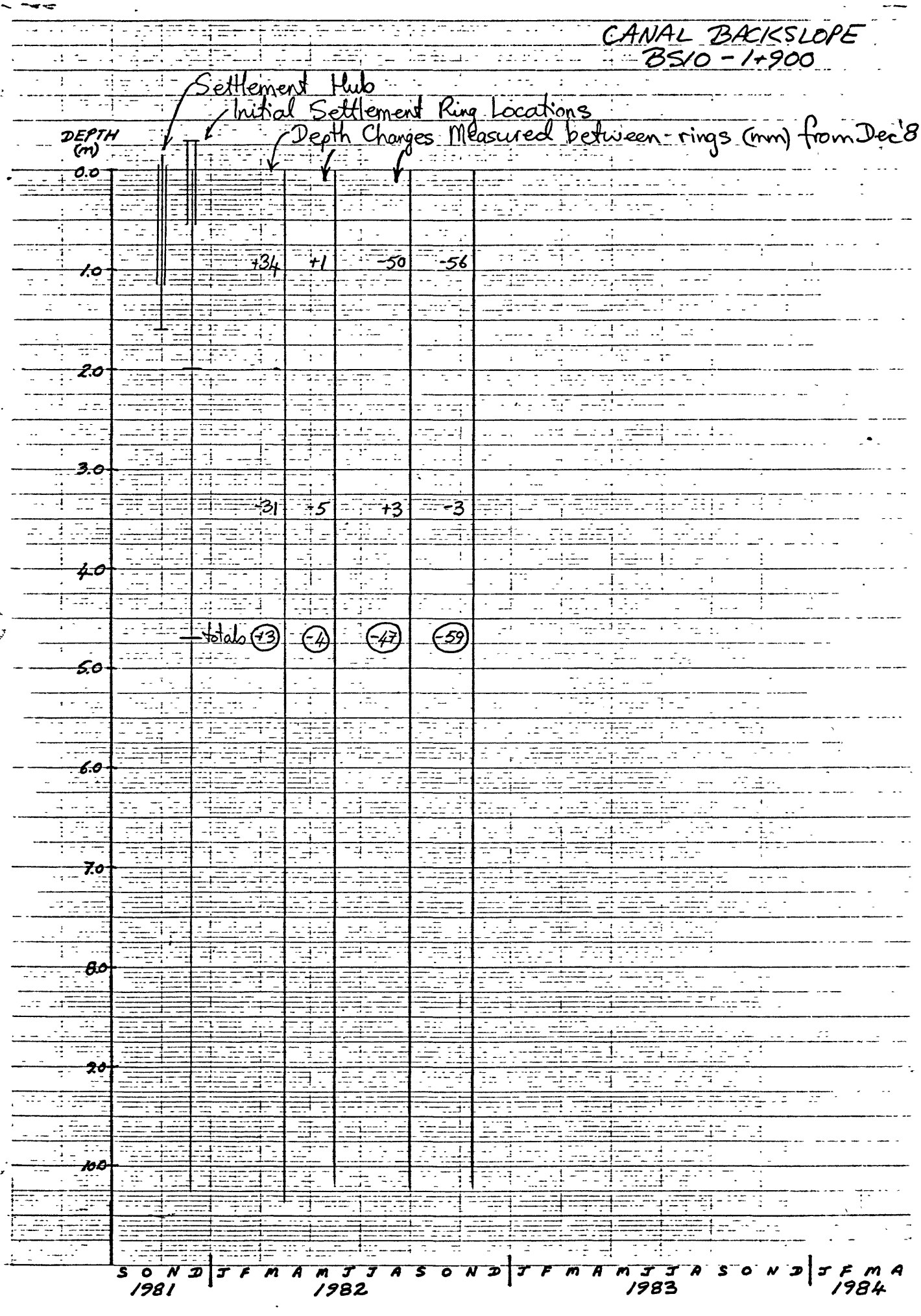


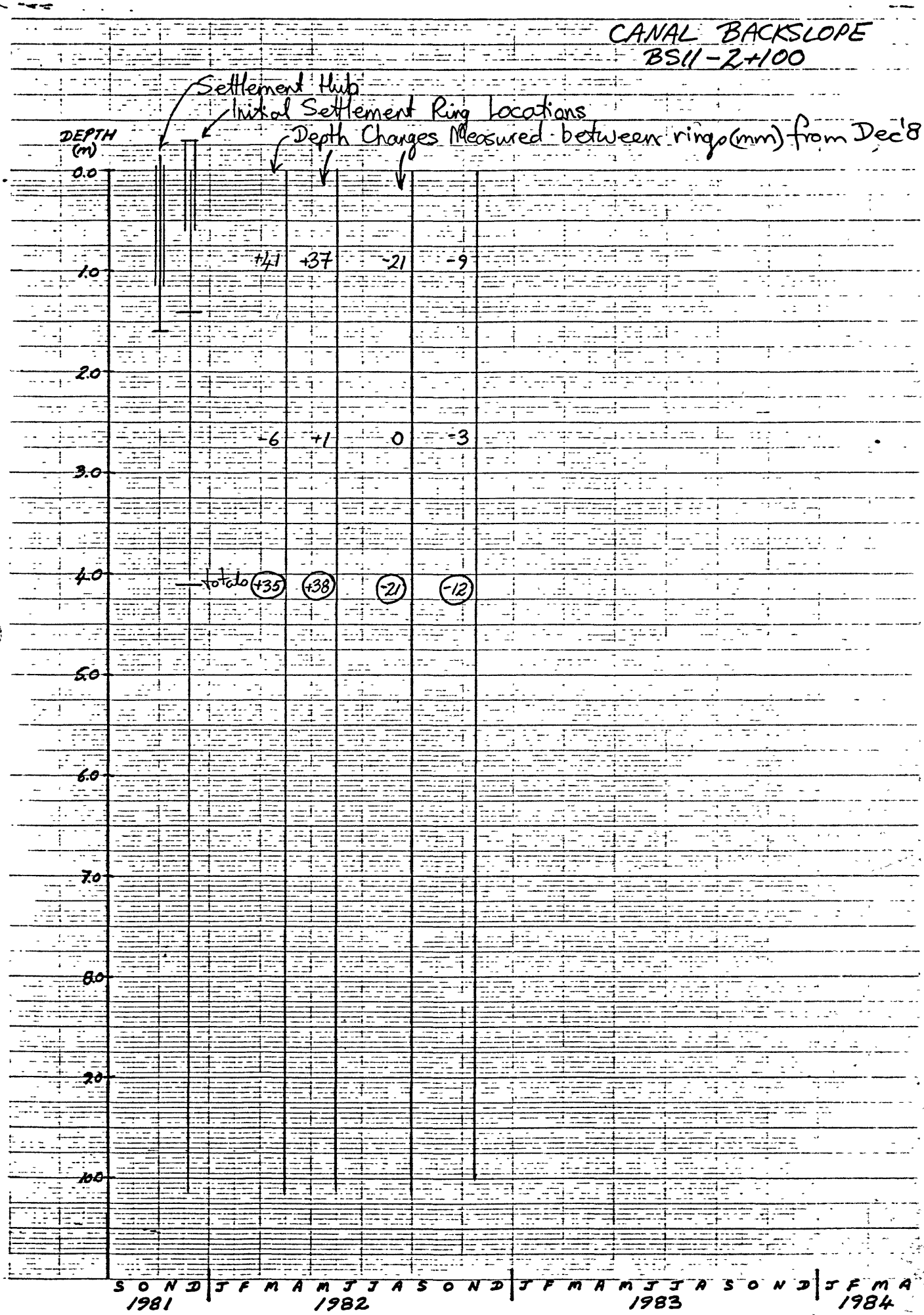

CANAL BACKSLOPE
BS2- 0+400
Settlement Hubs
Initial Settlement Ring Locations
Depth Changes Measured between rings (mm) from Dec'81
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
100
-2
-4
-68
-76
+5
+16
+4
-3
Hubs +3
+12
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984


CANAL BACKSLOPE
BS5-0+960
Settlement Hub
Initial Settlement Ring Locations
Depth Changes Measured between rings (mm) from Dec'81
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
100
+5
+33
-14
-8
+3
+2
-27
+5
-14
totals
+7
+6
-9
-22
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984

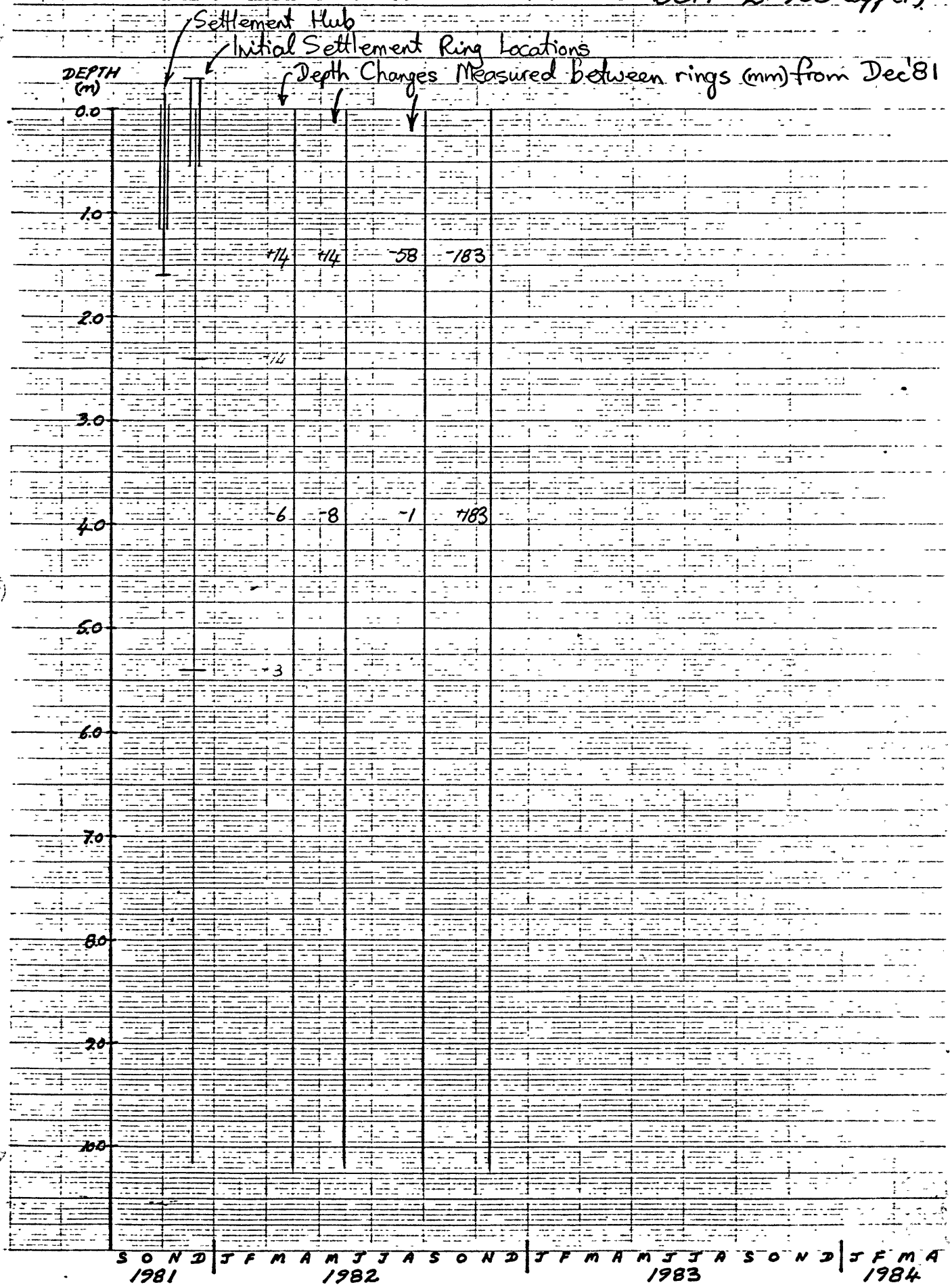
CANAL BACKSLOPE
BS9-1+530



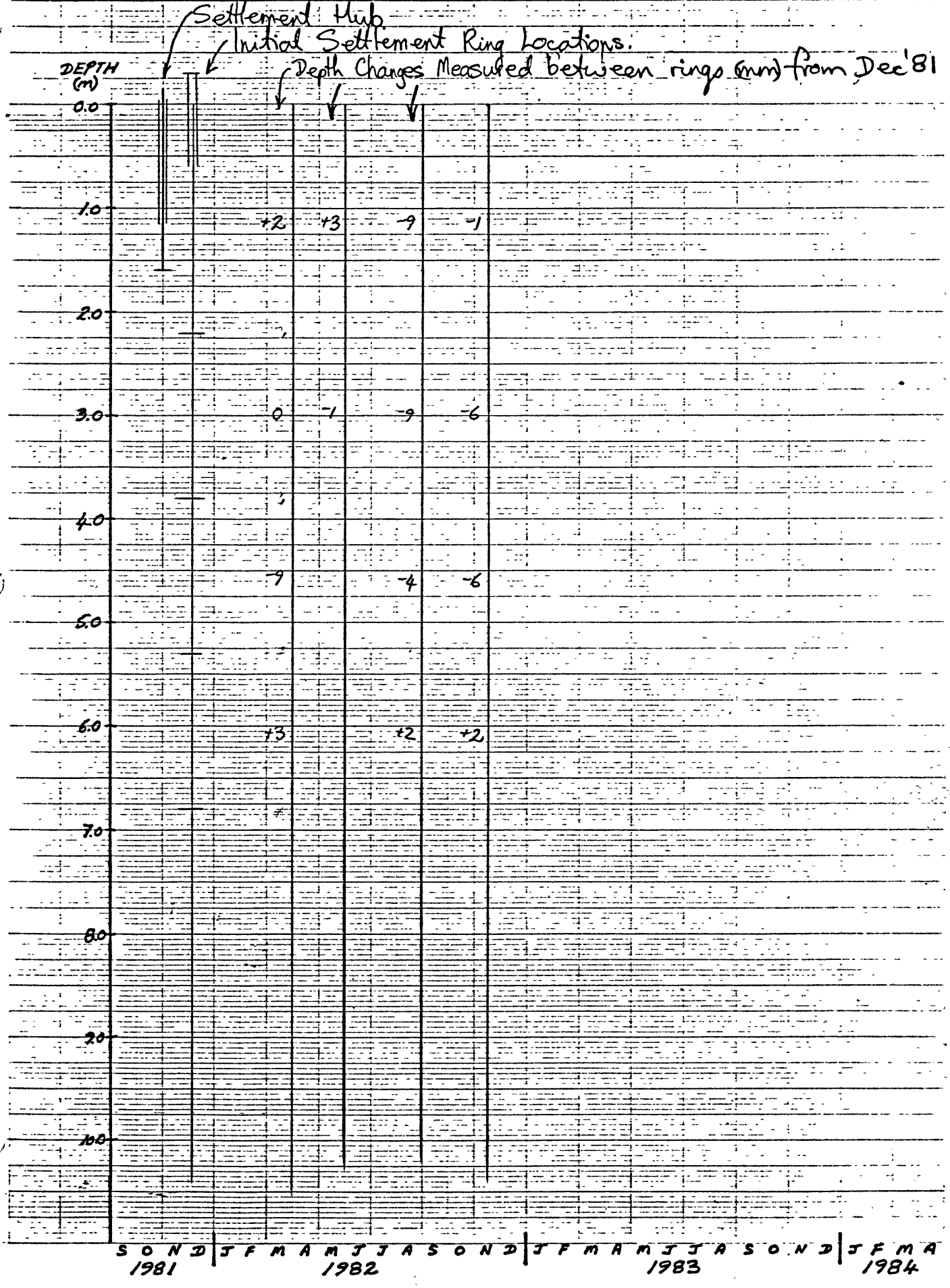

CANAL BACKSLOPE
BS10 - 1+900
Settlement Hub
Initial Settlement Ring Locations
Depth Changes Measured between-rings (mm) from Dec'81
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
10.0
+34
+1
-50
-56
-31
+5
+3
-3
totals
+3
-4
-47
-59
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984


CANAL BACKSLOPE
BS11-2+100
Settlement Hub
Initial Settlement Ring Locations
Depth Changes Measured between rings (mm) from Dec'81
DEPTH (m)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
20
100
+41
+37
-21
-9
-6
+1
0
-3
totals
+35
+38
-21
-12
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1981
1982
1983
1984

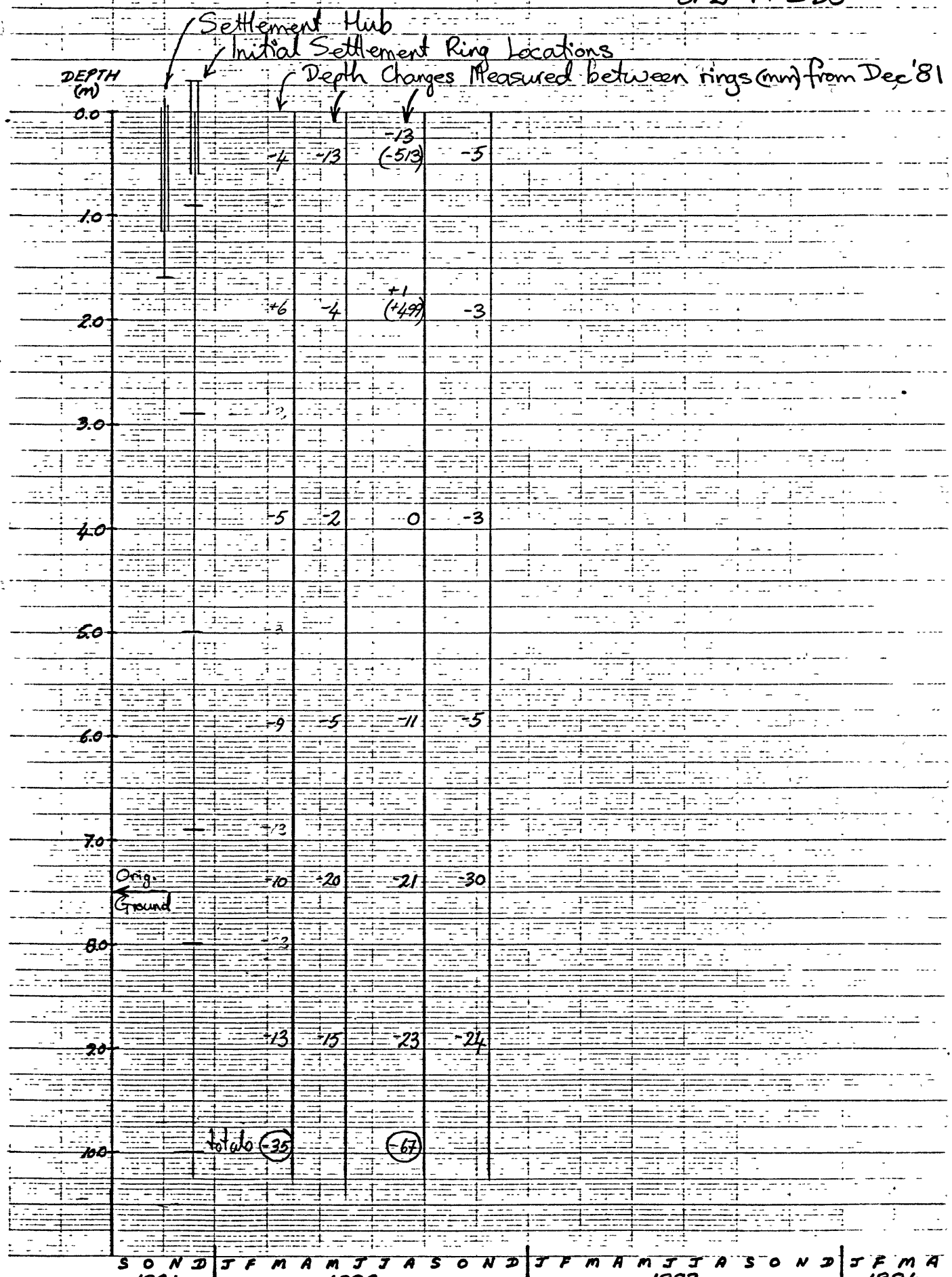
CANAL BACKSLOPE
BS17 - 2+900 (upper)



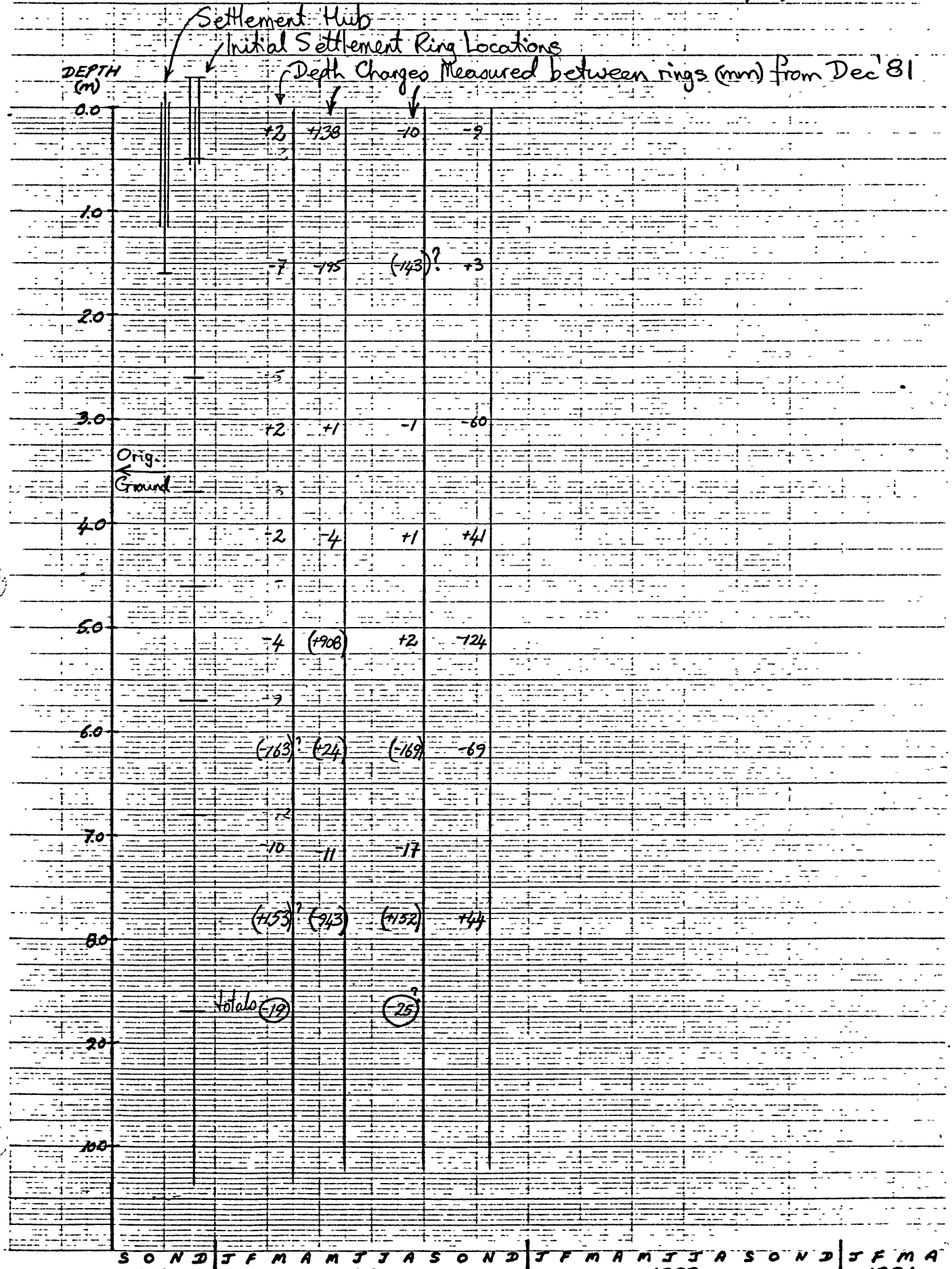
CANAL BACKSLOPE
BS18-3+000



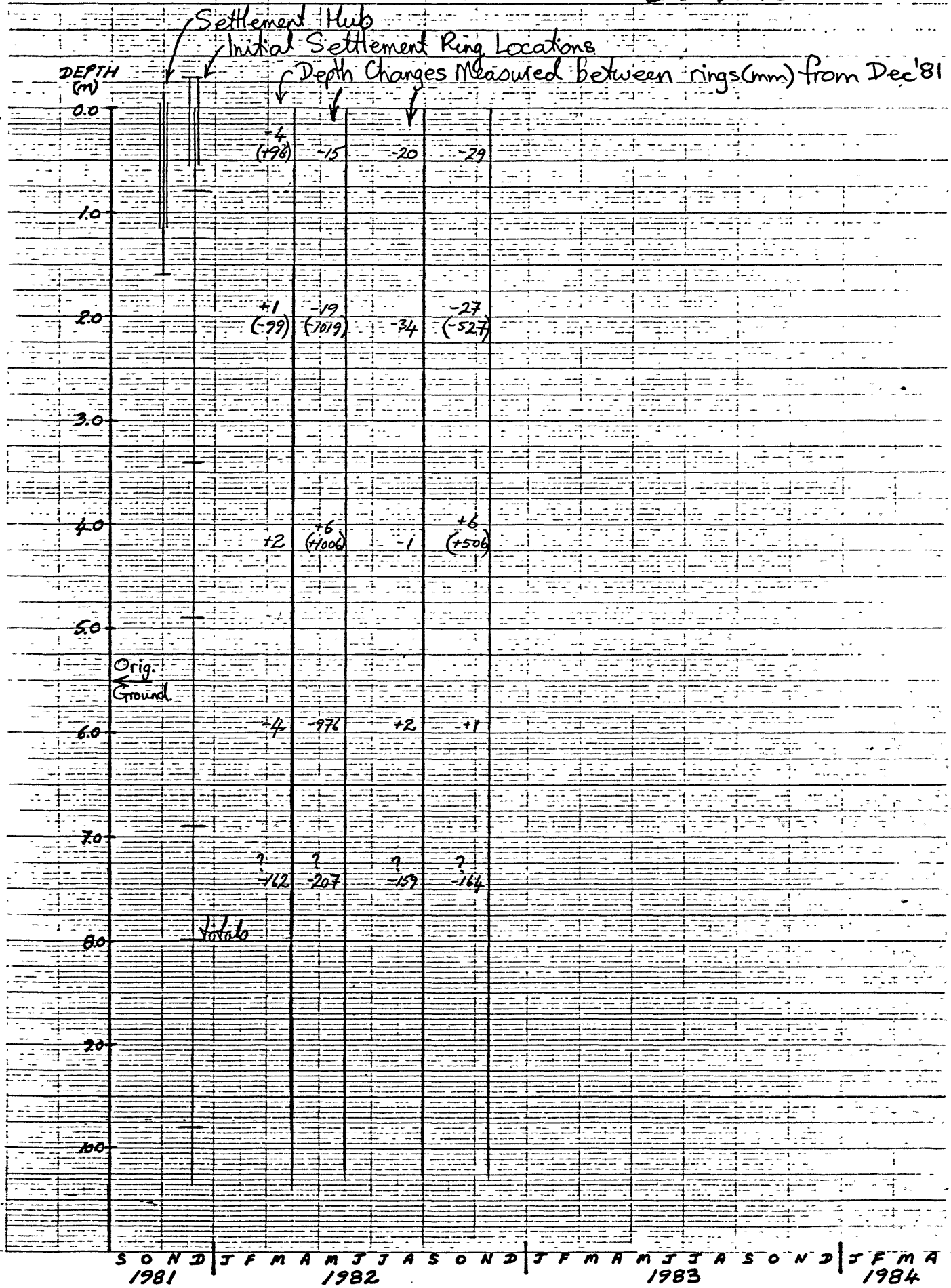
CANAL SPOIL PILES
SP2-1+530



CANAL SPOILPILES
SP3-1+900



CANAL SPOILPILES
SP5-2+950



Vertical and Horizontal Movement Hubs

Intermediate Dam

Centreline Profile

ID1-0+250

ID3-0+450

ID5-0+627

#814 (extra point for sighting purposes)

Cross Valley Dam

Centreline Profile

0+180 - steel re-bar

CVDC3-0+204 - V,H hub

CVDS-1-0+205 (SP'A') - settlement plate

0+210 - steel re-bar

0+240 - steel re-bar

0+270 - steel re-bar

0+300 - steel re-bar

0+330 - steel re-bar

CVDC5-0+338 - V,H hub

CVDS-2-0+341 (SP'B') - settlement plate

0+360 - steel re-bar

0+390 - steel re-bar

0+450 - steel re-bar

CVDS-3-0+459 (SP'C') - settlement plate

CVDC8-0+460 - V,H hub

0+480 - steel re-bar

0+510 - steel re-bar

CVDC10-0+568 - V,H hub

CVDS-4-0+567 (SP'D') - settlement plate

0+570 - steel re-bar

0+600 - steel re-bar

Canal Dyke

CD2-0+150 and CD3-0+300

CD4-0+400 (V,H hub)

CD5-0+510 and CD6-0+610

CD7-0+710 and CD8-0+840

CD9-0+960 and CD11-1+110

CD10-0+990 (V,H hub)

CD12-1+230 and CD14-1+440

CD13-1+350 (V,H hub)

CD15-1+530 (V,H hub)

CD16-1+610 and CD17-1+705

CD18-1+800 and CD20-2+000

CD19-1+900 (V,H hub)

CD21-2+100 (V,H hub)

CD22-2+200 (V,H hub)

CD23-2+260 and CD25-2+460

CD24-2+365 (V,H hub)

CD26-2+600 and CD27-2+765

CD28-2+900 (V,H hub)

CD29-3+000 (V,H hub)

CD30-3+130 (V,H hub)

CD31-3+360 (V,H hub)

CD32-3+550 (V,H hub)

Canal Backslope

BS1-0+150 and BS3-0+610

BS2-0+400 and (V,H hub)

BS5-0+960 (V,H hub)

BS6-1+110 and BS7-1+200

BS8-1+300

BS9-1+530 (V,H hub)

BS10-1+900 (V,H hub)

BS11-2+100 (V,H hub)

BS12-2+260 and BS13-2+460

BS14-2+560 and BS15-2+760

BS16-2+900 (lower) (V,H hub)

BS17-2+900 (upper) (V,H hub)

BS18-3+000 (V,H hub)

BS19-3+130

BS20-3+240 (V,H hub)

BS21-3+550 (V,H hub)

Canal Spoilpiles (all V,H hubs)

SP1-0+990

SP2-1+530

SP3-1+900

SP4-2+040

SP5-2+950

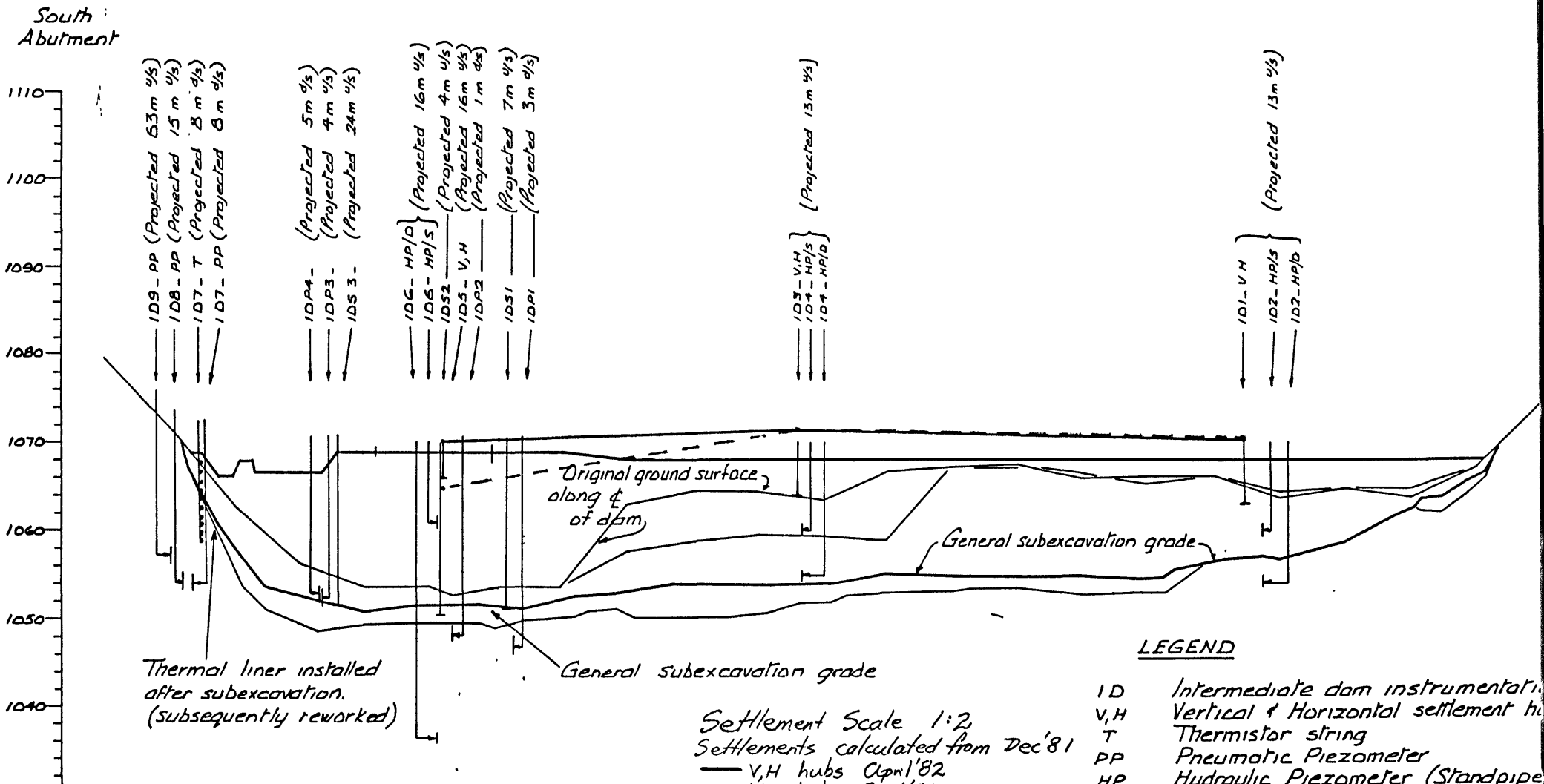
Survey Control Stations

#290

#291

#292

I.D.



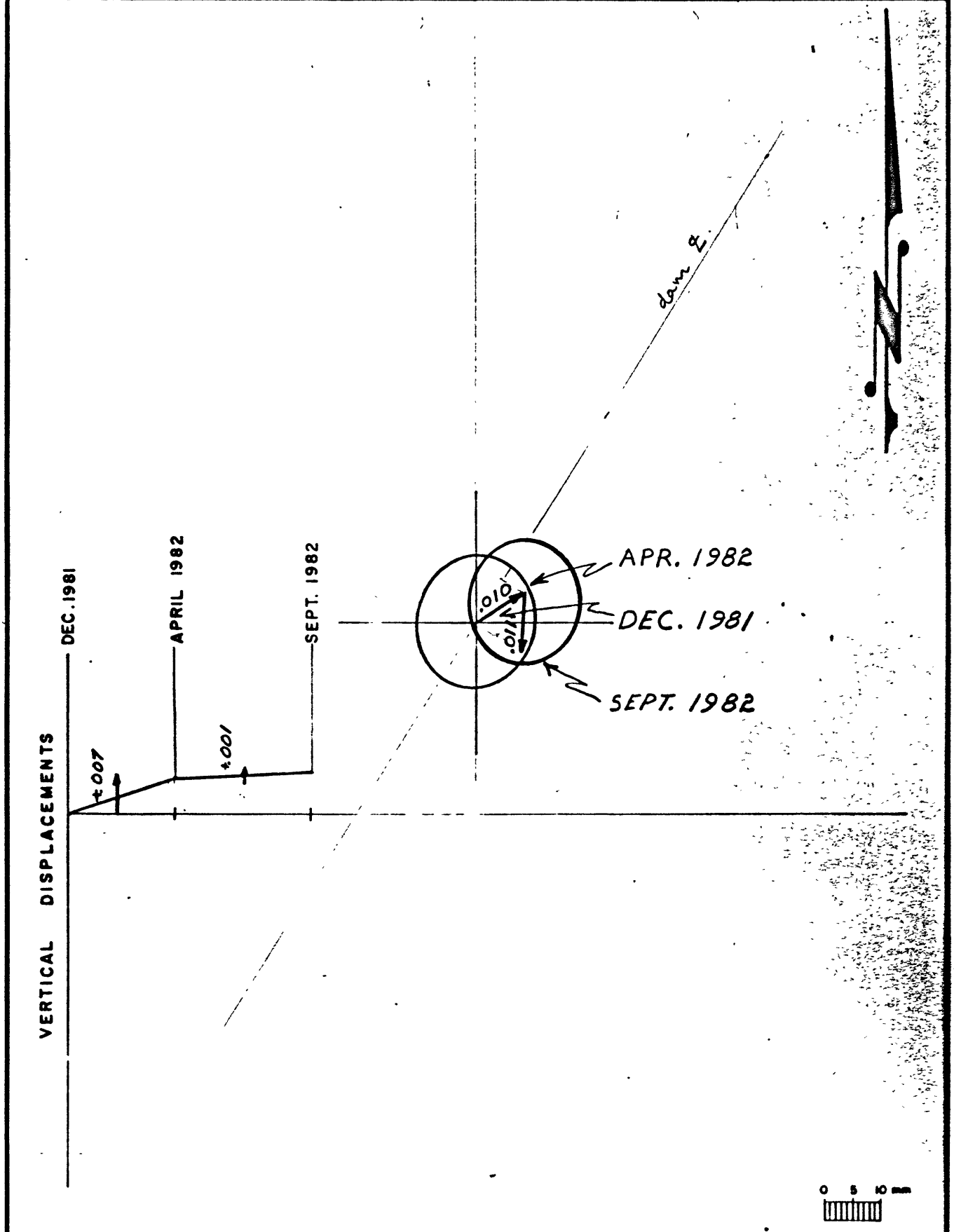
Settlement Scale 1:2
Settlements calculated from Dec'81
—— V,H hubs April'82
- - - V,H hubs Sept'82.

LEGEND

ID	Intermediate dam instrumentati
V,H	Vertical & Horizontal settlement hu
T	Thermistor string
PP	Pneumatic Piezometer
HP	Hydraulic Piezometer (Standpipe (HP/S - Shallow; HP/D - Deep)
IDP	Intermediate dam construction
IDS	Intermediate dam settlement pl

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

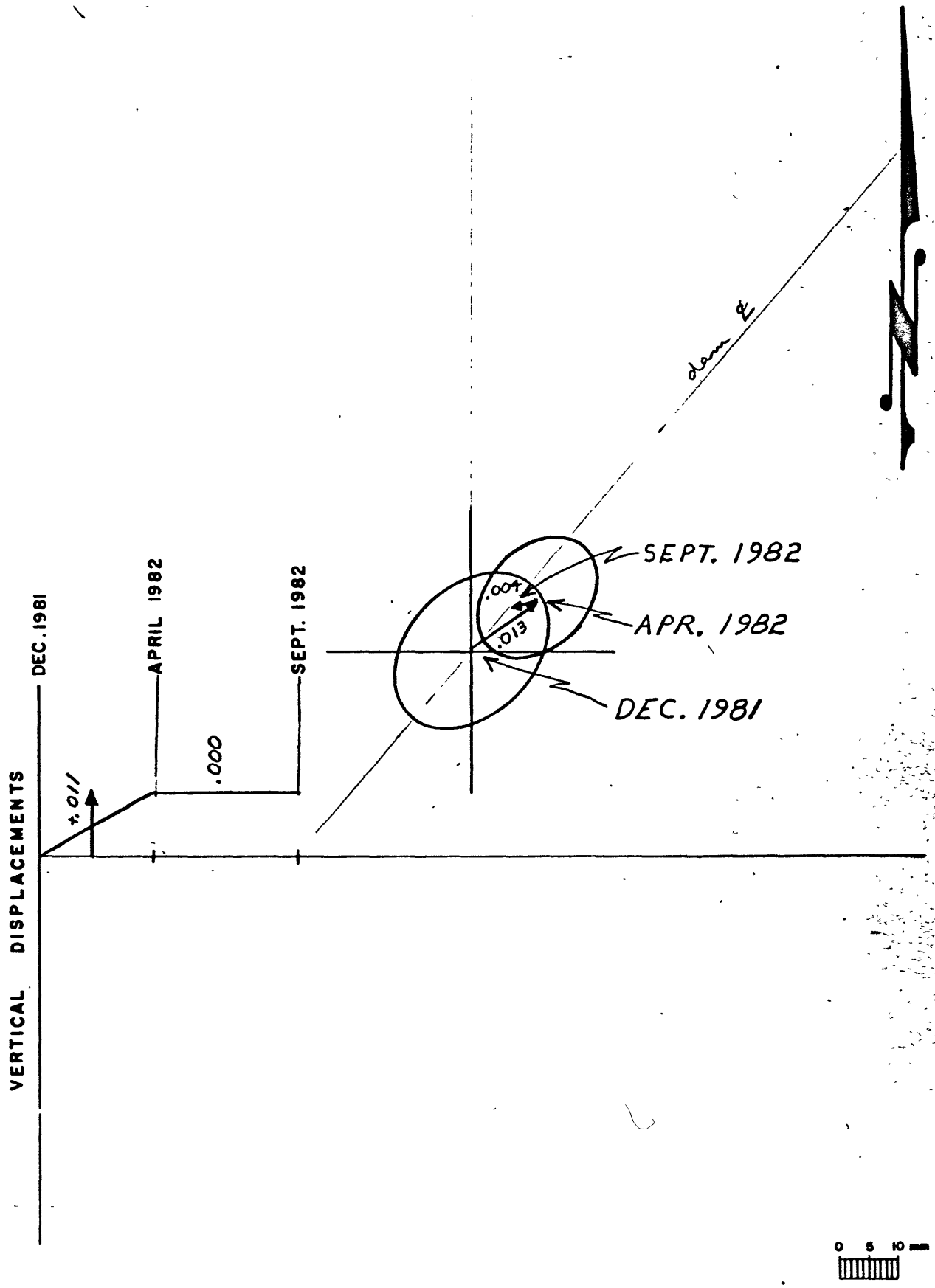
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+250 I.D. - 1	501



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678 SHEET 29 OF 38
	DATE OCT 22, 1982 DRAWING NUMBER 134-3
	SCALE

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

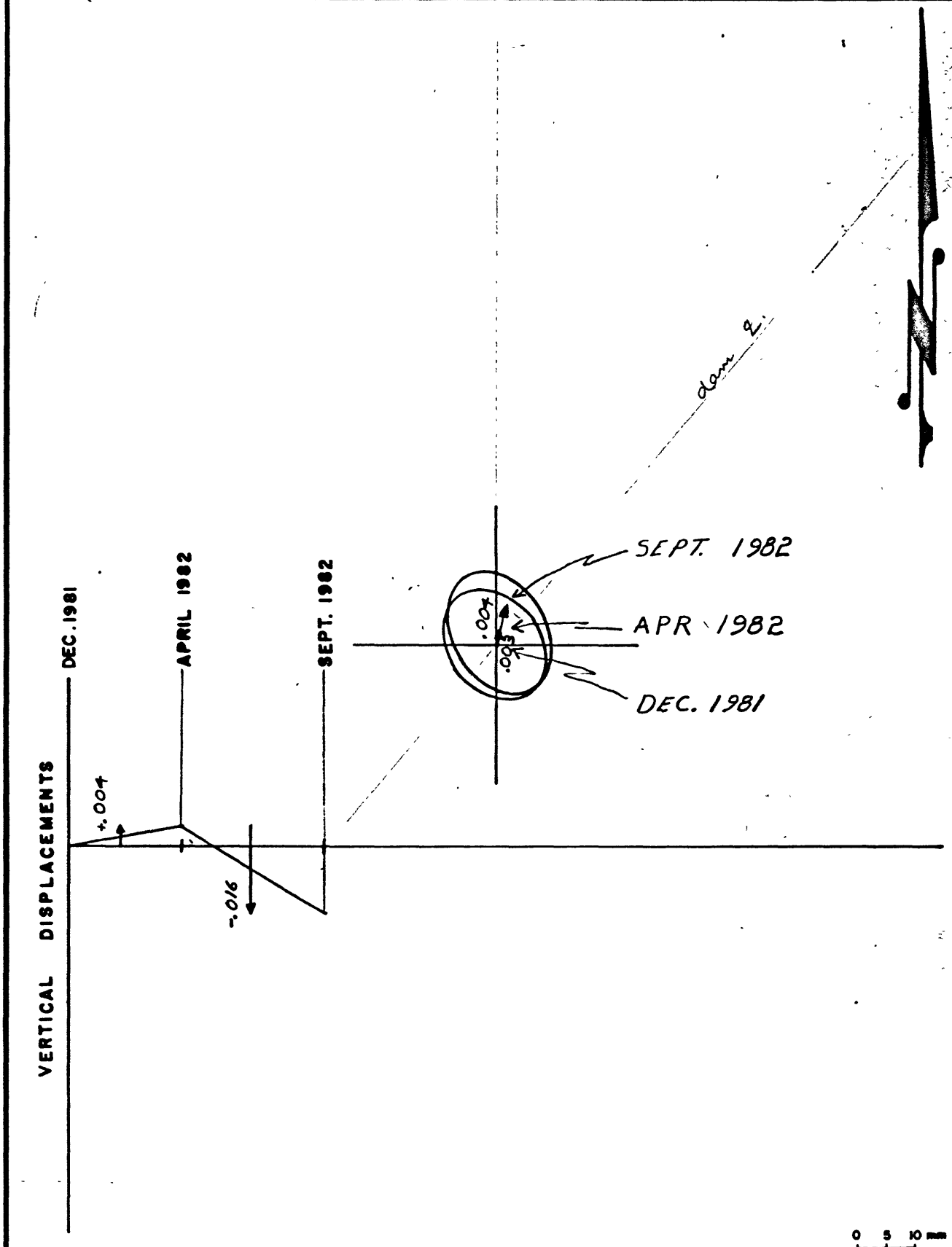
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+450 I.D.-3	412



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678
	DATE OCT 22, 1982
	SCALE 1:1
	SHEET 15 OF 38
	DRAWING NUMBER 134-3

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

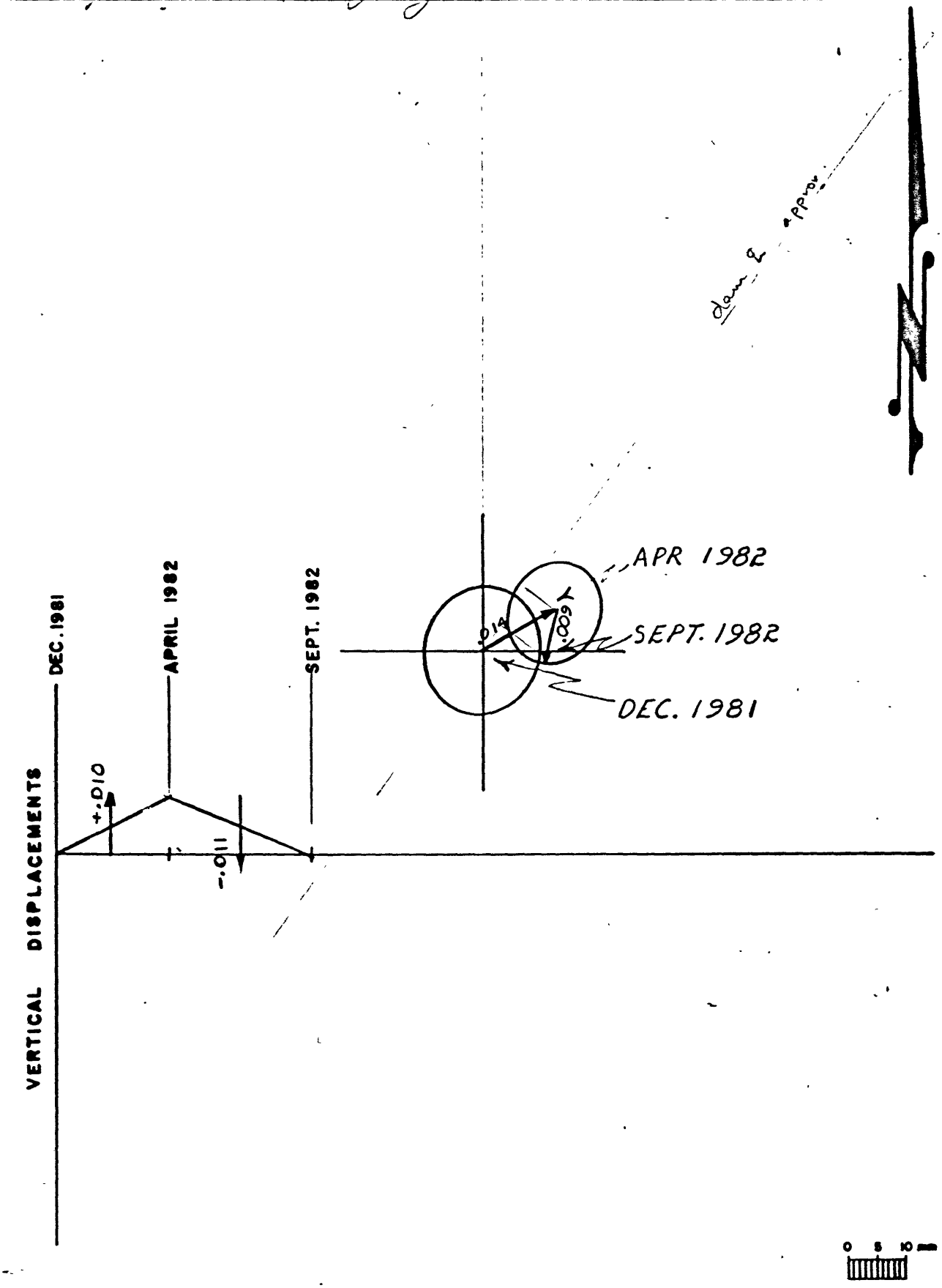
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+627 I.D. - 5	413



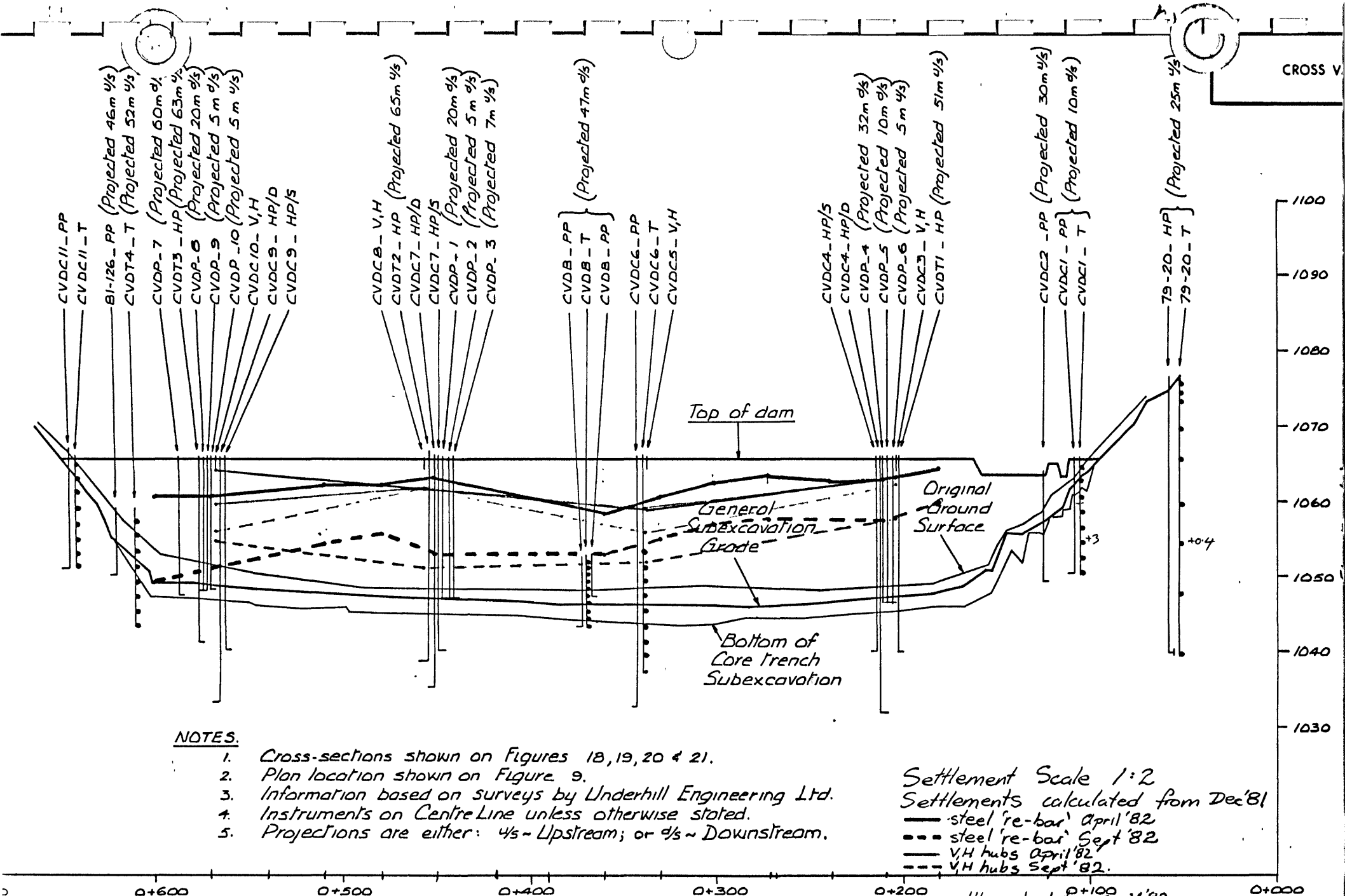
CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 16 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER (extra point on I.D. for sighting)	SURVEY STATION NUMBER 814



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 38A OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	



NOTES.

1. Cross-sections shown on Figures 18, 19, 20 & 21.
2. Plan location shown on Figure 9.
3. Information based on surveys by Underhill Engineering Ltd.
4. Instruments on Centre Line unless otherwise stated.
5. Projections are either: u/s ~ Upstream; or d/s ~ Downstream.

Oct 8 Settlement of Settlement plates installed during construction were

CVDS-4 @ 0+567 (SP'D') = 271 mm

CVDS-3 @ 0+460 (SP'C') = 110mm

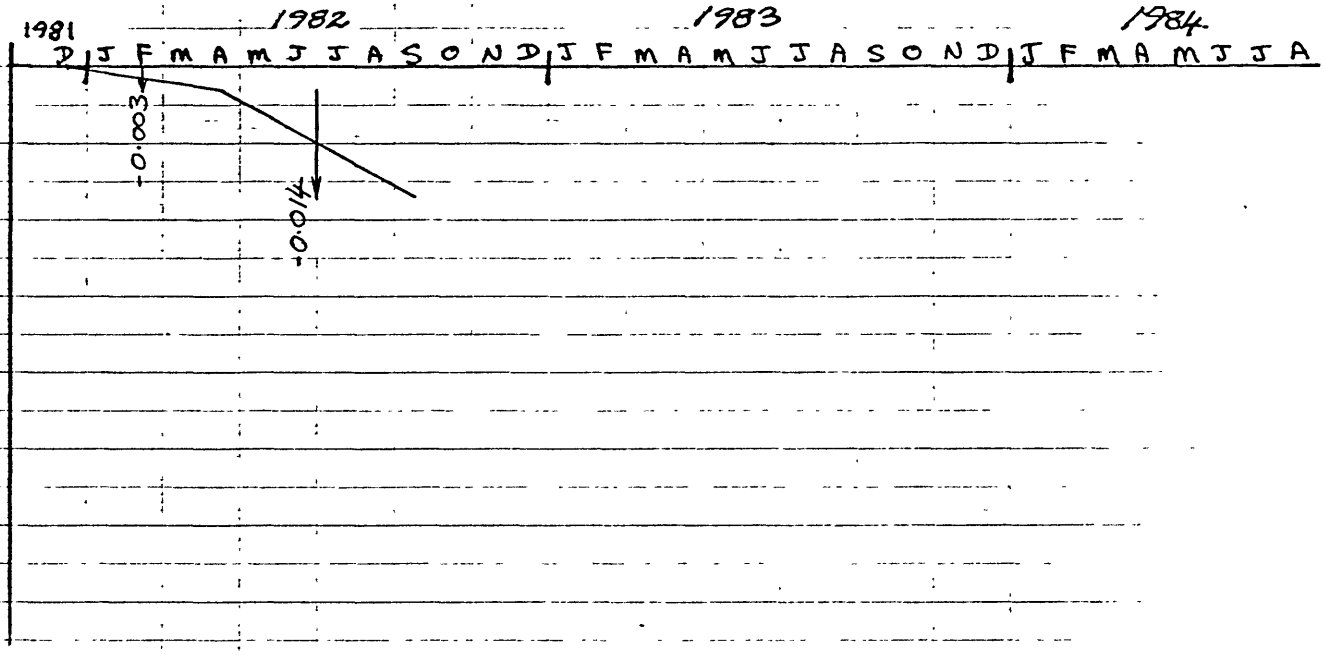
CVDS-2 @ 0+340 (SP'B') = 520 mm

CVDS-1 @ 0+205 (SP'A') = 254mm

SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

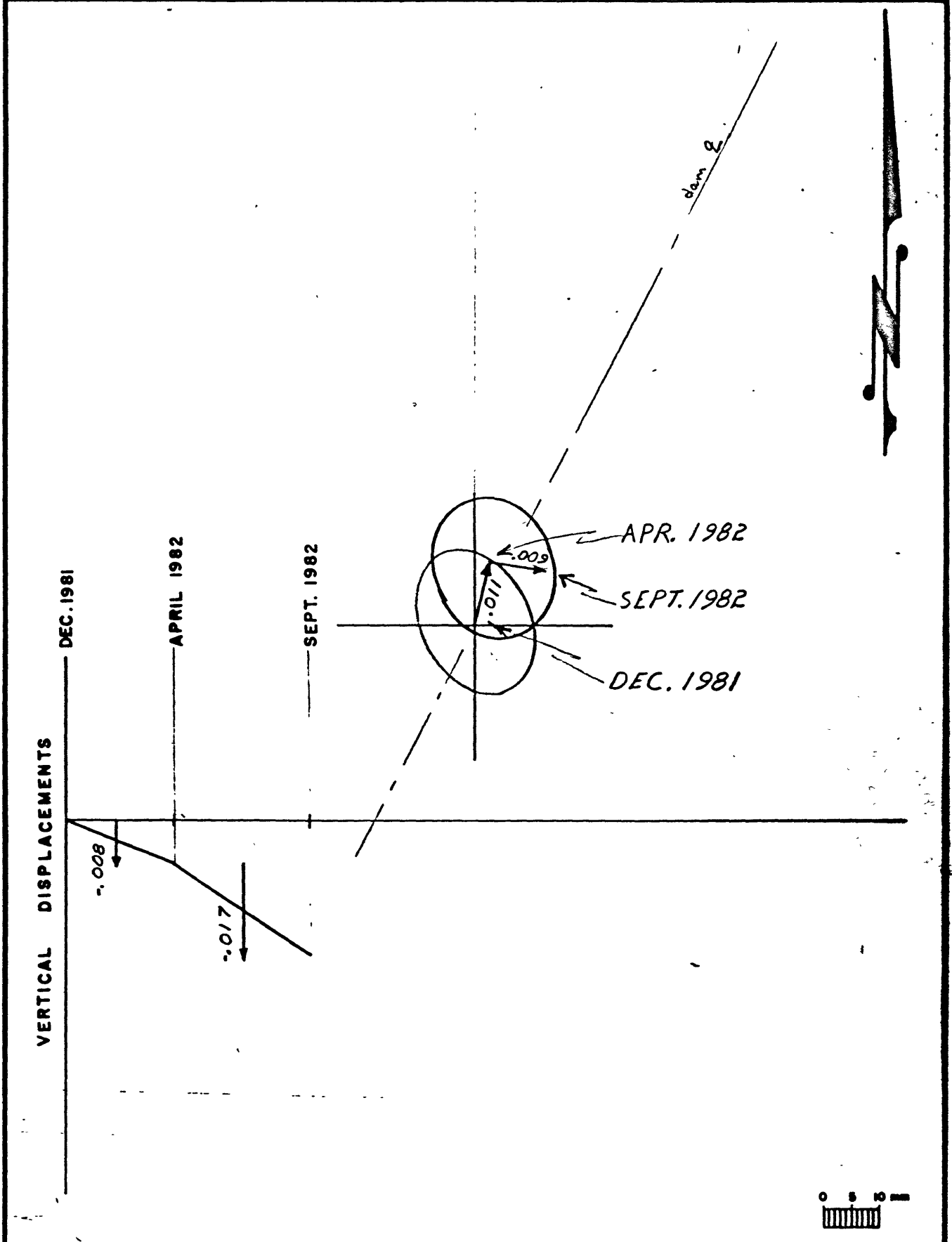
Location : 0+180
(steel 're-bar')

Displacement Scale 1:1
1cm



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+204 C.V.D.C. - 3	502

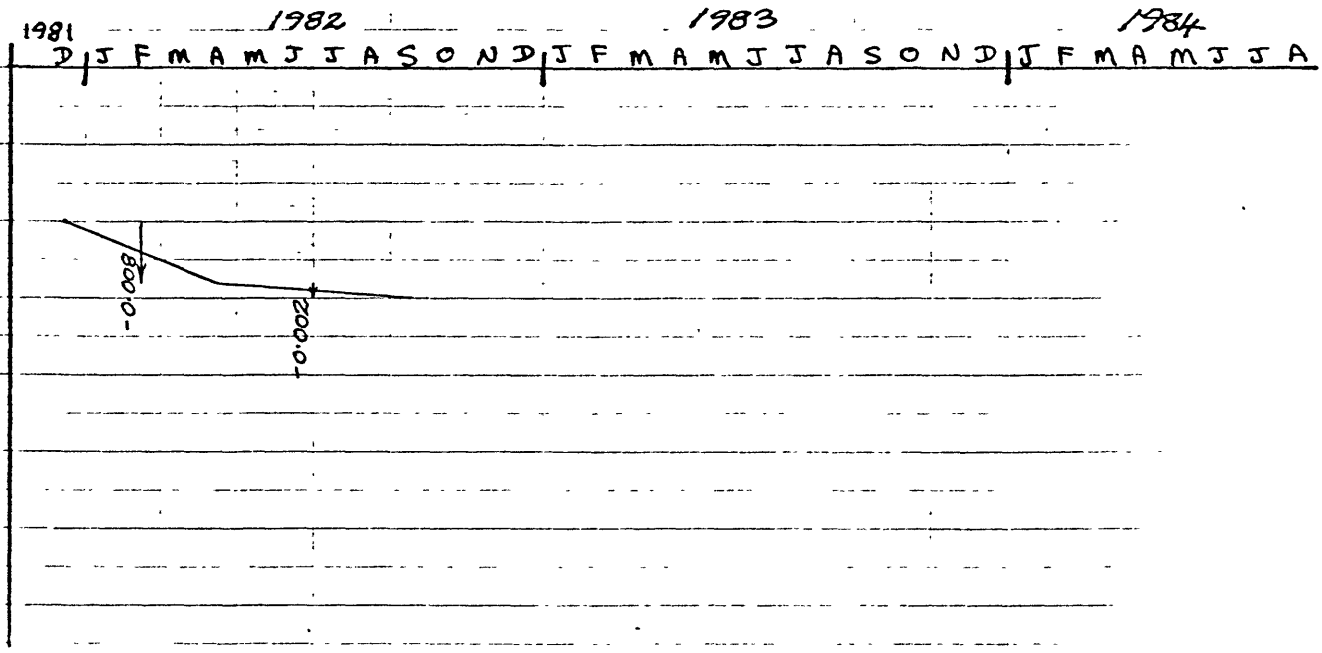


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 30 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : CVDS-1 (SP 'A')
0+205 m

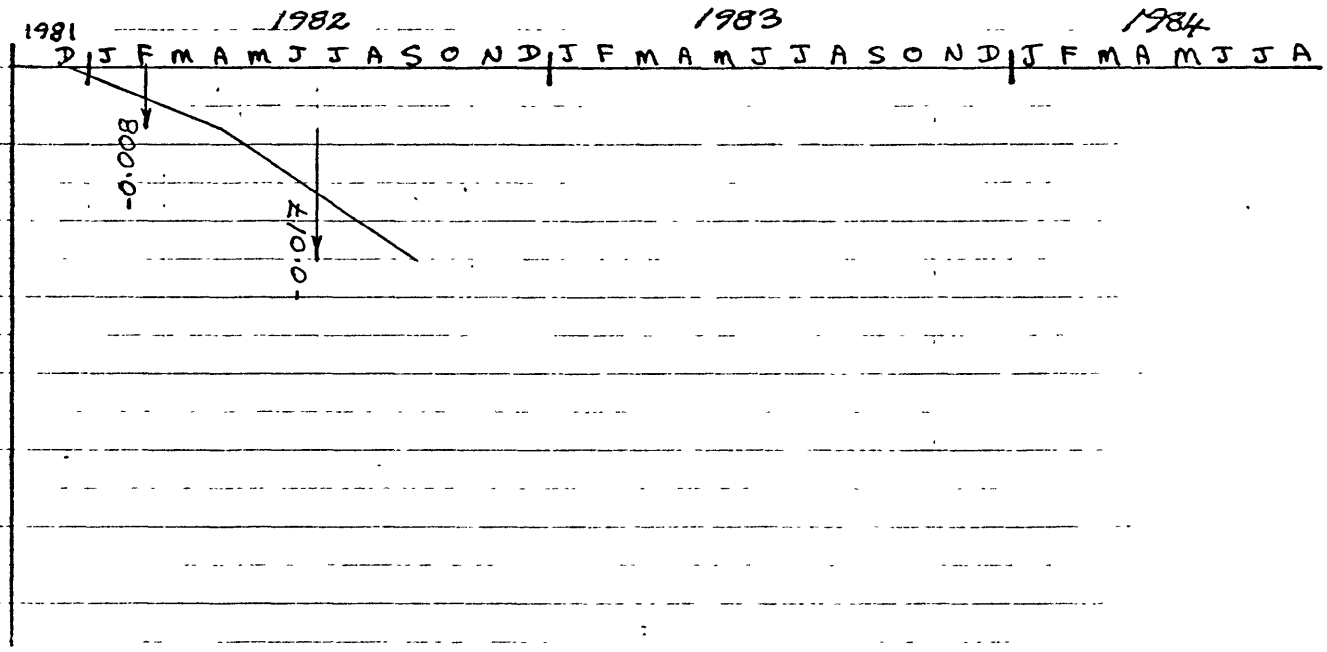
Displacement Scale 1:1
1 cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+210
(steel 're-bar')

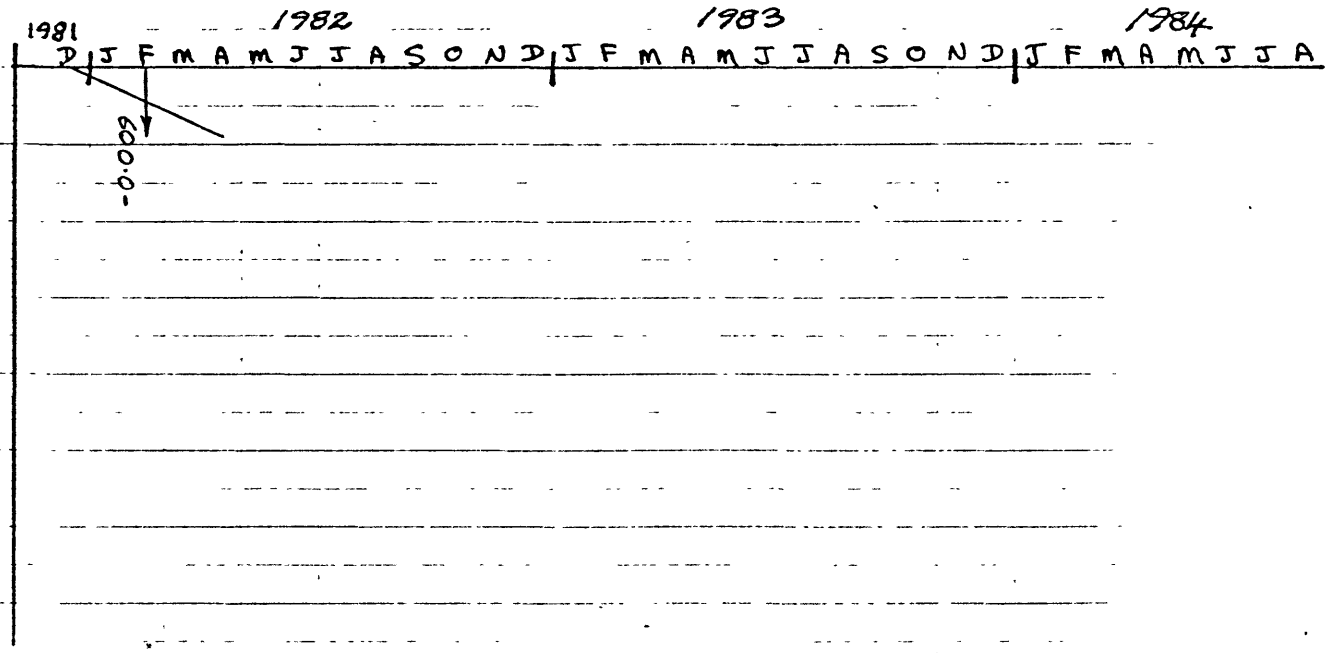
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+240
(steel 're-bar')

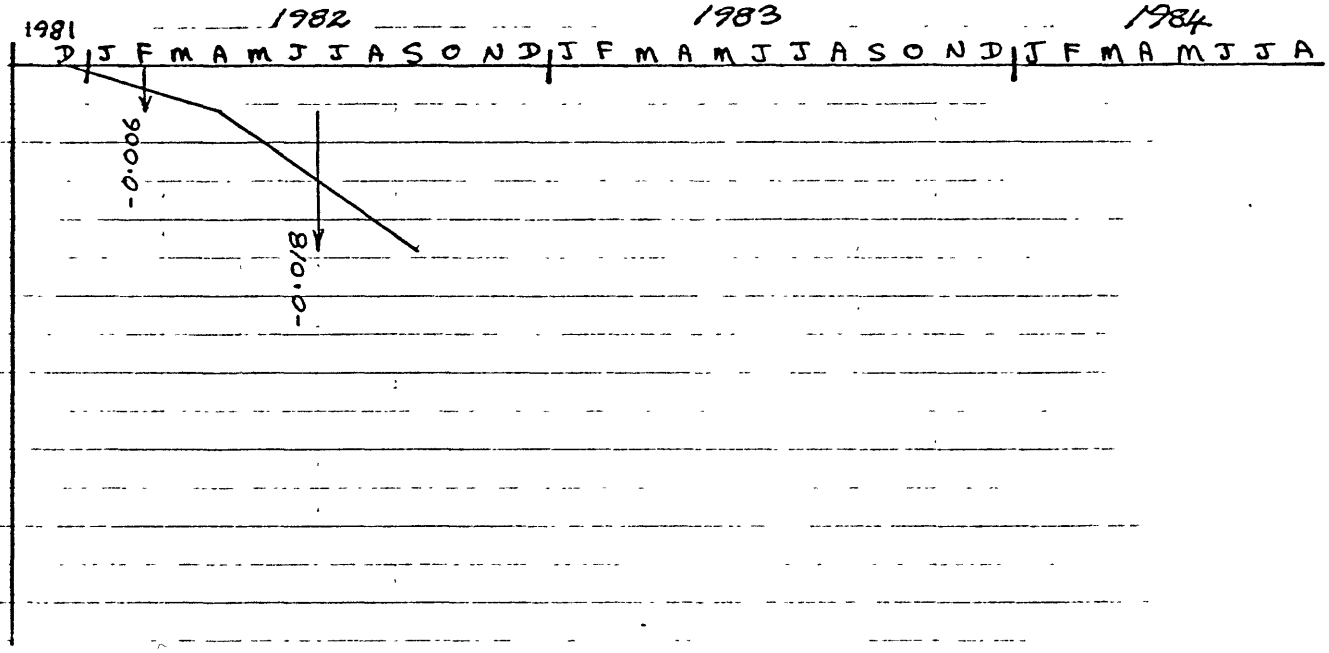
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+270
(steel 're-bar')

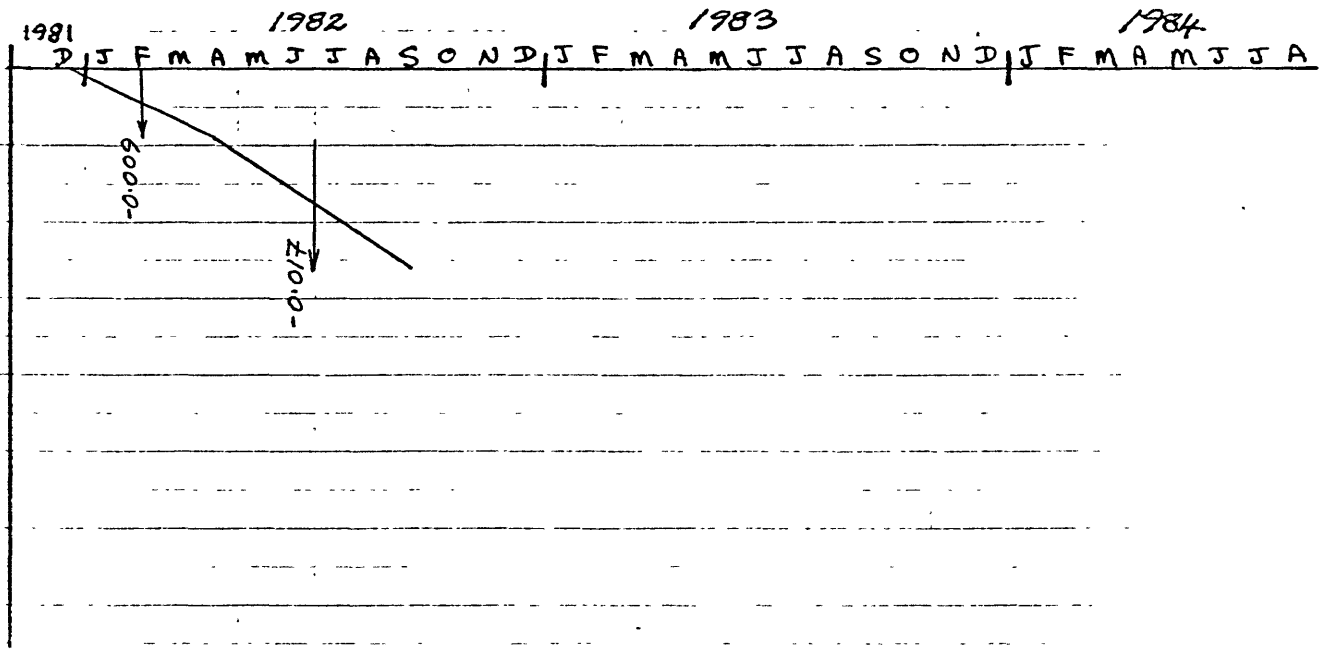
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+300
(steel 're-bar')

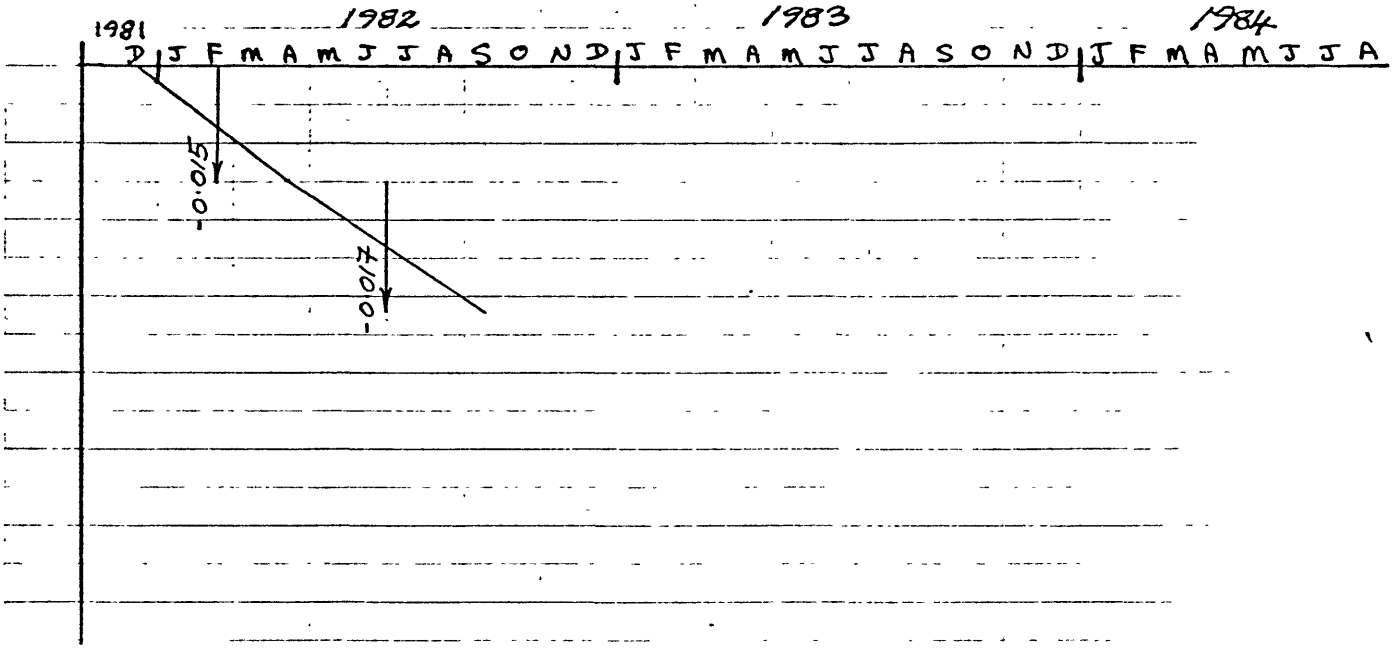
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

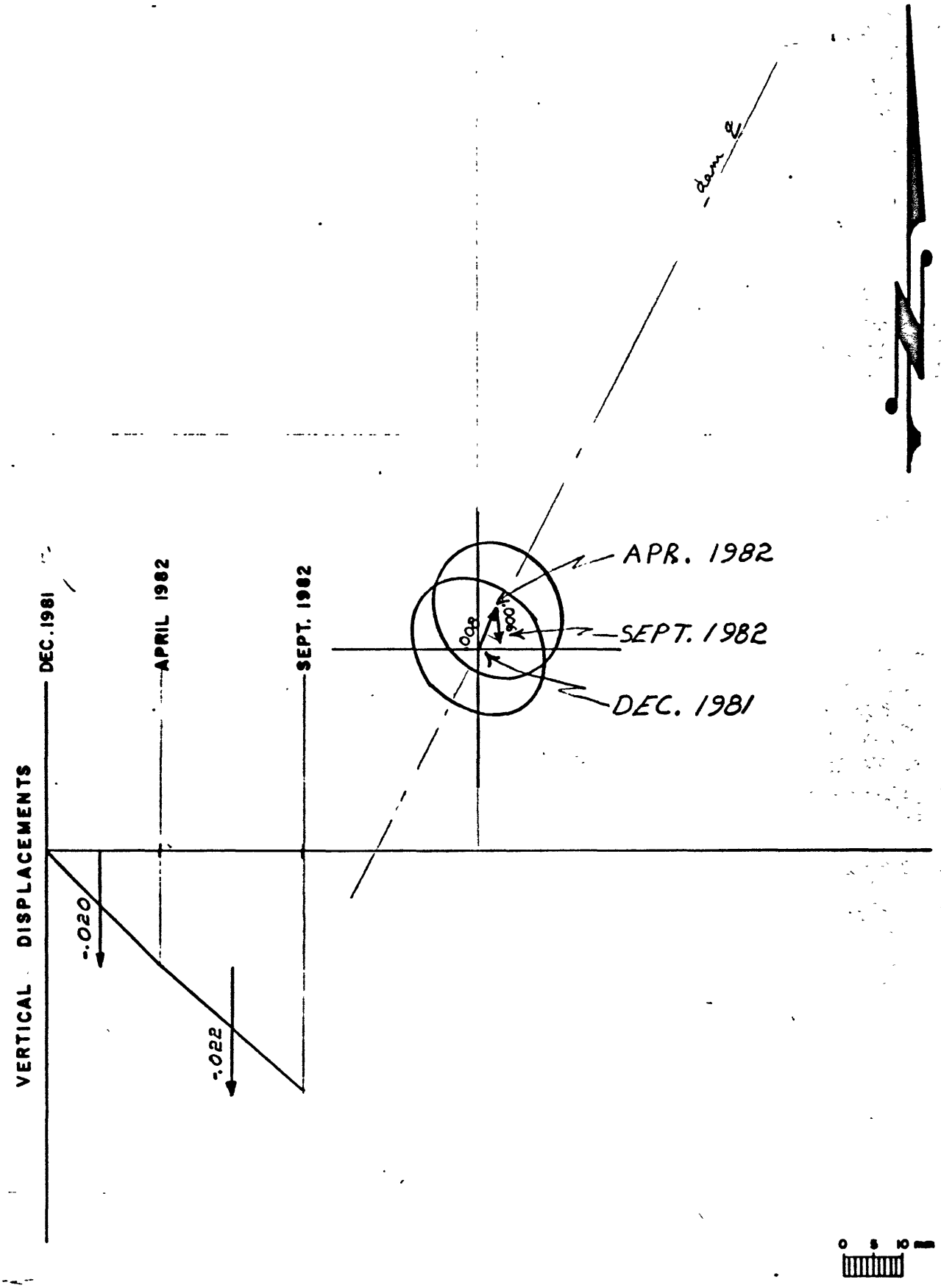
Location : 0+330
(steel 're-bar')

Displacement Scale 1:1
1cm



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+338 C.V.D.C.-5	415

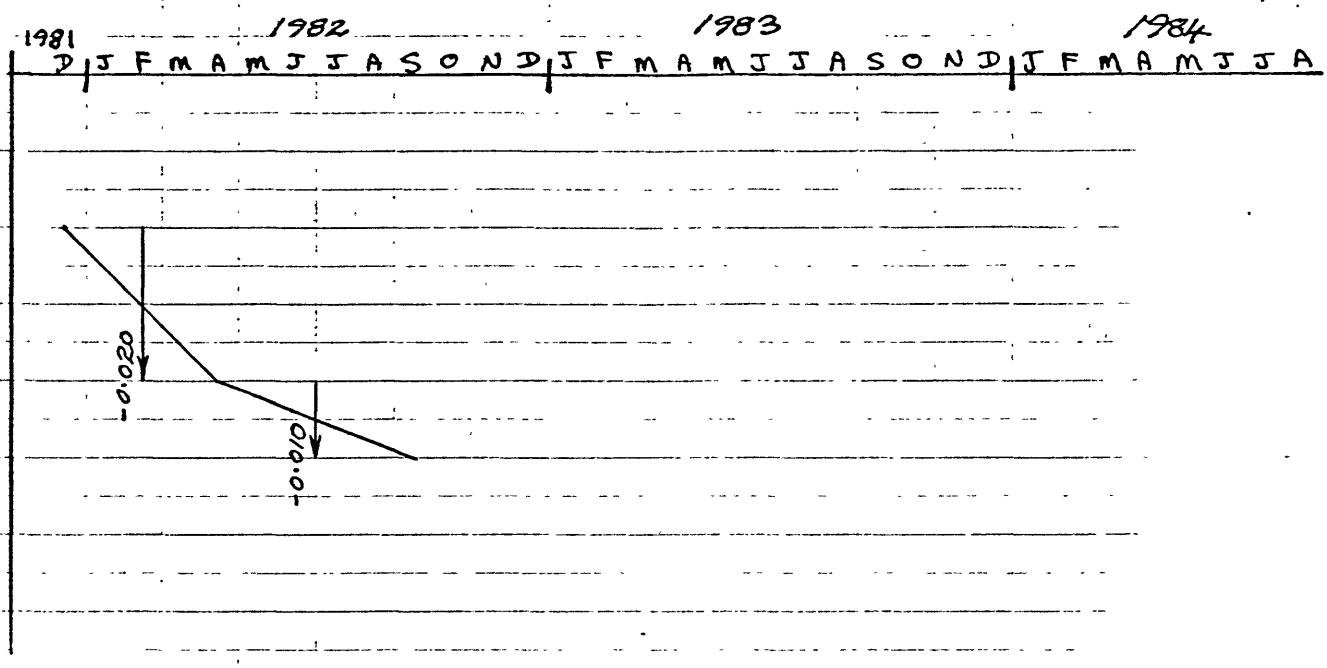


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 18 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : CVDS-2 (SP 'B')
0+341 m

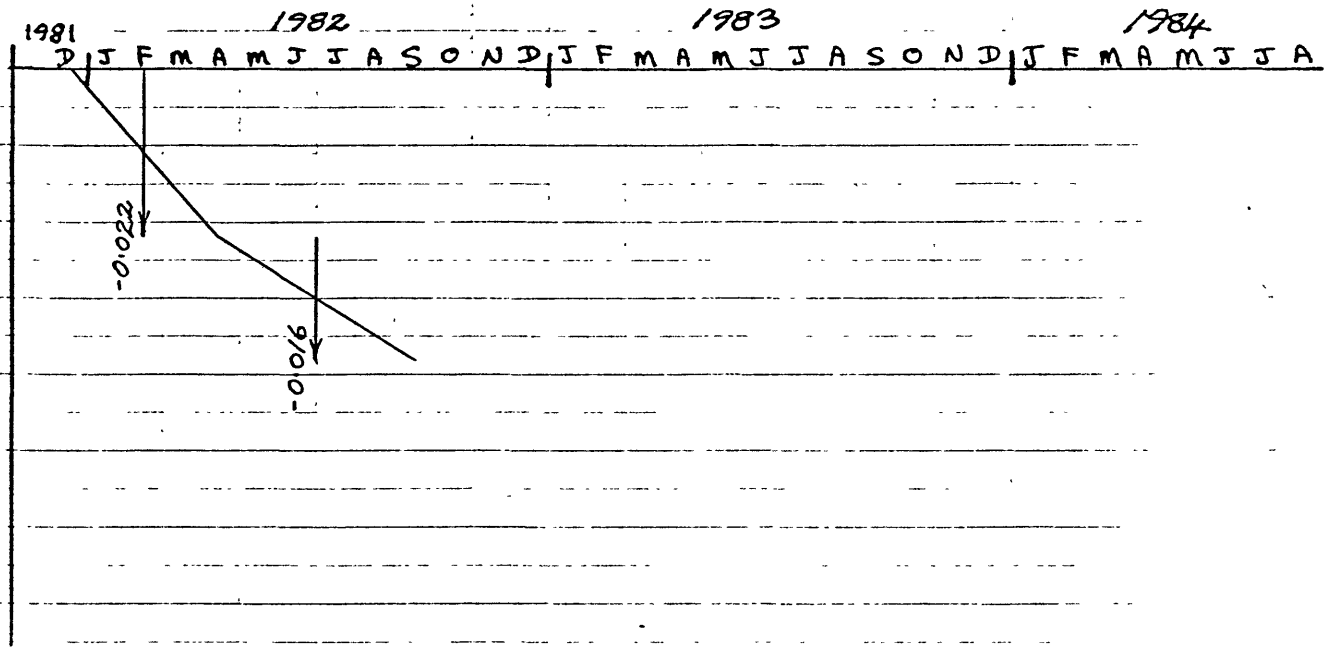
Displacement Scale 1:1
1 cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+360
(steel 're-bar')

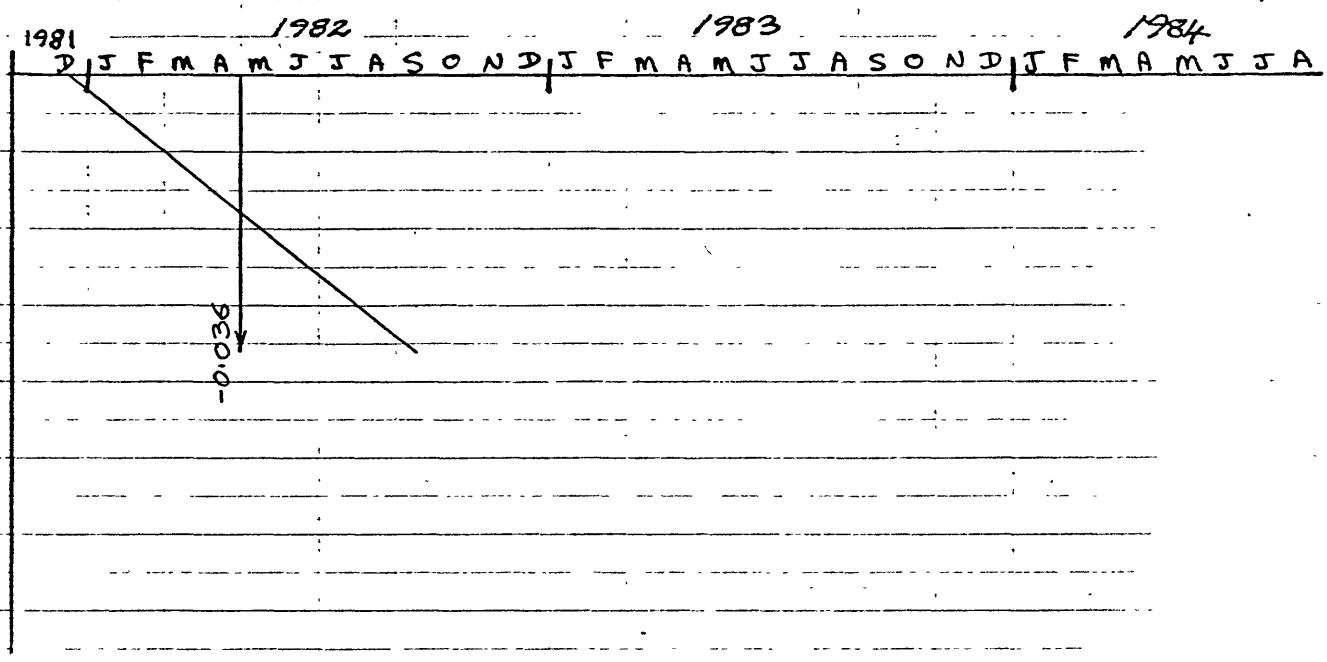
Displacement Scale 1:1
1 cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+390 (bent)
(steel 're-bar')

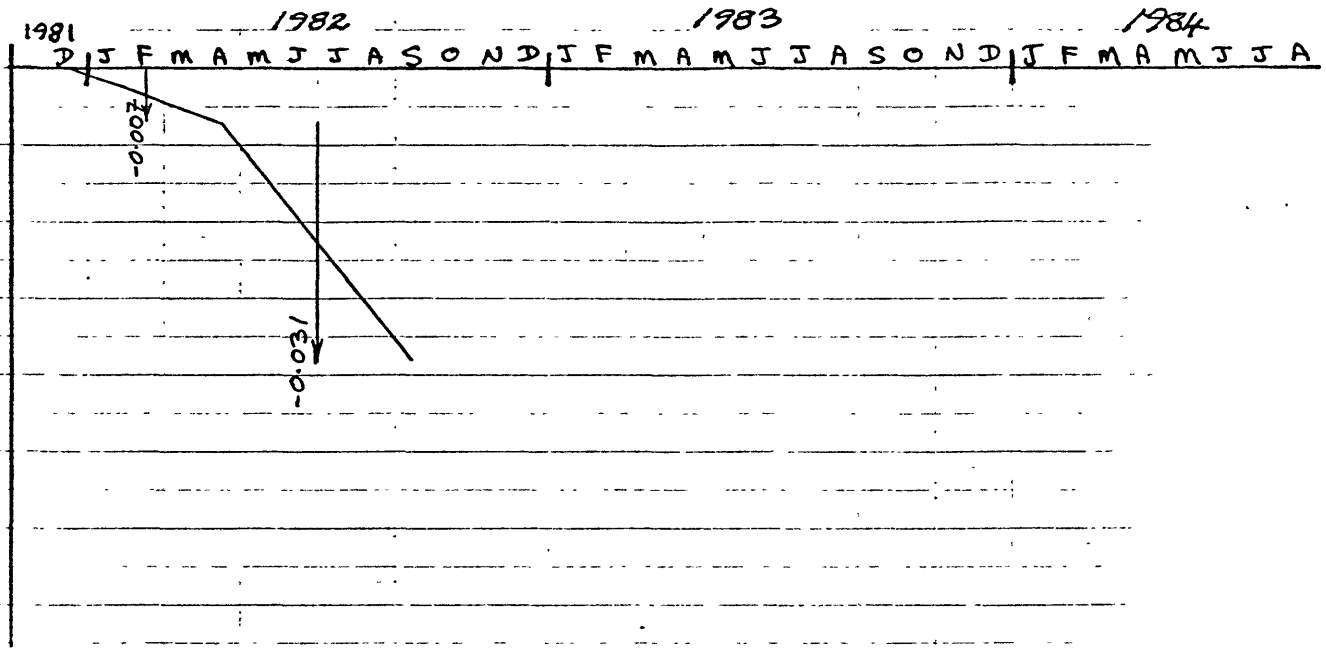
Displacement Scale 1:1
1 cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+450
(steel 're-bar')

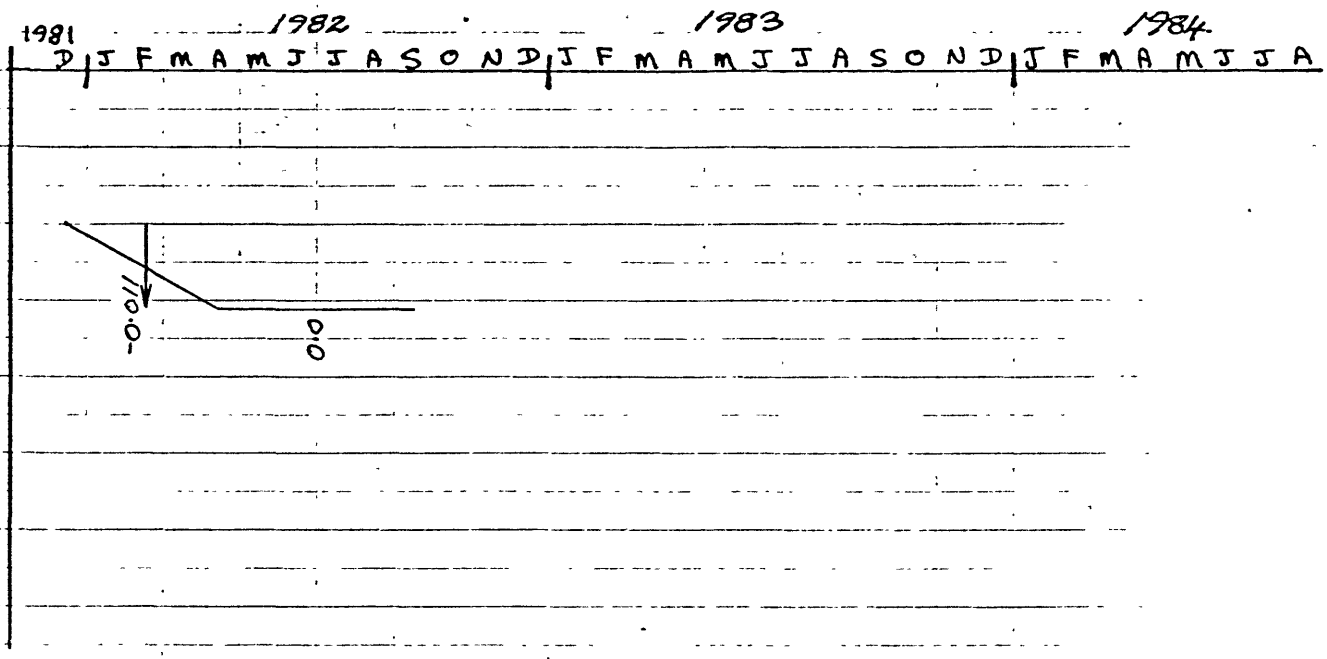
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

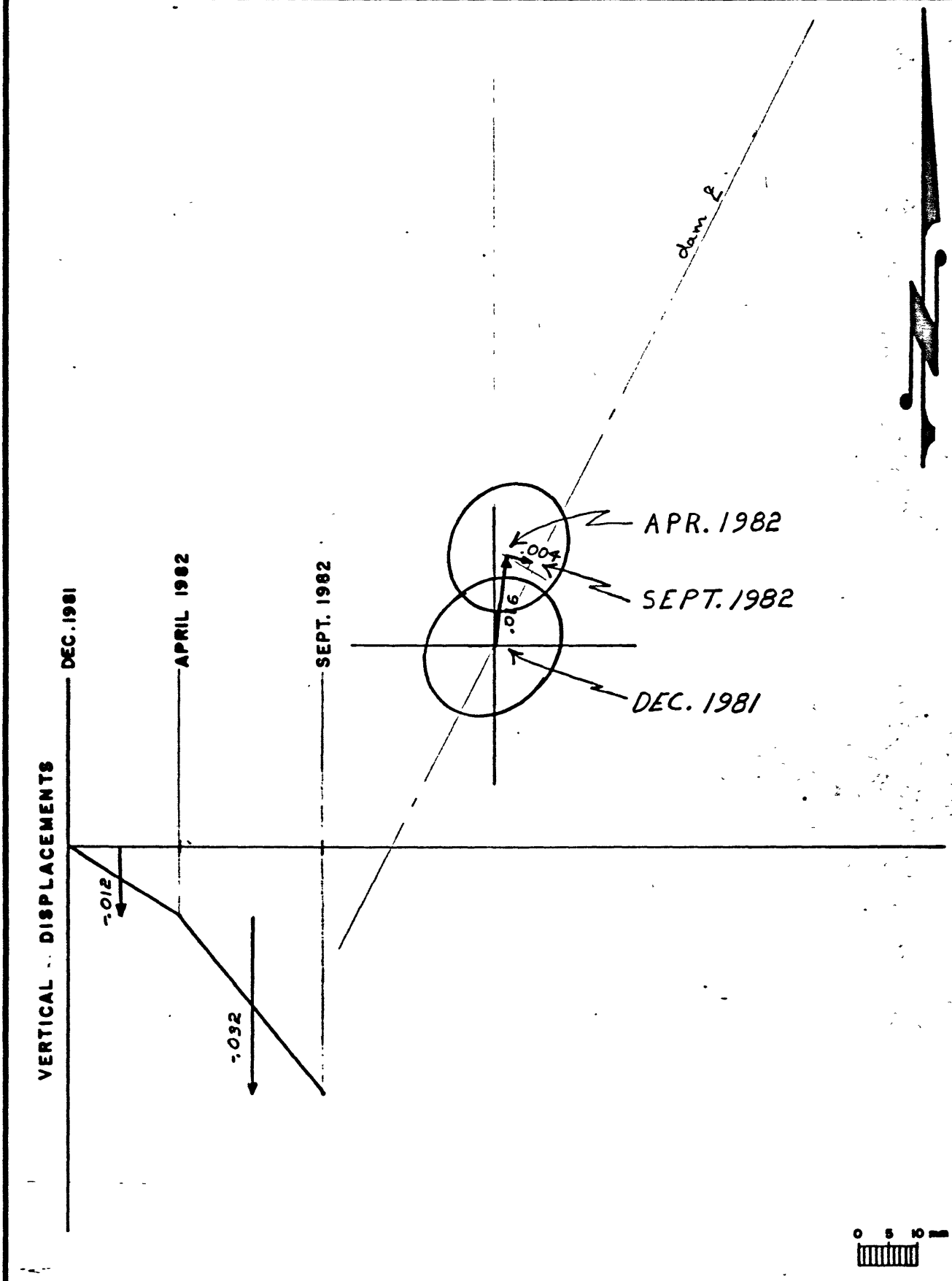
Location : CVDS-3 (SP'C')
0+459

Displacement Scale 1:1
1cm



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+460 C.V.D.C. - 8	416

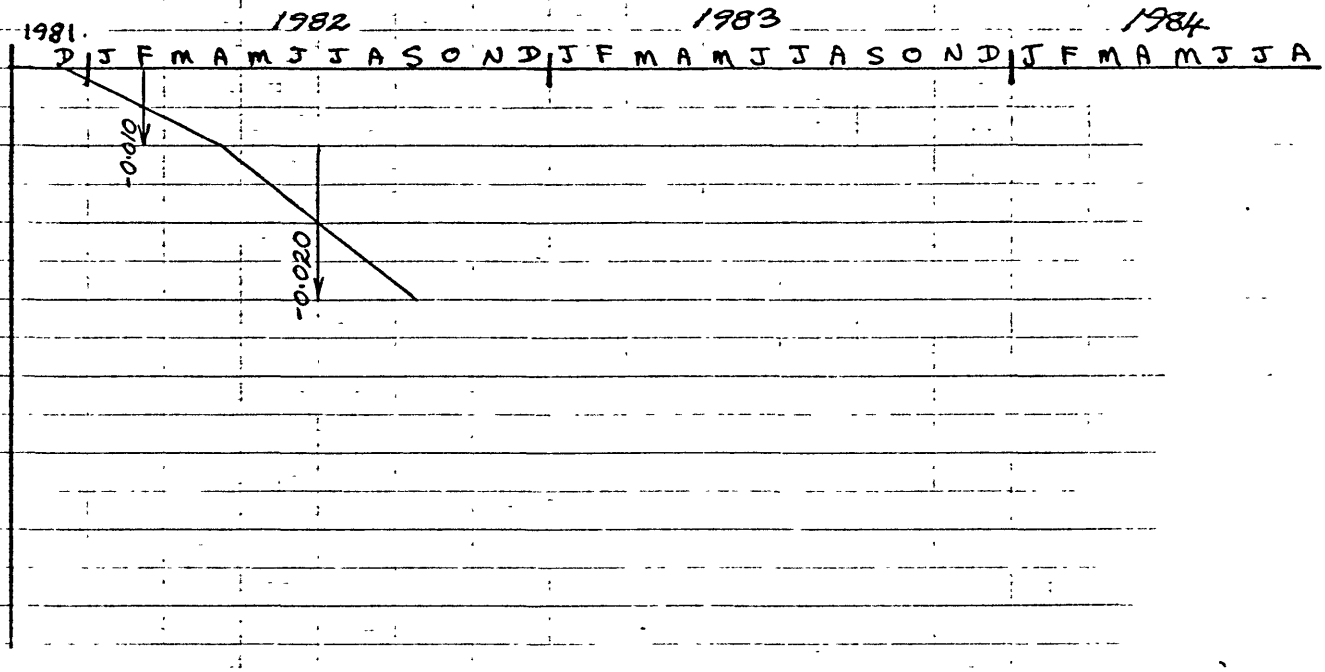


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 19 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+480
(steel 're-bar')

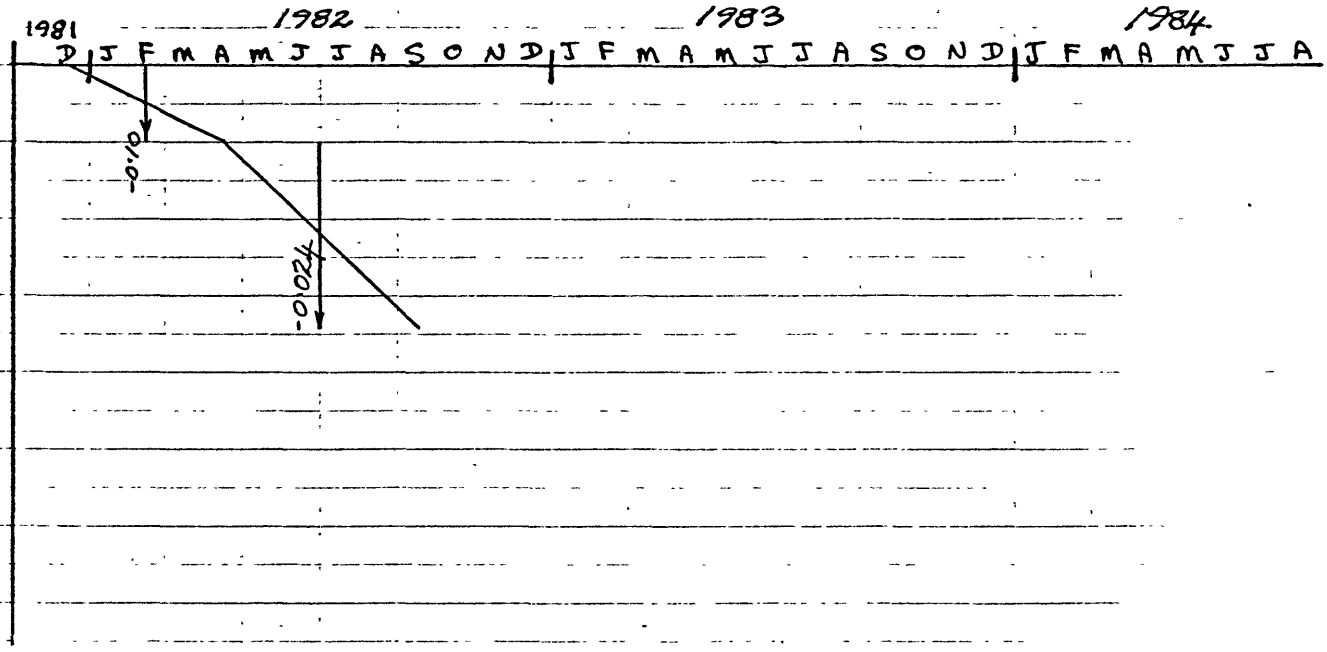
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

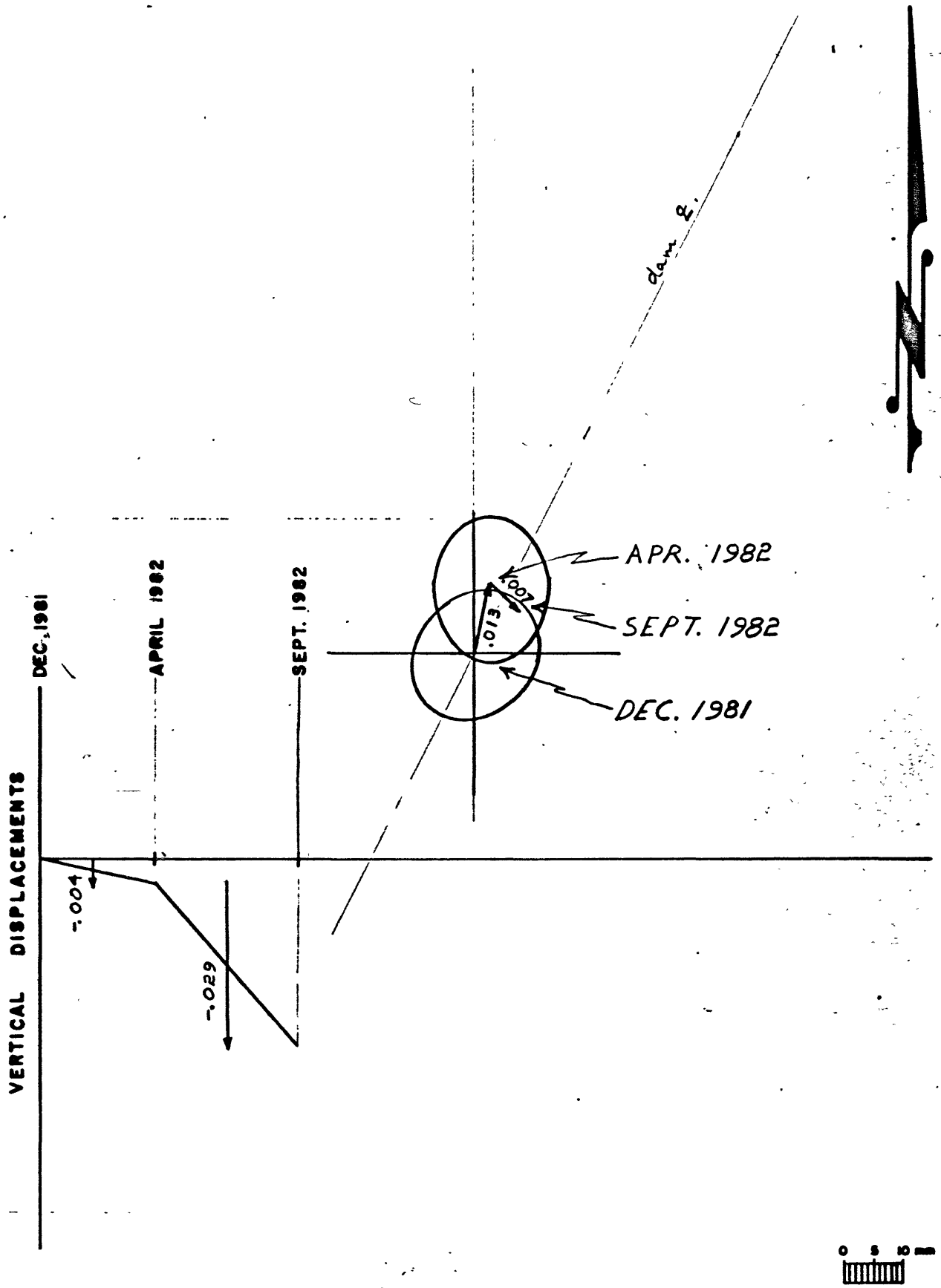
Location : 0+510
(steel 're-bar')

Displacement Scale 1:1
1cm



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+568 C.V.D.C.-10	417

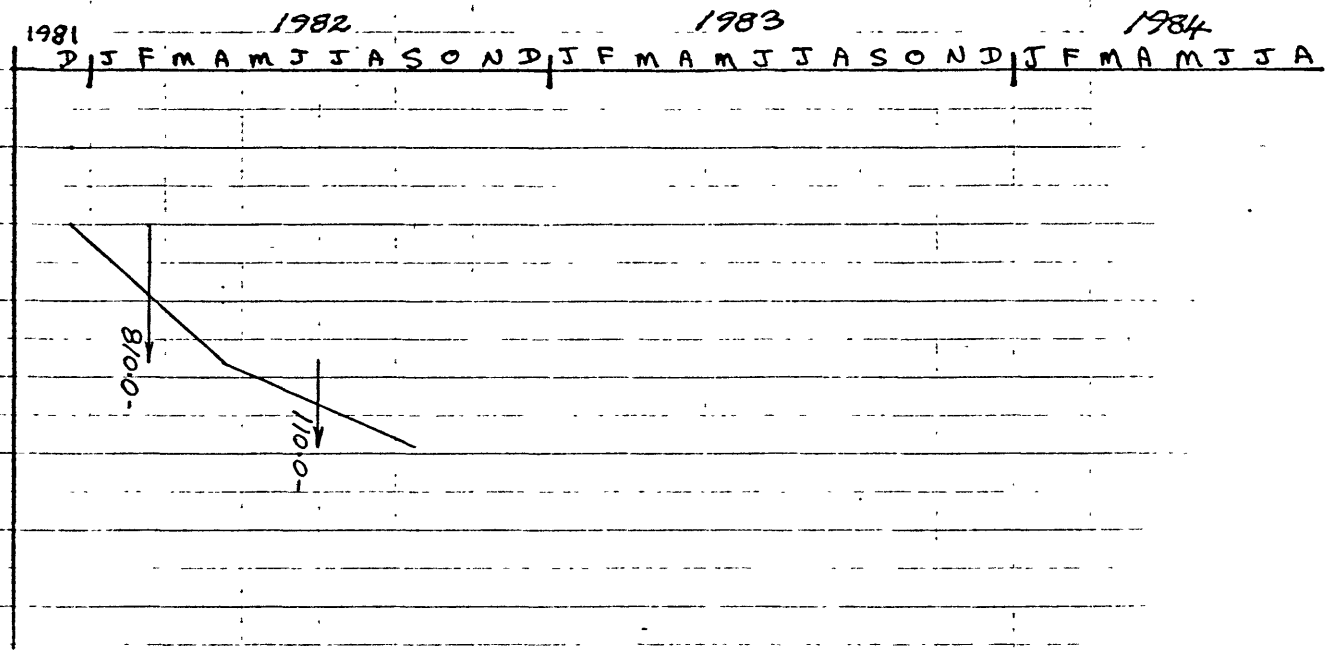


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 20 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : CVDS-4 (SP 'D')
0+567

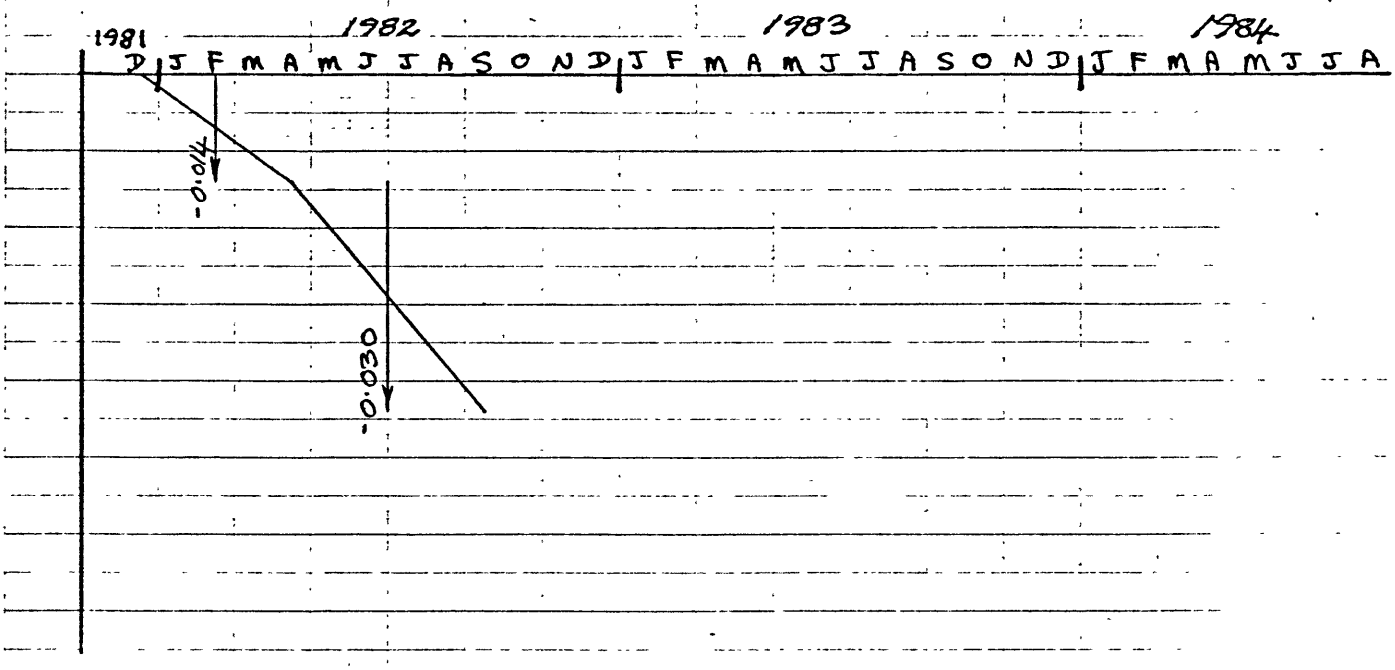
Displacement Scale 1:1
1cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

Location : 0+570
(steel 're-bar')

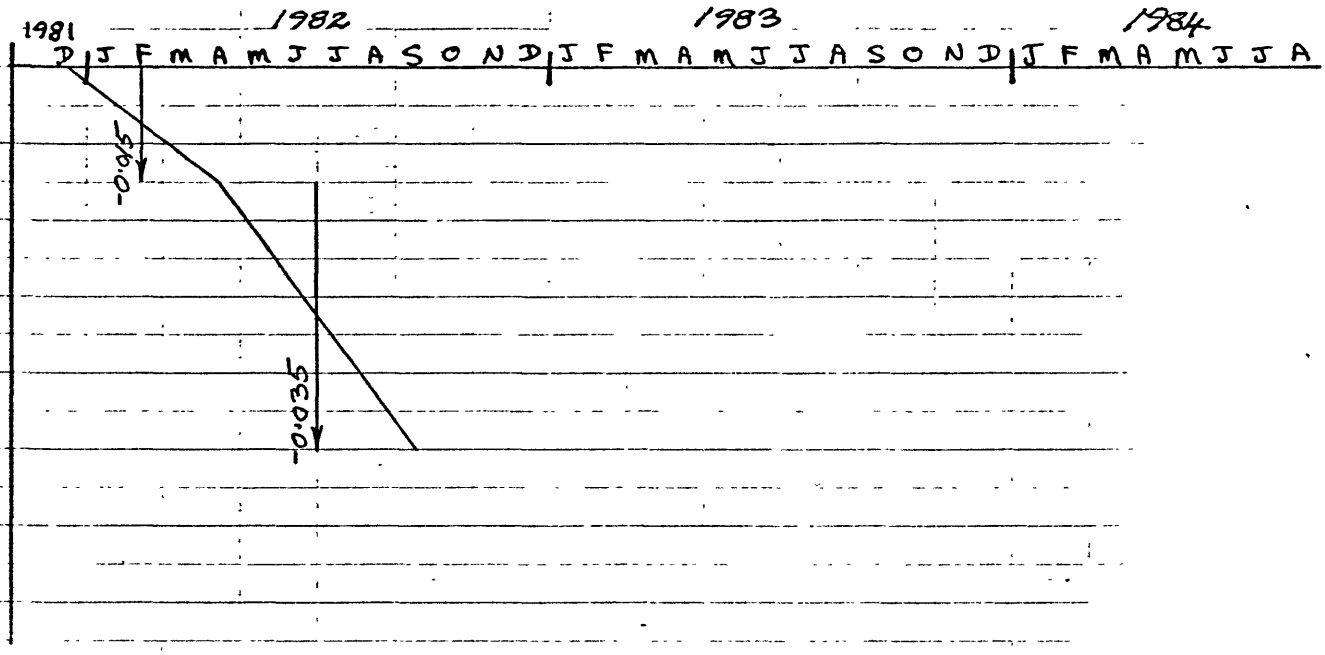
Displacement Scale 1:1
1 cm



SETTLEMENT - TIME PLOTS CROSS VALLEY DAM

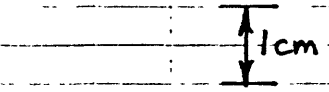
Location : 0+600
(steel 're-bar')

Displacement Scale 1:1
1cm

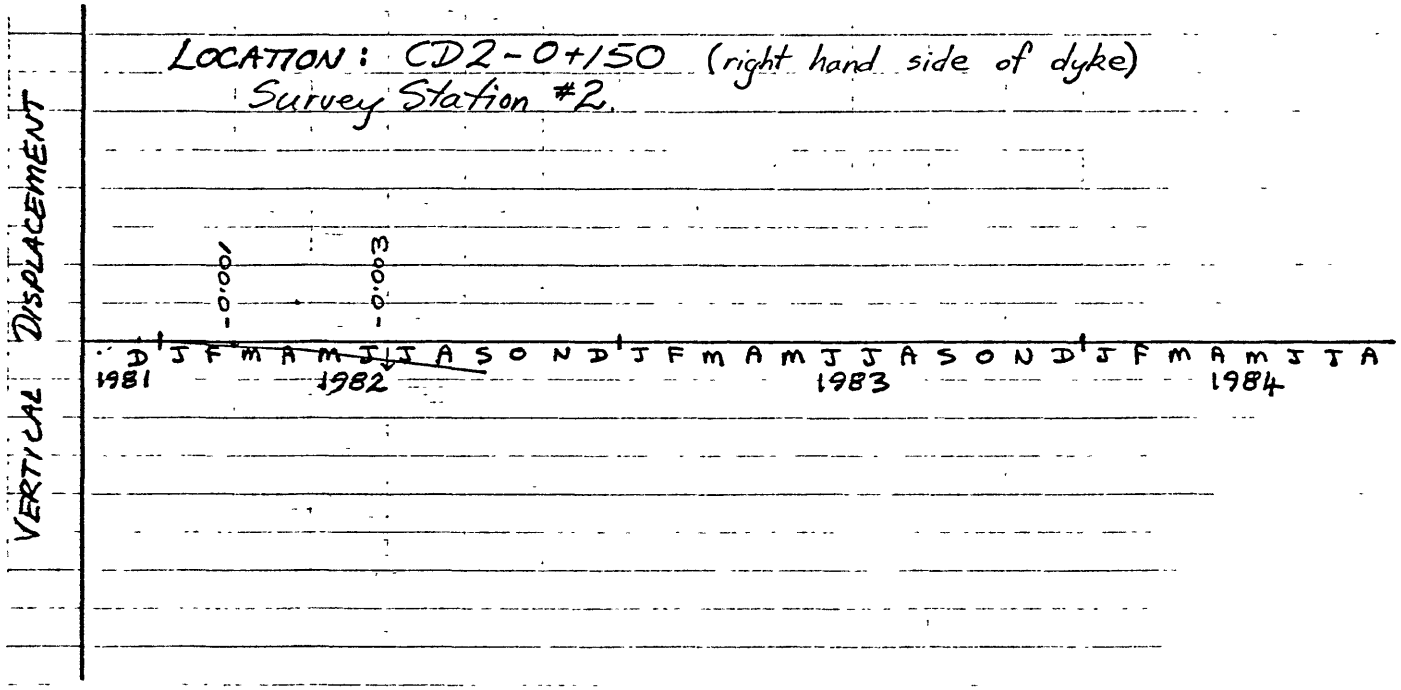


SETTLEMENT - TIME PLOTS

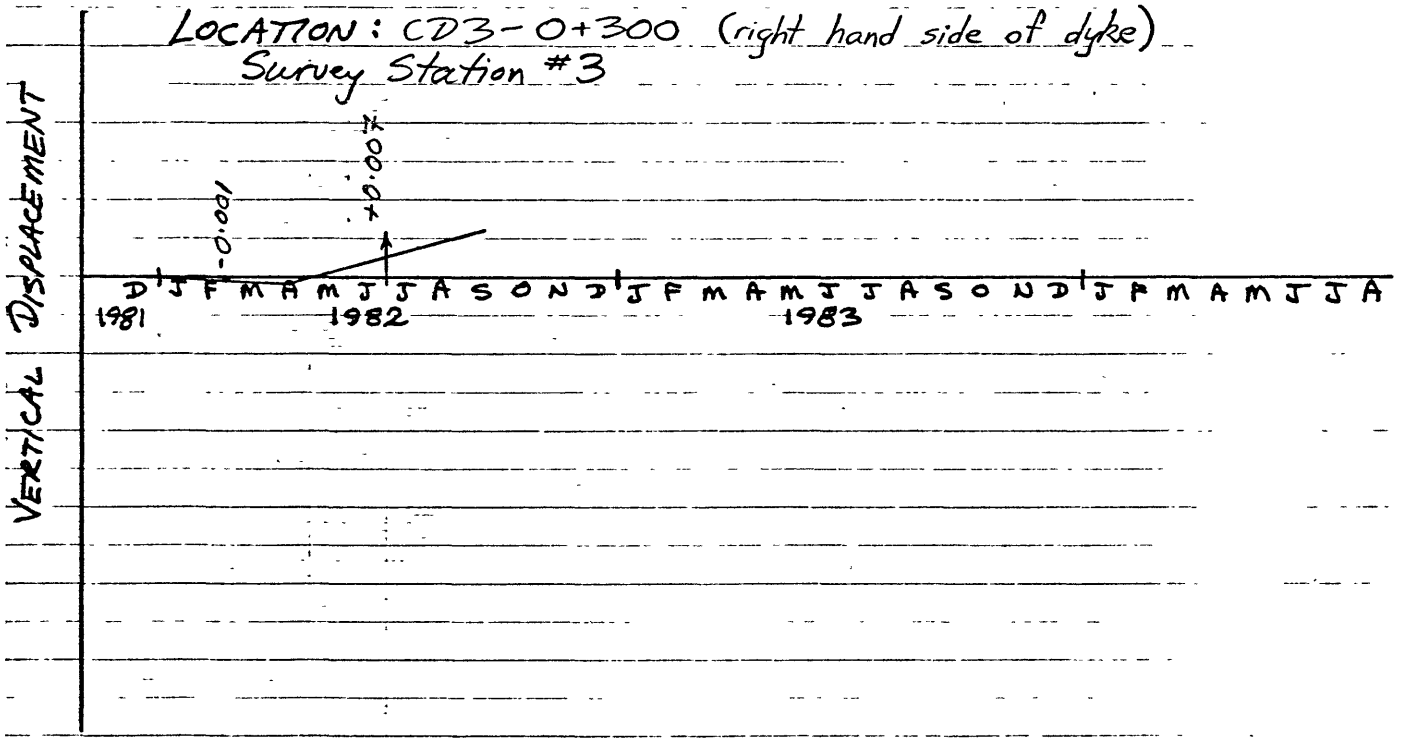
Displacement Scale 1:1



LOCATION: CD2-0+150 (right hand side of dyke)
Survey Station #2

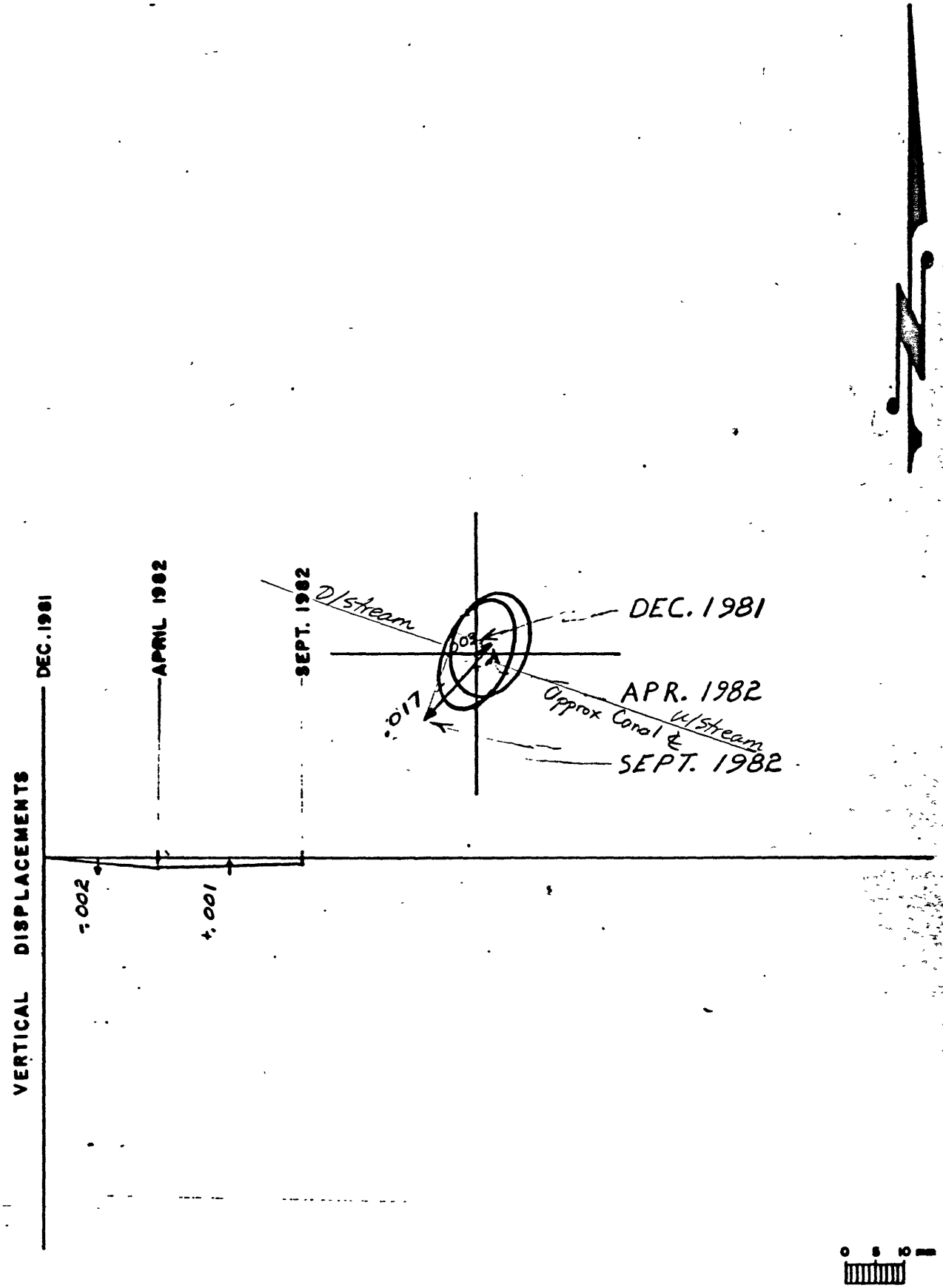


LOCATION: CD3-0+300 (right hand side of dyke)
Survey Station #3



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

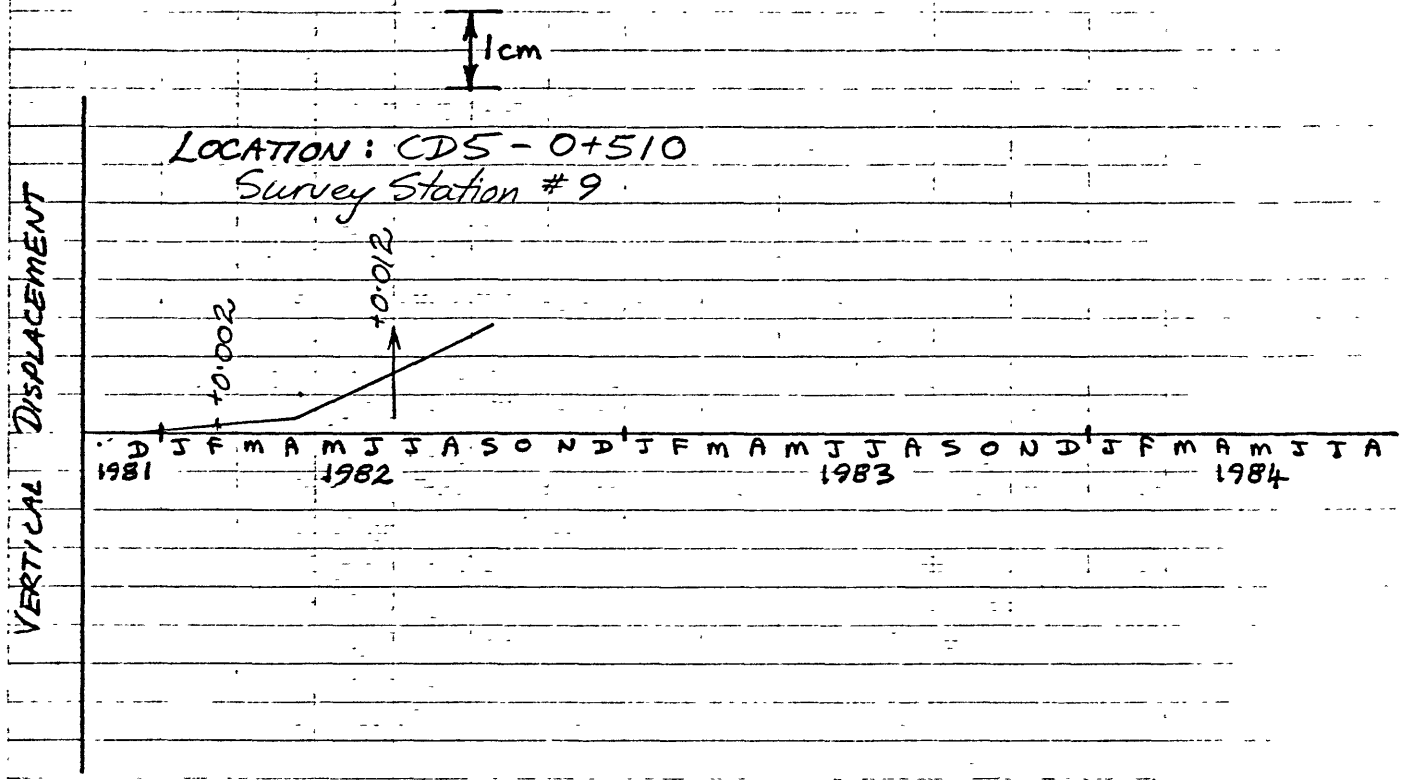
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+400 C.D. -4	550

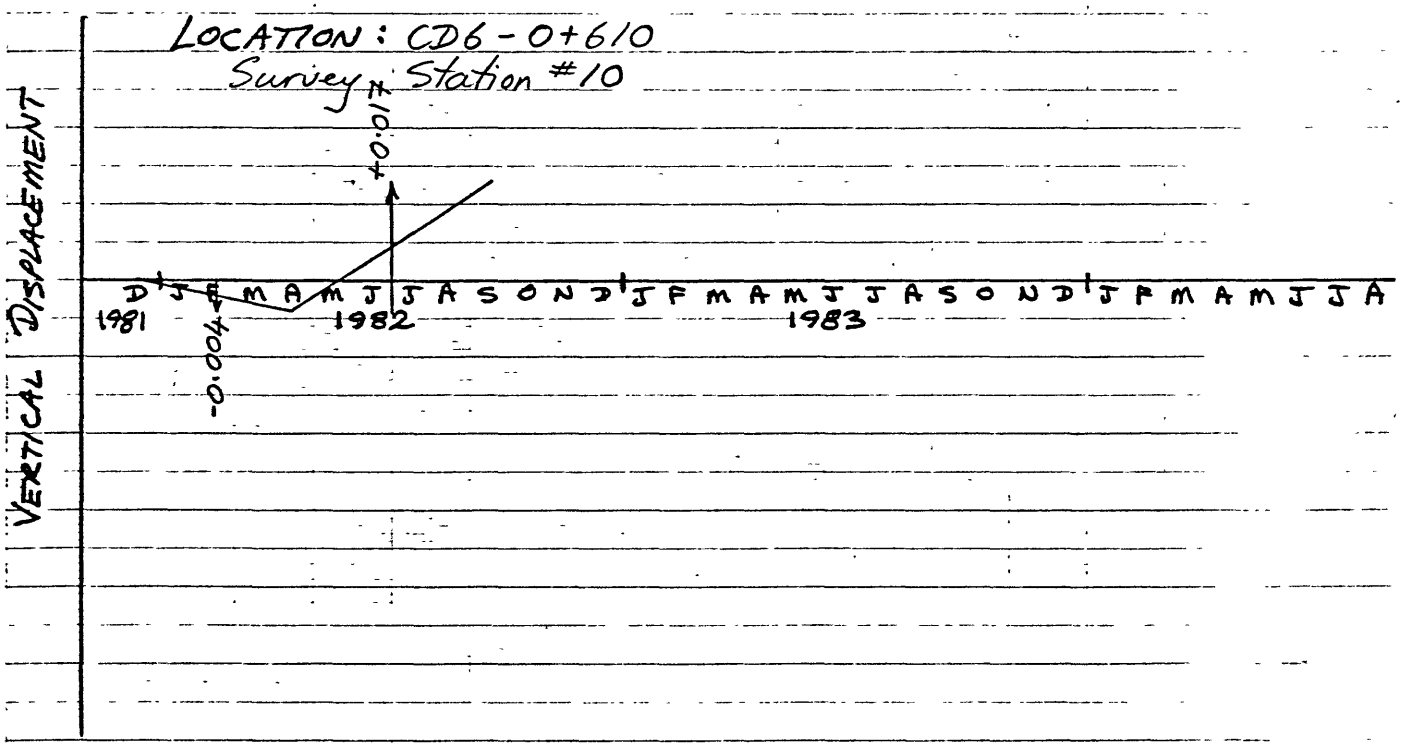


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET # 31 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

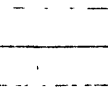
Displacement Scale 1:1



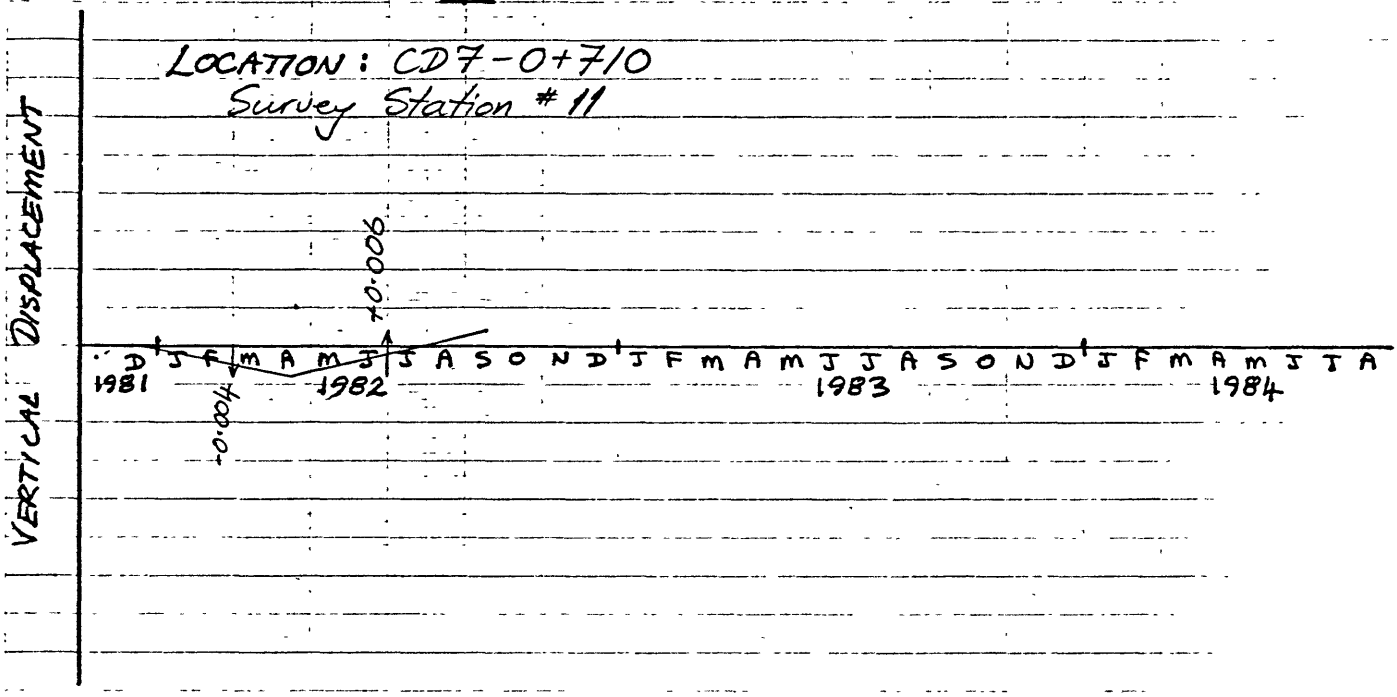


SETTLEMENT - TIME PLOTS

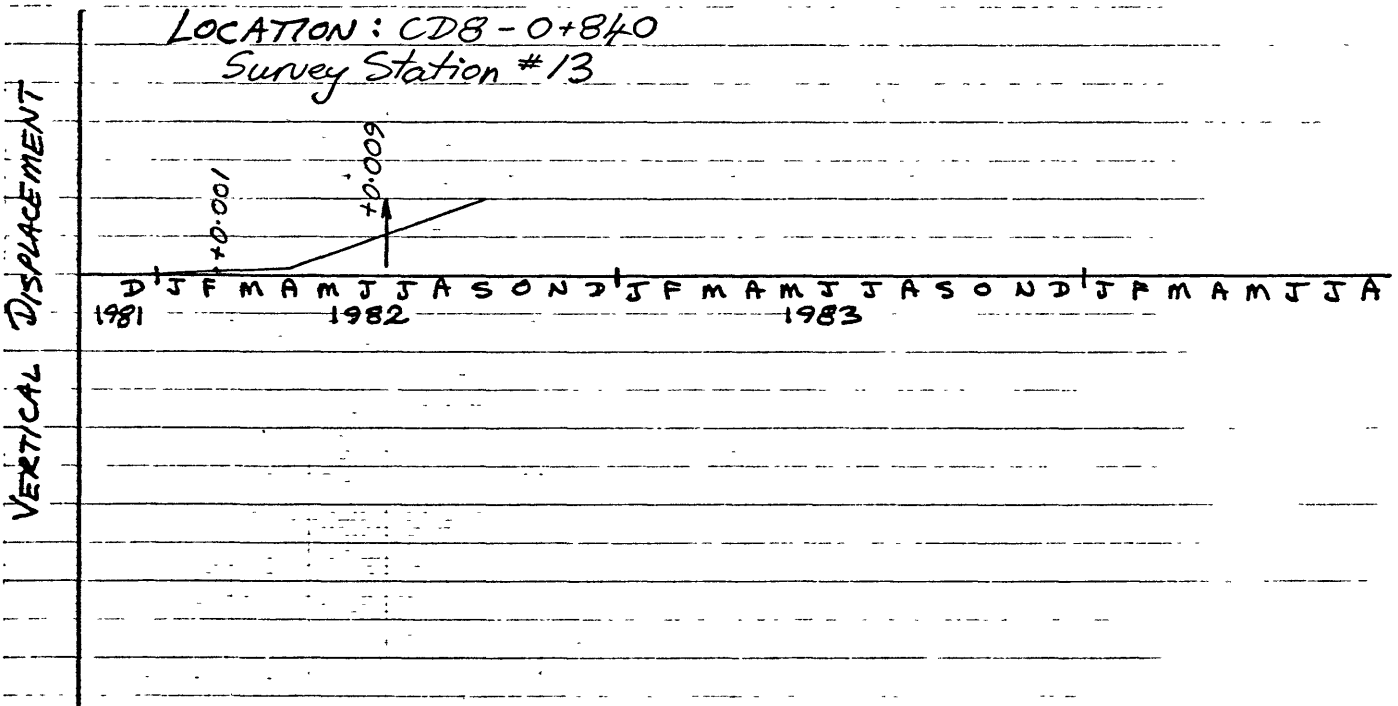
Displacement Scale 1:1



LOCATION : CD7-0+710
Survey Station #11

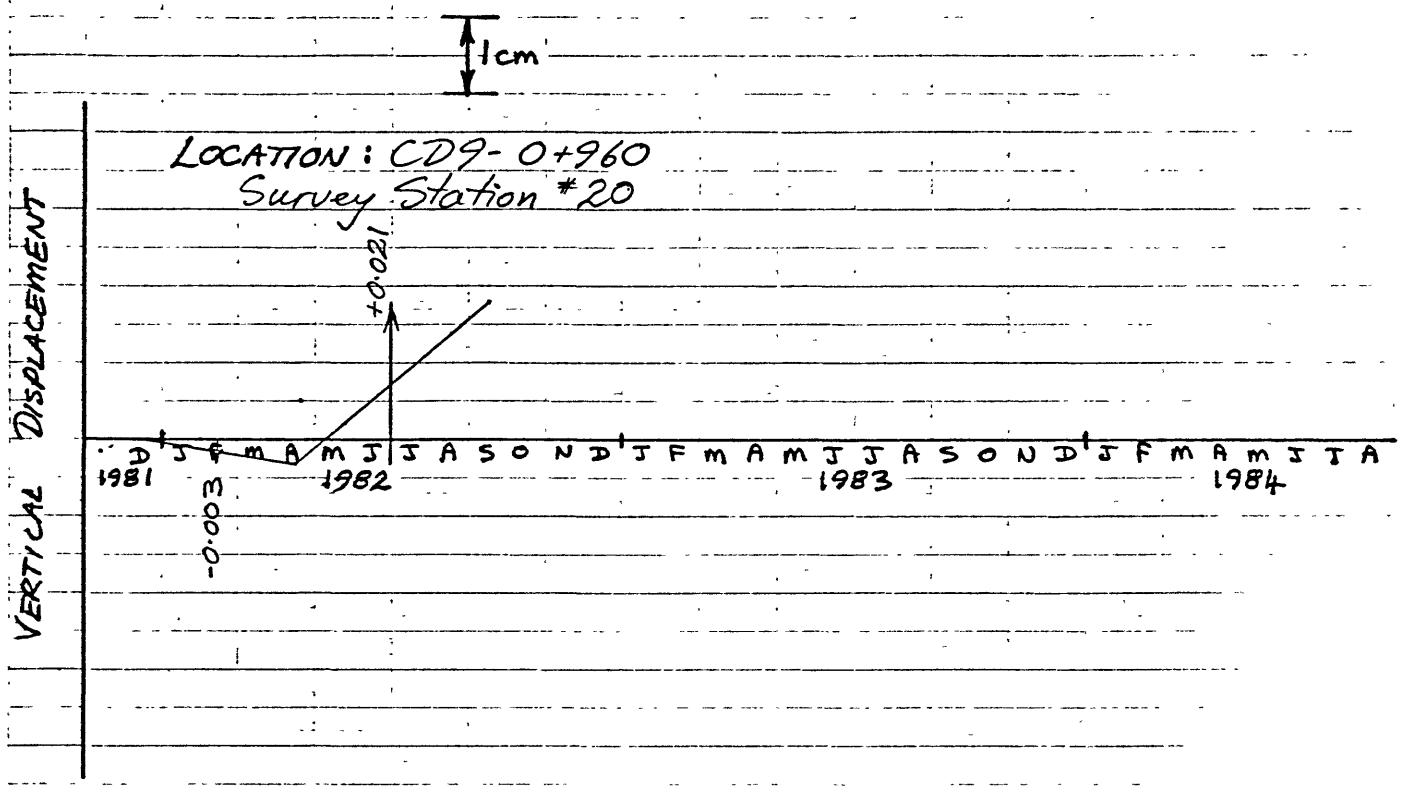


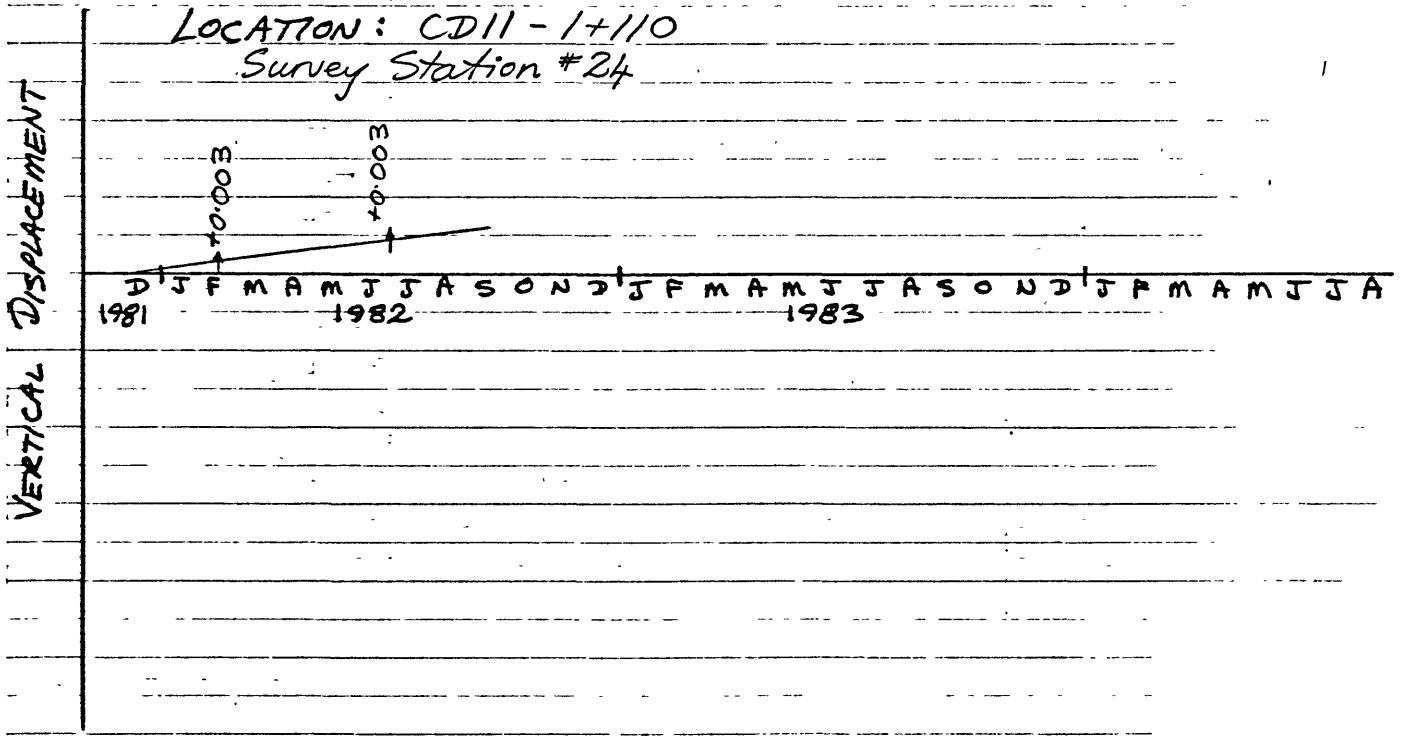
LOCATION : CD8-0+840
Survey Station #13



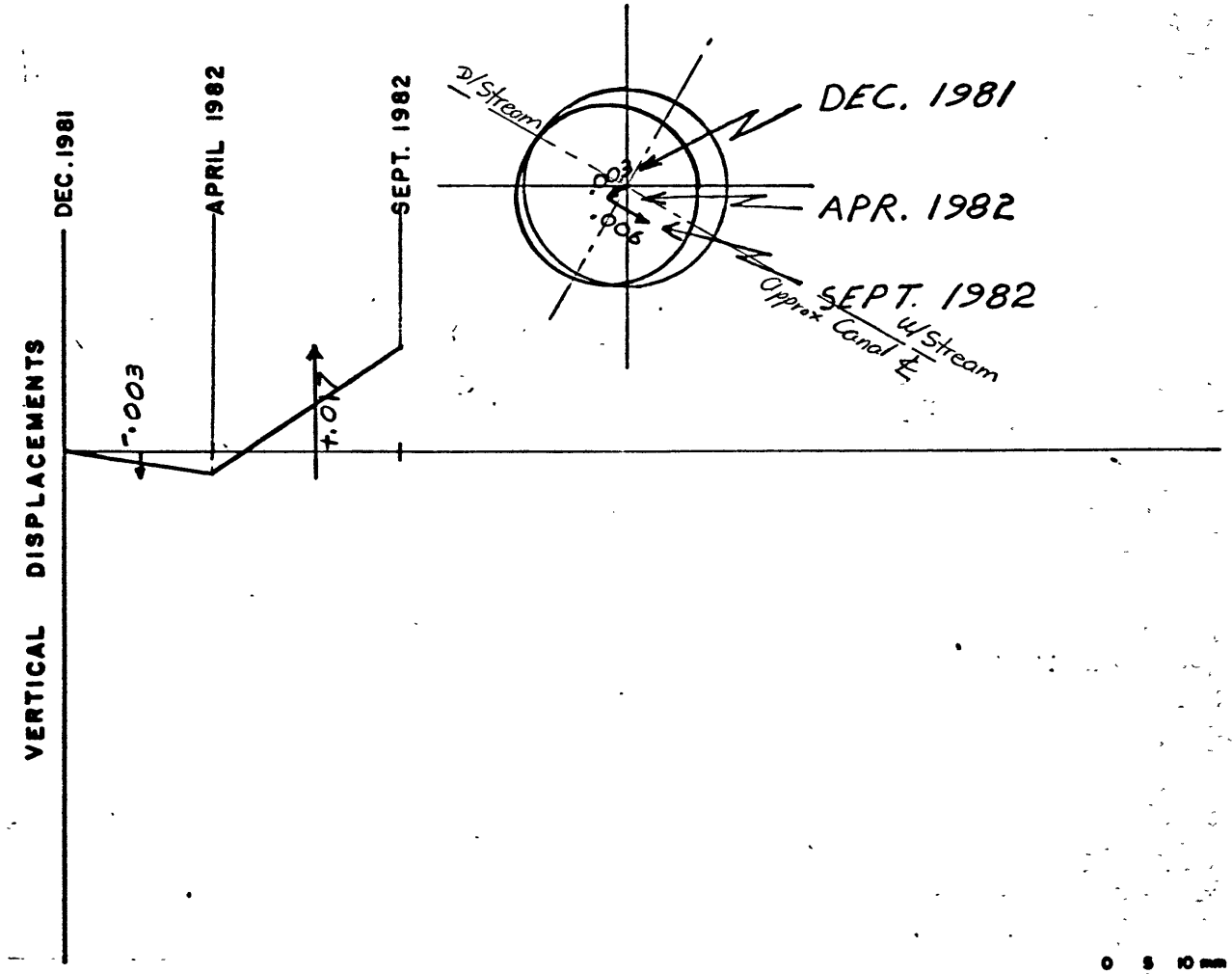
SETTLEMENT - TIME PLOTS

Displacement Scale 1:1





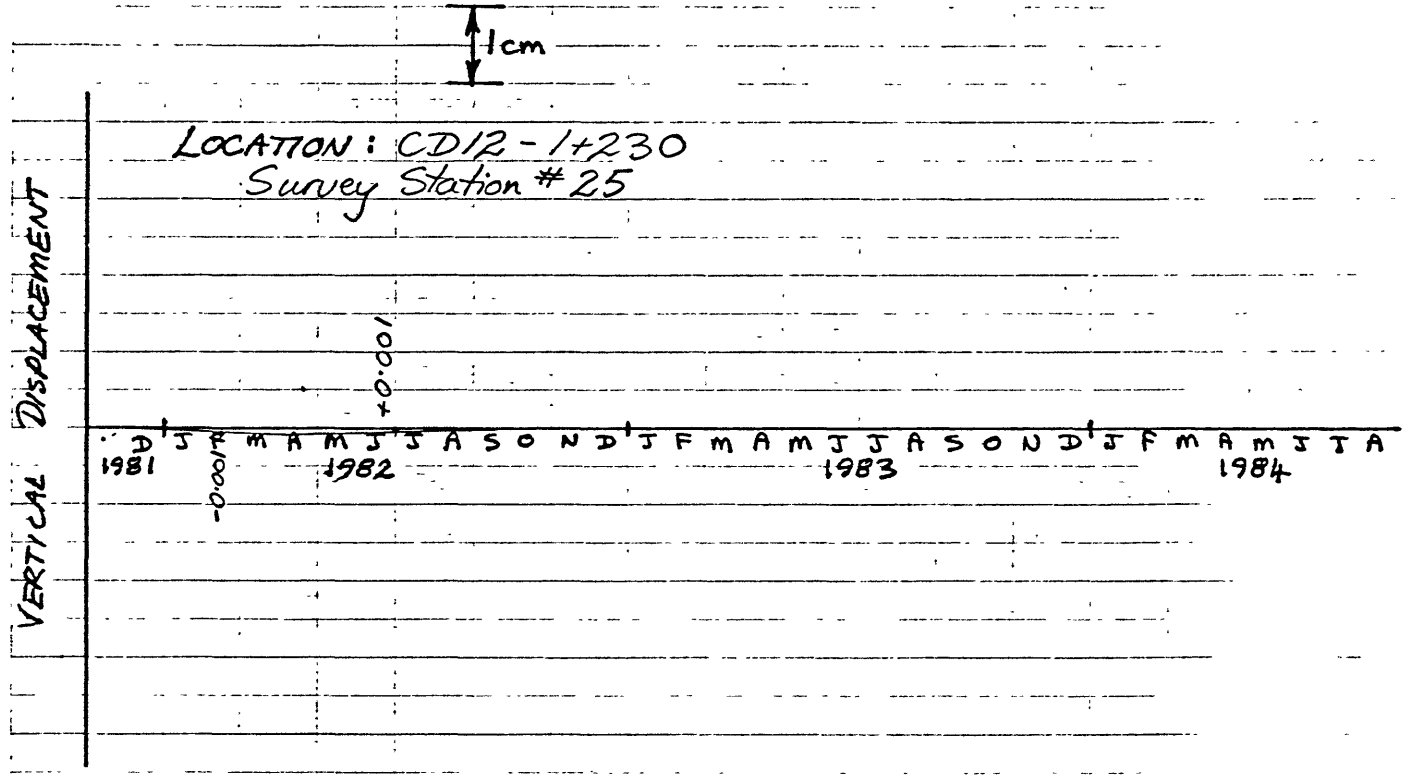
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES	
INSTRUMENT STATION NUMBER 0 + 990 CD.-10	SURVEY STATION NUMBER - 153

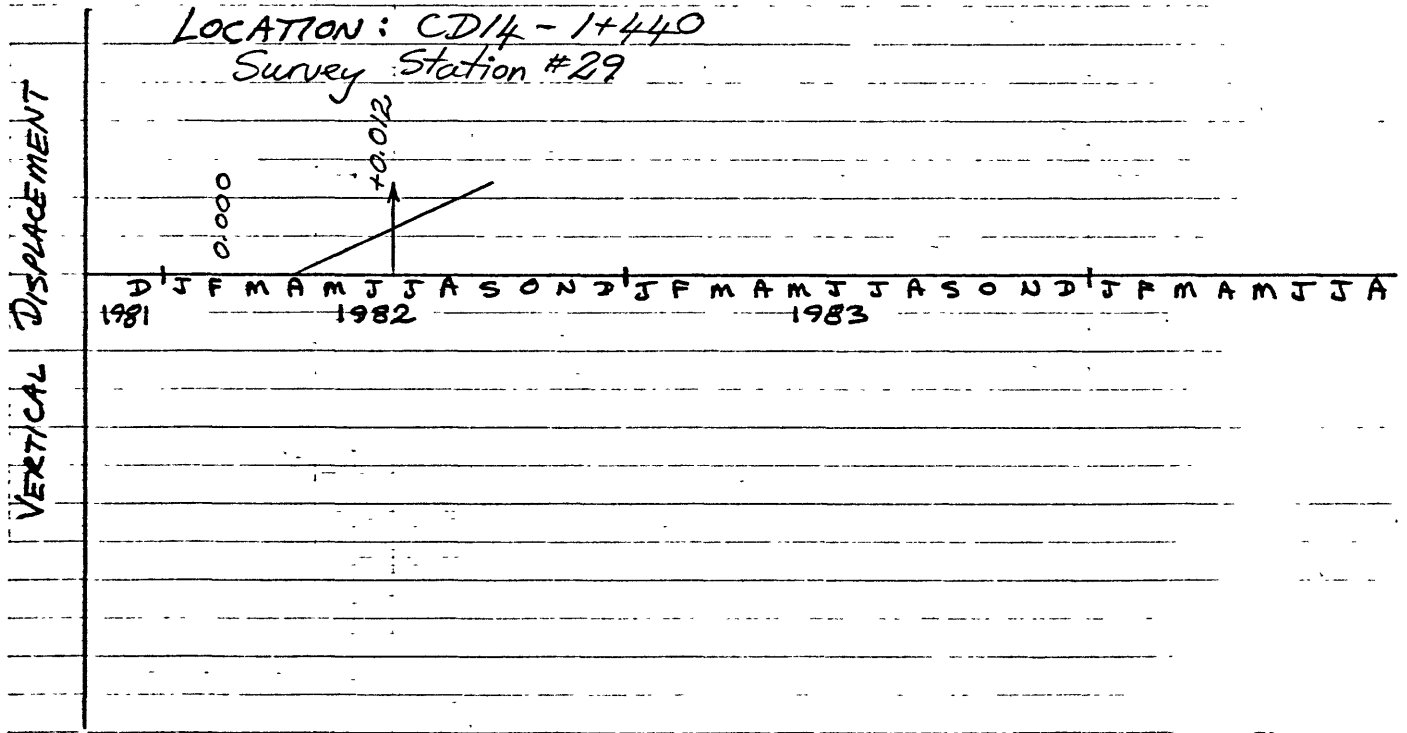


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678 DATE OCT. 22, 1982 SCALE 1 : 1	SHEET 1 OF 38 DRAWING NUMBER 134-3

SETTLEMENT - TIME PLOTS

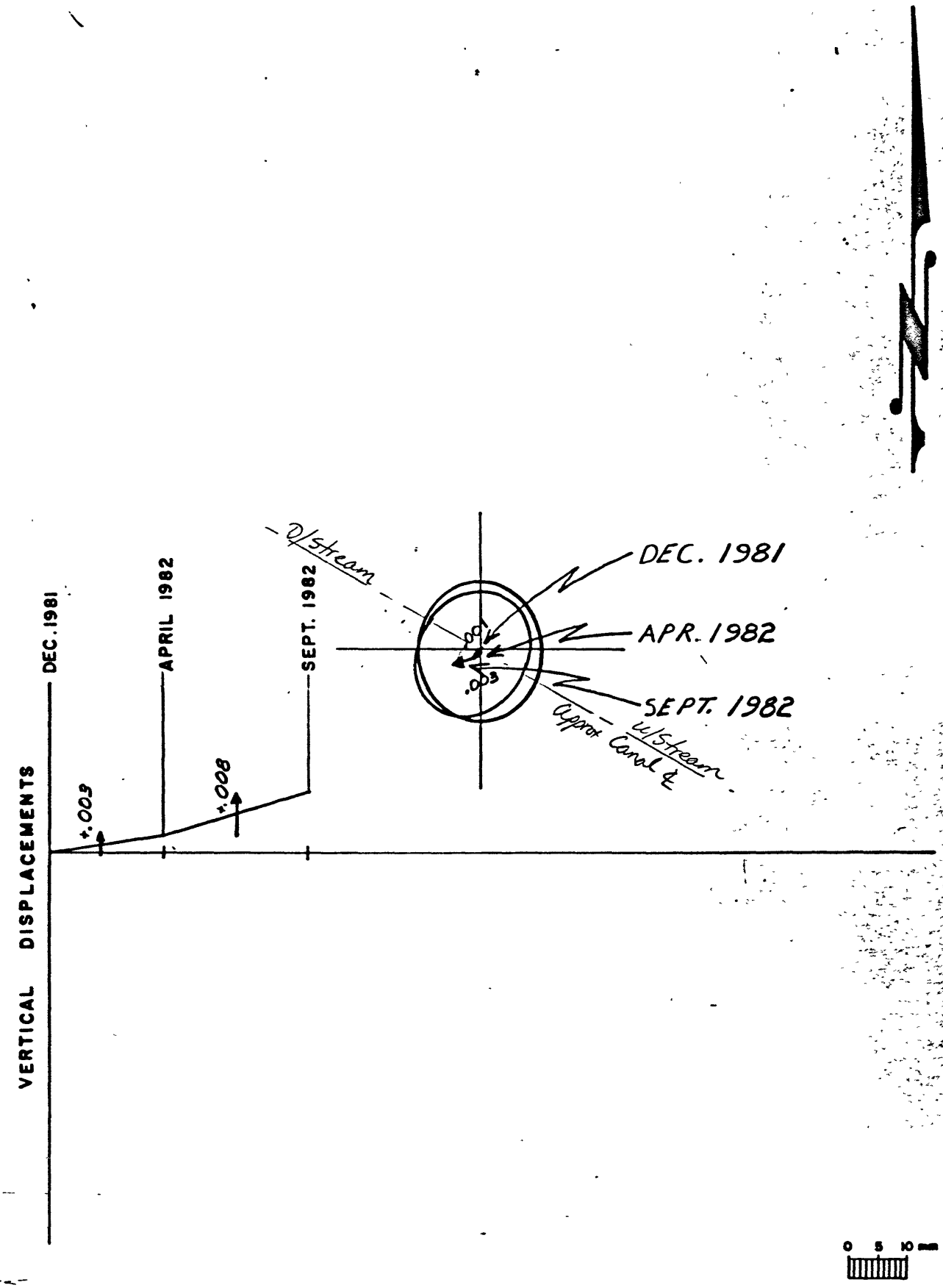
Displacement Scale 1:1





DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

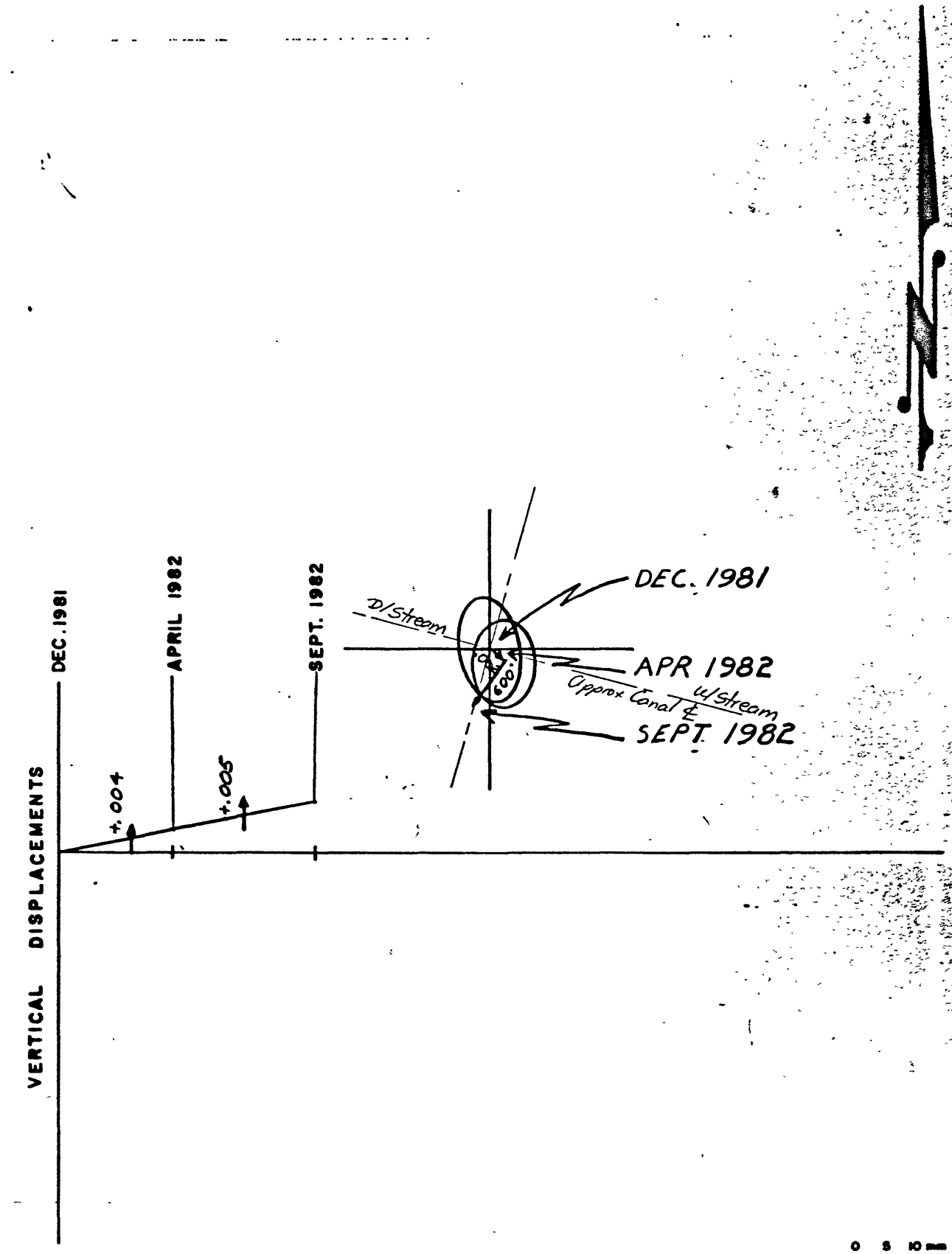
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+350 C.D.-13	155



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 3 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

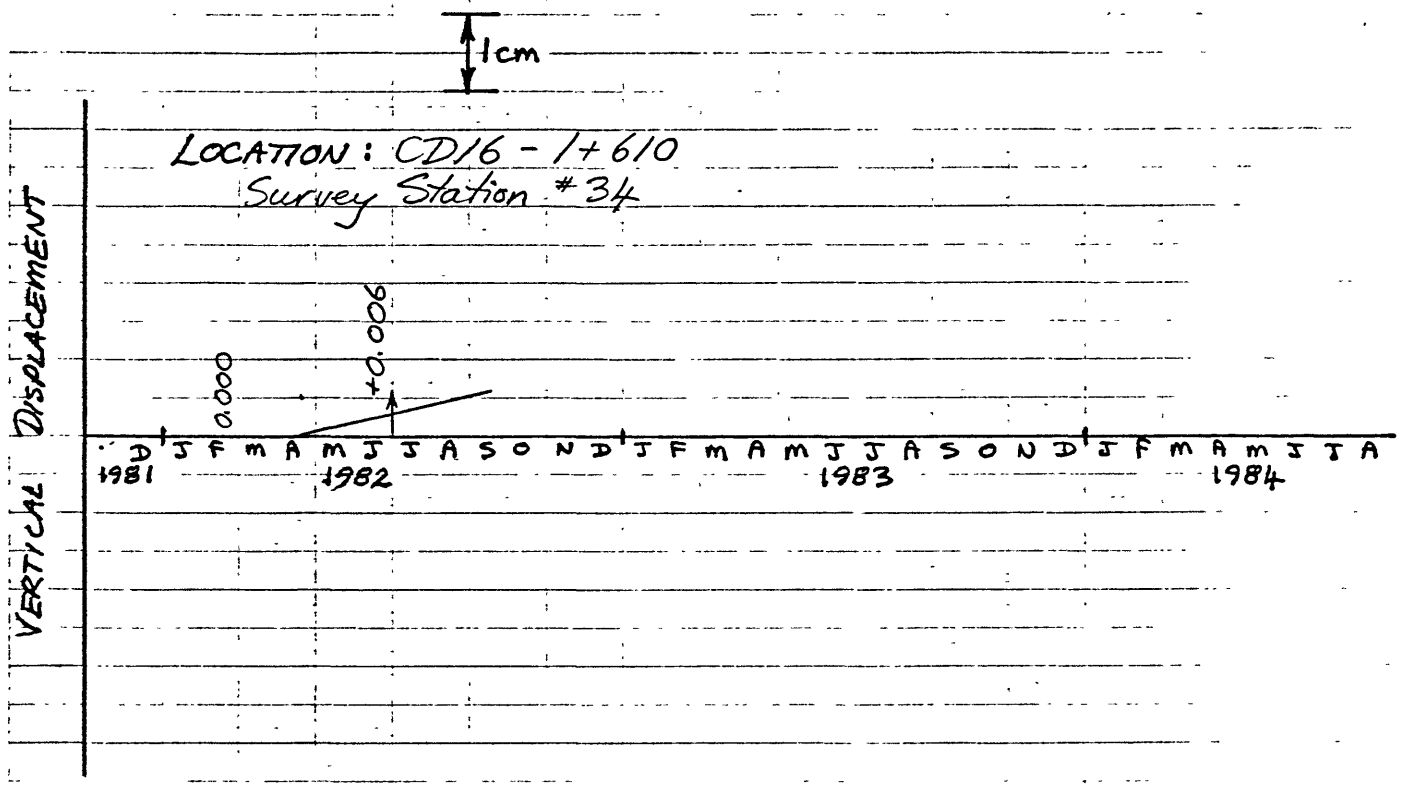
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+530 C.D. -15	156

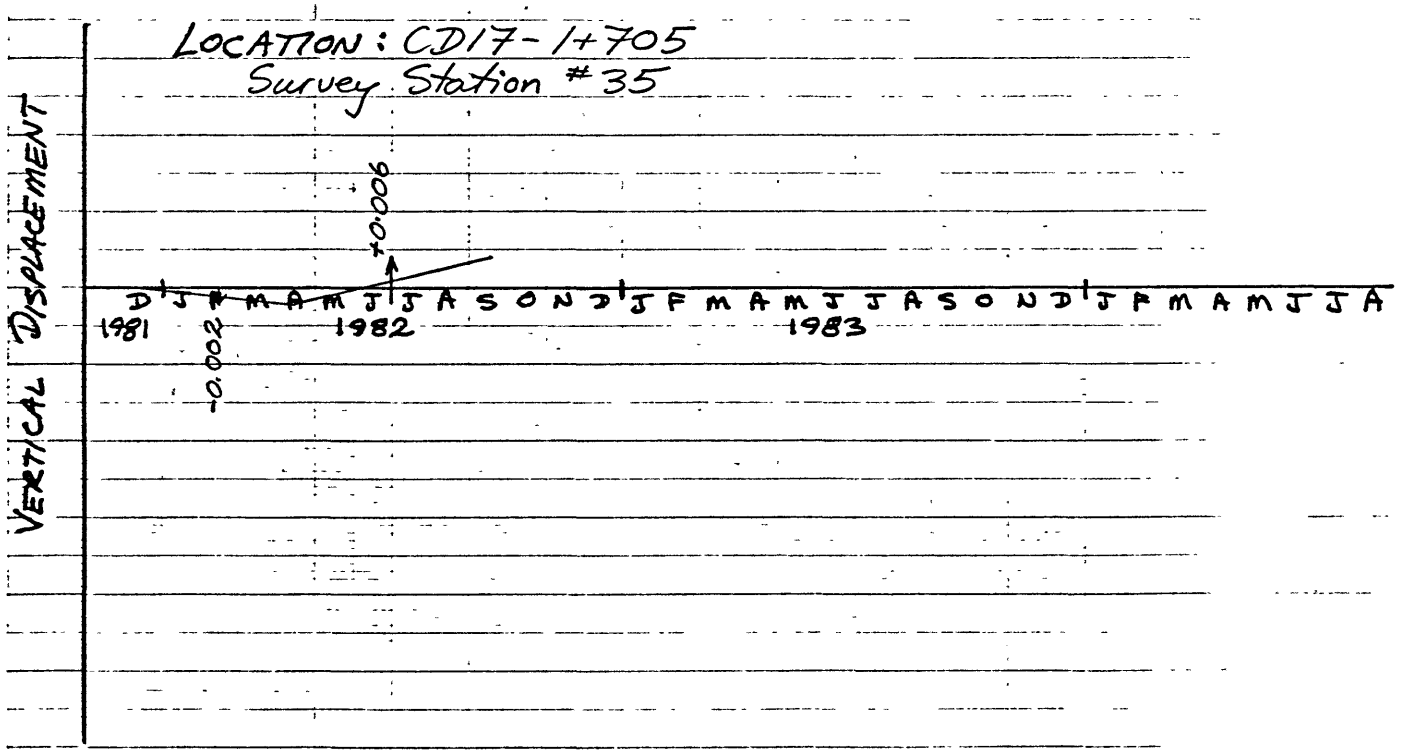


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 4 OF 38
	DATE OCT 22, 1982	DRAWING NUMBER 134-3
	SCALE 1 : 1	

SETTLEMENT - TIME PLOTS

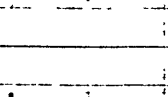
Displacement Scale 1:1



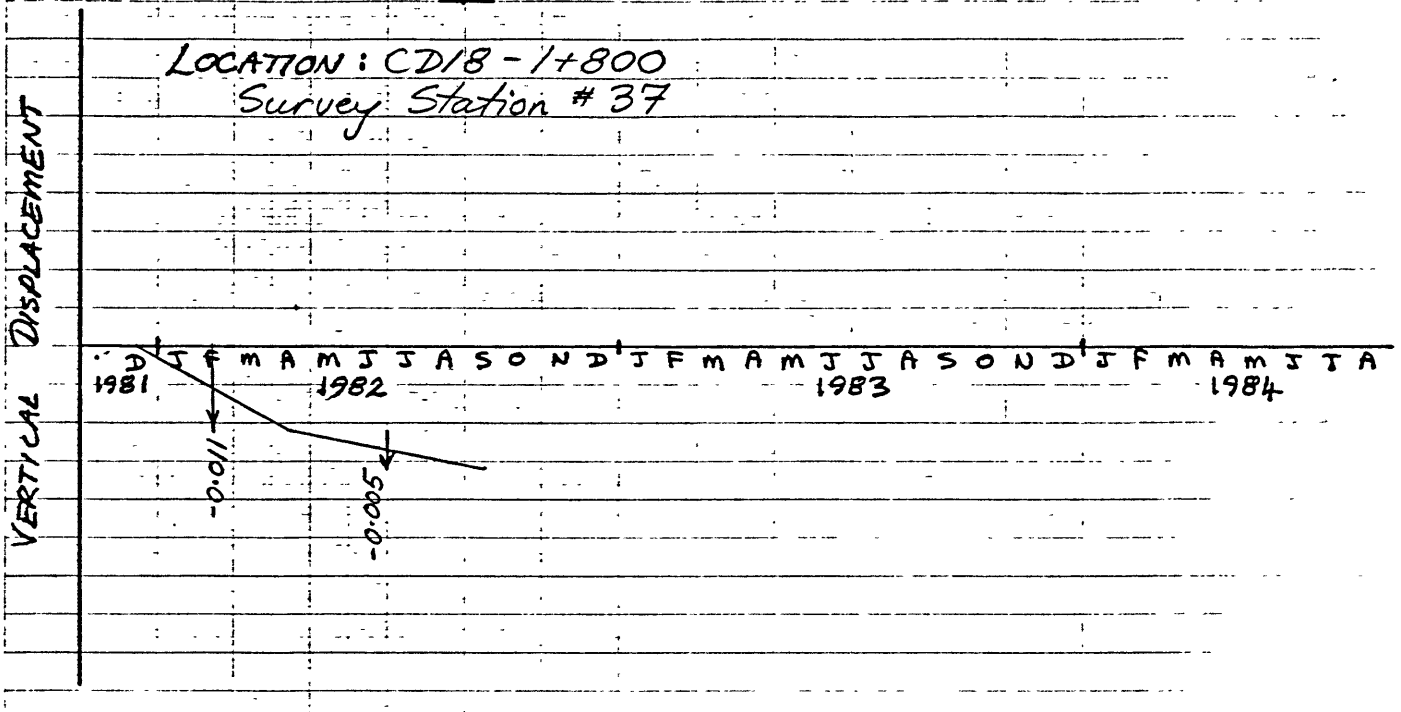


SETTLEMENT - TIME PLOTS

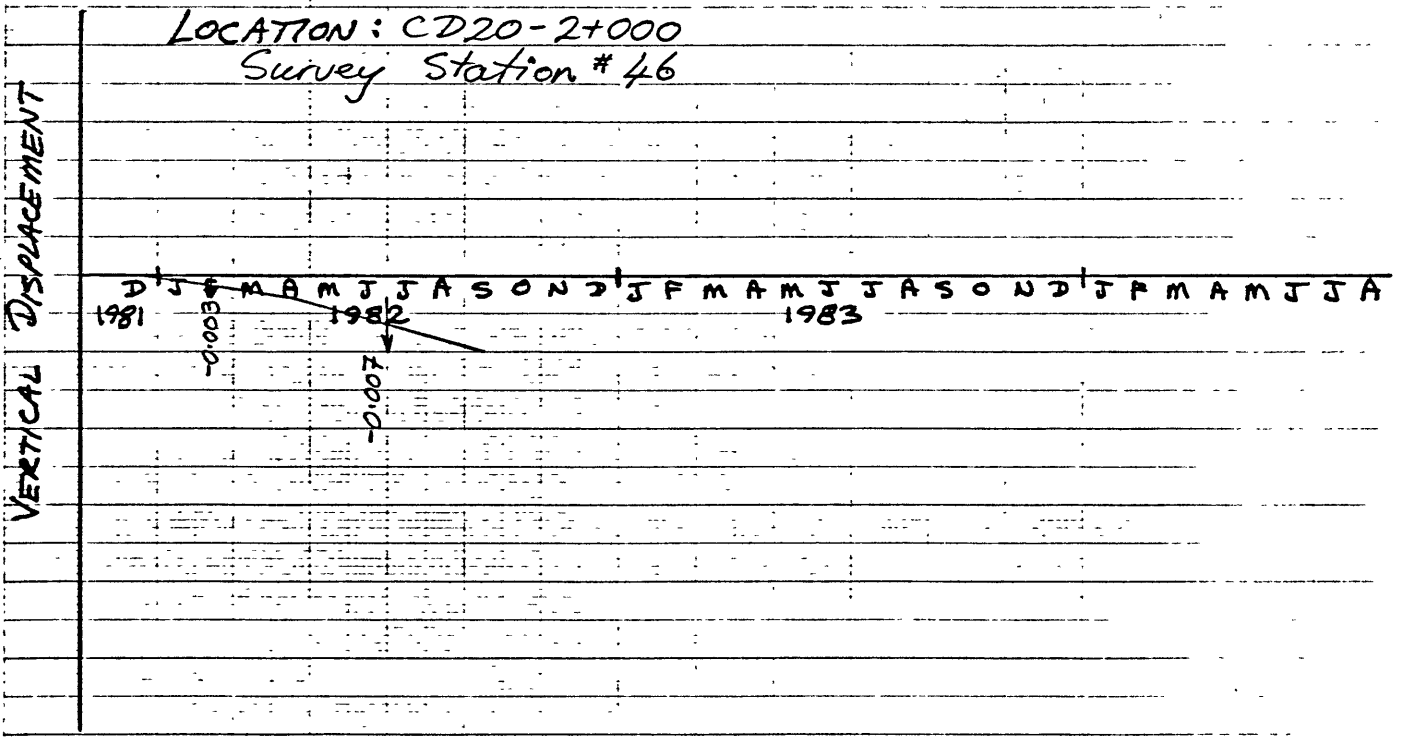
Displacement Scale 1:1



LOCATION: CD18 - 1+800
Survey Station # 37

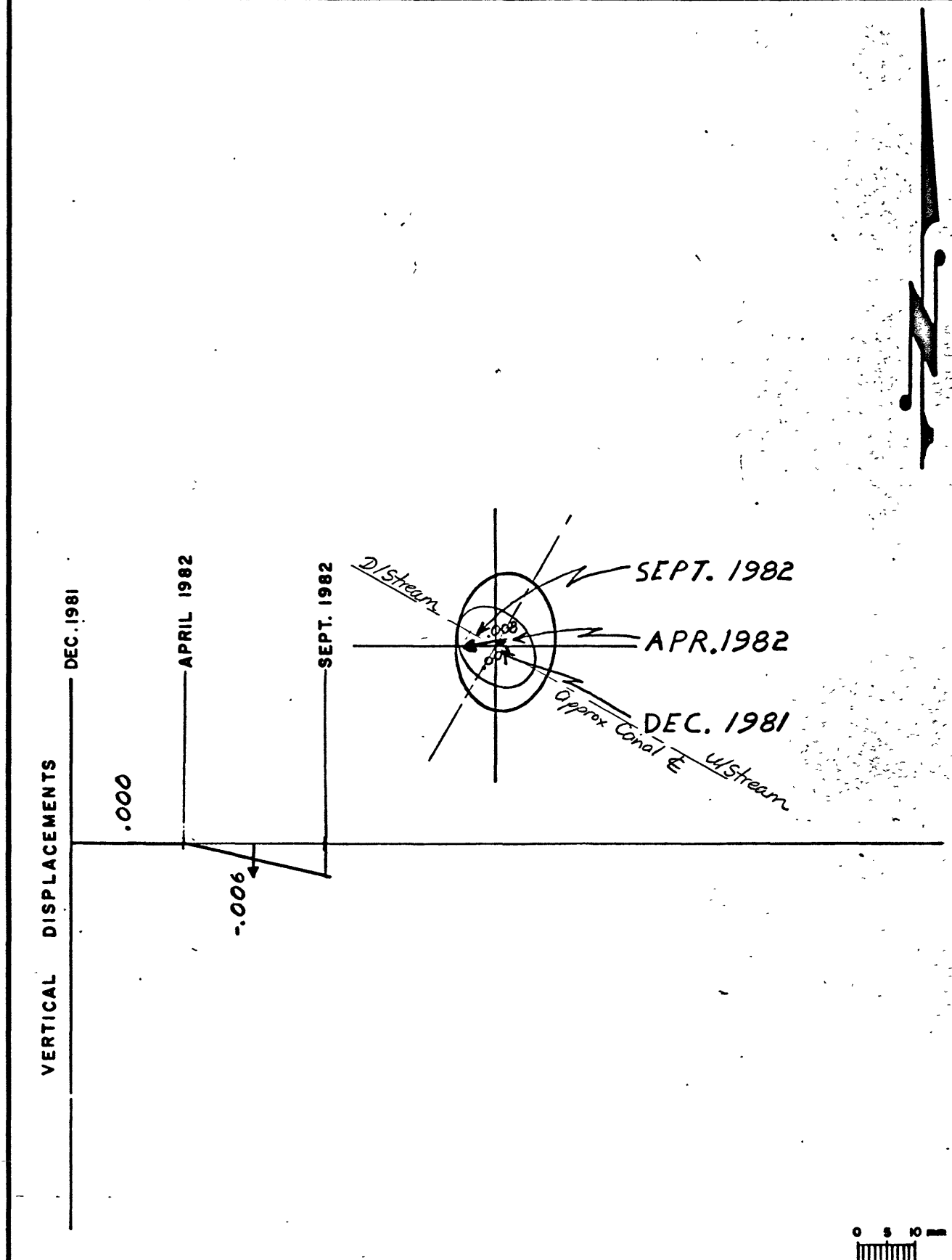


LOCATION: CD20 - 2+000
Survey Station # 46



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

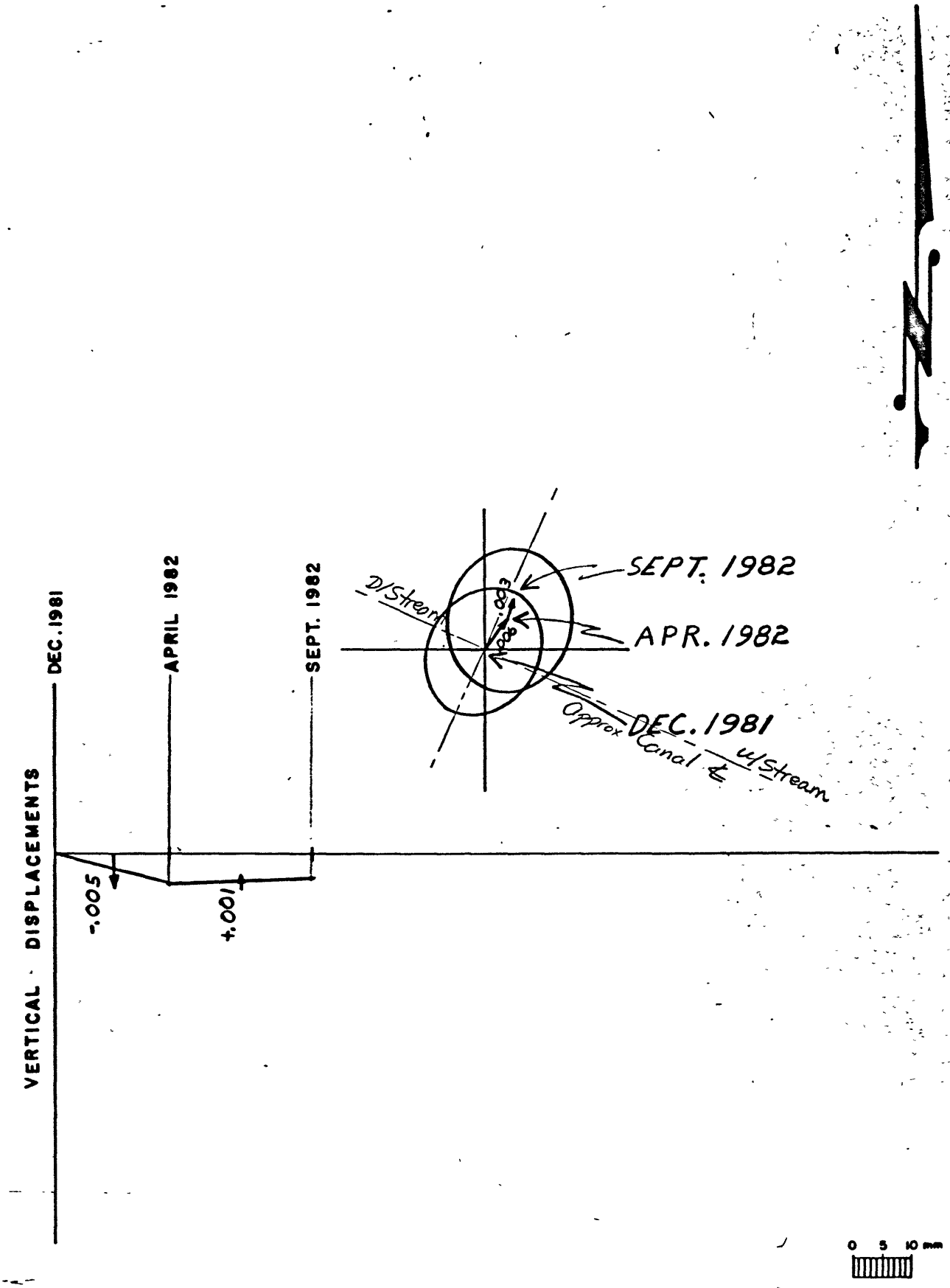
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+900 C.D. -19	159



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 7 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

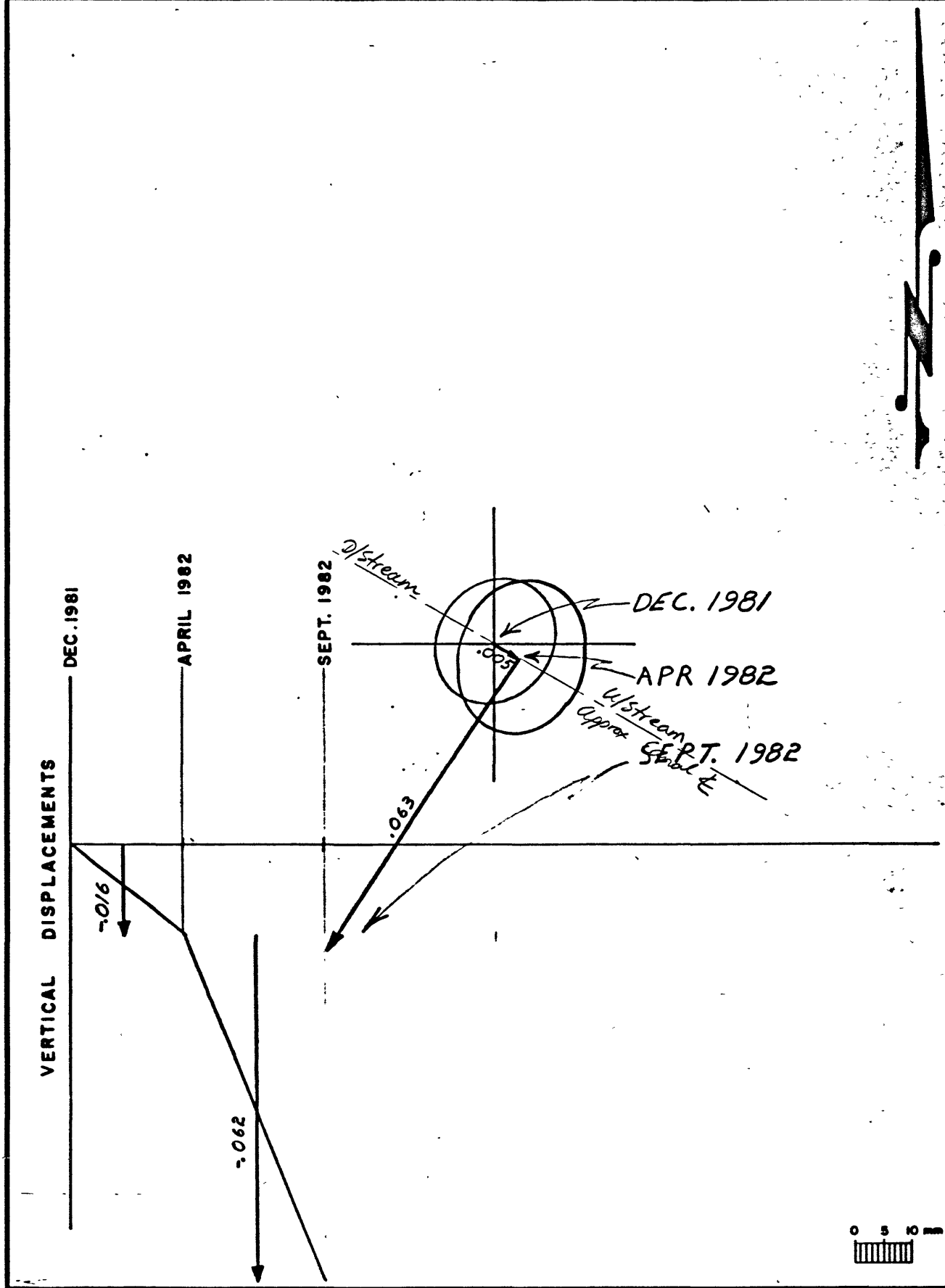
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+100 C.D.-21	409.



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 12 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

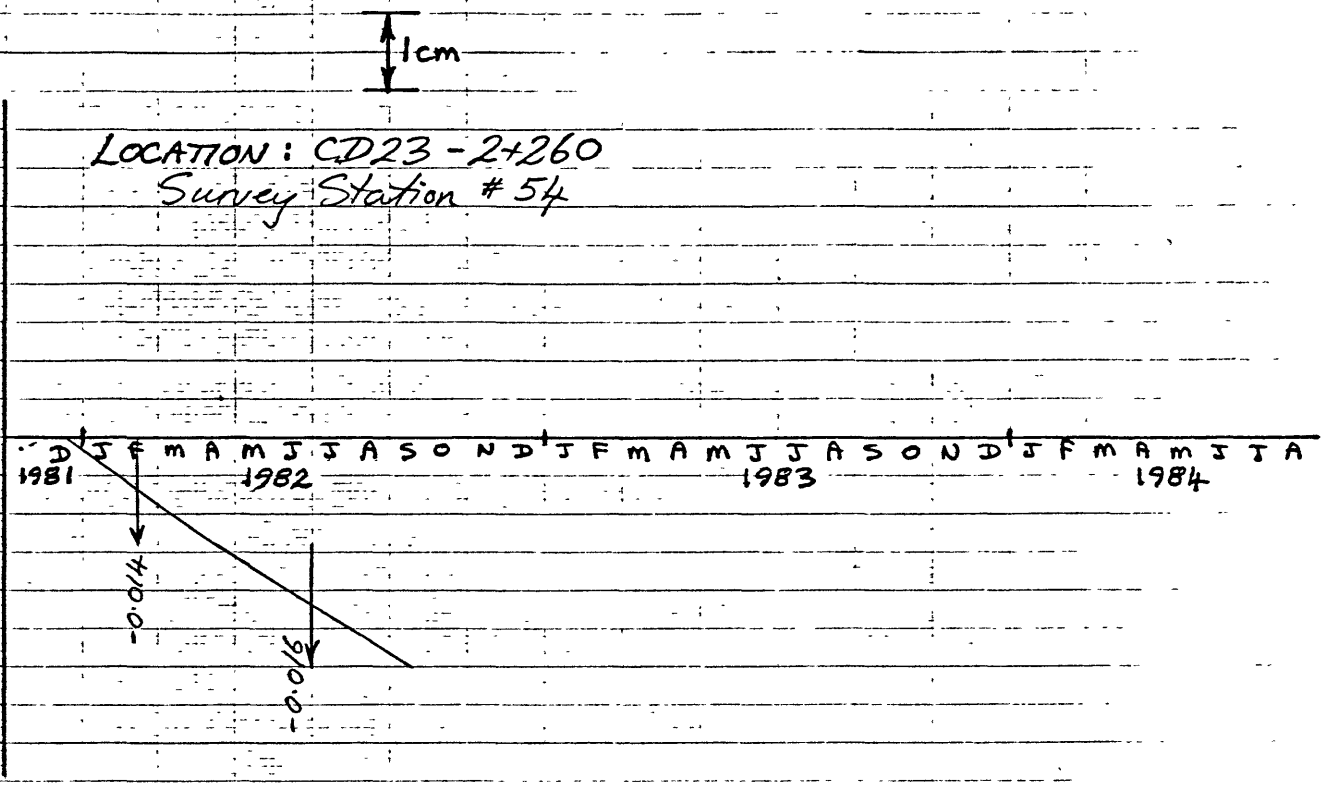
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+200 C.D. - 22	410

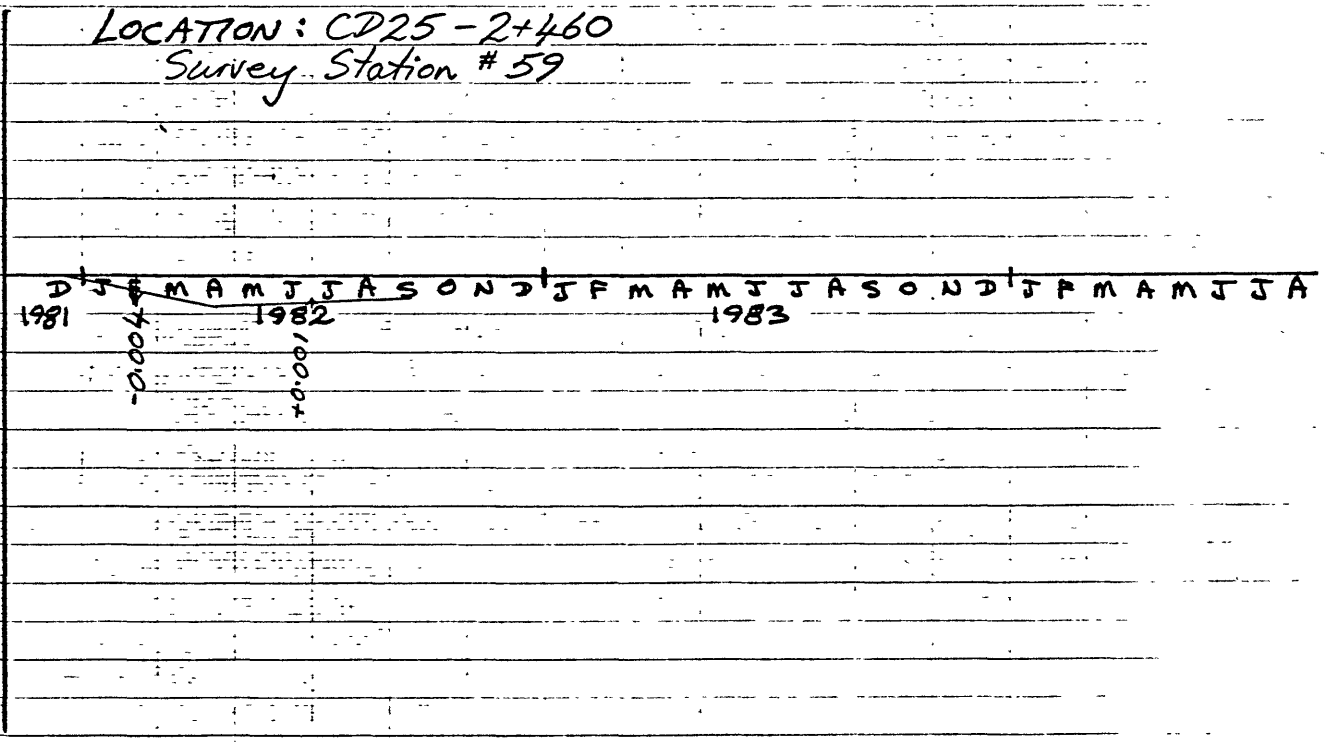


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 13 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

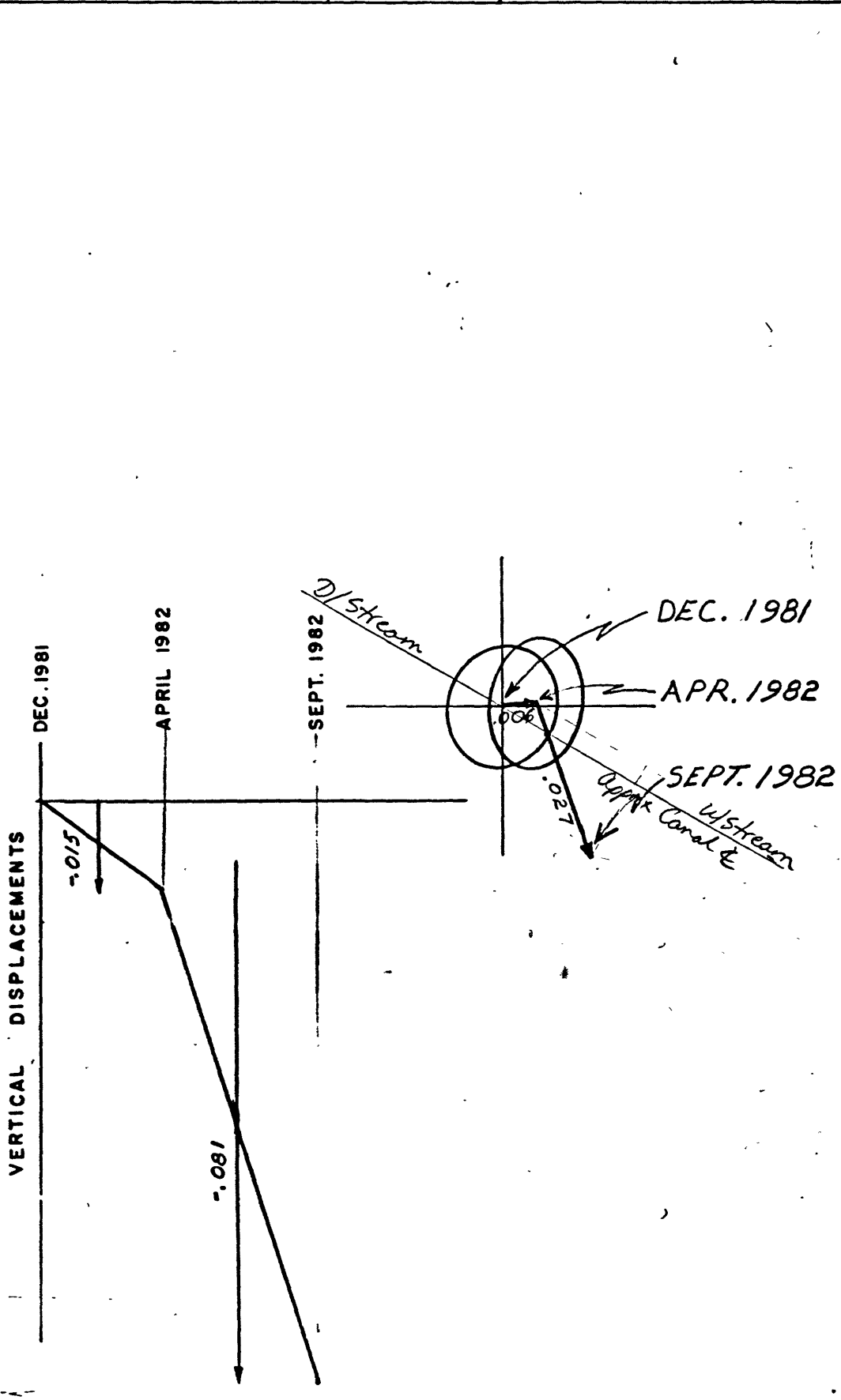
Displacement Scale 1:1





DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

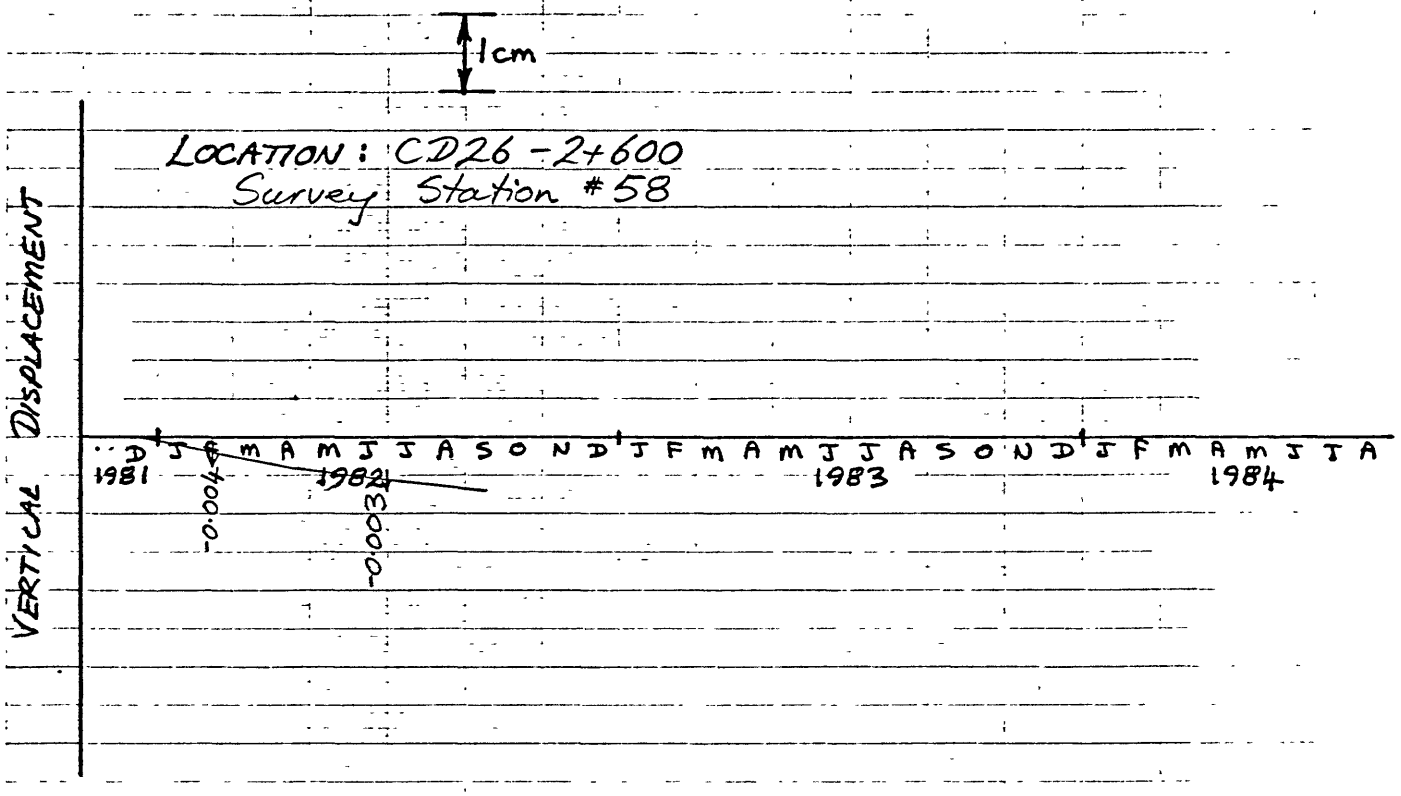
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+365 C.D. -24	411

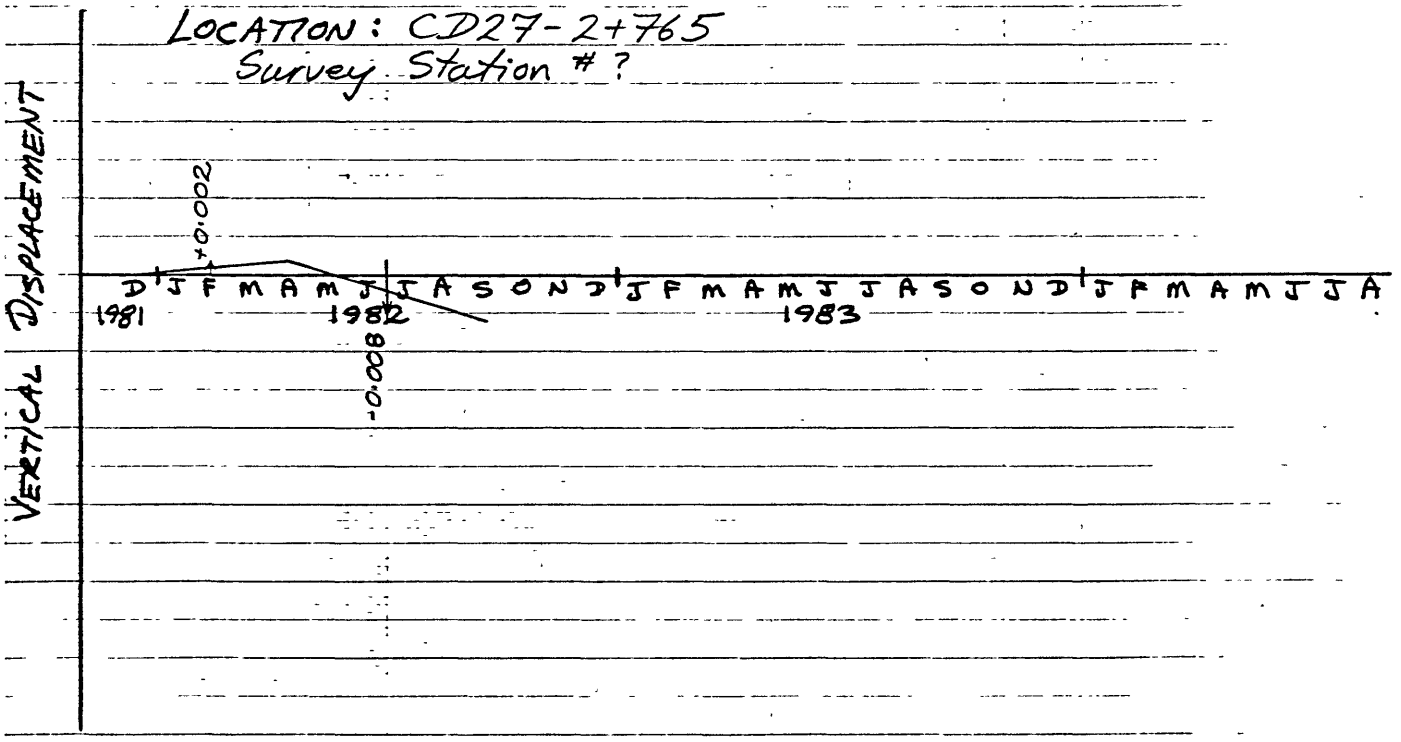


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 14 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

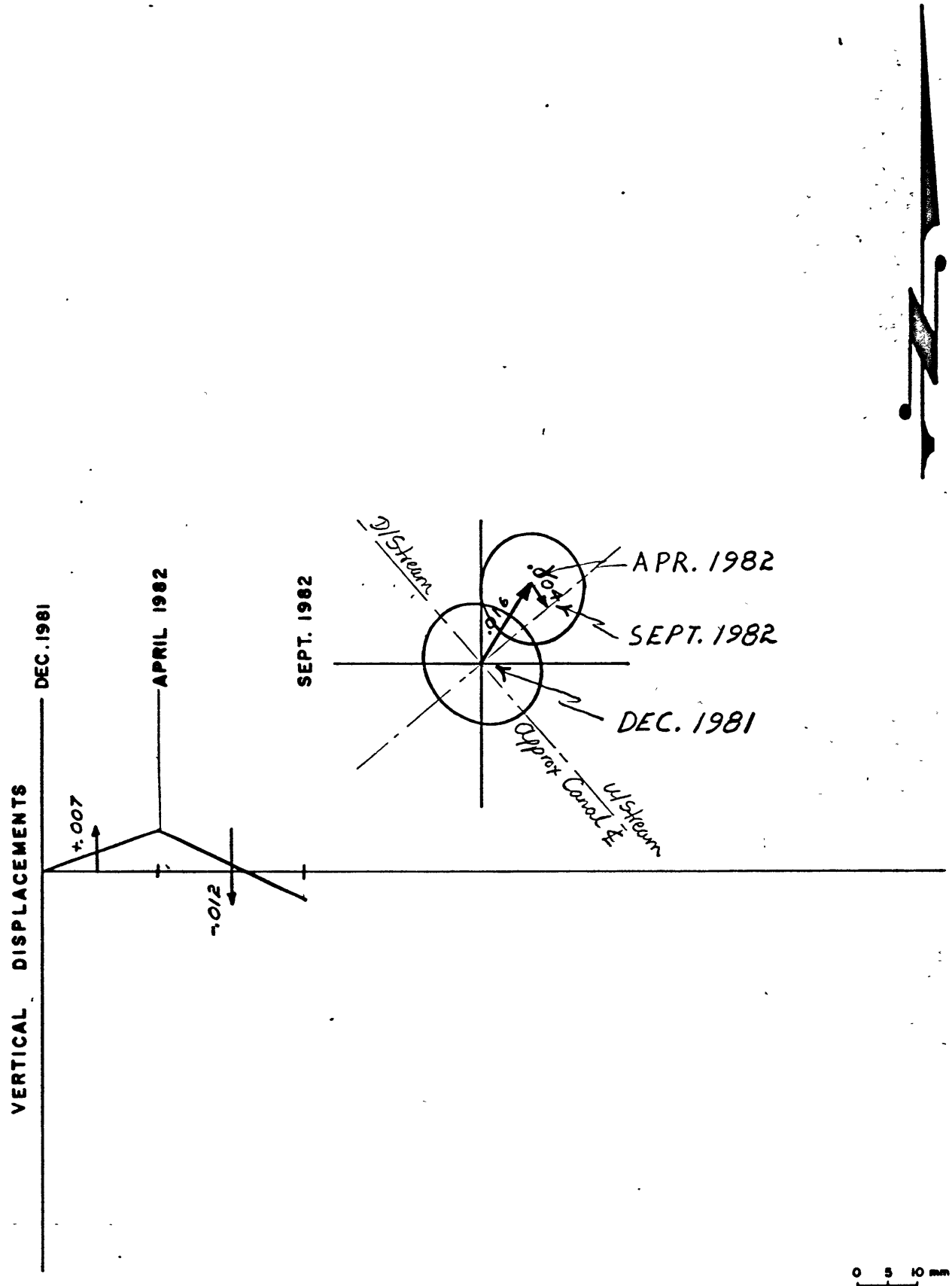
Displacement Scale 1:1





DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

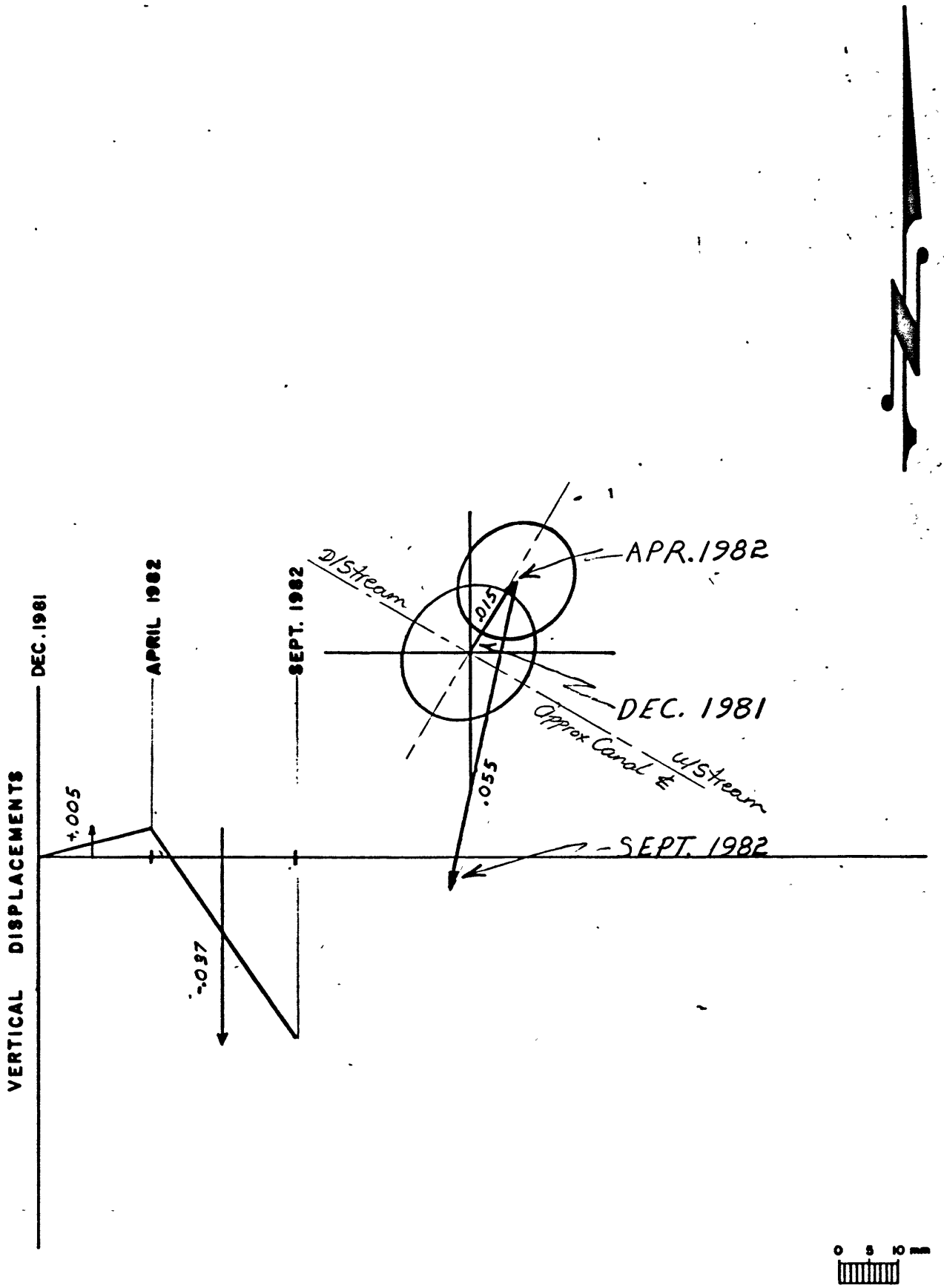
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+900 C.D.-28	419



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 22 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

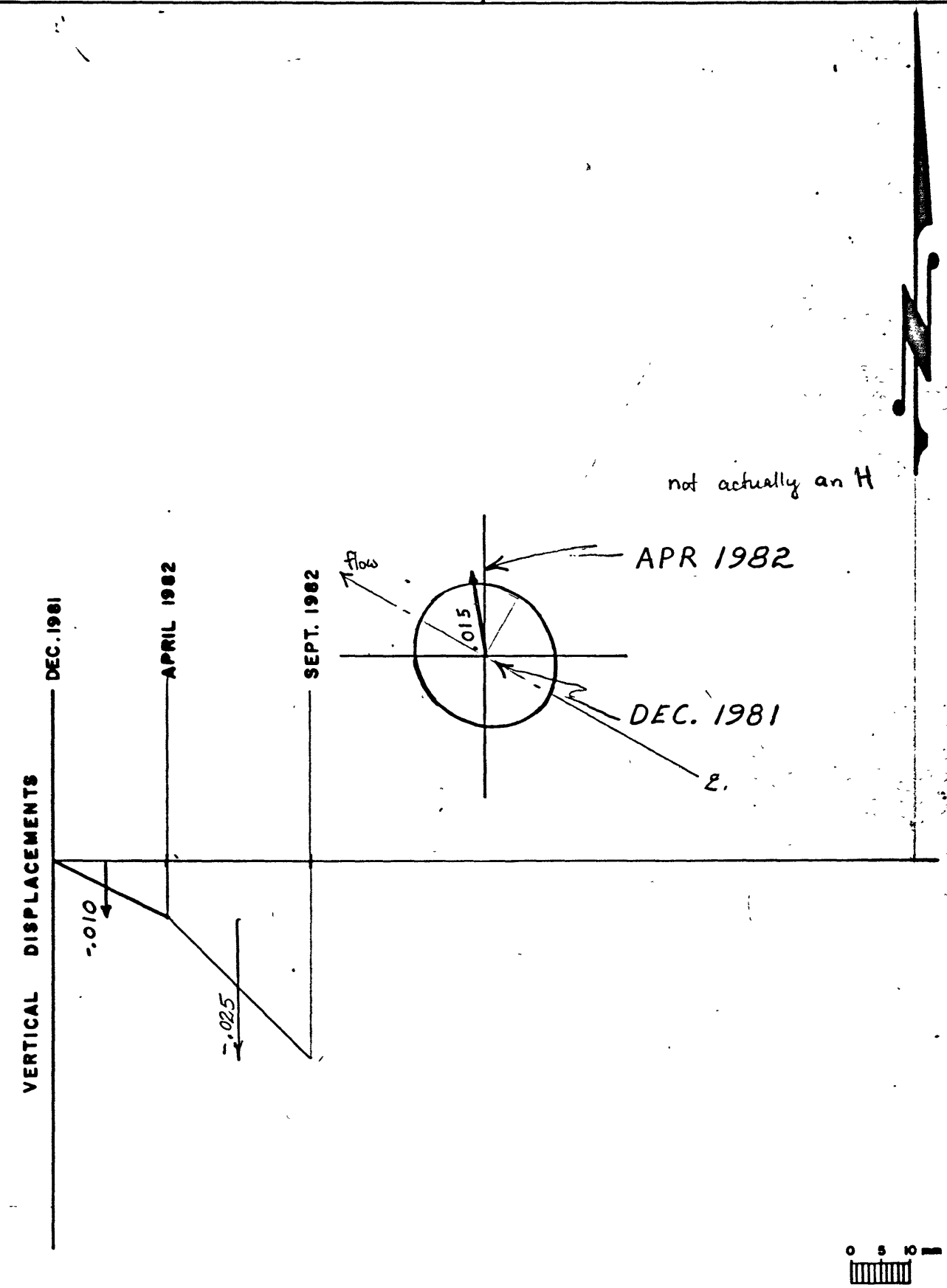
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+000 C.D.-29	499



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 27 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

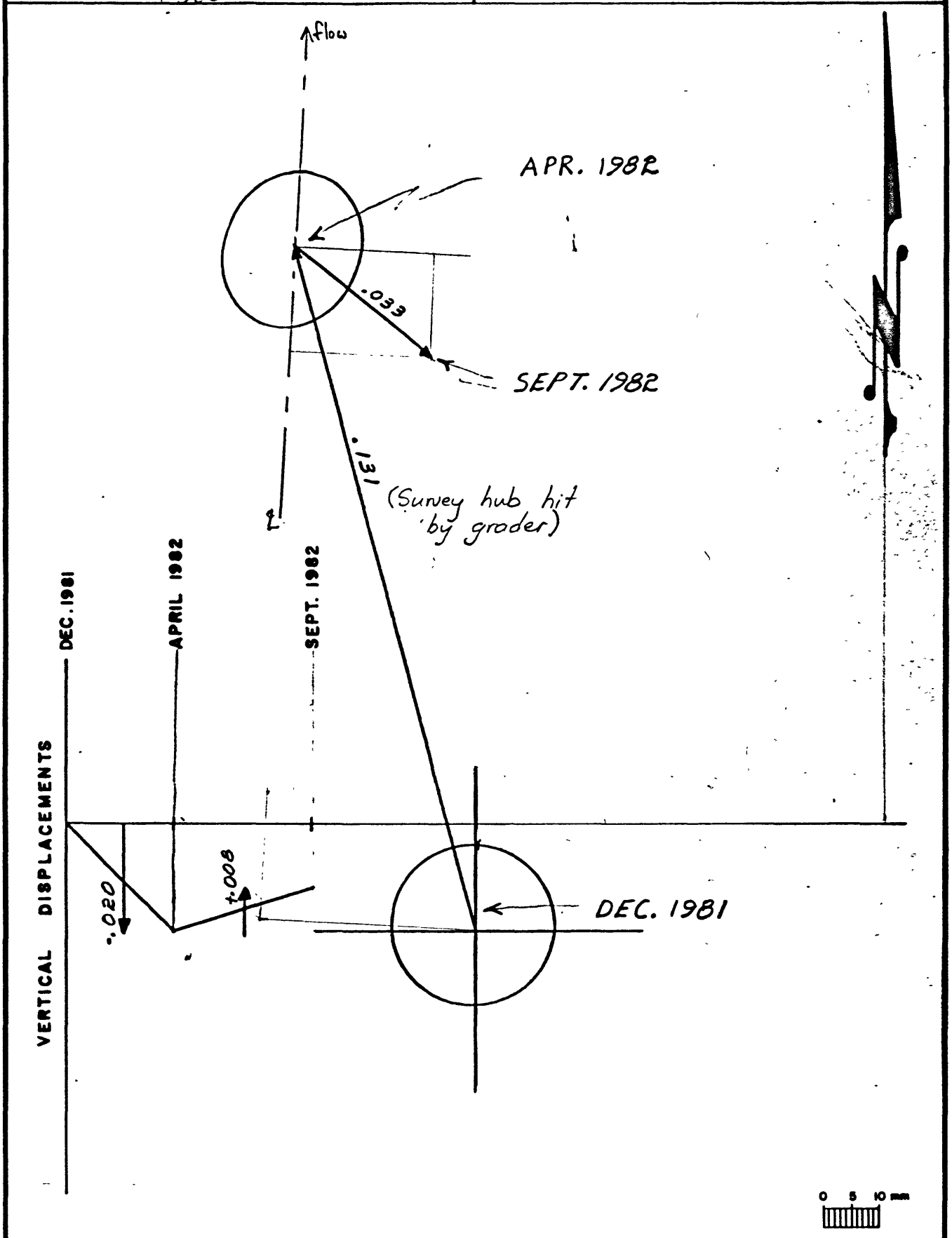
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+130 C.D.-30	496



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 24 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

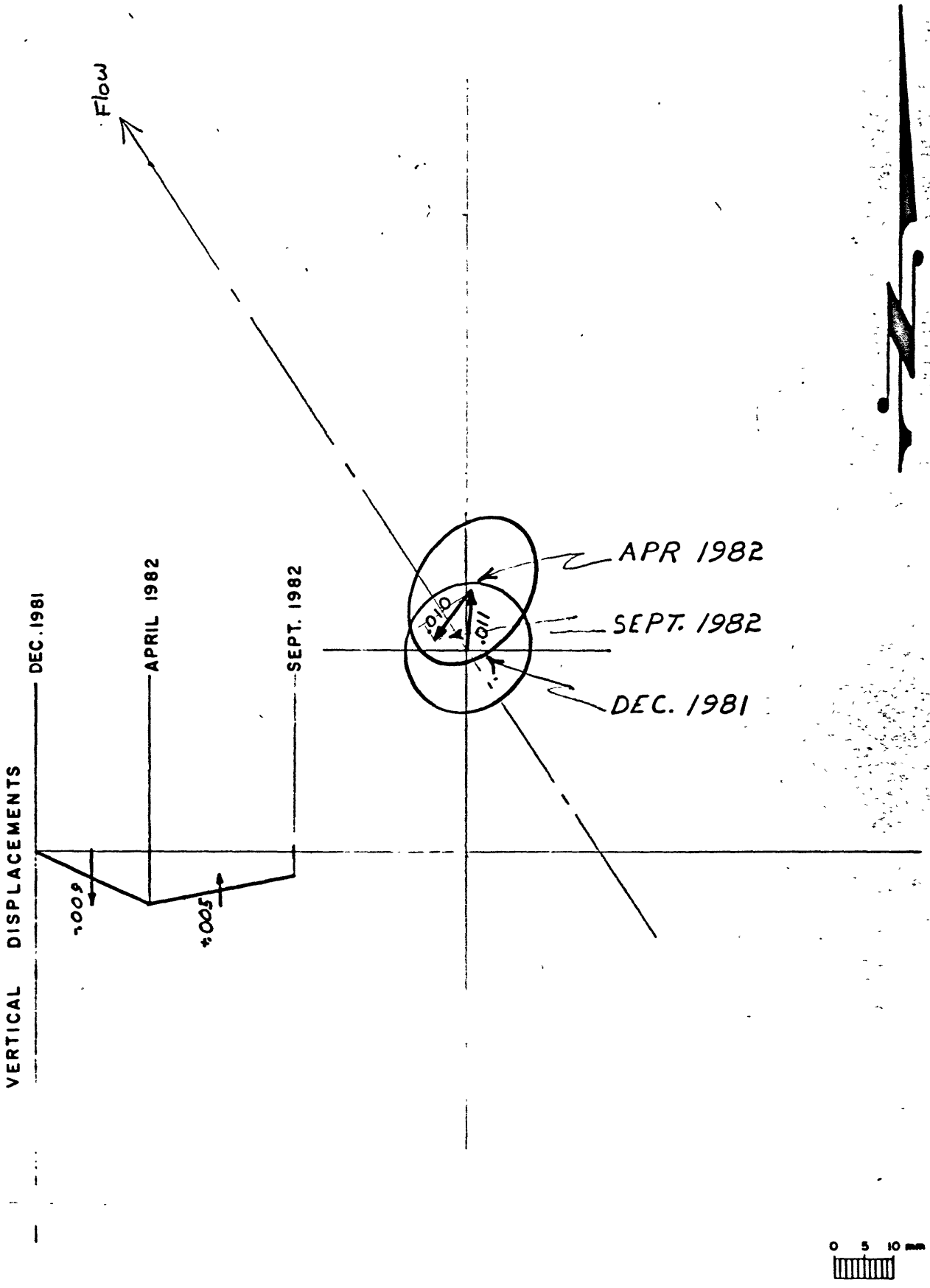
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+300 C.D.-31 +368	497



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 25 OF 38
	DATE OCT 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+550 C.D. - 32	500



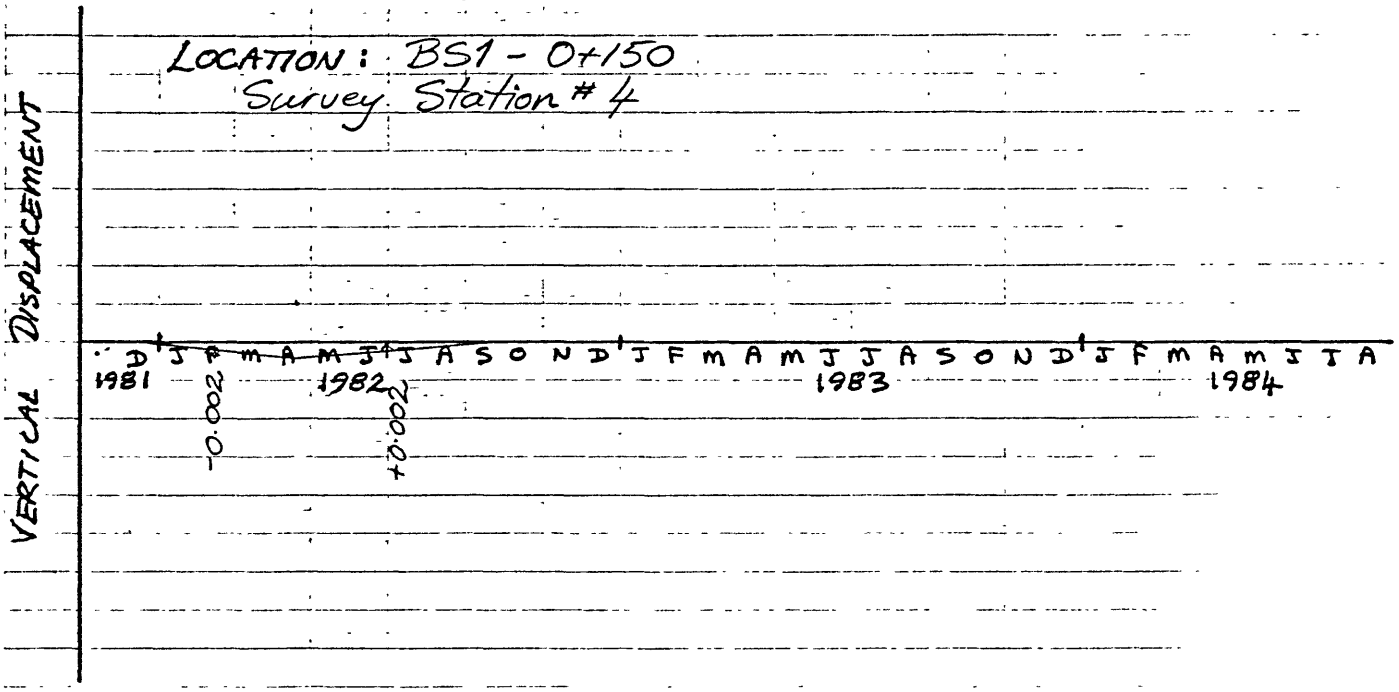
CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 28 OF 38
	DATE OCT 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

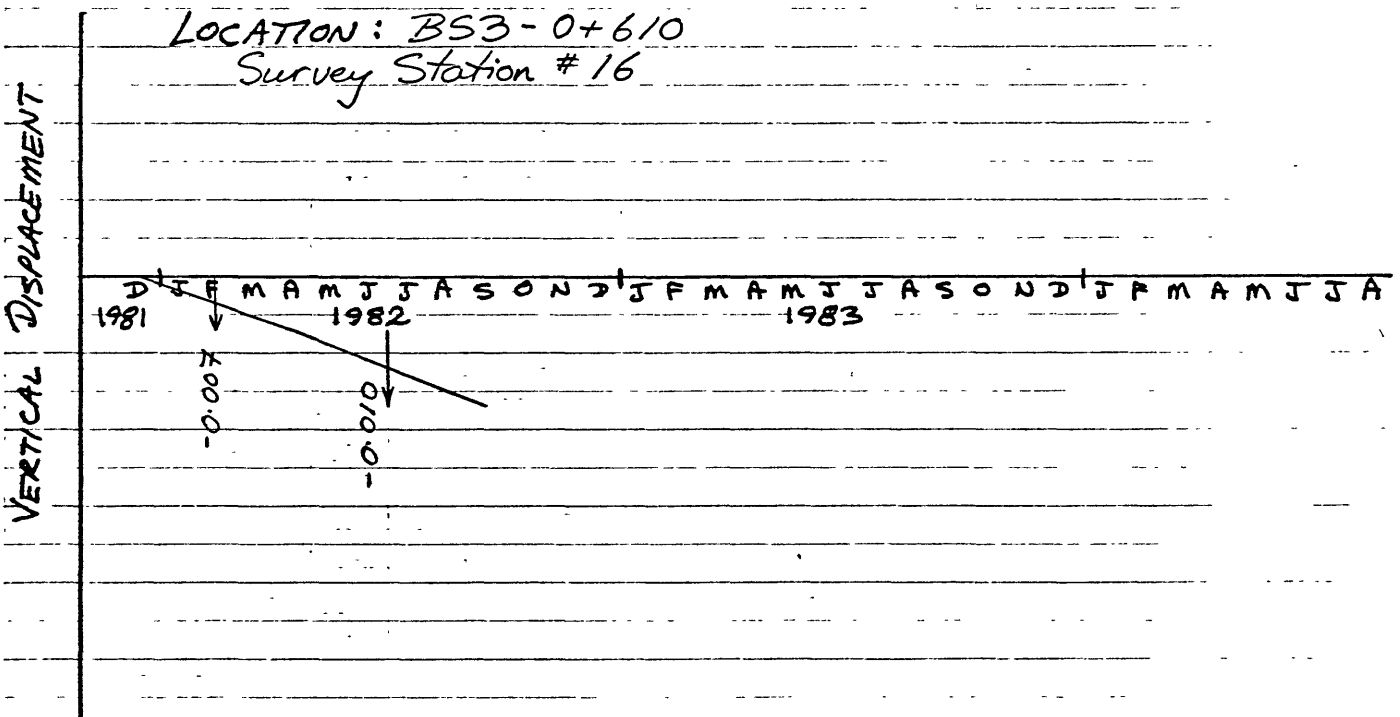
Displacement Scale 1:1



LOCATION: BS1 - 0+150
Survey Station # 4

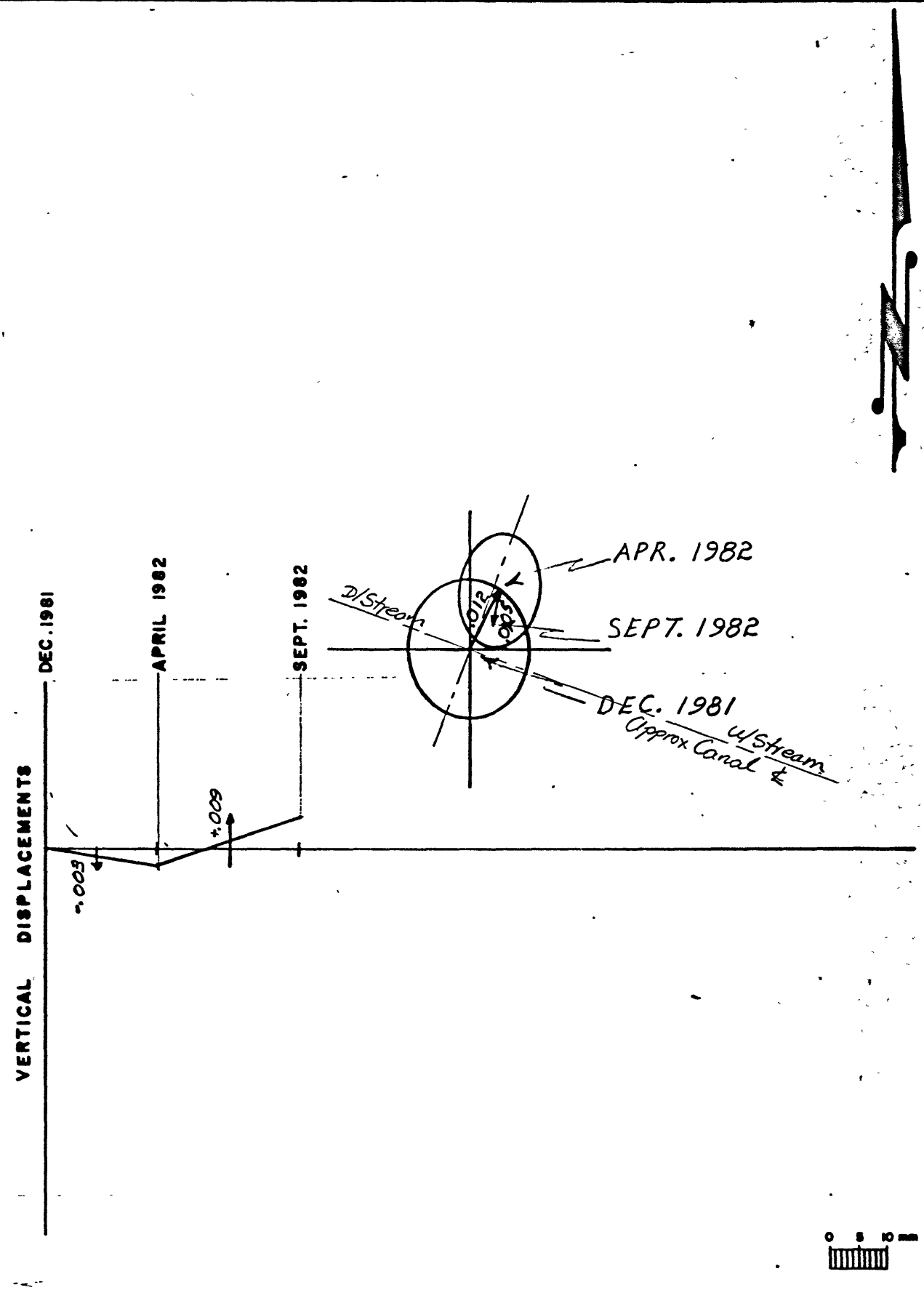


LOCATION: BS3 - 0+610
Survey Station # 16



DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

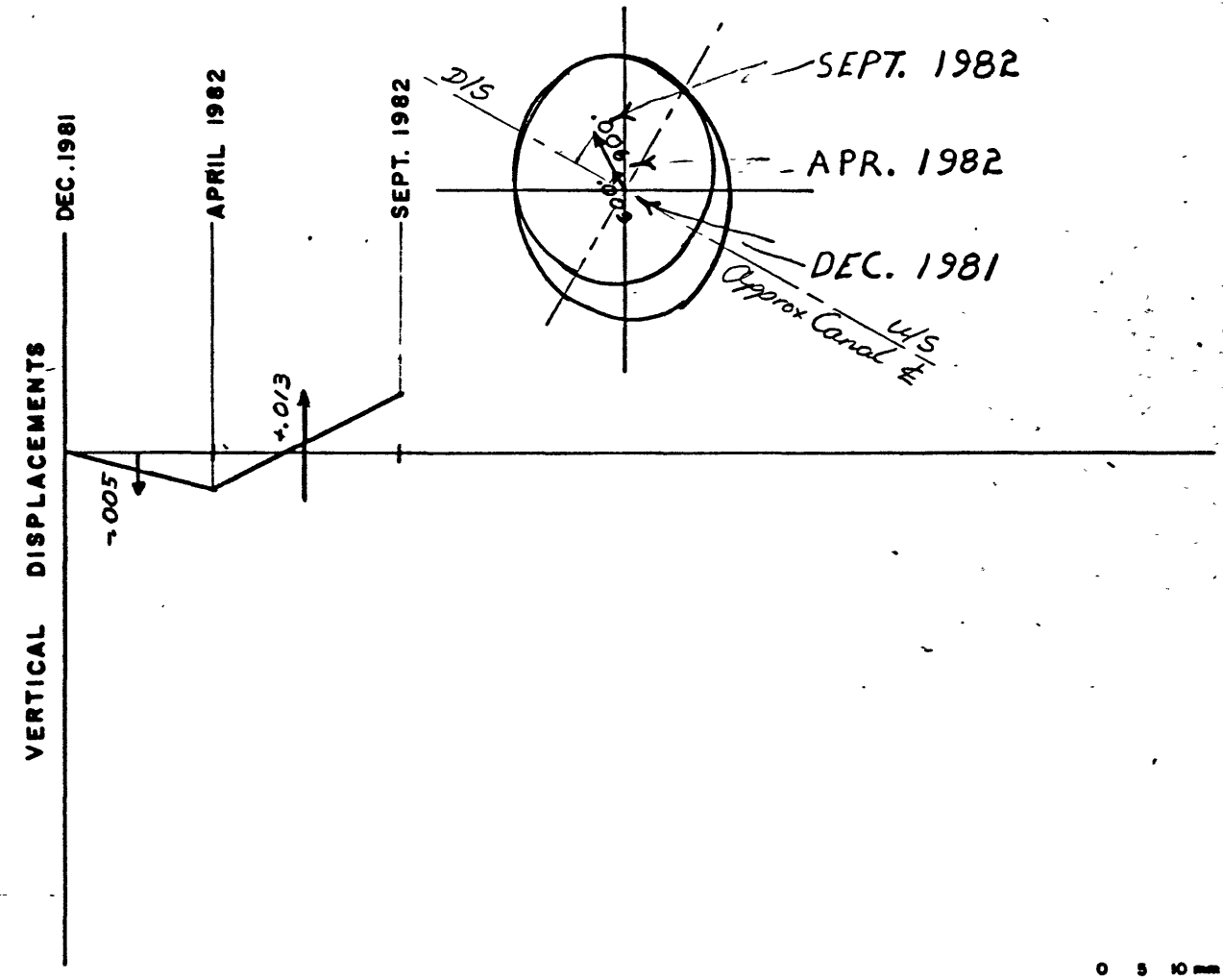
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+400 B.S. - 2	557



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 36 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+960 B.S.-5	555

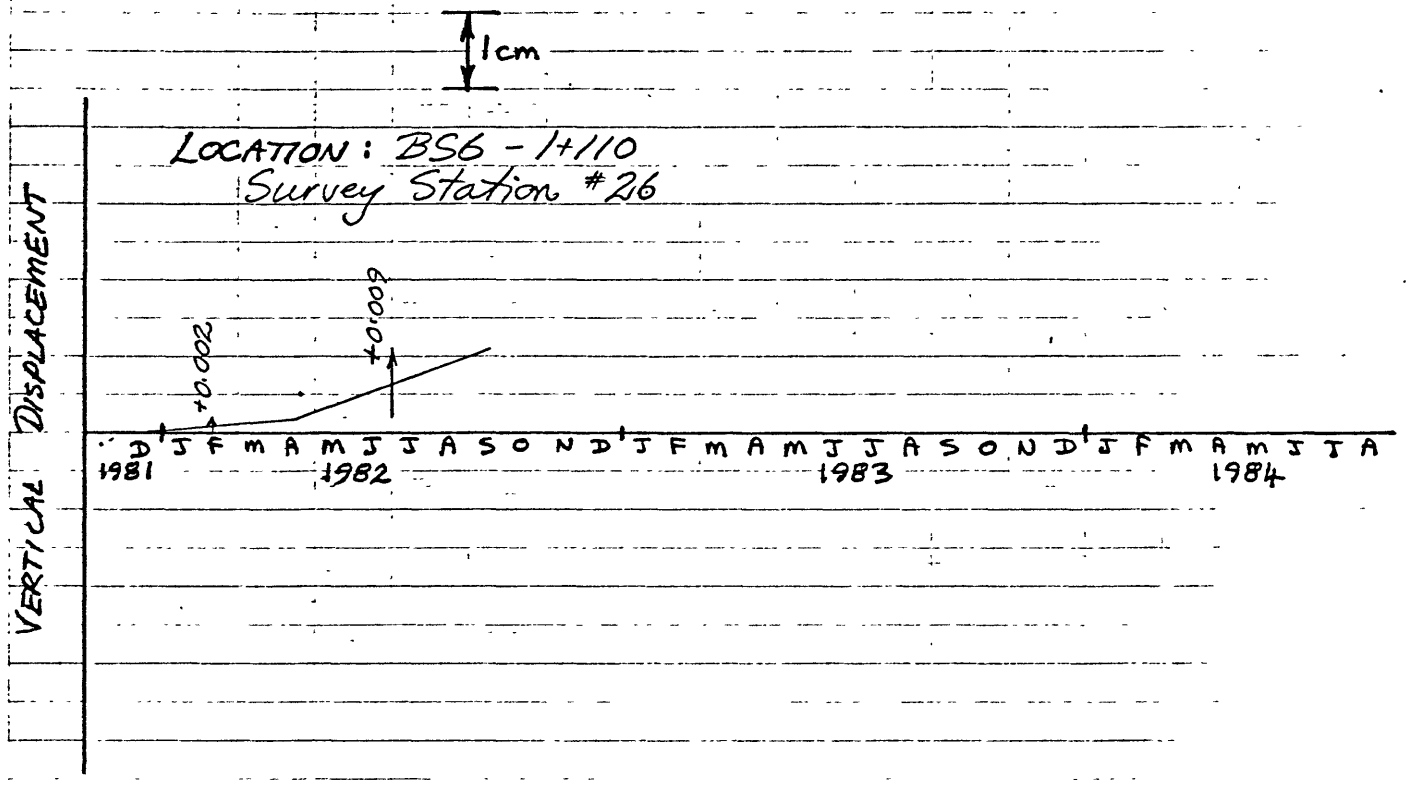


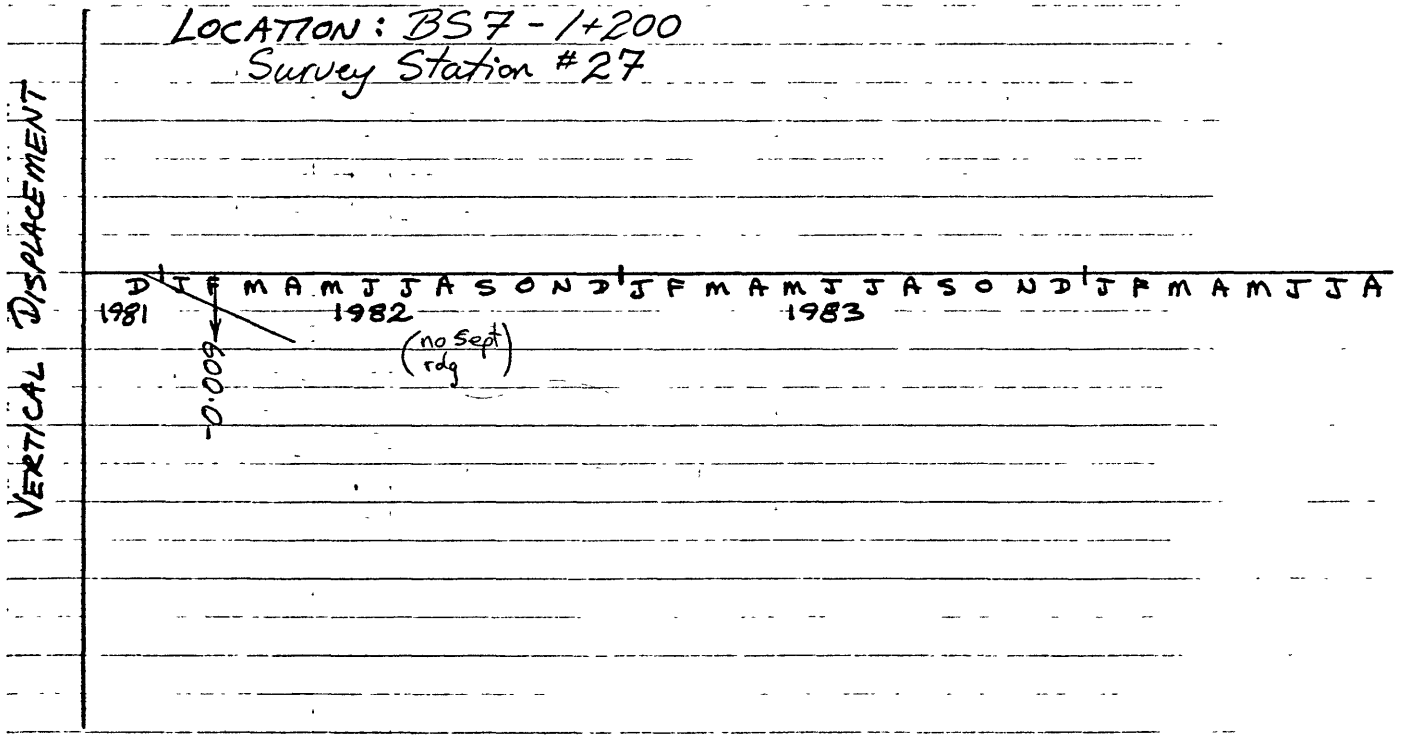
0 5 10 mm

CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 35 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

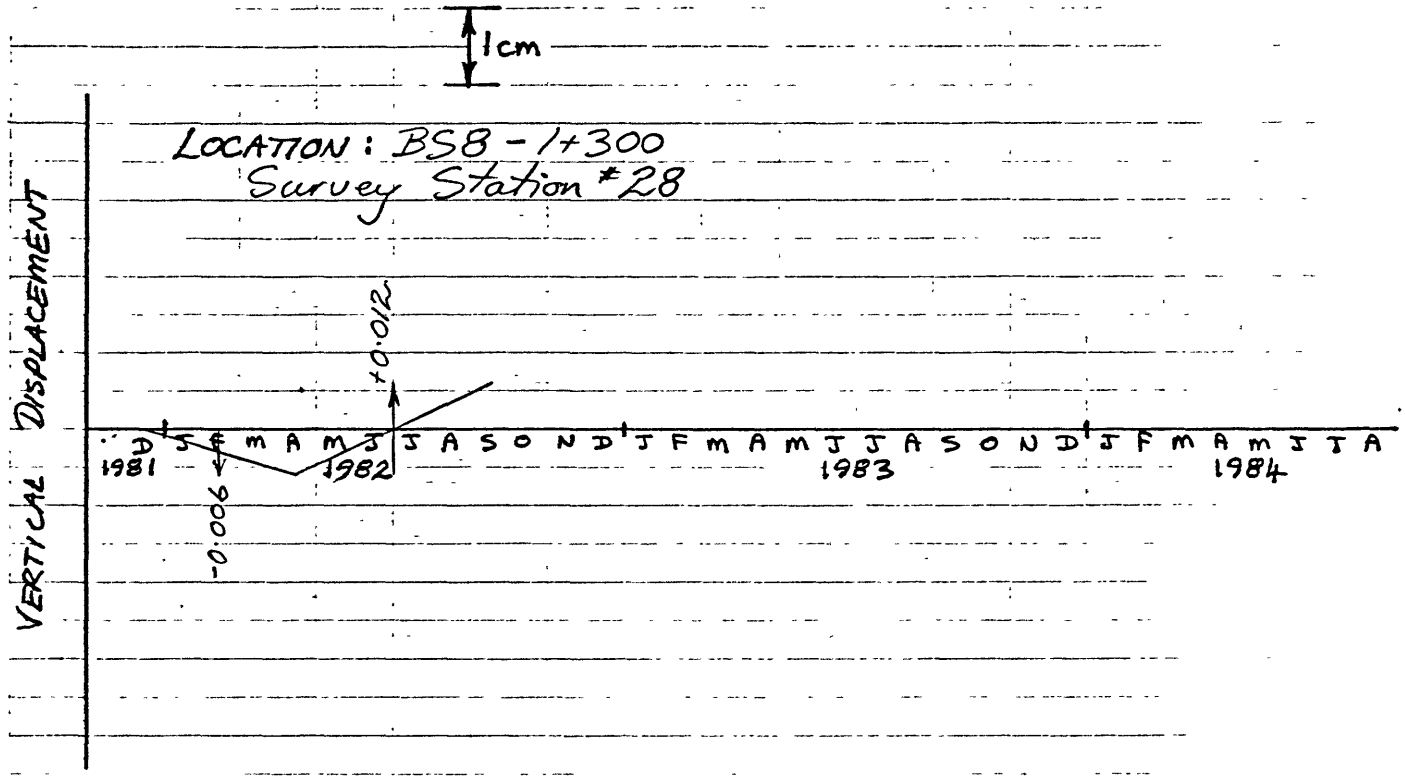
Displacement Scale 1:1

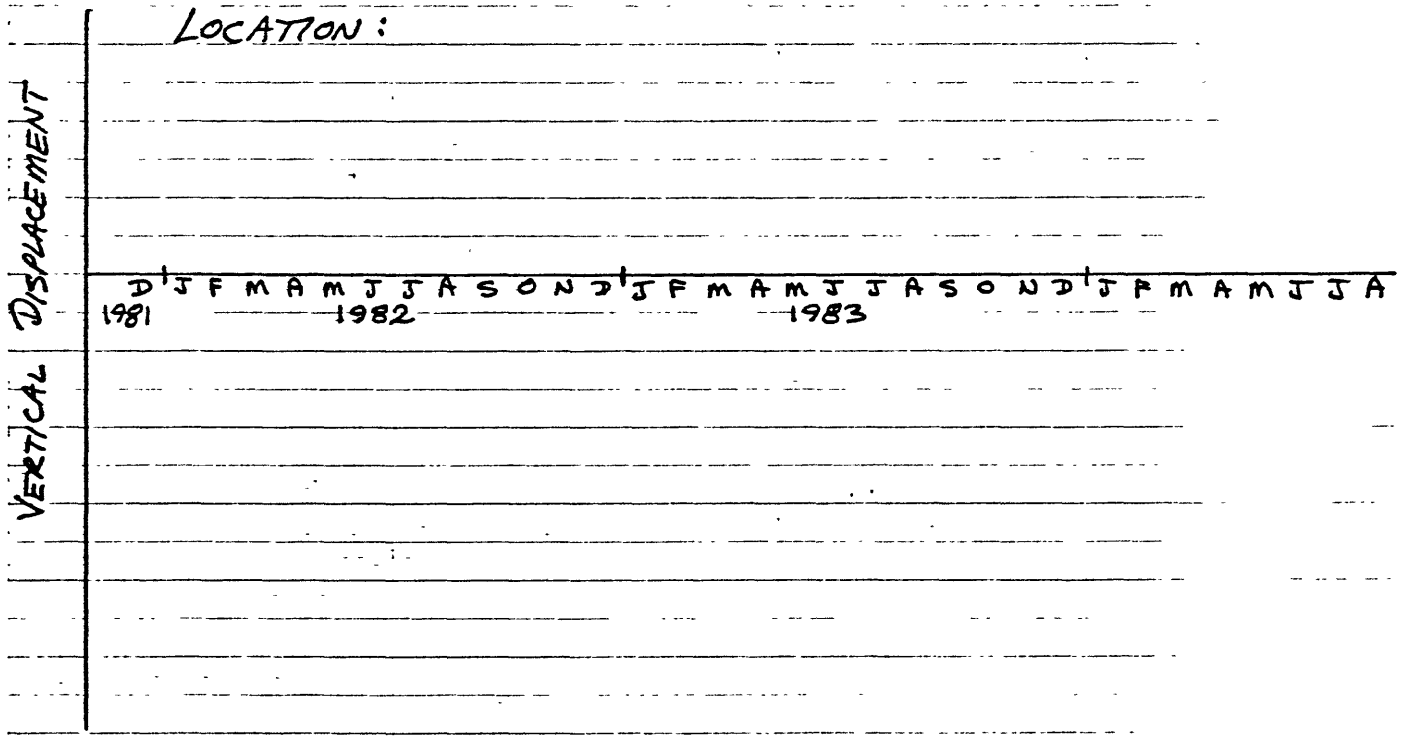




SETTLEMENT - TIME PLOTS

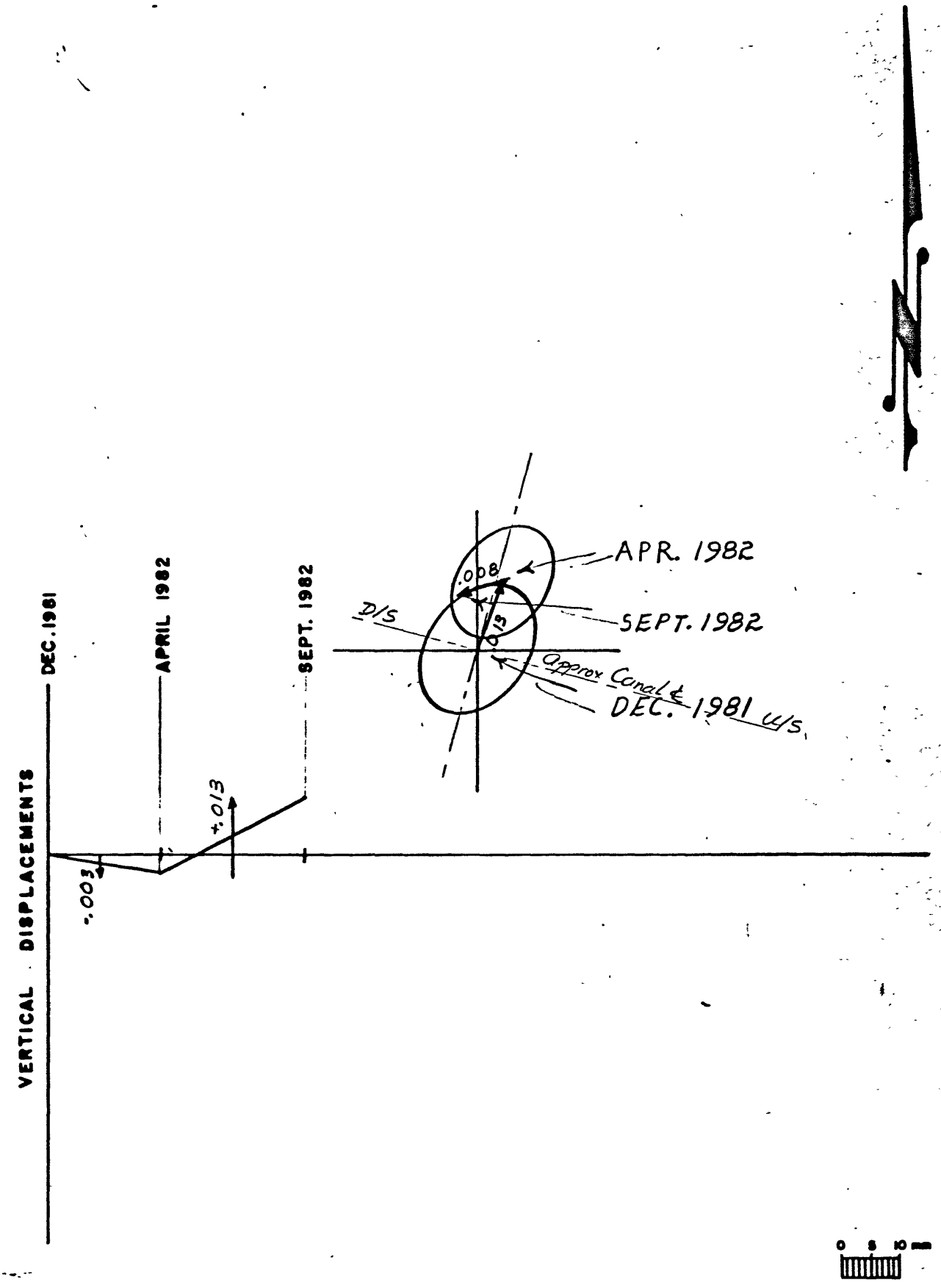
Displacement Scale 1:1





DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

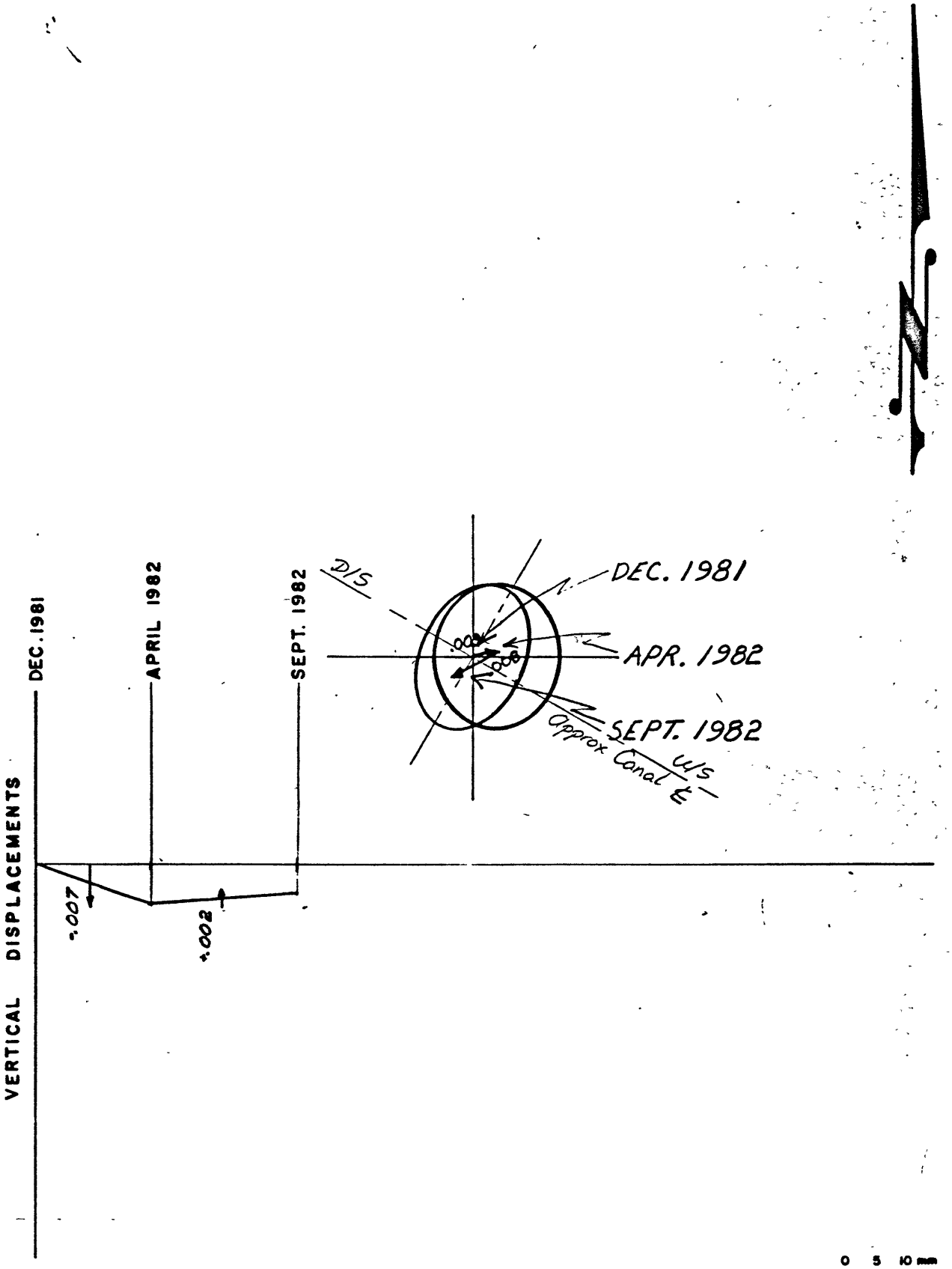
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+530 B.S. - 9	840



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 38 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

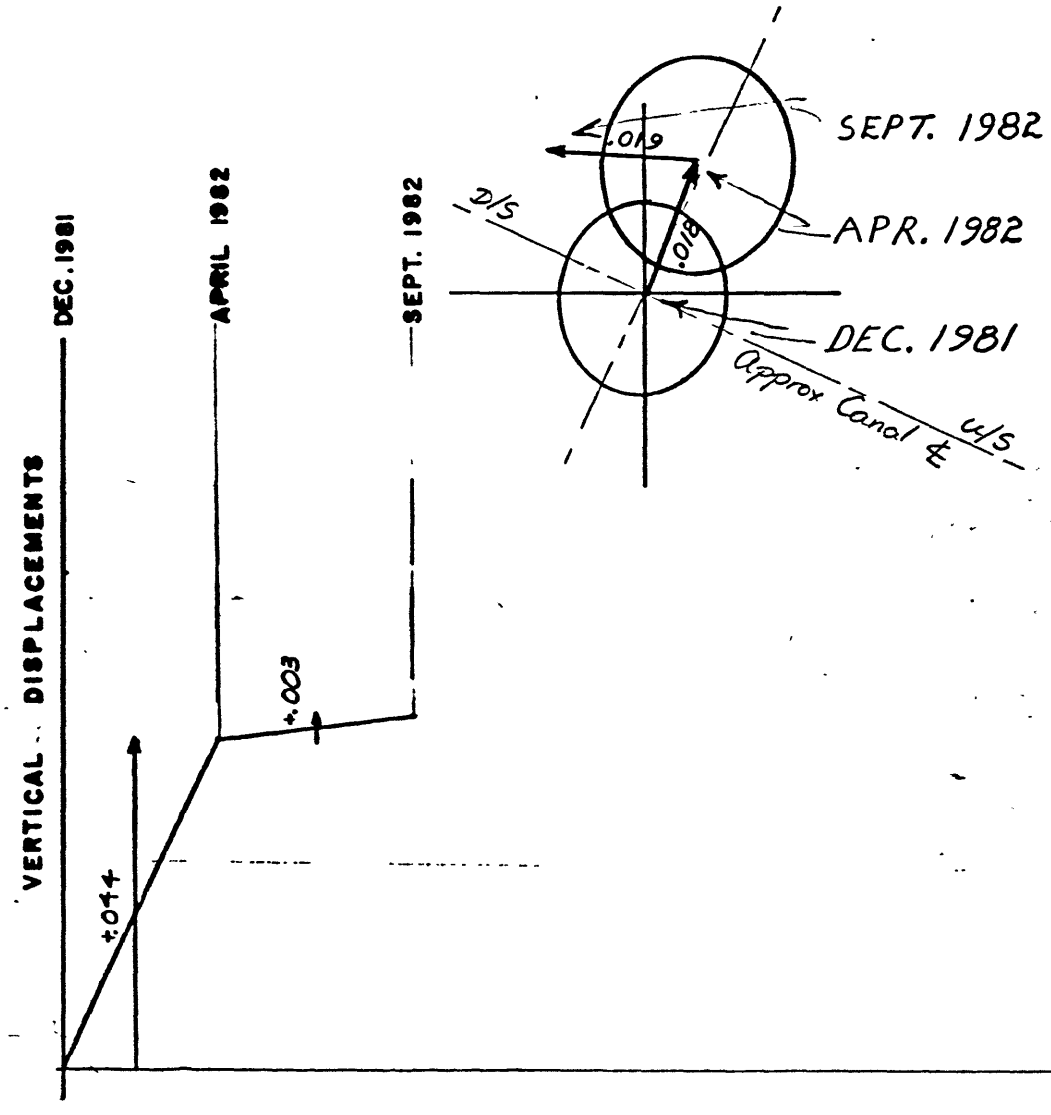
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+900 B.S. -10	414



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 17 OF 38
	DATE OCT 22, 1982	DRAWING NUMBER 134-3
	SCALE 1 : 1	

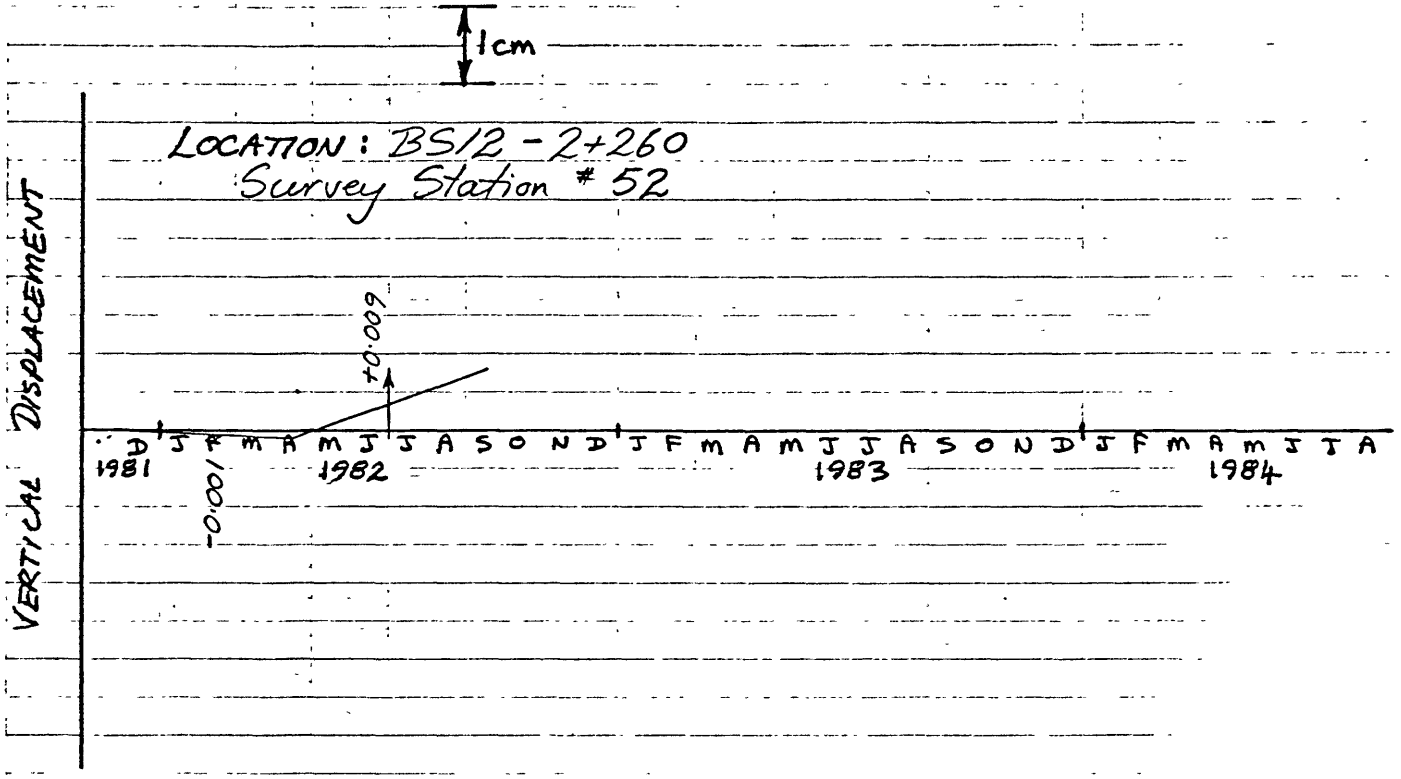
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES.	
INSTRUMENT STATION NUMBER 2+100 B.S. - 11	SURVEY STATION NUMBER 559

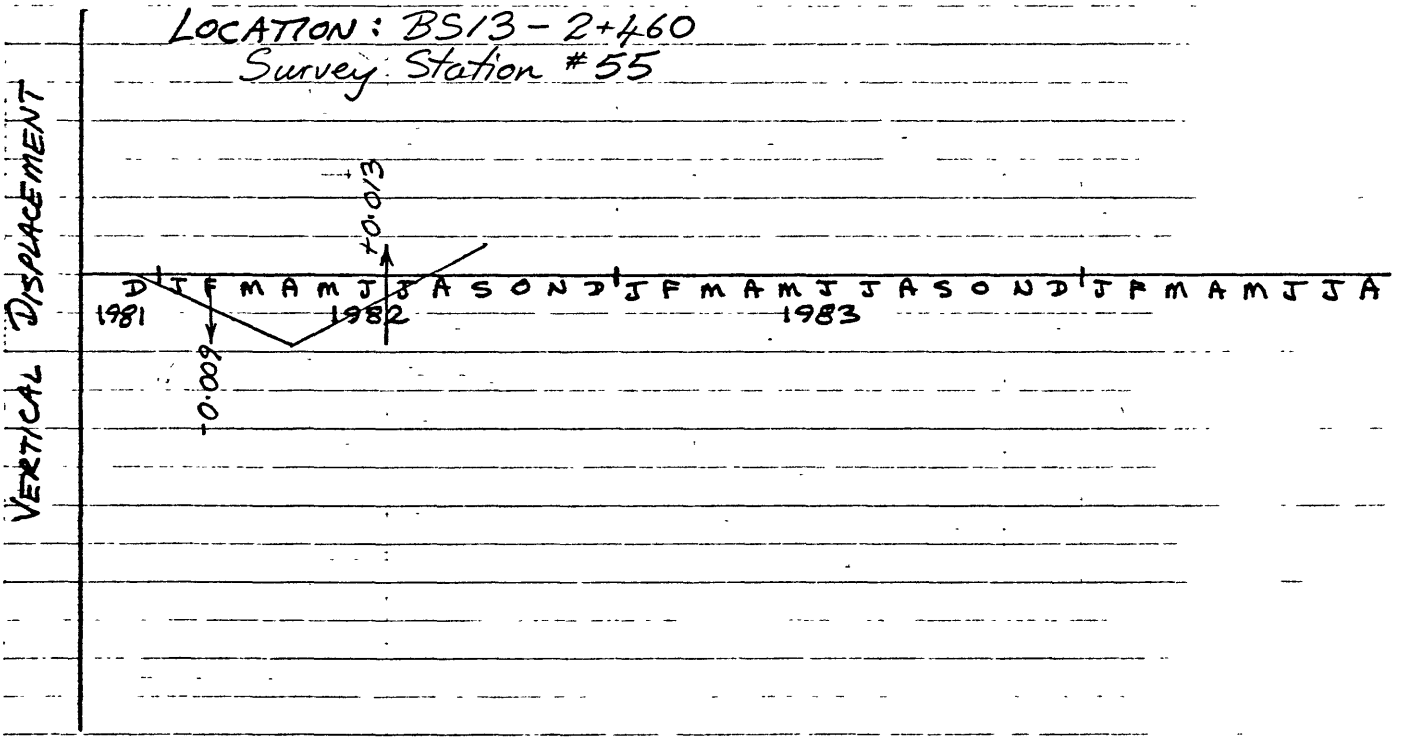


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678 DATE OCT. 22, 1982 SCALE 1:1	SHEET 37 OF 38 DRAWING NUMBER 134-3

SETTLEMENT - TIME PLOTS

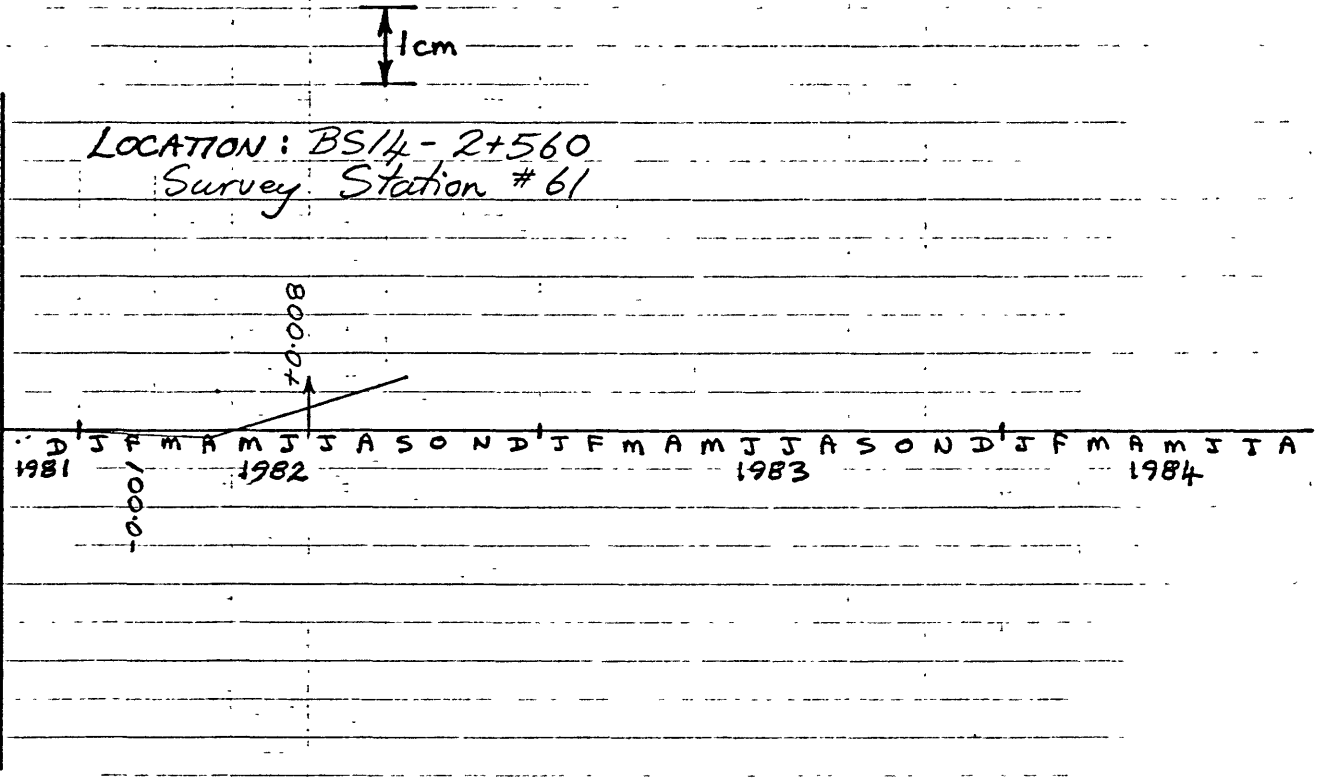
Displacement Scale 1:1

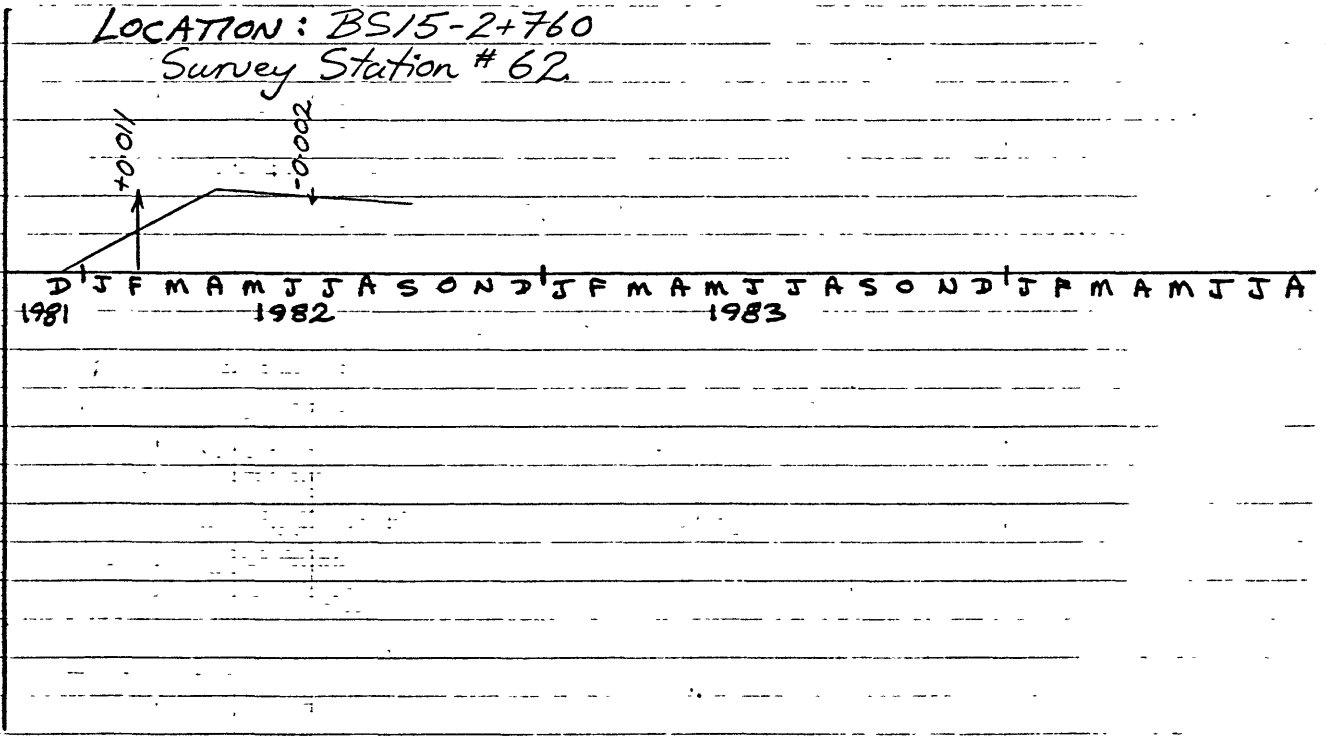




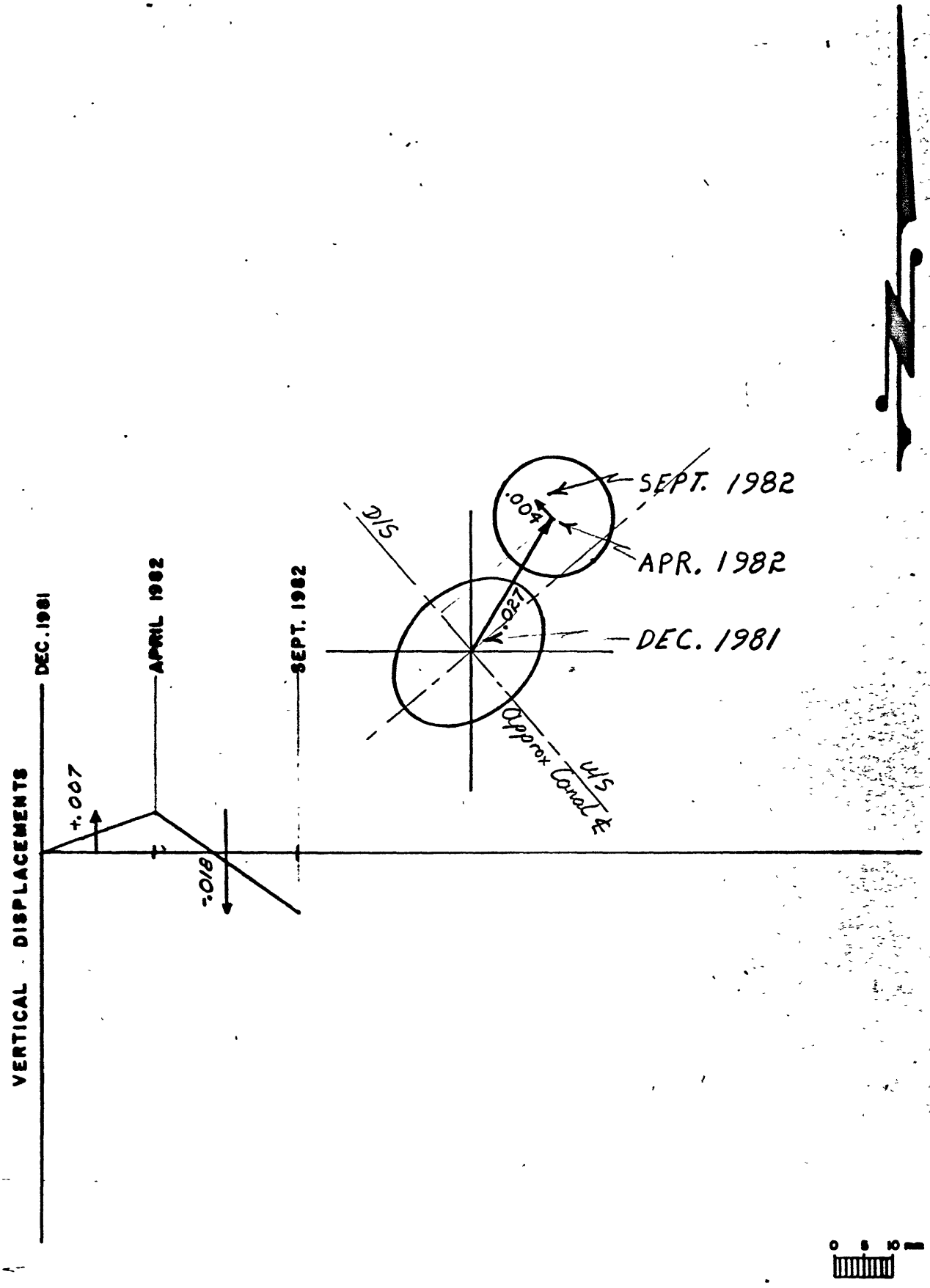
SETTLEMENT - TIME PLOTS

Displacement Scale 1:1





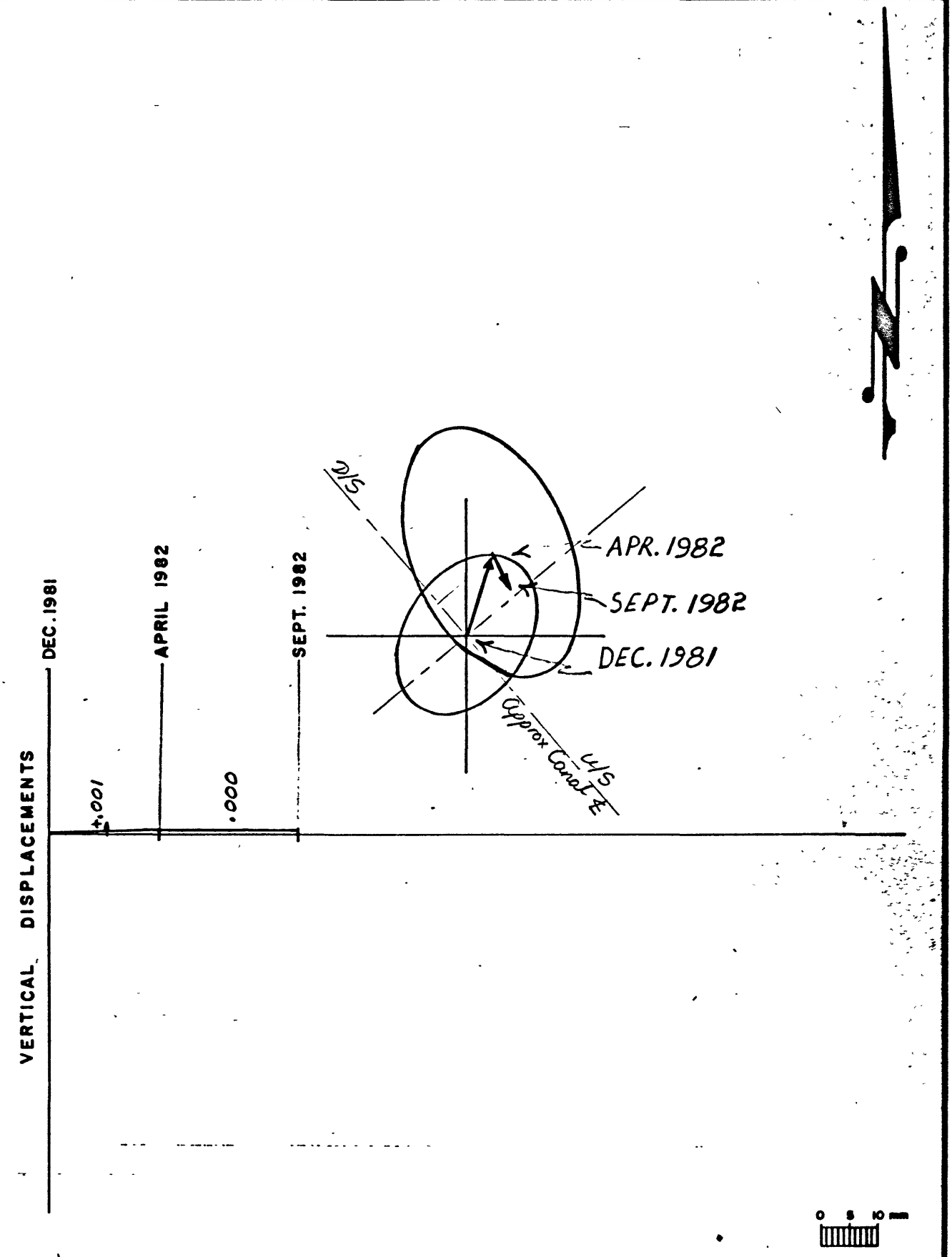
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES	
INSTRUMENT STATION NUMBER 2+900 B.S. (Lower)-16	SURVEY STATION NUMBER 553



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678 DATE OCT 22, 1982 SCALE	SHEET 34 OF 38 DRAWING NUMBER 134-3

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES.

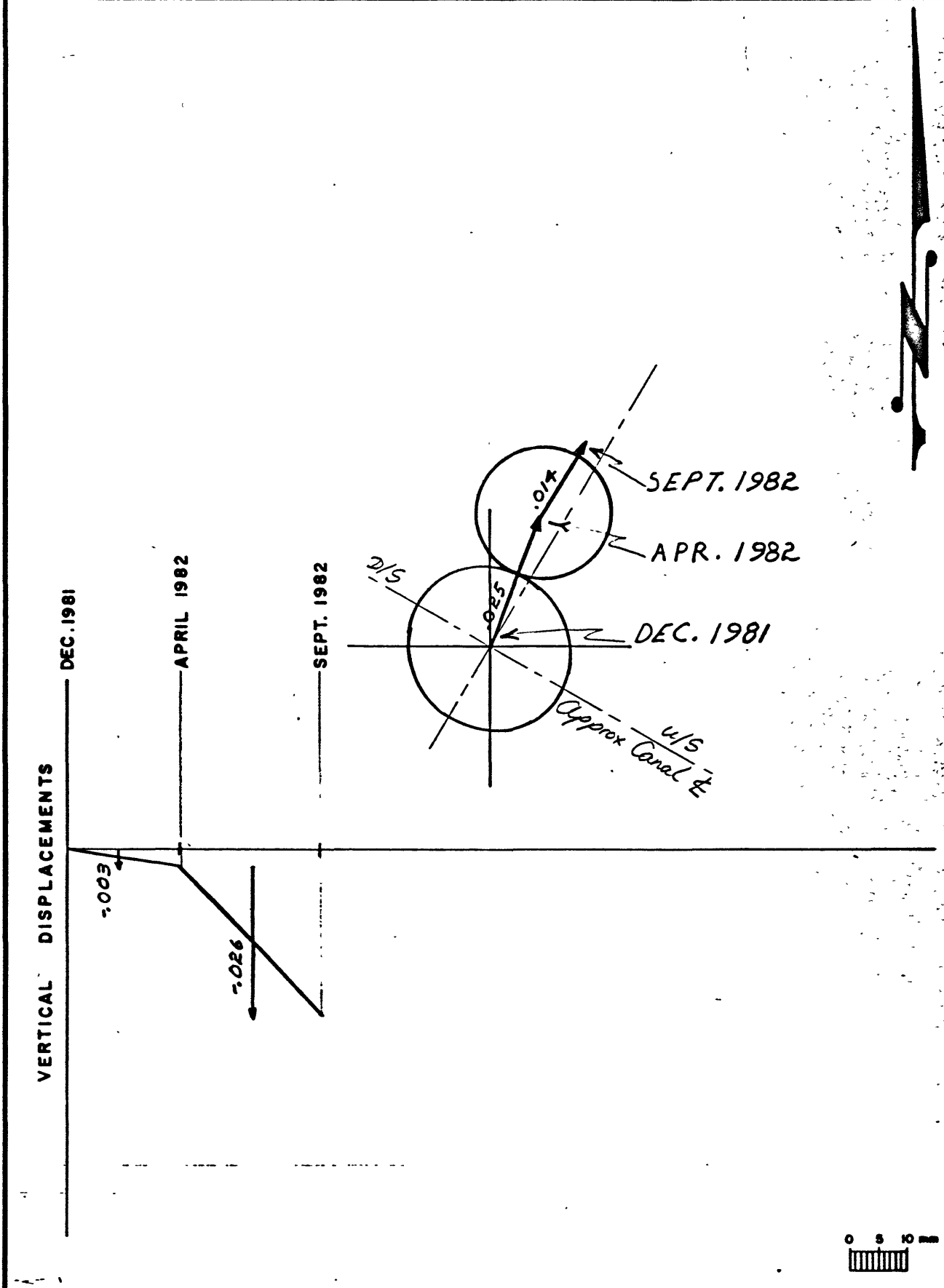
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+900 B.S. (Upper)-17	552



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 33 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

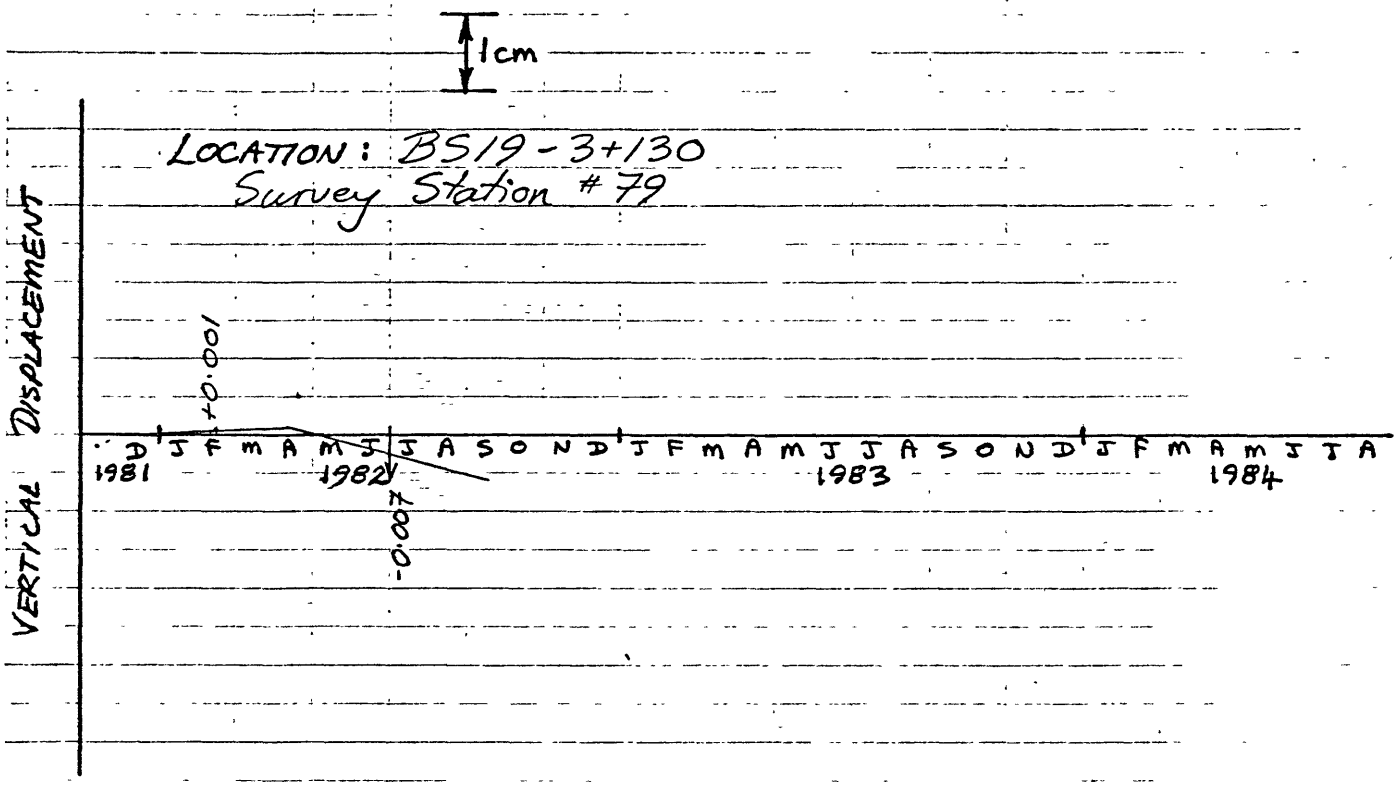
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+000 B.S. -18	551

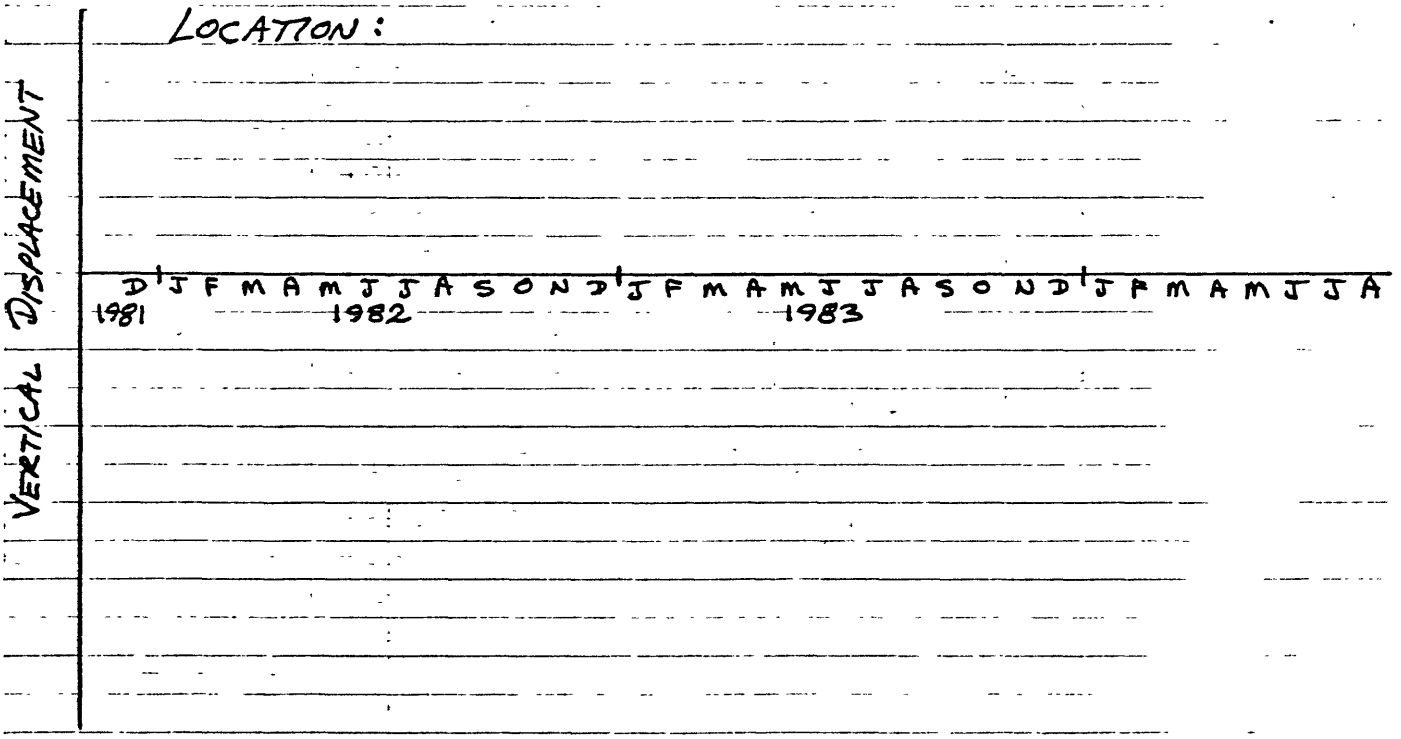


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678	SHEET 32 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

SETTLEMENT - TIME PLOTS

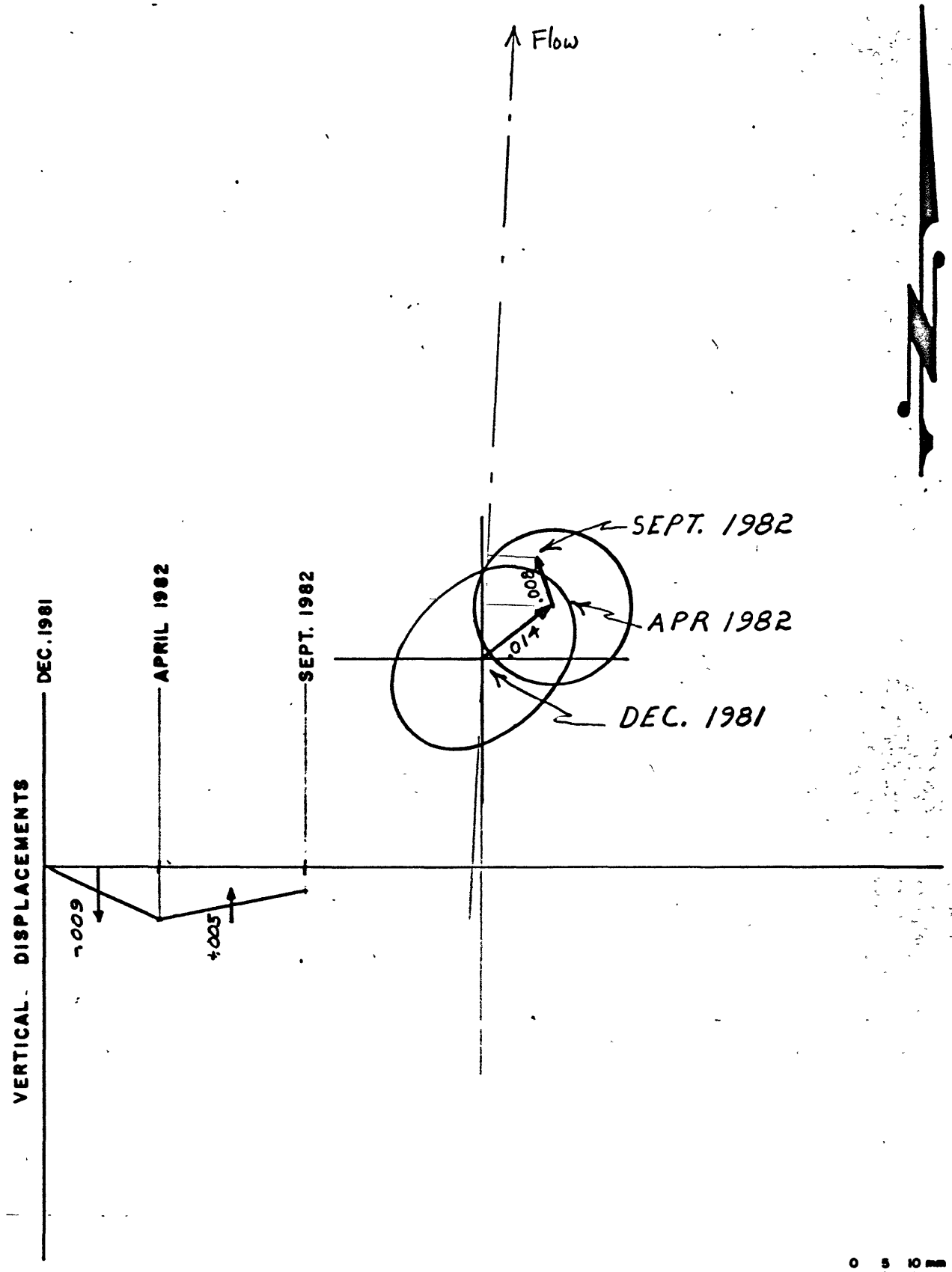
Displacement Scale 1:1





DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

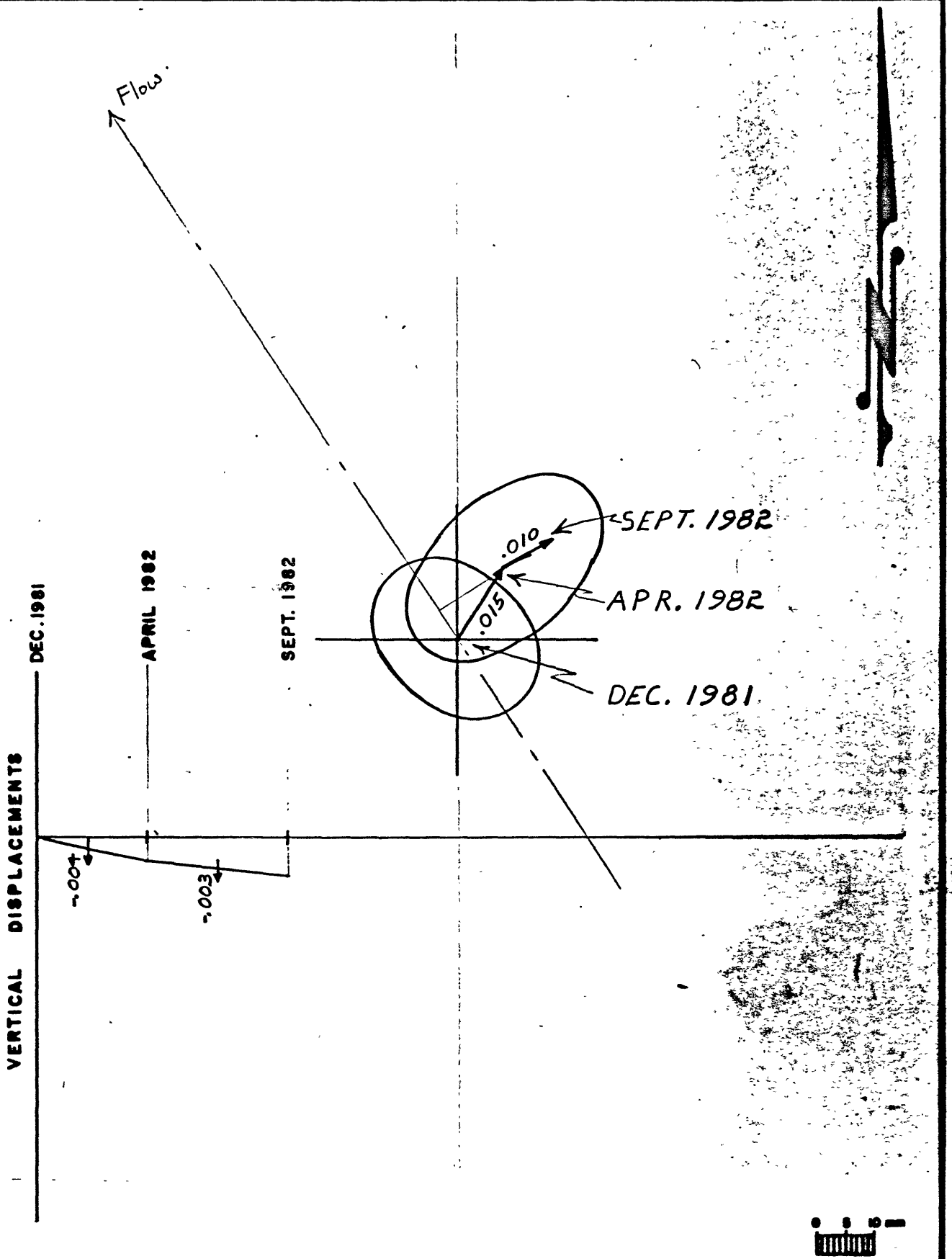
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+240 B.S. -20	495



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 23 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

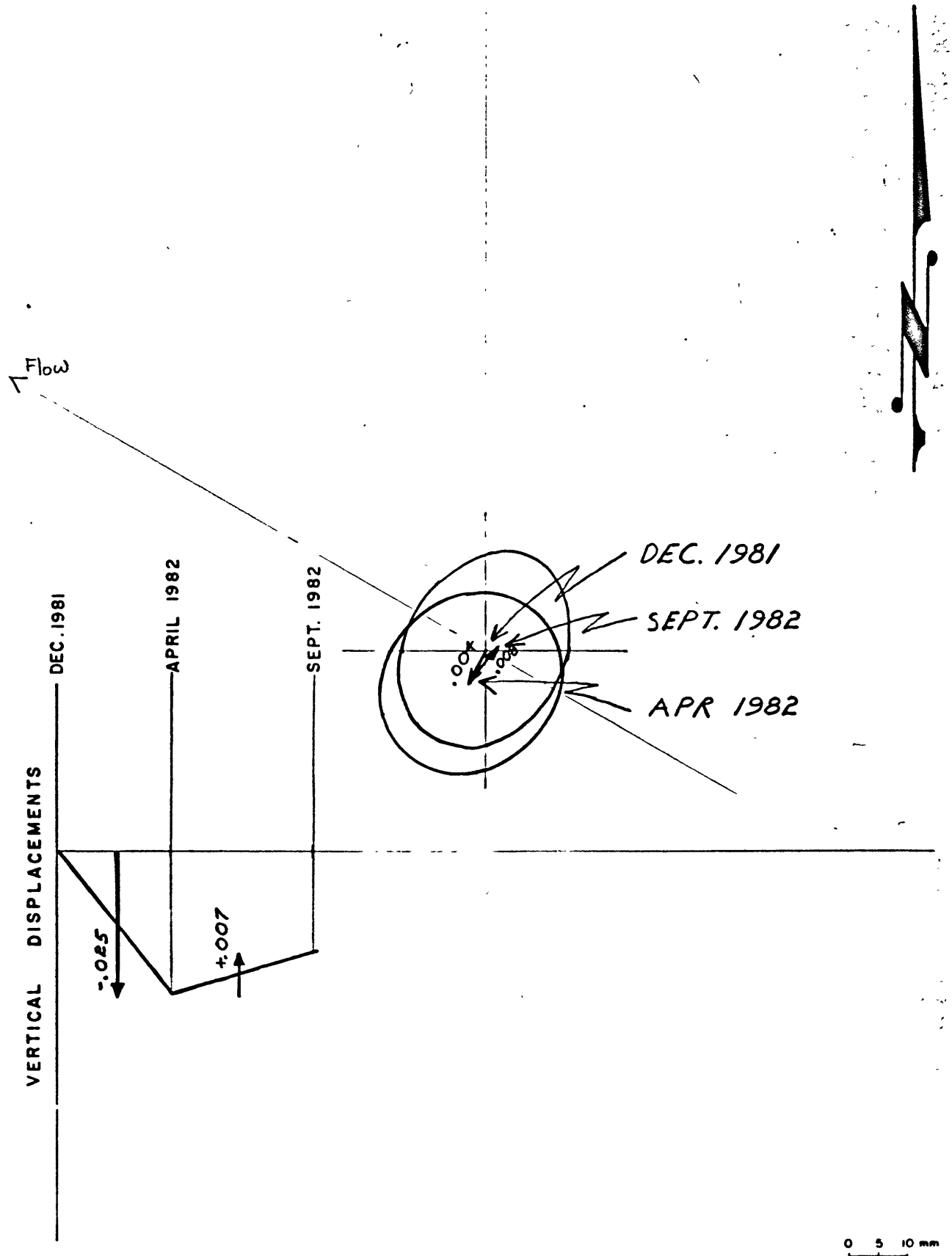
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
3+550 B.S. - 21	498



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 26 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

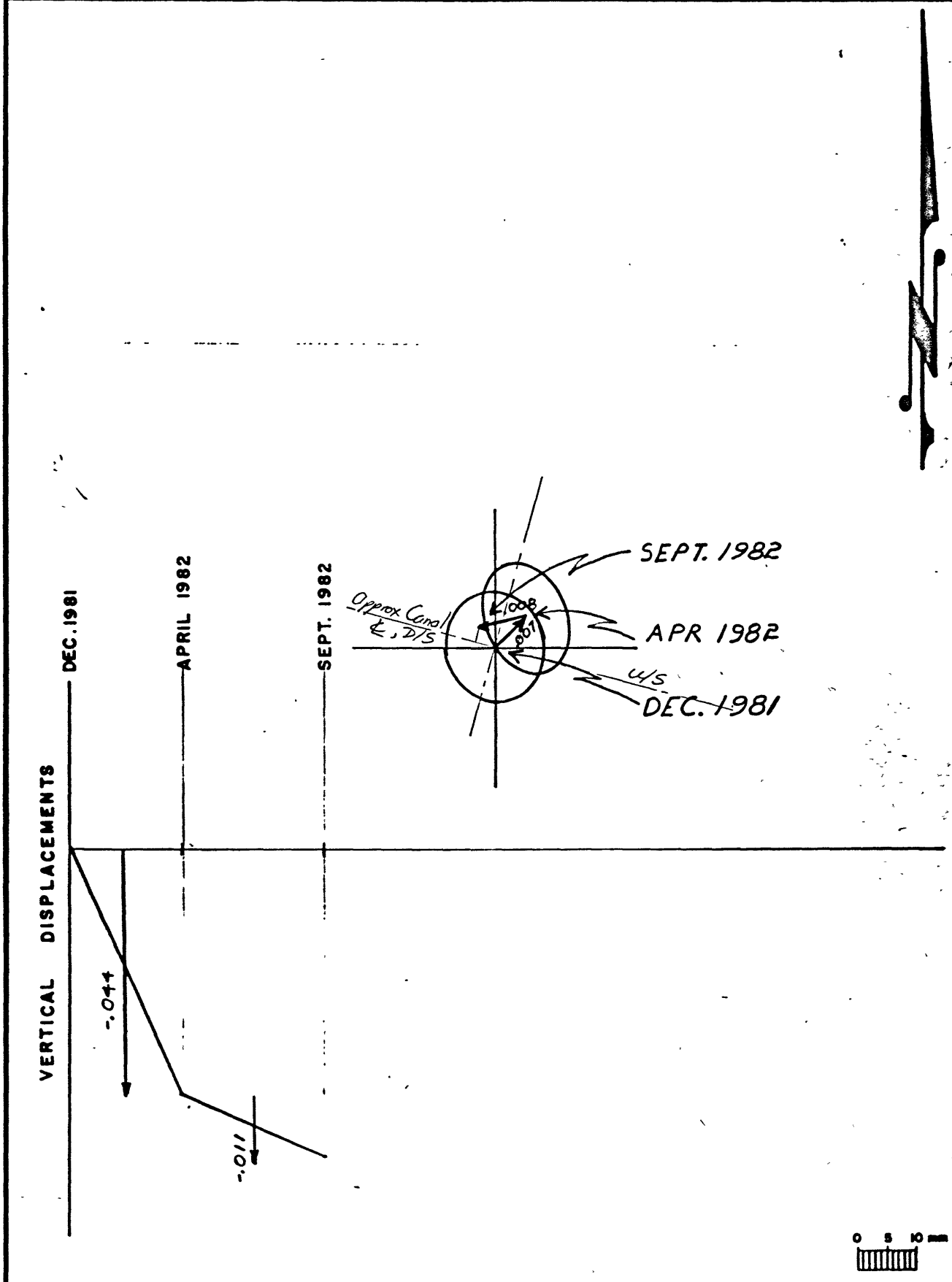
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
0+990 S.P.-1	154



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678 DATE OCT 22, 1982 SCALE	SHEET 2 OF 38 DRAWING NUMBER 134-3

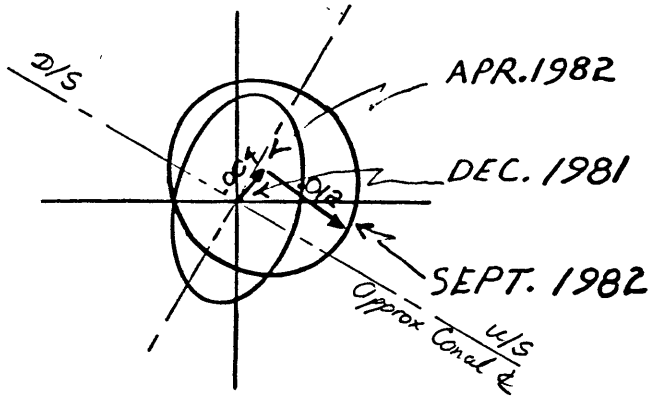
DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES	
INSTRUMENT STATION NUMBER 1+530 S.P.-2	SURVEY STATION NUMBER 157

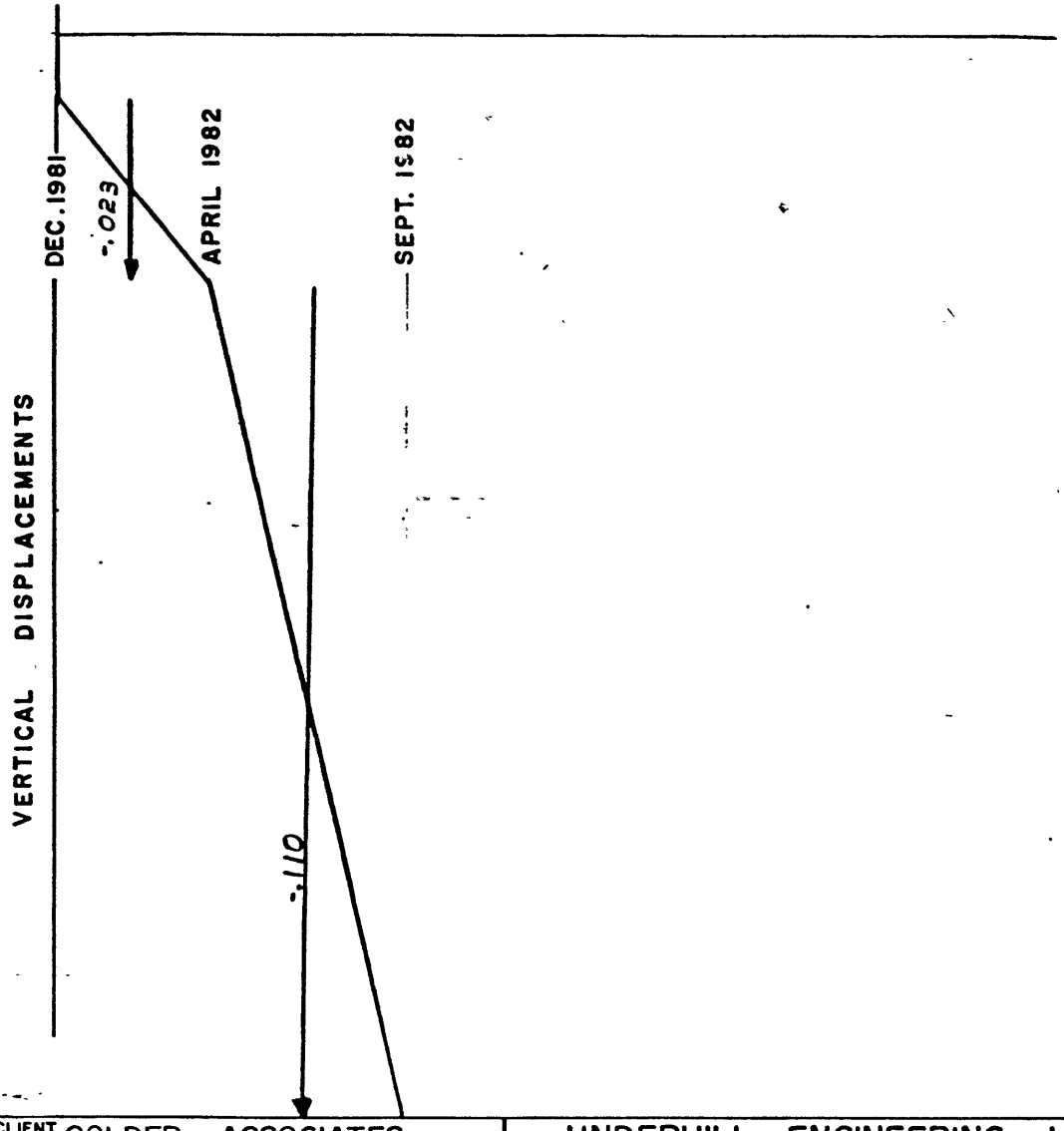


CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO Y-2678 DATE OCT. 22, 1982 SCALE 1:1	SHEET 5 OF 38 DRAWING NUMBER 134-3

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
1+900 S.P.-3	158

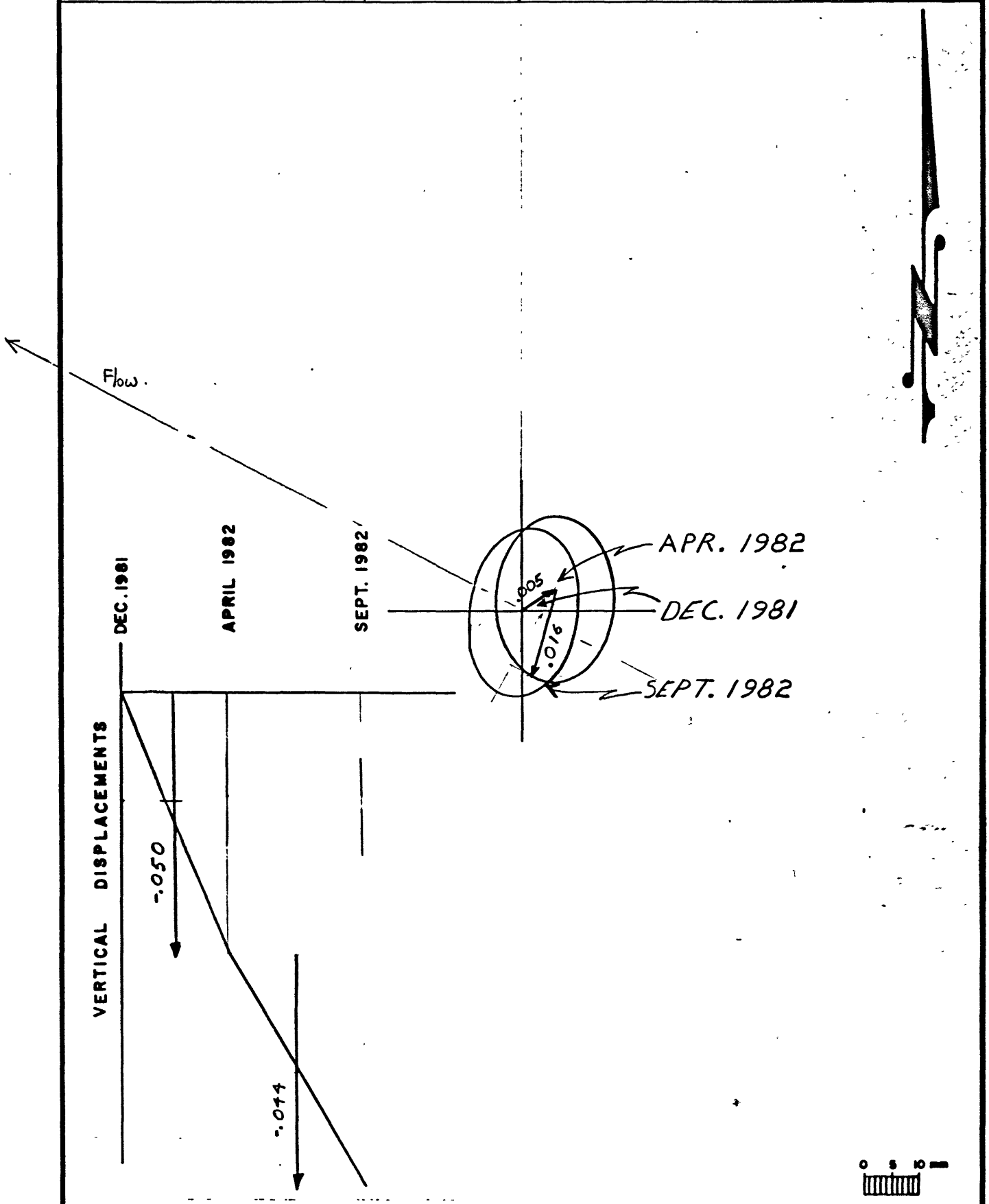




CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 6 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

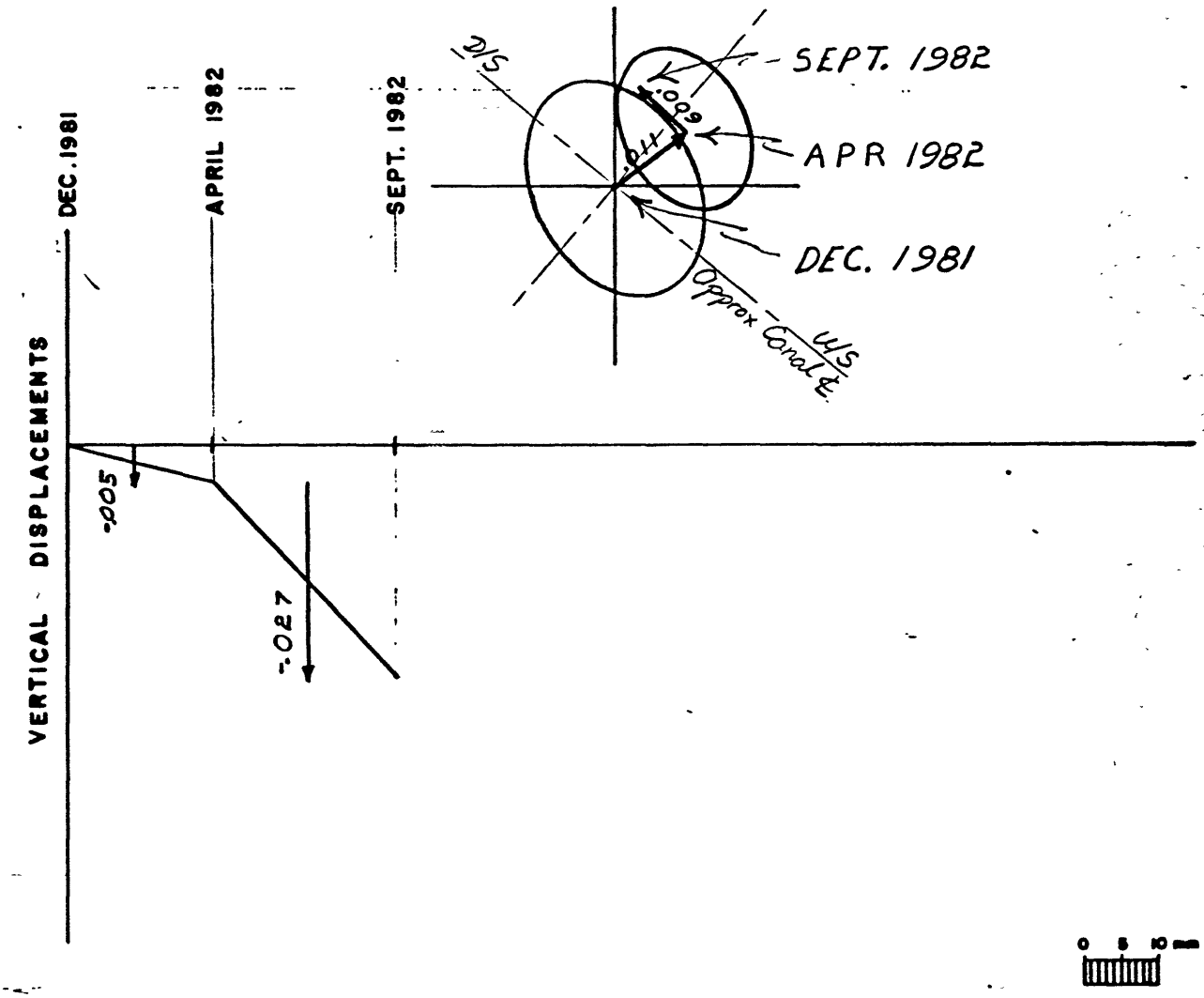
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+040 S.P.-4	408



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 11 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
2+950 S.P. -5	418

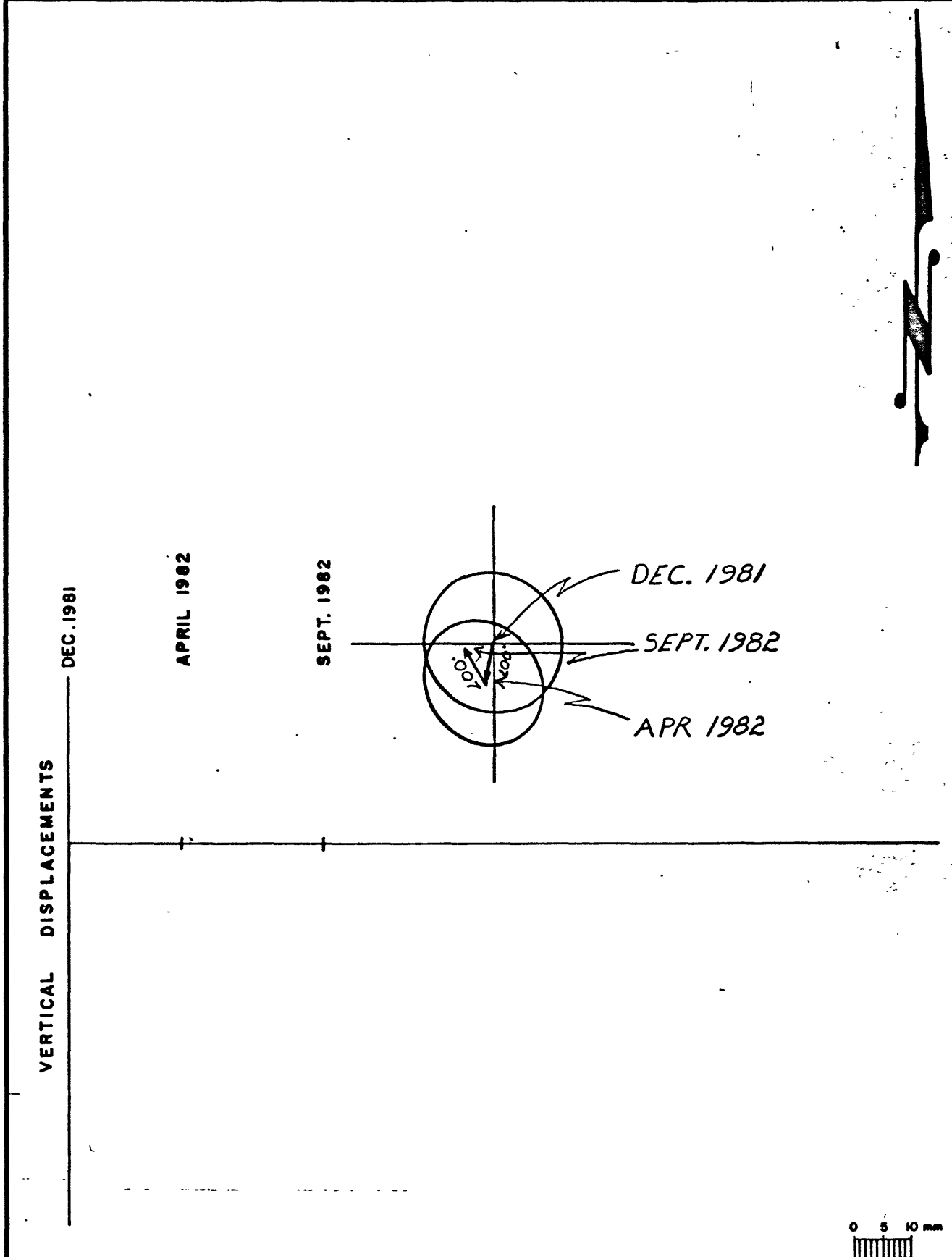


0 5 10 mm

CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 21 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

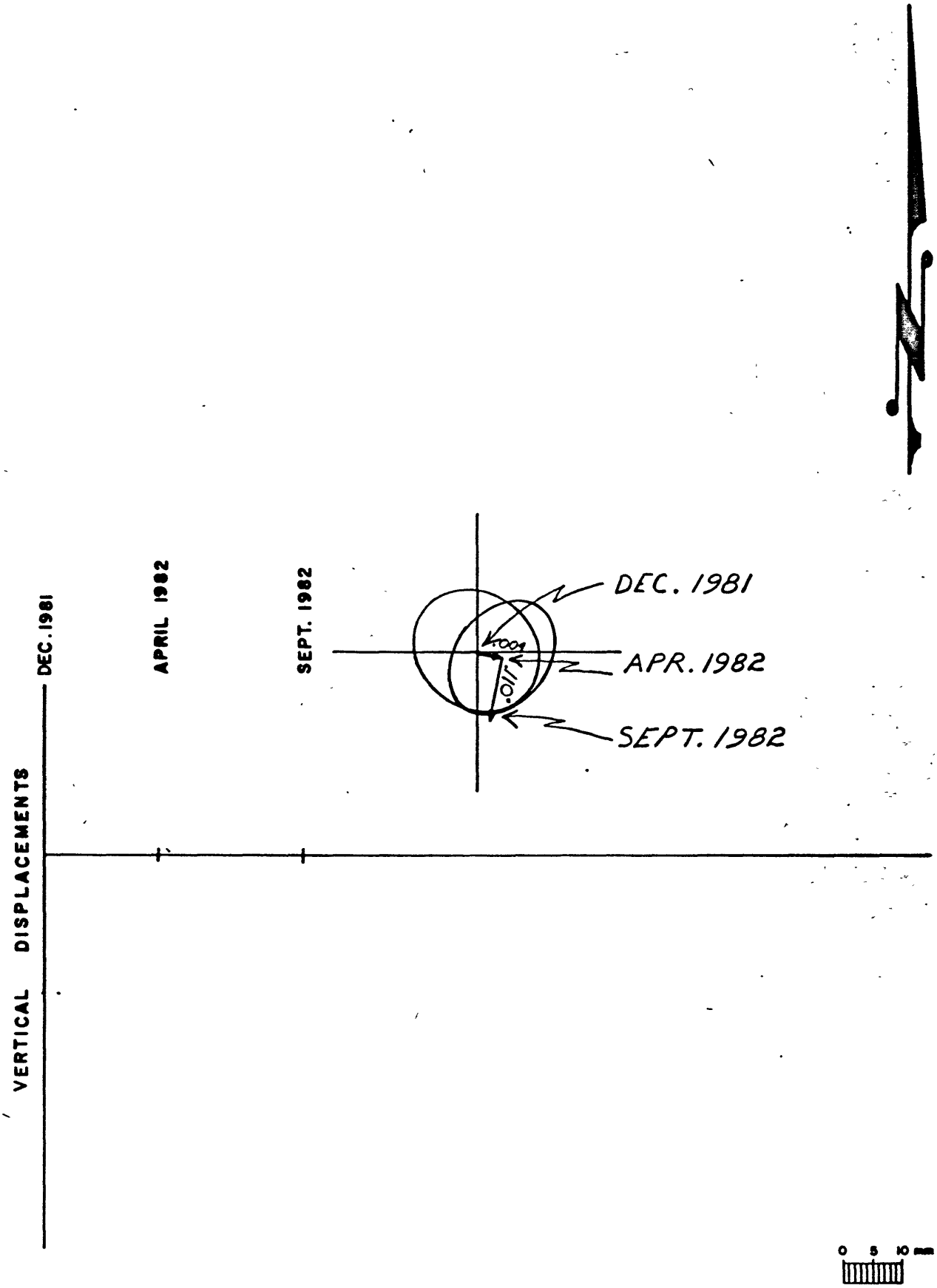
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER 290



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 8 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

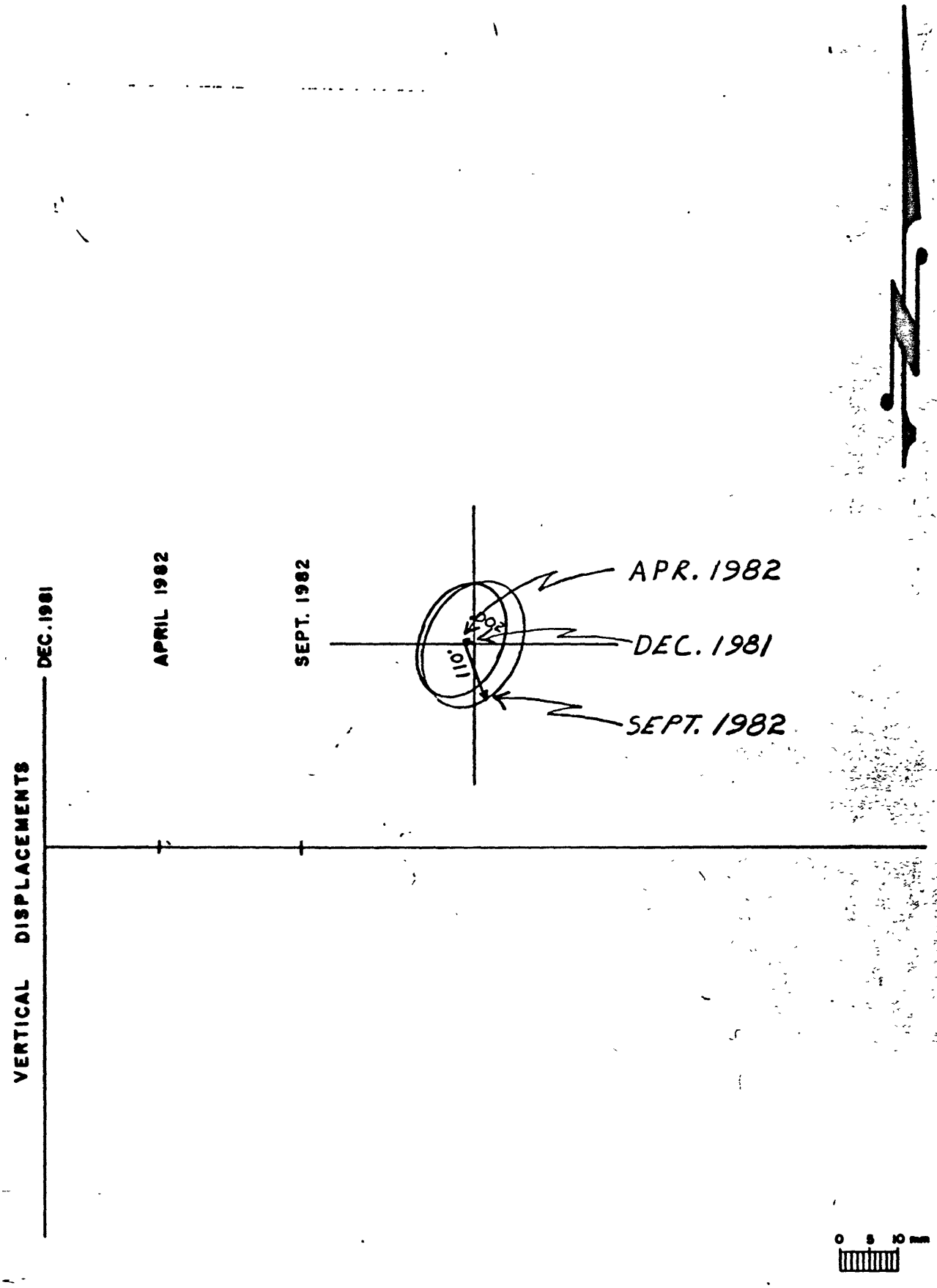
INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER
	291



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 9 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-3
	SCALE 1:1	

DISPLACEMENT VECTORS AND 95% RELATIVE ERROR ELLIPSES

INSTRUMENT STATION NUMBER	SURVEY STATION NUMBER 292



CLIENT GOLDER ASSOCIATES	UNDERHILL ENGINEERING LTD.	
PROJECT CYPRUS ANVIL DOWN VALLEY TAILINGS CONTAINMENT PROJECT	JOB NO. Y-2678	SHEET 10 OF 38
	DATE OCT. 22, 1982	DRAWING NUMBER 134-13
	SCALE 1:1	

Field Procedure and Reduction of Readings

Thermistors

The thermistor strings are read with an ohmmeter and a 'switch box' which is screwed onto the end of each thermistor string to enable a reading to be taken from each of the eight or ten thermistor tips on each string.

The readings, in kohms, are entered onto the field data sheets, Figures 1 and 2. These readings are then transferred to the office data sheets, for example Figure 3, where the reading in kohms is converted into a temperature in °C according to the thermistor calibration. Calibration sheets were supplied by 'Cantech Controls Ltd.' for almost all of the thermistor strings and on examination of these sheets it was decided to generally use a value of 16.2 kohms for a temperature of 0.0°C. There are some strings, however, where the theoretical value of 16.32 kohms for 0.0°C has been used for temperature calculations because of the absence of, or other calibration data. The theoretical values of resistance for temperatures between -50°C to +87°C are given in Figure 4. A plot of resistance versus temperature (in the range of -14°C to +9°C) for a 0.0°C value of 16.32 kohms and 16.20 kohms is presented on Figure 5.

The accuracy of the calculated temperatures is considered to be within $\pm$0.1°C.

Piezometers

a) Hydraulic (Standpipe)

The hydraulic (standpipe) piezometers are read with a water level sounder and the depth measured from the top of the P.V.C. tubing, and entered on, the Hydraulic Piezometer Reading Field Data Sheet Figure 6. These readings are then transferred to an office data sheet and

converted into a piezometric elevation and depth from ground surface, for example Figure 7.

The water elevations are measured to an accuracy of 0.01 metres.

b) Pneumatic

The pneumatic piezometers are read with a Petur Pneumatic Readout Box and recorded in p.s.i. on the 'Pneumatic Piezometer Reading Field Data Sheet' Figure 8. These readings are then transferred to an office data sheet and converted into a piezometric elevation and depth from ground surface, in metres, for example Figure 9.

The piezometers pressures are considered accurate to approx. 0.1 psi, equivalent to 0.07 metres of head of water.

Slope Indicators

The slope indicators are read with a 'Slope Indicator 1000 Inclinometer System' as per the Instruction Manual. For the correct orientation of the slope indicator probe the A+ groove on the casing has been indicated with black marker and is the groove which is predominantly in the downslope direction. The datum for depth measurements is the top of the protective steel plate, as shown in Figure 10. The readings are entered onto the "Slope Indicator Field Data Sheet' Figure 11. These readings are then transferred to 'Inclinometer Data Summary Sheets', for example Figures 12 and 13 and resultant displacements from the original position of December 1981 computed and resolved parallel and perpendicular to the canal centreline. For the purpose of calculations, the top of the slope indicator tubing is assumed to be a known point in space (determined by the survey of the horizontal movement hubs installed at each slope indicator location) and all relative computed movements are summed from the top down to the bottom of the casing.

The accuracy of the computed horizontal displacements is considered to be ±5 mm over the 10 metre length of slope indicator casing.

Incremental Settlement Rings

The depths to the incremental settlement rings are read using the Sondex sensor and readout box as per the manufacturers, instructions. The datum for the depth measurements is the same as for the slope indicator measurements, that is, the top of the protective steel plate, as shown in Figure 10. The depths are entered on to the 'Incremental Settlement Rings Field Data Sheet' Figure 14. A correction of 0.156 m has then to be subtracted from this field depth measurement to give a true depth to be entered onto the office data sheet, Figure 15, because the true distance from the first 0.5 m marker on the cable to the sondex probe sensor is only 0.343 m and not 0.5 m.

To analyse the settlement, or heaves of the soil, the distance between adjacent rings at any specific date is compared to the initial distance between the same rings as measured in December 1981. These settlements (-ve) or heaves (+ve) of each layer of soil between consecutive rings are computed on the office 'Incremental Settlement (s) Data Sheet' Figure 15. The incremental settlements for each date being the net settlement from the initial reading of December 1981.

The instrument accuracy was found to be within approximately ± 2 mm, however, the measuring procedure is very prone to field recording errors which may be all but eliminated if dual sets of readings are taken.

CYPRUS ANVIL DOWN VALLEY PROJECT

THERMISTOR READING FIELD DATA SHEET *Sheet 1 of 2*

Figure 1

Date: _____ Technician: _____

TIP No. / LOCATION	1	2	3	4	5	6	7	8	9	10
CD4 #12										
CD5 #27										
CD10 #23										
CD15 #26										
CD17 #28										
CD19 #A										
CD20 #20										
CD21 #12										
81-125 #T2										
CD24 #22										
CD25 #19										
CD26 #17										
CD27 #18										
CD28 #13										
81-96 #T1										
CD29 #16										
CD30 #15										
BS2 #1										
BS4 #2										
BS5 #3										
BS9 #4										
BS10 #5										
BS11 #6										
BS12 #10										
BS15 #9										
BS16 #7										
BS17 #14										
BS18 #8										
SP2 #21										
SP3 #25										
SP5 #24										

CYPRUS ANVIL DOWN VALLEY PROJECT

THERMISTOR READING FIELD DATA SHEET *Sheet 2 of 2*

Figure 2

Date: _____ Technician: _____

TIP No. / LOCATION	1	2	3	4	5	6	7	8	9	10
ID7 #11										
CVDB #'B'										
79-20										
CVDC1 #30										
CVDC6 #32										
CVDC11 #29										
CVDT4 #31										

Figure 3

CYPRUS ANVIL DOWN VALLEY PROJECT

Thermistor (T) Data Sheet

LOCATION: CD4-0+400 747.2 mN 2,057.0 mE

THERMISTOR STRING No. 12 Ground Elevation: 1089.7m Subex at 4.0m

TIP No.	1	2	3	4	5	6	7	8	9	10	
DEPTH (m)	0.8	1.8	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	
Calibration at 0°C Ice Bath(1)	16.17	16.18	16.17	16.17	16.11	16.19	16.18	16.17	16.18	16.17	
	16.17	16.18	16.17	16.17	16.11	16.19	16.18	16.17	16.18	16.18	
DATE / KOHMS / *Temp.°C											
15 Nov '81	16.51 kΩ	15.52	14.85	14.35	14.02	14.03	14.16	14.43	14.82	15.22	D.K., B.P.
	-0.4°C	+0.8	+1.7	+2.4	+2.8	+2.8	+2.7	+2.3	+1.7	+1.2	
9 Dec '81	19.01 kΩ	16.22	15.62	15.03	14.58	14.52	14.64	14.86	15.16	15.53	D.K., D.G.
	-3.1°C	0.0	+0.7	+1.5	+2.0	+2.1	+2.0	+1.7	+1.3	+0.8	
16 Mar '82	27.7	24.7	21.8	17.95	16.15	16.06	15.92	15.88	15.91	15.97	D.K.
	-10.1	-8.0	-5.7	-2.0	0.0	+0.1	+0.3	+0.4	+0.3	+0.3	
27 May '82	16.36	17.41	17.63	17.10	16.30	16.25	16.13	16.08	16.08	16.07	KM
	-0.2	-1.4	-1.7	-1.1	-0.2	-0.1	+0.1	+0.1	+0.1	+0.1	
25 Aug '82	10.28	11.34	12.92	15.27	16.22	15.31	13.86	12.85	12.21	11.70	KM.
	+9.0	+7.1	+4.4	+1.1	-0.1	+1.1	+3.1	+4.5	+5.6	+6.4	
8 Nov '82	16.28	15.61	15.26	15.11	14.98	14.74	14.30	14.12	14.37	14.94	KM
	-0.1	+0.7	+1.1	+1.3	+1.5	+1.8	+2.4	+2.7	+2.3	+1.6	

(1.) Readings in KOHMS. (Two sets of calibration readings were taken)

* Temperature calculated using a mean value of 16.20kΩ for 0°C, calculated using the 0°C ice bath calibration sheets supplied by "Cantech Controls Ltd." for each thermistor string.

** Indicates thermistor for which the ice bath calibration differs more than 0.2kΩ from the mean of 16.20kΩ

CD4-0+400

Figure. 4

TEMPERATURE °C	RESISTANCE KOHMS	TEMPERATURE °C	RESISTANCE KOHMS		TEMPERATURE °C	RESISTANCE KOHMS
-50.00000	335.61768	0.0	16.32468	16.20	50.00000	1.80075
-49.00000	312.78369	1.00000	15.51389	15.39	51.00000	1.73374
-48.00000	291.45239	2.00000	14.74827	14.62	52.00000	1.66957
-47.00000	271.56787	3.00000	14.02511	13.90	53.00000	1.60812
-46.00000	253.07468	4.00000	13.34173	13.22	54.00000	1.54926
-45.00000	236.01790	5.00000	12.69546	12.57	55.00000	1.49285
-44.00000	220.30235	6.00000	12.08407	11.96	56.00000	1.43879
-43.00000	205.75526	7.00000	11.50569	11.39	57.00000	1.38697
-42.00000	192.28520	8.00000	10.95845	10.84	58.00000	1.33730
-41.00000	179.80070	9.00000	10.44051	0.49	59.00000	1.28967
-40.00000	168.21031	10.00000	9.95000	0.46	60.00000	1.24400
-39.00000	157.42944	11.00000	9.48518	0.45	61.00000	1.20018
-38.00000	147.40097	12.00000	9.04467	0.41	62.00000	1.15810
-37.00000	138.07457	13.00000	8.62722	0.40	63.00000	1.11767
-36.00000	129.39990	14.00000	8.23156	0.37	64.00000	1.07875
-35.00000	121.32671	15.00000	7.85642		65.00000	1.04126
-34.00000	113.80490	16.00000	7.50055.		66.00000	1.00507
-33.00000	106.79239	17.00000	7.16278		67.00000	0.97016
-32.00000	100.25612	18.00000	6.84207		68.00000	0.93655
-31.00000	94.16351	19.00000	6.53737		69.00000	0.90427
-30.00000	88.48207	20.00000	6.24763		70.00000	0.87337
-29.00000	83.17928	21.00000	5.97183		71.00000	0.84389
-28.00000	78.22392	22.00000	5.70899		72.00000	0.81584
-27.00000	73.59254	23.00000	5.45862		73.00000	0.78915
-26.00000	69.26427	24.00000	5.22038		74.00000	0.76374
-25.00000	65.21825	25.00000	4.99396		75.00000	0.73949
-24.00000	61.43362	26.00000	4.77900		76.00000	0.71631
-23.00000	57.88953	27.00000	4.57518		77.00000	0.69410
-22.00000	54.56819	28.00000	4.38200		78.00000	0.67275
-21.00000	51.45627	29.00000	4.19873		79.00000	0.65218
-20.00000	48.54085	30.00000	4.02460		80.00000	0.63227
-19.00000	45.80905	31.00000	3.85887		81.00000	0.61294
-18.00000	43.24794	32.00000	3.70077		82.00000	0.59407
-17.00000	40.84489	33.00000	3.54959		83.00000	0.57557
-16.00000	38.58974	34.00000	3.40495		84.00000	0.55735
-15.00000	36.47342 1.98	35.00000	3.26666		85.00000	0.53929
-14.00000	34.48688	36.00000	3.13449		86.00000	0.52131
-13.00000	32.62105 1.75	37.00000	3.00824		87.00000	0.50329
-12.00000	30.86691	38.00000	2.88770			
-11.00000	29.21640	39.00000	2.77264			
-10.00000	27.66348 1.4614	40.00000	2.66283			
-9.00000	26.20238	41.00000	2.55801			
-8.00000	24.82733	42.00000	2.45792			
-7.00000	23.53259	43.00000	2.36231			
-6.00000	22.31244	44.00000	2.27094			
-5.00000	21.16231 21.04	45.00000	2.18359			
-4.00000	20.07825 19.93	46.00000	2.10008			
-3.00000	19.05634 18.93	47.00000	2.02022			
-2.00000	18.09267 17.97	48.00000	1.94383			
-1.00000	17.18333 17.06	49.00000	1.87073			
0.00000	0.86					

#1 : 50' - at 0°C reading is - 16.32 long wire sticking up

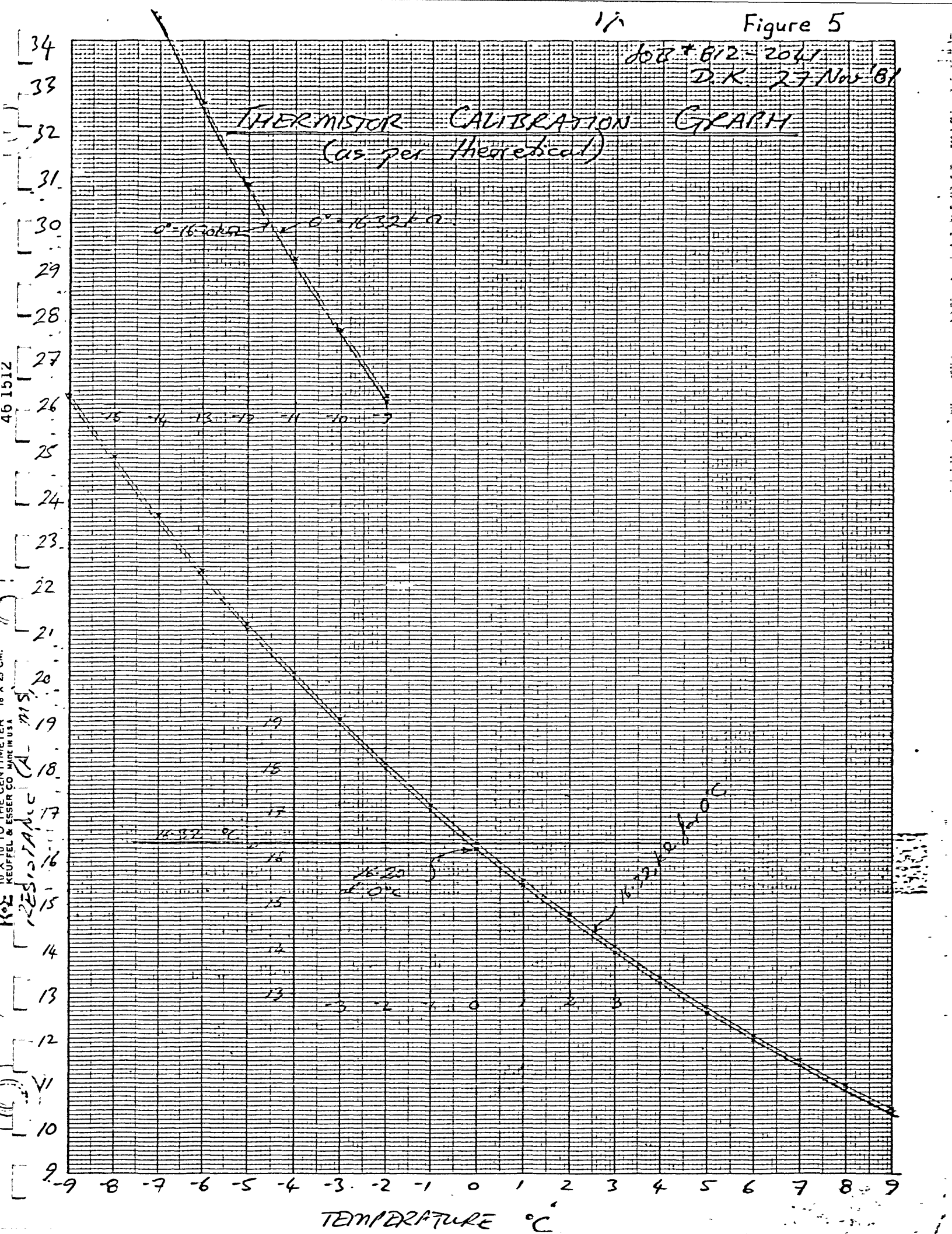
#2 : 30' - at 0°C reading is - 16.07 short " " "

~~16~~ ~~ksr~~

Figure 5

DOE/ET/12041-204
D.K. 27 Nov '81

THERMISTOR CALIBRATION GRAPH
(as per theoretical)



KOE 10 X 10 TO THE CENTIMETER 16 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 1512

CYPRUS ANVIL DOWN VALLEY PROJECT

HYDRAULIC PIEZOMETER READING FIELD DATA SHEET

Figure 6

Date: _____ Technician: _____

LOCATION	Depth from top of P.V.C (m)	Remarks	LOCATION	Depth from top of P.V.C (m)	Remarks
BS18			81-K1-S(KLC1")		
			81-K1-D(KLC3")		
ID2-S			81-K2-S		
ID2-D			81-K2-D		
ID4-S			81-K3-S(#2)		
ID4-D			81-K3-D(#1)		
ID6-S			81-K4-S(KLA2)	} blocked	at 1m depth
ID6-D			81-K4-D(KLA1)		
			81-K5		
79-20			81-K6-S(KLD3)		
CVDC4-S			81-K6-(KLD2)		
CVDC4-D			81-K6-D(KLD1)		
CVDC7-S			81-K7-S(K7B)		
CVDC7-D			81-K7-D(K7A)		
CVDC9-S			81-K8		
CVDC9-D					
CVDT1					
CVDT2					
CVDT3					
P81-01-S					
P81-01-D					
P81-02-S } plugged at 5.0m depth					
P81-02-D }					
P81-03					
P81-04-S (#2)					
P81-04-D (#1)					
P81-05					
P81-06					
P81-07					
P81-08					
P81-09					

Golder Associates

Drawn: BS :: Reviewed: OK :: Date: March 82 :: 812-2041

CYPRUS ANVIL DOWN VALLEY PROJECT Figure 7

Hydraulic Piezometer (2HP) Data Sheet

Location : CVDC 4 - 0+215

(S)

Tip Depth : 23·8 - 25·3 m

Ground Elev: 1065·5 m

65.63 Tip Elev. : 1041·7 - 1040·2 m

Top of tube above ground: 0·13 m

(D)

Tip Depth : 32·0 - 33·5 m

Ground Elev: 1065·5 m

Tip Elev. : 1033·5 - 1032·0 m

Top of tube above ground: 0·0

DATE	W.L. from top of tube (m)	WATER LEVEL ELEV. (m)	WATER LEVEL DEPTH (m)	REMARKS		W.L. from top of tube (m)	WATER LEVEL ELEV. (m)	WATER LEVEL DEPTH (m)	REMARKS
15 Nov '81	17·12	1048·51	16·99			17·00	1048·50	17·00	D.K & B P
12 Dec '81	16·48	49·15	16·35			16·38	49·12	16·38	D.K & K.M.
2 Mar '82		50·07	15·43	(Pond @ 59.6)			49·97	15·53	DG/KOG/WEH
5 Mar '82	15·36	50·27	15·23			15·39	50 11	15·39	KOG/WEH.
12 Mar	15·30	50·33	15·17	Pond @ 59·75		15·33	50·17	15·33	D.K/KM.
18 Mar	15·26	50·37	15·13	Pond 1059·9		15·29	50·21	15·29	D.K.
22 Mar	15·13	50·50	15·00	Pond 1060·9		15·18	50·32	15·18	D.K.
26 Mar	15·05	50·58	14·92	Pond 1061·5		15·11	50·39	15·11	DK/KM
1 Apr	14·96	50·67	14·83	Pond 1062·0		15·08	50·42	15·08	DK/KM
7 Apr	14·90	50·73	14·77	Pond 1062·75		15·07	50·43	15·07	KM
14 Apr	14·85	50·78	14·72	Pond 1063·2		15·04	50·46	15·04	KM
20 Apr	14·77	50·86	14·64	"		14·97	50·53	14·97	KM
28 Apr	14·75	50·88	14·62			14·94	50·56	14·94	KM
12 May	14·69	50·94	16·56			14·89	50·61	14·89	KM
26 May	14·71	50·92	14·58			14·91	50·59	14·91	KM
23 July	15. 1	50.53	14·97			15.3	50.20	15·30	Randy Lop. phoned.
27 Aug 82	15.1	50·53	14·97	KM		15.26	50·24	15·26	KM.
29 Dec	15·82	49·81	15·69			15·71	49·79	15·71	NGC phoned in

CVDC 4 - 0+215

CYPRUS ANVIL DOWN VALLEY PROJECT

PNEUMATIC PIEZOMETER READING FIELD DATA SHEET

Figure 8

Date: _____ Tschnician: _____

LOCATION	Reading p.s.i.	Remarks	LOCATION	Reading p.s.i.	Remarks
CD1 #368			ID7 #3821		
CD1 #384			ID8 #333		
CD4 #365			ID9 #390		
CD4 #341			IDP1 #1299		
CD7 #391			IDP3 #3581		
CD9 #346			IDP4 #3582		
CD10 #367					
CD13 #350			CVDP1 #2549		
CD13 #381			CVDP2 #2548		
CD15 #353			CVDP3 (unknown)		
CD15 #362			CVDP4 #3528		
CD19 #365			CVDP5 #3529		
CD19 #382			CVDP6 #3530		
CD21 #345			CVDP7 #3578		
CD21 #366			CVDP8 #3580		
CD26 #349			CVDP9 #3579		
CD26 #356			CVDP10 #3584		
CD28 #348			CVDB #3475		
CD28 #361			CVDB #3576		
CD29 #360			CVDC1 #3822		
CD29 #351			CVDC2 #344		
			CVDC6 #3526		
BS2 #354			CVDC11 #3820		
BS4 #358			81-126		
BS5 #369					
BS9 #355					
BS10 #359					
BS11 #347					
BS16 #357					
BS18 #352					
79-23					

Golder Associates

CYPRUS ANVIL DOWN VALLEY PROJECT

Figure 9

Pneumatic Piezometer (2PP) Data Sheet

Location : CD13 - 1+350

Tip Number: #350
Tip Depth : 6·1 m
Ground Elev: 1087·6 m
Tip Elev. : 1081·0 m

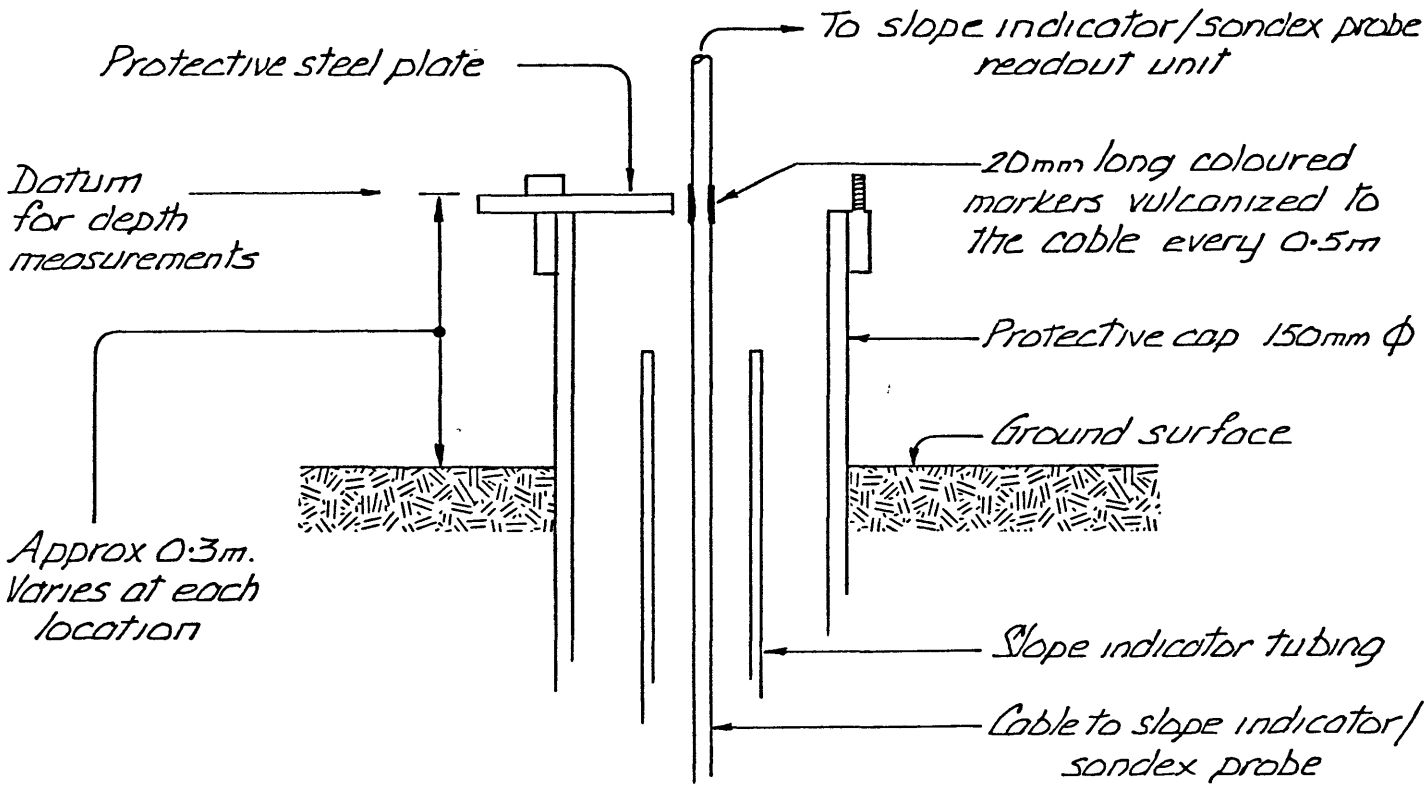
Tip Number: #381
Tip Depth : 10·1 m
Ground Elev: 1087·6 m
Tip Elev. : 1077·0 m

DATE	Rdg. P.S.I.	PIEZOMETRIC ELEV. (m.)	PIEZOMETRIC DEPTH (m.)	REMARKS		Rdg. P.S.I.	PIEZOMETRIC ELEV. (m.)	PIEZOMETRIC DEPTH (m.)	REMARKS
15 Nov '81	3·2	1083·24	4·36			7·9	1082·53	5·07	D.K. & B.P.
9 Dec '81	2·75	82·93	4·67			7·5	82·25	5·35	D.G.
17 Mar '82	0·9	81·63	5·97			5·0	80·50	7·10	D.K.
27 May '82	0·4	81·28	6·32			4·1	79·87	7·73	KM.
26 Aug 82	3.4	83·39	4·21			7.9	82·56	5·04	KM.

CD13 - 1+350

DATUM FOR SLOPE INDICATOR AND SONDEX RING DEPTH MEASUREMENTS

Figure 10



Notes: ① The datum for depth measurements is the top of the protective steel plate.

② For the slope indicator depth intervals of 0·5 metres, the centre of each 20 mm coloured marker is lined up with the datum.

③ For the sondex ring depths, a tape measurement is made from the datum to the centre of the nearest 0·5 m marker. A correction of 0·157m has then to be subtracted from this measured depth because the actual depth from the first 0·5m marker on the cable to the sondex probe sensor is only 0·343m and not 0·5m.

Project No. 822-2021 Drawn G.P. Reviewed ..... Date Feb '83

CYPRUS ANVIL DOWN VALLEY PROJECT

SLOPE INDICATOR FIELD DATA SHEET

Figure 11

Date: _____ Technician: _____

Location: _____ Instrument No: _____ k = _____ c = _____

DEPTH	DIFF.	AZ =		DIFF.	CHANGE	DIFF.	AZ =		DIFF.	CHANGE

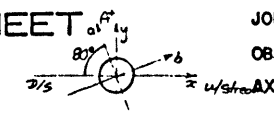
SINCO Slope Indicator Company
Seattle, Washington U.S.A.

INCLINOMETER DATA SUMMARY SHEET

JOB NO. 812-2041 / 822-2021 SHT. 1 OF 1
OBSERVATION WELL NO. CD10-0-990
AXIS A/Y DIRECTION Perpendicular to ℄

Calculated by linear interpolation from 2 foot interval readings

$y = a\sin 80° + b\cos 80°$



DEPTH (m)	INITIAL DIFF 10/12/81	DATE 30/3/82 INST. SI 1000 K= 2500 C= 0.1				DATE 1/9/82 INST. SI 1000 K= 2500 C= 0.1				DATE ____ INST. ____ K= ____ C= ____				DATE ____ INST. ____ K= ____ C= ____				DATE ____ INST. ____ K= ____ C= ____				DATE ____ INST. ____ K= ____ C= ____			
		DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.	DIFF.	CHANGE	ΣCHANGE	DEFL.
0.5	+113	+121	+8	+9	-0.9	+111	-2	+1	-0.1																				
1.0	+97	+110	+13	+11	-2.0	+112	+15	+14	-1.5																				
1.5	+73	+61	-12	-14	-0.6	+60	-13	-14	-0.1																				
2.0	+60	+63	+3	+8	-1.4	+67	+7	+11	-1.2																				
2.5	+81	+84	+3	+4	-1.8	+84	+3	+4	-1.6																				
3.0	+103	+105	+2	+1	-1.9	+103	0	-1	-1.5																				
3.5	+127	+130	+3	+2	-2.1	+128	+1	0	-1.5																				
4.0	+157	+160	+3	+2	-2.3	+156	-1	-1	-1.4																				
4.5	+208	+196	-12	-14	-0.9	+201	-7	-9	-0.5																				
5.0	+274	+295	+21	+24	-3.3	+296	+22	+25	-3.0																				
5.5	+312	+317	+5	+4	-3.7	+318	+6	+4	-3.4																				
6.0	+327	+331	+4	+3	-4.0	+330	+3	+2	-3.6																				
6.5	+330	+337	+7	+5	-4.5	+338	+8	+6	-4.2																				
7.0	+324	+321	-3	-5	-4.0	+320	-4	-7	-3.5																				
7.5	+300	+309	+9	+10	-5.0	+305	+5	+5	-4.0																				
8.0	+253	+239	-14	-18	-3.2	+241	-12	-17	-2.3																				
8.5	+208	+211	+3	+3	-3.5	+211	+3	+3	-2.6																				
9.0	+202	+205	+3	+3	-3.8	+204	+2	+3	-2.9																				
9.5	+203	+201	-2	-3	-3.5	+205	+2	+2	-3.1																				
10.0	+206	+207	+1	0	-3.5	+206	0	-1	-3.0																				

2301 CONIS

Figure 12

SINCO Slope Indicator Company
Seattle, Washington U.S.A.

INCLINOMETER DATA SUMMARY SHEET

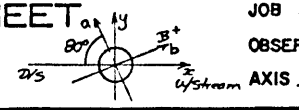
JOB NO. 812-2041 / 822-2021 SHT. 1 OF 1

OBSERVATION WELL NO. CD10-0+990

AXIS B/X DIRECTION Parallel to ℄

Calculated by linear interpolation from 2 foot interval readings

$x = b\sin 80° - a\cos 80°$



DEPTH (m)	INITIAL DIFF 10/12/81	DATE 30/3/82 INST. SI 1000 K= 2500 C= 0.1				DATE 11/9/82 INST. SI 1000 K= 2500 C= 0.1				DATE ___ INST. ___ K= ___ C= ___				DATE ___ INST. ___ K= ___ C= ___				DATE ___ INST. ___ K= ___ C= ___				DATE ___ INST. ___ K= ___ C= ___			
		DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.	DIFF.	CHANGE	Σ CHANGE	DEFL.
0.5	-61	-54	+7	+6	-0.6	-46	+15	+15	-1.5																				
1.0	-41	-50	-9	-11	+0.5	-48	-7	-9	-0.6																				
1.5	+6	-4	-10	-8	+1.3	0	-6	-4	-0.2																				
2.0	+68	+97	+29	+28	-1.5	+94	+26	+24	-2.6																				
2.5	+118	+123	+5	+4	-1.9	+122	+4	+3	-2.9																				
3.0	+152	+147	-5	-5	-1.4	+149	-3	-3	-2.6																				
3.5	+183	+175	-8	-8	-0.6	+179	-4	-4	-2.2																				
4.0	+212	+209	-3	-3	-0.3	+214	+2	+2	-2.4																				
4.5	+259	+246	-13	-11	+0.8	+245	-14	-13	-1.1																				
5.0	+305	+326	+21	+17	-0.9	+323	+18	+14	-2.5																				
5.5	+329	+321	-8	-9	0.0	+319	-10	-11	-1.4																				
6.0	+306	+302	-4	-5	+0.5	+299	-7	-7	-0.7																				
6.5	+279	+269	-10	-11	+1.6	+266	-13	-14	+0.7																				
7.0	+246	+236	-10	-9	+2.5	+231	-15	-14	+2.1																				
7.5	+191	+196	+5	+3	+2.2	+191	0	-1	+2.2																				
8.0	+110	+84	-26	-23	+4.5	+83	-27	-25	+4.7																				
8.5	+73	+72	-1	-2	+4.7	+72	-1	-2	+4.9																				
9.0	+63	+65	+2	+1	+4.6	+67	+4	+4	+4.5																				
9.5	+65	+61	-4	-4	+5.0	+65	0	0	+4.5																				
10.0	+73	+69	-4	-4	+5.4	+66	-7	-7	+5.2																				

Figure 13

2801 CONS.

CYPRUS ANVIL DOWN VALLEY PROJECT

INCREMENTAL SETTLEMENT RINGS FIELD DATA SHEET

Figure 14

Date: _____ Technician: _____

Depth (m) from top of steel protective cap

RING No. / LOCATION	1	2	3	4	5	6	7	8	9	10
CD4										
CD10										
CD15										
CD19										
CD21										
CD27										
CD28										
CD29										
BS2										
BS5										
BS9										
BS10										
BS11										
BS17										
BS18										
SP2										
SP3										
SP5										

NOTE: A correction of 0.157 m has to be subtracted from the field depth reading to give the true depth because the true distance from the first 0.5 m marker on the cable to the sondex probe sensor is only 0.343 m and not 0.5 m.

Figure 15

CYPRUS ANVIL DOWN VALLEY PROJECT

Incremental Settlement (S) Data Sheet

LOCATION: CD19-1+900 1,355·6mN 691·8mE

GROUND ELEVATION: 1086·4

TOP OF STEEL CAP ABOVE GROUND: 0·30m

Ring No.		1	2	3	4	5	6	7	8	9	10	
		INITIAL DEPTHS (m) 9 Dec'81 DK,KM										
from ground		0·7	1·8	2·8	3·8	4·8	5·8	6·8	7·8	8·8	9·8	
from top of steel cap		1·022	2·097	3·061	4·067	5·145	6·092	7·101	8·142	9·139	10·120	
distance between rings	1·022	1·075	0·964	1·006	1·078	0·947	1·009	1·041	0·997	0·981		
DATE	LATER DEPTHS * (m) INCR. SETTLEMENT BETWEEN RINGS (mm) (heave +ve)											
29 Mar'82		1·023	2·097	3·068	4·069	5·149	6·098	7·108	8·148	9·141	10·118	DK Km
	+1	-1	+7	-5	+2	+2	+1	-1	-4	-4		
2 Jun'82		1·060	2·067	3·049	4·071	5·148	6·100	7·105	8·147	9·140	10·120	Krr. KS
	+38	-68	+18	+16	-1	+5	-4	+1	-4	-1		
1 Sept'82		1·019	2·095	3·058	4·057	5·127	6·084	7·097	8·127	9·132	10·108	IE Krr
	-3	+1	-1	-7	-8	+10	+4	-11	+8	-5		
16 Nov'82		1·033	2·104	3·069	4·069	5·146	6·095	7·108	8·141	9·140	10·120	Km DP
	+11	-4	+1	-6	-1	+2	+4	-8	+2	-1		

* All field depths for settlement are measured from the top of the steel protective cap