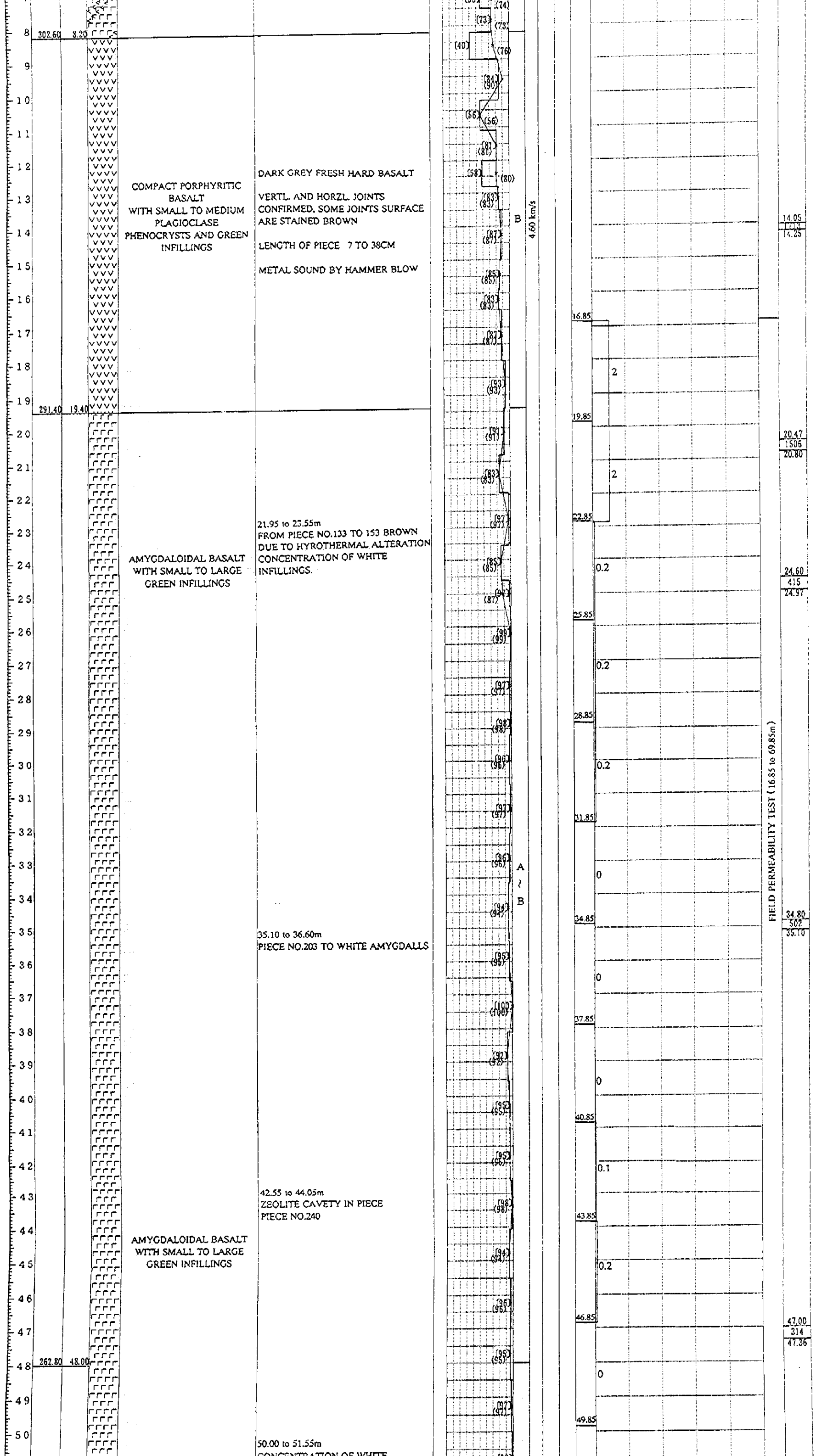
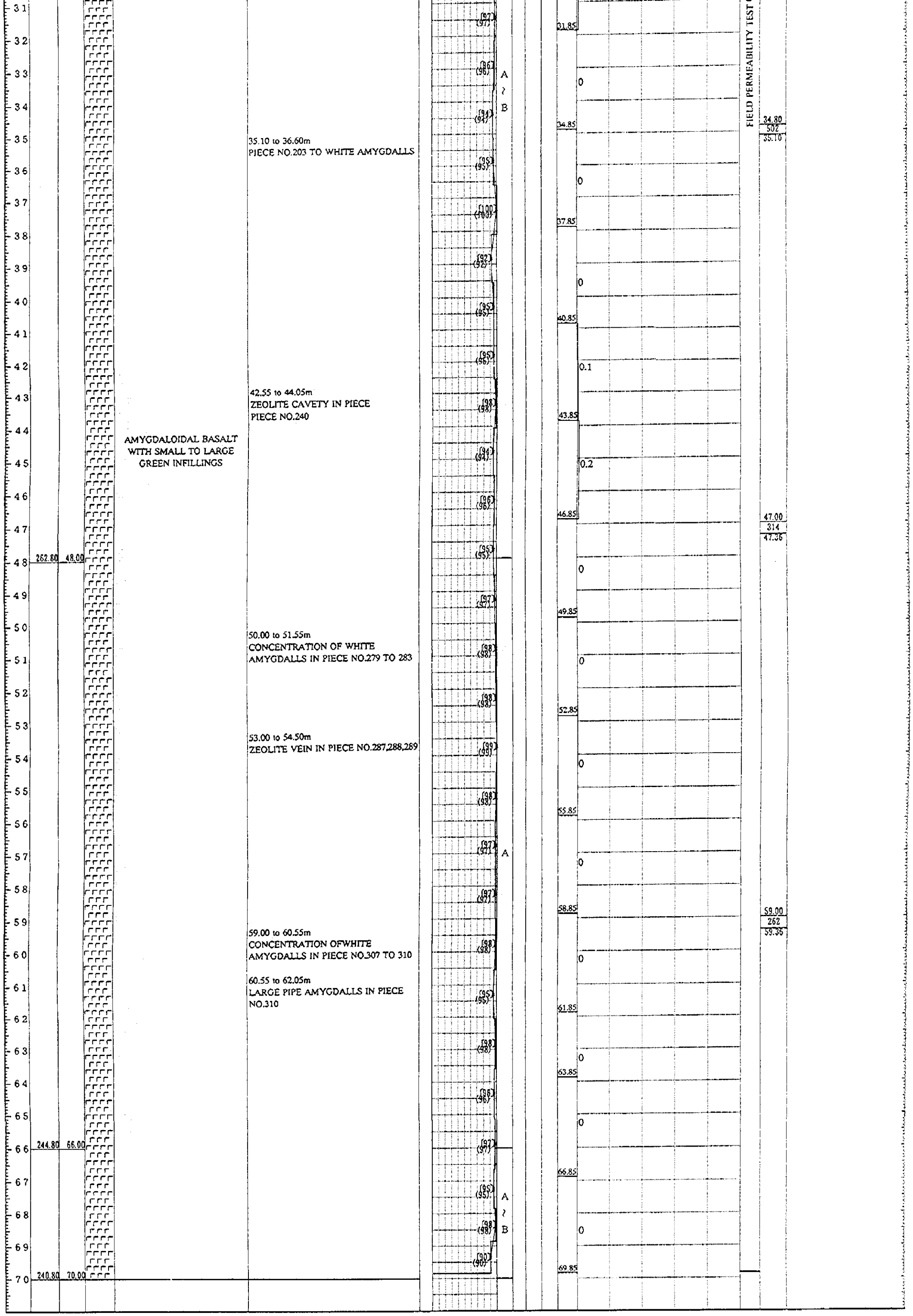
Appendix 2 Drilling Log

Fig. APP.2-1 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	14/DEC./1995 ~ 20/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LJ-1	**Elevation**	R.L. 310.8 m	**Total Depth**	70.00 m	**Location**	JAROND PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF

Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Core Recovery —×— (%) / RQD [%]	Rock Classification	VP (km/s)	Water Table	N-Value	LUGEON VALUE / S.P.T / N VALUE	U.C.S (kgf/cm²)	Remarks
1				OVERBURDEN	REDDISH BROWN SOIL & BASALT BOULDER POOR CORE RECOVERY			0.35 km/s	NIL	18			
2										34			
3										21			
	307.05	3.75											
4				PORPHYRITIC AMYGDALOIDAL BASALT	THE LENGTH OF PIECE IS 5 TO 24CM POOR CORE RECOVERY		B						
5													
6													
7													
8	302.60	8.20											
9				COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND GREEN INFILLINGS	DARK GREY FRESH HARD BASALT VERTL. AND HORZL. JOINTS CONFIRMED, SOME JOINTS SURFACE ARE STAINED BROWN LENGTH OF PIECE 7 TO 38CM METAL SOUND BY HAMMER BLOW		B	4.60 km/s					
10													
11													
12													
13													
14												14.05 / 17.03 / 14.25	
15													
16											16.85		
17													
18											2		
19	291.40	19.40									19.85		
20				AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS	21.95 to 23.55m FROM PIECE NO.133 TO 153 BROWN DUE TO HYROTHERMAL ALTERATION CONCENTRATION OF WHITE INFILLINGS.							20.47 / 1506 / 20.80	
21											2		
22											22.85		
23													
24											0.2	24.60 / 415 / 24.97	
25											25.85		
26													


302.60 8.20
COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND GREEN INFILLINGS
DARK GREY FRESH HARD BASALT
VERTL. AND HORZL. JOINTS CONFIRMED, SOME JOINTS SURFACE ARE STAINED BROWN
LENGTH OF PIECE 7 TO 38CM
METAL SOUND BY HAMMER BLOW
291.40 19.40
AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS
21.95 to 23.55m
FROM PIECE NO.133 TO 153 BROWN DUE TO HYROTHERMAL ALTERATION CONCENTRATION OF WHITE INFILLINGS.
35.10 to 36.60m
PIECE NO.203 TO WHITE AMYGDALLS
42.55 to 44.05m
ZEOLITE CAVETY IN PIECE PIECE NO.240
AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS
262.80 48.00
50.00 to 51.55m
CONCENTRATION OF WHITE
B
4.60 km/s
A ~ B
FIELD PERMEABILITY TEST (16.85 to 69.85m)
14.05
14.25
20.47
1506
20.80
24.60
415
24.97
34.80
502
35.10
47.00
314
47.36


31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
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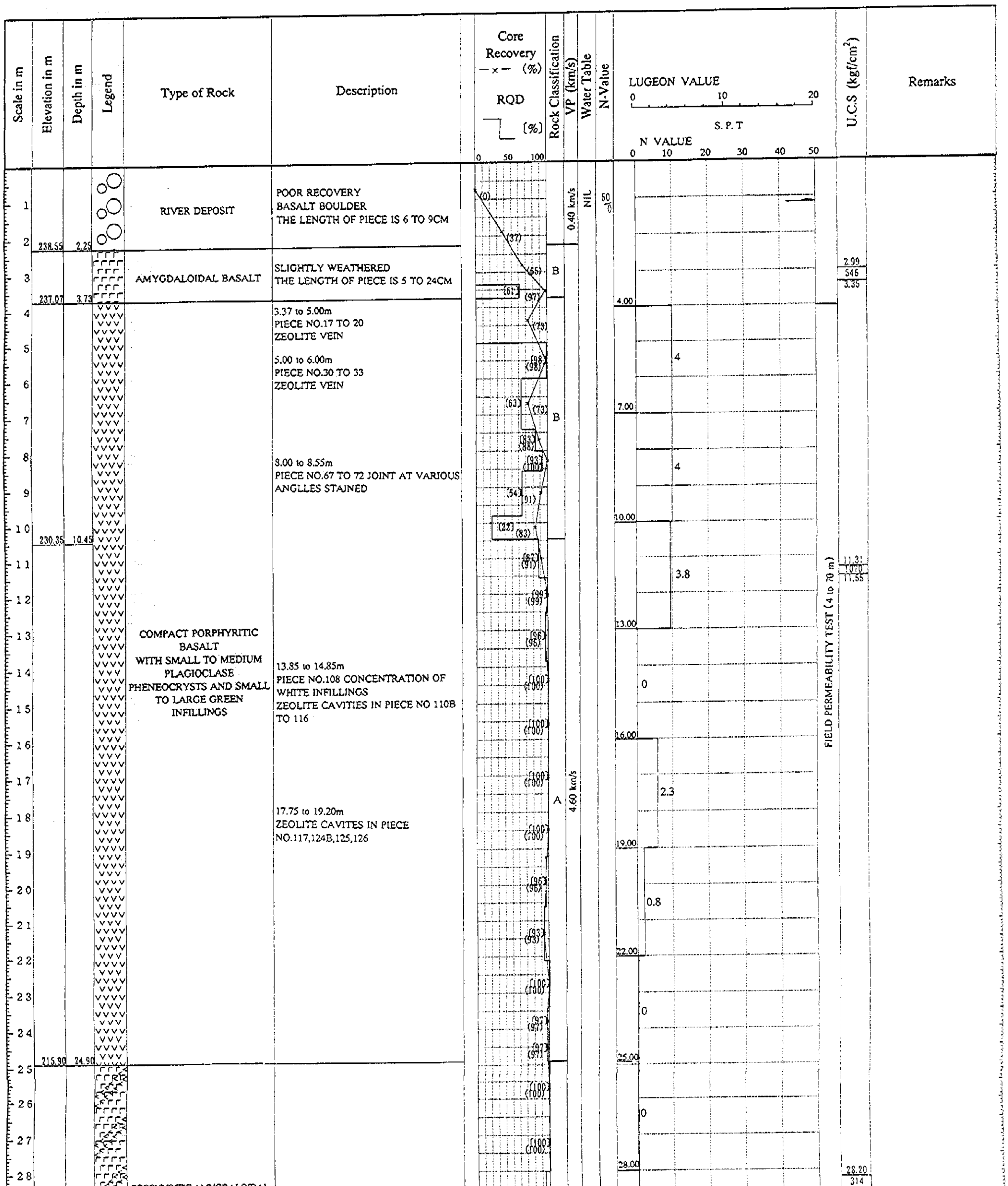
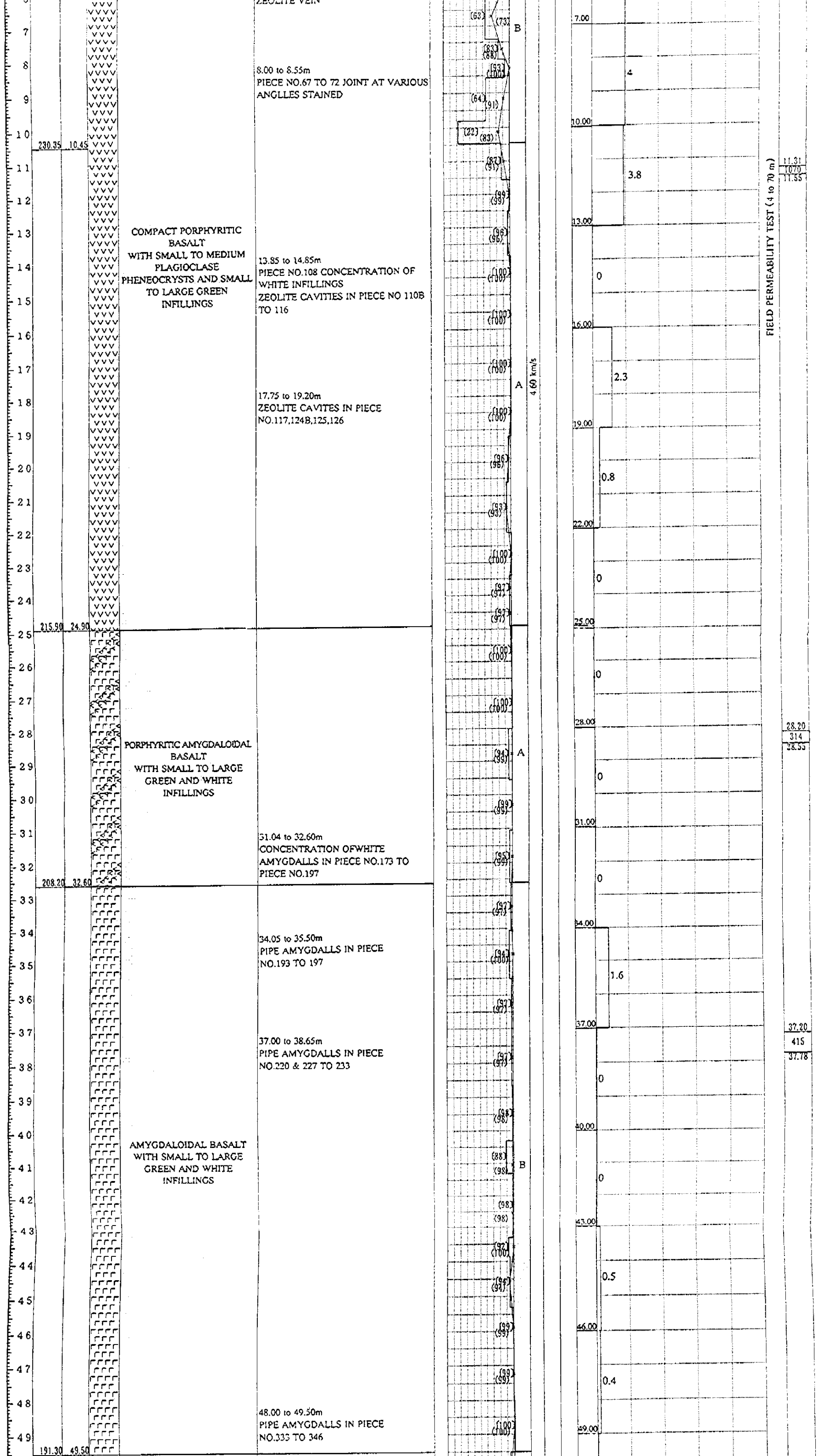
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
262.80 48.00
244.80 66.00
240.80 70.00
AMYGDALOIDAL BASALT
WITH SMALL TO LARGE
GREEN INFILLINGS
35.10 to 36.60m
PIECE NO.203 TO WHITE AMYGDALLS
42.55 to 44.05m
ZEOLITE CAVETY IN PIECE
PIECE NO.240
50.00 to 51.55m
CONCENTRATION OF WHITE
AMYGDALLS IN PIECE NO.279 TO 283
53.00 to 54.50m
ZEOLITE VEIN IN PIECE NO.287,288,289
59.00 to 60.55m
CONCENTRATION OFWHITE
AMYGDALLS IN PIECE NO.307 TO 310
60.55 to 62.05m
LARGE PIPE AMYGDALLS IN PIECE
NO.310
A
~
B
FIELD PERMEABILITY TEST
31.85
34.85
37.85
40.85
43.85
46.85
49.85
52.85
55.85
58.85
61.85
63.85
66.85
69.85
0
0.1
0.2
34.80
502
35.10
47.00
314
47.36
59.00
262
59.36

Fig. APP.2-2 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	12/DEC./1995 ~ 5/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LJ-2	**Elevation**	R.L. 240.8 m	**Total Depth**	70.00 m	**Location**	JAROND PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF




ZEOLITE VEIN
8.00 to 8.55m
PIECE NO.67 TO 72 JOINT AT VARIOUS ANGLLES STAINED
230.35 10.45
COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENEOCRYSTS AND SMALL TO LARGE GREEN INFILLINGS
13.85 to 14.85m
PIECE NO.108 CONCENTRATION OF WHITE INFILLINGS
ZEOLITE CAVITIES IN PIECE NO 110B TO 116
17.75 to 19.20m
ZEOLITE CAVITES IN PIECE NO.117,124B,125,126
215.90 24.90
PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN AND WHITE INFILLINGS
31.04 to 32.60m
CONCENTRATION OFWHITE AMYGDALLS IN PIECE NO.173 TO PIECE NO.197
208.20 32.60
34.05 to 35.50m
PIPE AMYGDALLS IN PIECE NO.193 TO 197
37.00 to 38.65m
PIPE AMYGDALLS IN PIECE NO.220 & 227 TO 233
AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN AND WHITE INFILLINGS
48.00 to 49.50m
PIPE AMYGDALLS IN PIECE NO.333 TO 346
191.30 49.50
B
A
4.60 km/s
A
B
FIELD PERMEABILITY TEST (4 to 70 m)
11.31
1070
11.55
28.20
314
28.55
37.20
415
37.78

31.04 to 32.60m
CONCENTRATION OFWHITE AMYGDALLS IN PIECE NO.173 TO PIECE NO.197

208.20 32.60

34.05 to 35.50m
PIPE AMYGDALLS IN PIECE NO.193 TO 197

37.00 to 38.65m
PIPE AMYGDALLS IN PIECE NO.220 & 227 TO 233

AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN AND WHITE INFILLINGS

48.00 to 49.50m
PIPE AMYGDALLS IN PIECE NO.333 TO 346

191.30 49.50

PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS

184.00 56.80

MAXIMUM LENGTH OF CORE IS 57 TO 66CM

179.30 61.50

61.50 to 36.10m
CONCENTRATION OF WHITE INFILLING IN PIECE NO.414 TO 426

64.70 to 66.05m
PIPE AMYGDALLS IN PIECE NO.425,426

66.05 to 67.60m
PIPE AMYGDALLS IN PIECE NO.433,434

MAXIMUM LENGTH OF CORE IS 58 TO 60CM

AMYGDALOIDAL BASALT WITH SMALL TO LARGE WHITE AND GREEEN INFILLINGS

170.80 70.00

(95) (99) (97) (97) (94) (100) (97) (97) (97) (97) (98) (98) (88) (98) B (98) (98) (92) (100) (96) (94) (99) (99) (100) (100) (94) (94) (91) (91) (100) (100) B (95) (95) (99) (99) (92) (92) (96) (96) A (97) (97) (99) (99) (96) (96) (98) (98) A (99) (99) (100) (100) (87) (87)

34.00 37.00 40.00 43.00 46.00 49.00 52.00 55.00 58.00 61.00 64.00 67.00 70.00

0 1.6 0 0 0 0.5 0.4 0 0 0 0 0.3 0.4 0

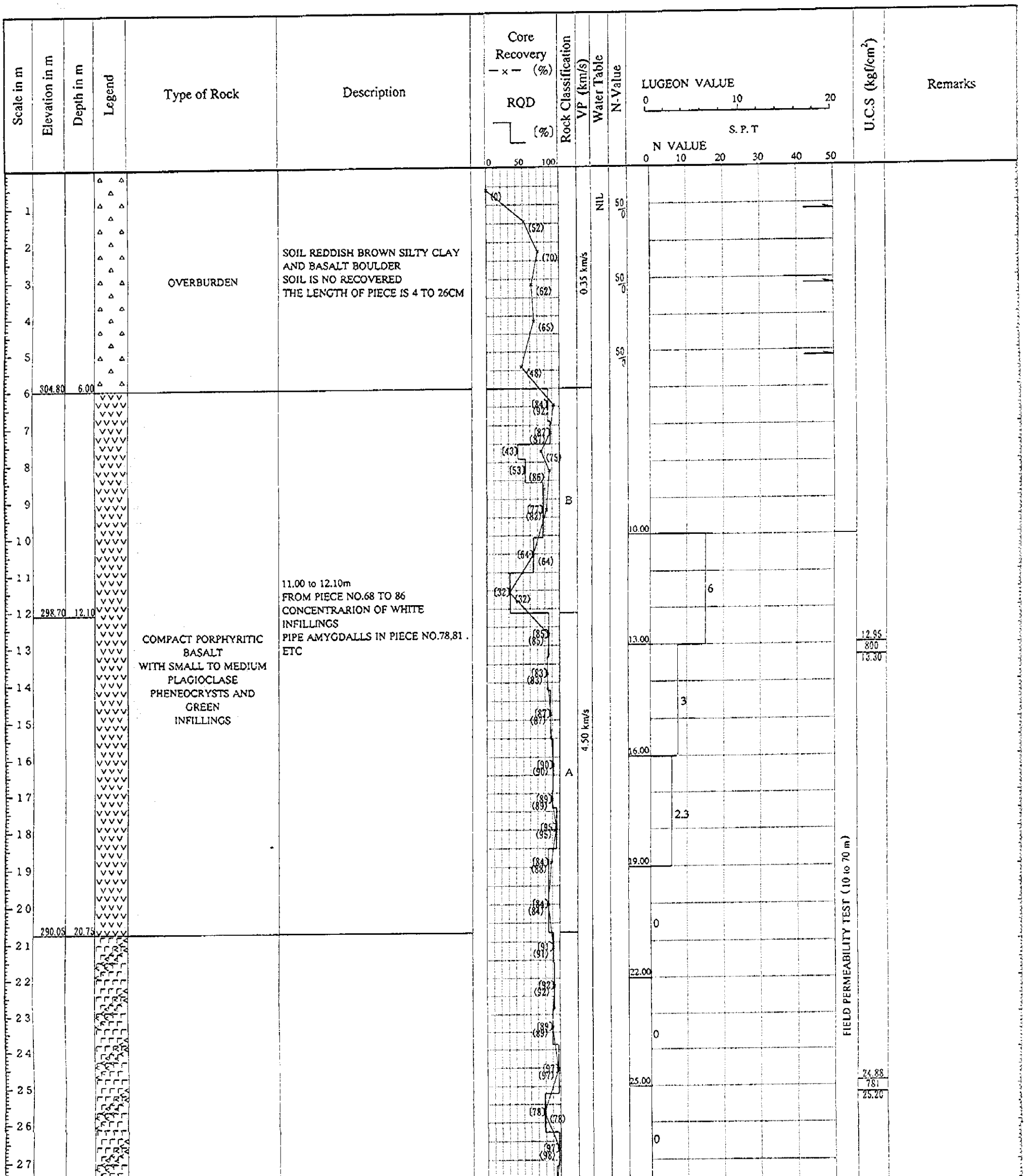
37.20 415 37.78

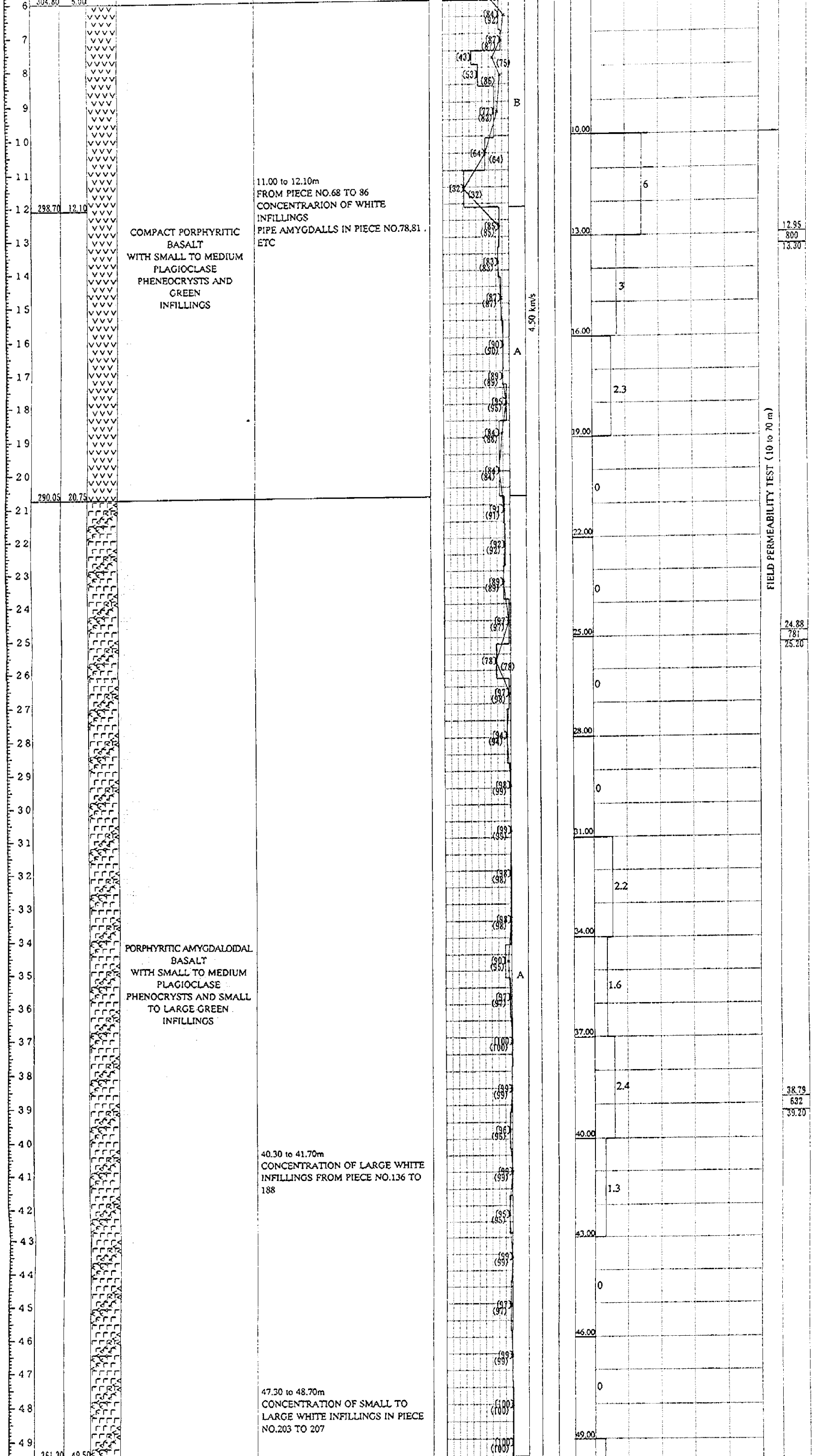
52.05 589 52.50

68.05 1048 68.42

Fig. APP.2-3 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	20/DEC./1995 ~ 15/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LJ-3	Elevation	R.L. 310.8 m	Total Depth	70.00 m	Location	JAROND PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		Sheet No.	OF




304.80 5.00
298.70 12.10
290.05 20.75
261.30 49.50
COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENEOCRYSTS AND GREEN INFILLINGS
PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE GREEN INFILLINGS
11.00 to 12.10m
FROM PIECE NO.68 TO 86
CONCENTRARION OF WHITE INFILLINGS
PIPE AMYGDALLS IN PIECE NO.78,81 .
ETC
40.30 to 41.70m
CONCENTRATION OF LARGE WHITE INFILLINGS FROM PIECE NO.136 TO 188
47.30 to 48.70m
CONCENTRATION OF SMALL TO LARGE WHITE INFILLINGS IN PIECE NO.203 TO 207
B
A
4.50 km/s
FIELD PERMEABILITY TEST (10 to 70 m)
12.95
800
13.30
24.88
781
25.20
38.79
632
39.20

Depth	Lithology	Description	Notes	RQD	Core	Recovery	Run	Core Loss
31				(99) (99)				
32				(98) (98)		2.2	31.00	
33				(98) (98)				
34		PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE GREEN INFILLINGS		(90) (95)	A		34.00	
35						1.6		
36				(97) (97)				
37				(100) (100)			37.00	
38						2.4		38.79 / 632 / 39.20
39				(99) (99)				
40			40.30 to 41.70m CONCENTRATION OF LARGE WHITE INFILLINGS FROM PIECE NO.136 TO 188	(96) (96)			40.00	
41				(99) (99)		1.3		
42				(95) (95)				
43							43.00	
44				(99) (99)		0		
45				(97) (97)			46.00	
46				(99) (99)				
47						0		
48			47.30 to 48.70m CONCENTRATION OF SMALL TO LARGE WHITE INFILLINGS IN PIECE NO.203 TO 207	(100) (100)				
49	261.30	49.50		(100) (100)			49.00	
50				(97) (97)		1.2		50.43 / 614 / 50.76
51				(100) (100)				
52				(98) (98)			52.00	
53						0		
54				(100) (100)				
55							55.00	
56				(99) (99)				
57						0		
58			57.45 to 58.65m PIECE NO.225 TO 228 BROWN DUE TO HYDROTHERMAL ALTERATION CONCENTRATION OF WHITE AMYGDALLS	(100) (100)			58.00	
59		AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS	PIPE AMYGDALLS IN PIECE NO.226 TO 250	(99) (99)	A	0		
60								
61				(98) (98)			61.00	
62			MAXIMUM LENGTH OF PIECE IS 60 TO 81CM	(99) (99)		0		
63								
64				(100) (100)			64.00	
65				(99) (99)				
66				(96) (96)		0.3		
67				(98) (98)			67.00	
68			MAXIMUM LENGTH OF PIECE IS 58 TO 87CM	(100) (100)				68.26 / 484 / 68.55
69						0		
70	240.80	70.00		(98) (98)			70.00	

Fig. APP.2-4 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	27/DEC./1995 ~ 13/JAN./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	**UM-1**	**Elevation**	R.L. 871.092 m	**Total Depth**	60.00 m	**Location**	MARLESHWAR PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF

Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Core Recovery —×— (%) / RQD [%] (0 50 100)	Rock Classification	VP (km/s)	Water Table	N-Value	LUGEON VALUE (0 10 20) / S. P. T N VALUE (0 10 20 30 40 50)	U.C.S (kgf/cm²)	Remarks
1					0 to 1.5m DRY HARD GROUND SURFACE LIKE ROCK MASS	(0) (69) (0) (84)			NIL	50/0			
2						(0)				50/0			
3					1.5 to 28.00m RED LATERITE SOIL AND PARTIALLY WEATHERED BOULDER								
4						(0)							
5						(0)							
6					GENERALLY POOR RECOVERY WITH WATER FLUSH DRILLING					50/0			
7						(0)				50/0			
8						(0)							
9										50/0			
10						(0)				50/0			
11						(0)							
12										50/0			
13						(0)				50/0			
14				LATERITE		(0)	D	1.50 km/s					
15										50/0			
16						(0)				50/0			
17						(0)				50/0			
18													
19						(0)							
20						(0) (10)							
21					PARTIALLY WEATHERED ROCK PIECES								
22						(58) (50)							
23						(20)							
24													
25						(20)							
26						(0)							
27						(20)							

ROCK MASS

1.5 to 28.00m
RED LATERITE SOIL AND PARTIALLY WEATHERED BOULDER

GENERALLY POOR RECOVERY WITH WATER FLUSH DRILLING

LATERITE

PARTIALLY WEATHERED ROCK PIECES

843.09 28.00

PORPHYRITIC BASALT (WEATHERED)

HIGHLY WEATHERED SOIL AND ROCK
ALL STAINED REDDISH BROWN

834.19 36.90

DARK GREY HARD BASALT

36.90 to 38.40m
RELATIVELY HORZL. JOINTS

42.90 to 44.40m
VERTL.,JOINTS

PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS

D 1.50 km/s

D

?

B 4.60 km/s

FIELD PERMEABILITY TEST (30 to 60m)

30.00 0.4 33.00 0.4 36.00 0 39.00 0 42.00 0 45.00

29.50 29.61 30.60 30.73 33.10 33.30 39.45 39.76

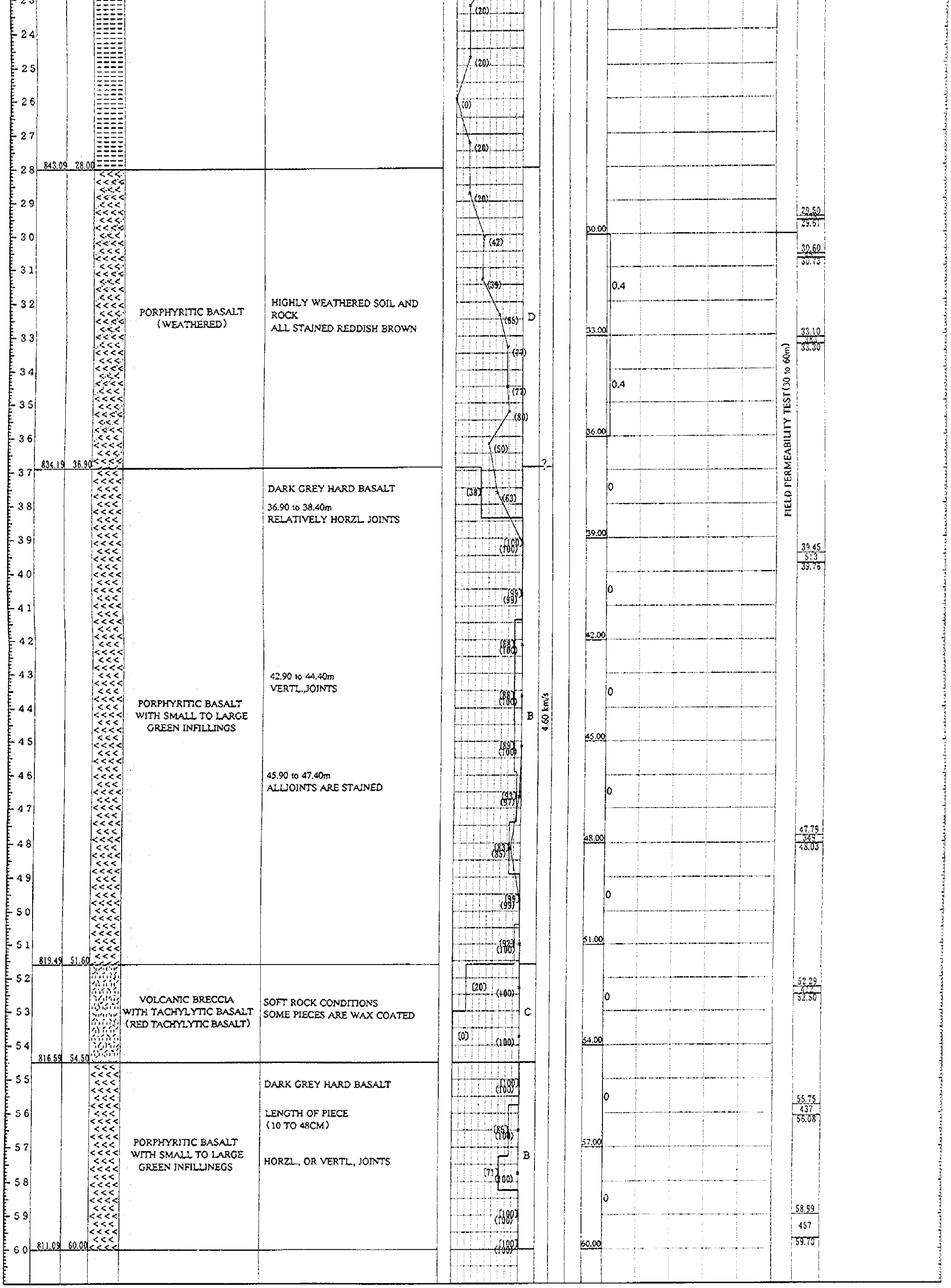
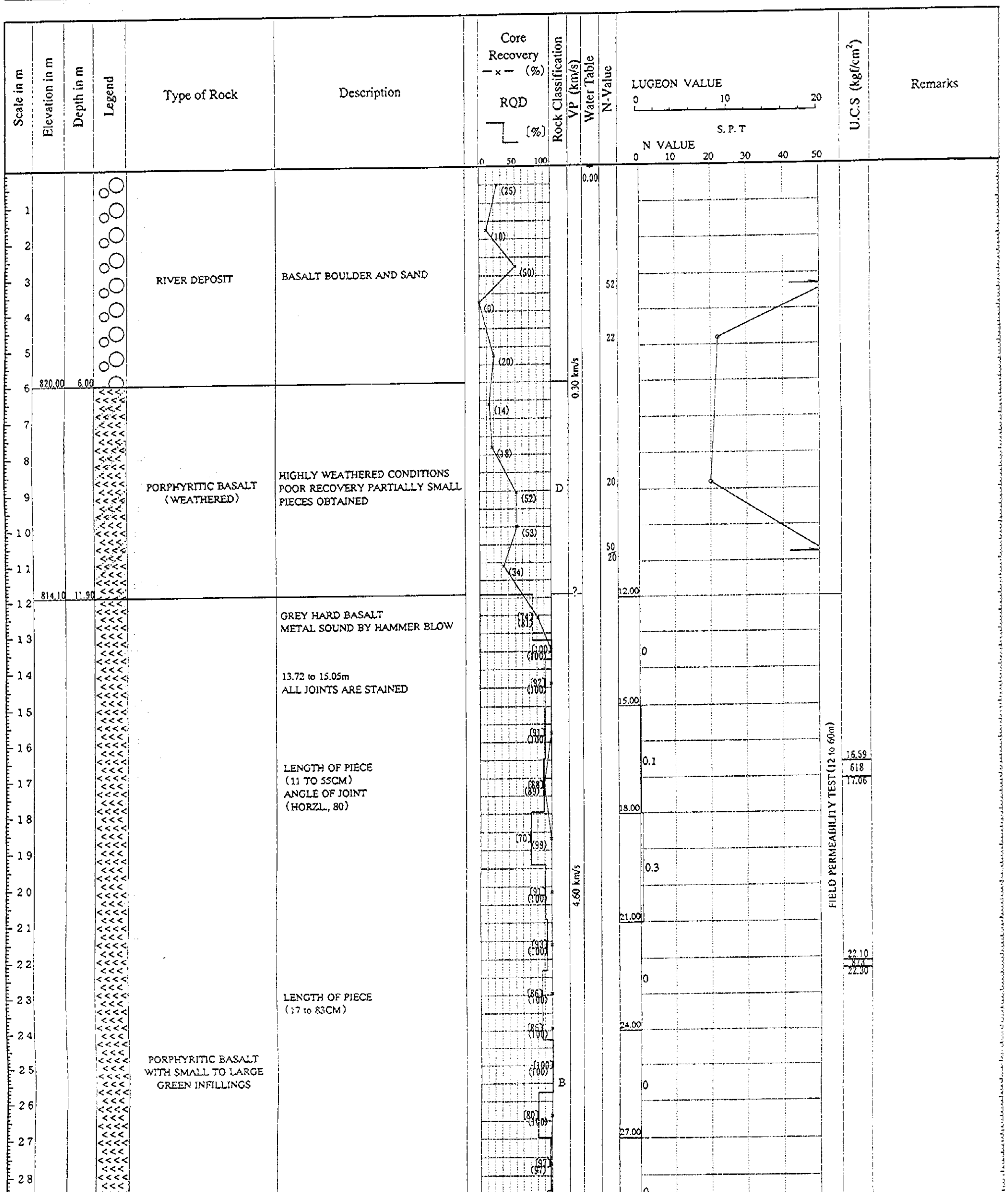
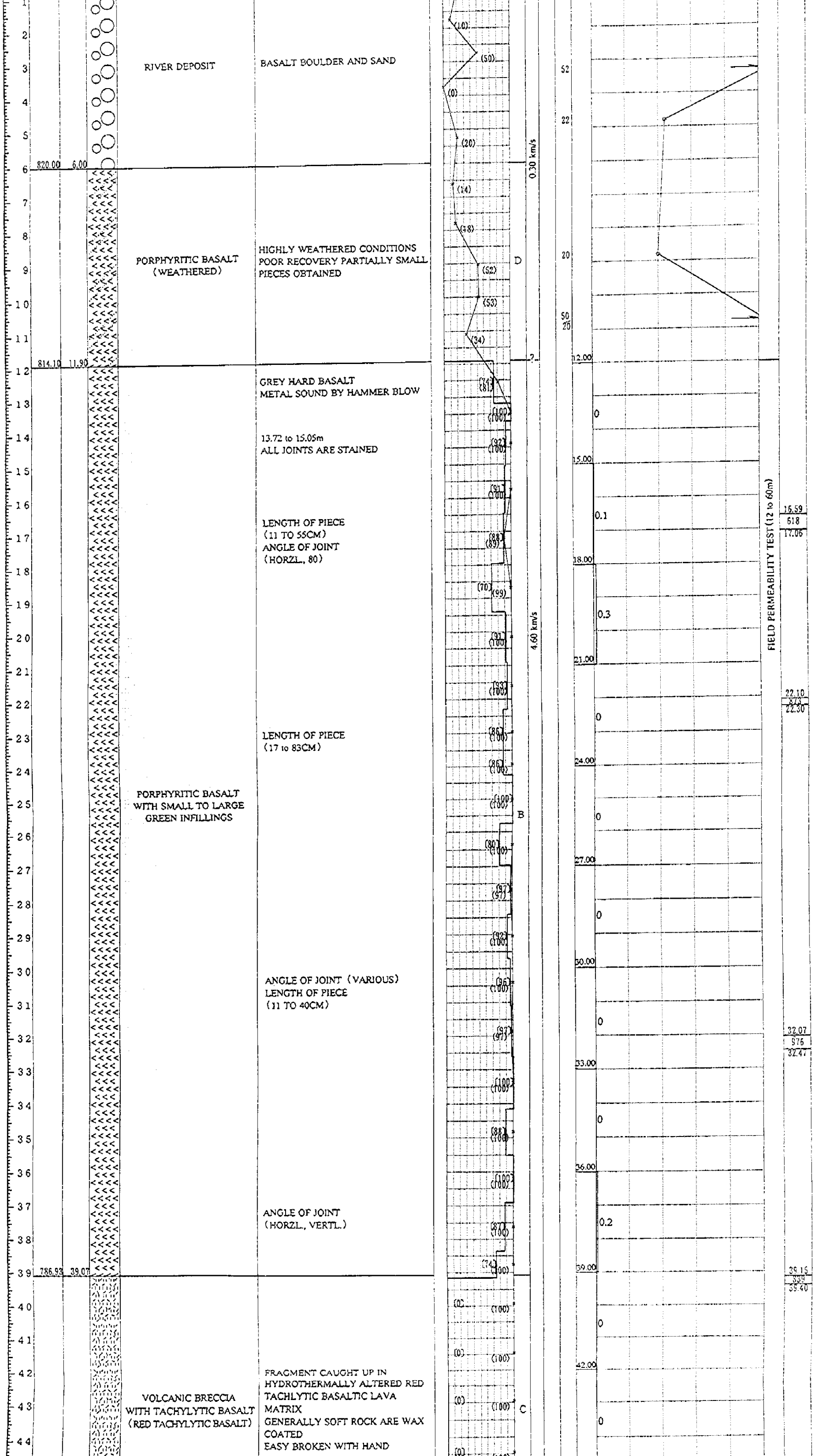

843.09 28.00
PORPHYRITIC BASALT (WEATHERED)
HIGHLY WEATHERED SOIL AND ROCK
ALL STAINED REDDISH BROWN
834.19 36.90
DARK GREY HARD BASALT
36.90 to 38.40m
RELATIVELY HORZL JOINTS
42.90 to 44.40m
VERTL.,JOINTS
PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS
45.90 to 47.40m
ALLJOINTS ARE STAINED
819.49 51.60
VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)
SOFT ROCK CONDITIONS
SOME PIECES ARE WAX COATED
816.59 54.50
DARK GREY HARD BASALT
LENGTH OF PIECE (10 TO 48CM)
HORZL., OR VERTL., JOINTS
PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINEGS
811.09 60.00
D
B
C
B
4.60 km/s
FIELD PERMEABILITY TEST (30 to 60m)
30.00
33.00
36.00
39.00
42.00
45.00
48.00
51.00
54.00
57.00
60.00
0.4
0.4
0
0
0
0
0
0
0
0
29.50
29.61
30.60
30.73
33.10
33.30
39.45
39.76
47.79
48.03
52.29
52.50
55.75
56.08
58.99
59.70

Fig. APP.2-5 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	14/DEC./1995 ~ 4/JAN./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UM-2	Elevation	R.L. 826 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	CALYX Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		Sheet No.	OF

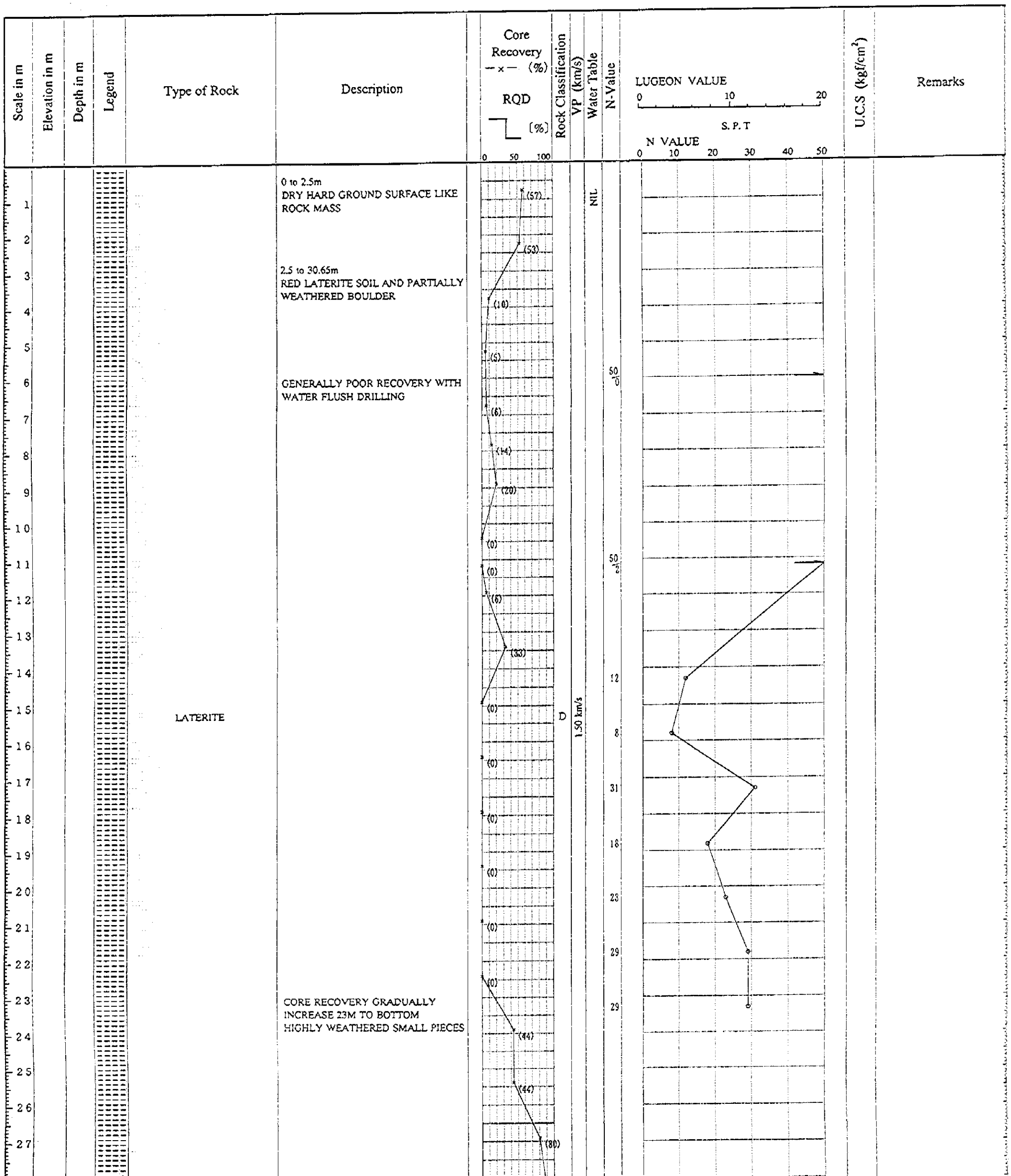


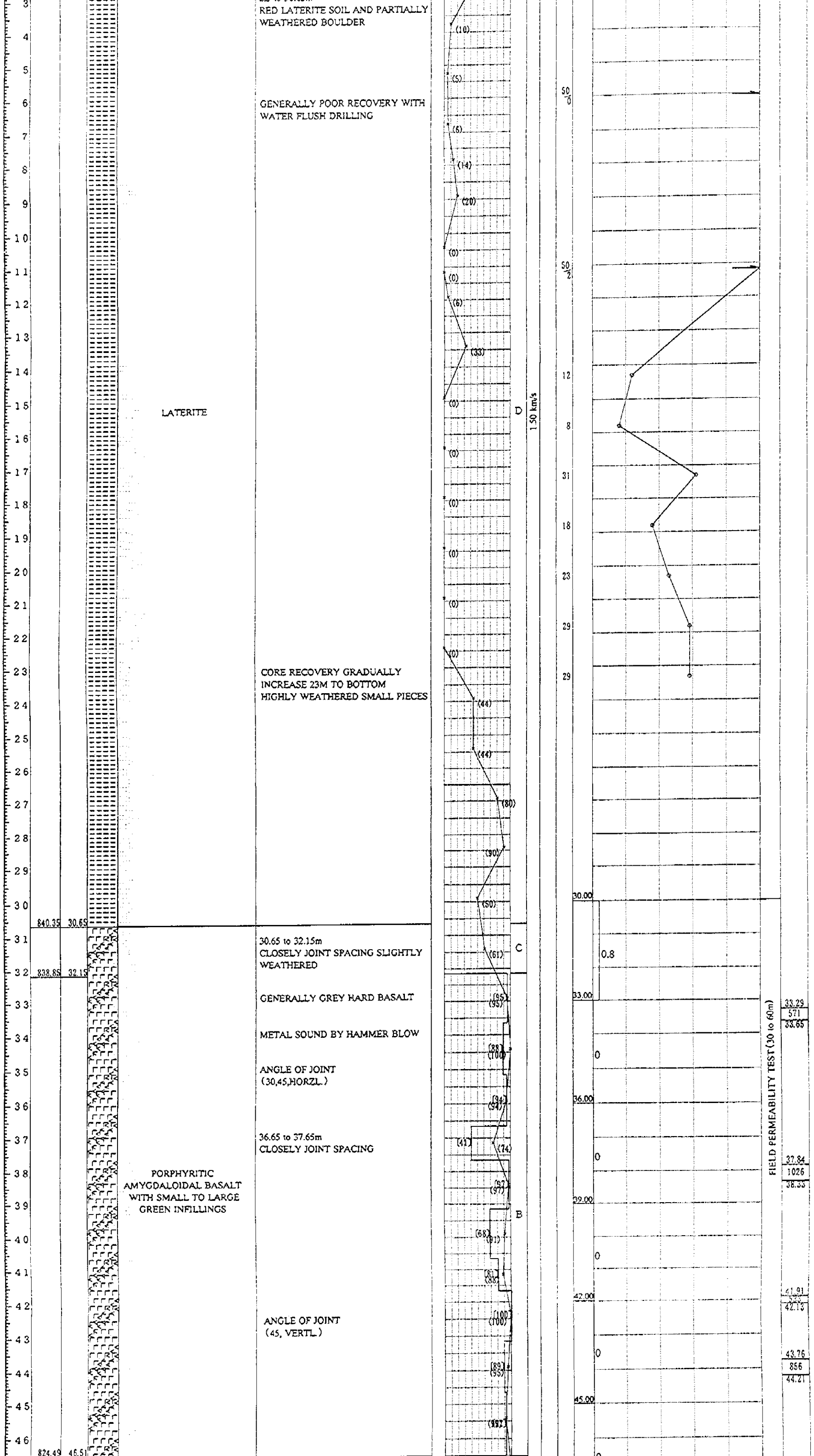

RIVER DEPOSIT
BASALT BOULDER AND SAND
820.00
6.00
PORPHYRITIC BASALT
(WEATHERED)
HIGHLY WEATHERED CONDITIONS
POOR RECOVERY PARTIALLY SMALL
PIECES OBTAINED
814.10
11.90
GREY HARD BASALT
METAL SOUND BY HAMMER BLOW
13.72 to 15.05m
ALL JOINTS ARE STAINED
LENGTH OF PIECE
(11 TO 55CM)
ANGLE OF JOINT
(HORZL, 80)
LENGTH OF PIECE
(17 to 83CM)
PORPHYRITIC BASALT
WITH SMALL TO LARGE
GREEN INFILLINGS
ANGLE OF JOINT (VARIOUS)
LENGTH OF PIECE
(11 TO 40CM)
ANGLE OF JOINT
(HORZL., VERTL.)
786.93
39.07
VOLCANIC BRECCIA
WITH TACHYLYTIC BASALT
(RED TACHYLYTIC BASALT)
FRAGMENT CAUGHT UP IN
HYDROTHERMALLY ALTERED RED
TACHLYTIC BASALTIC LAVA
MATRIX
GENERALLY SOFT ROCK ARE WAX
COATED
EASY BROKEN WITH HAND
0.30 km/s
4.60 km/s
D
B
C
FIELD PERMEABILITY TEST (12 to 60m)
12.00
15.00
18.00
21.00
24.00
27.00
30.00
33.00
36.00
39.00
42.00
16.59
618
17.06
22.10
878
22.30
32.07
976
32.47
39.15
889
39.40

Depth	Elevation	Length	Description	Notes	RQD	Core Loss	Run
21					(93) (100)	21.00	
22						0	22.10 / 843 / 22.30
23			LENGTH OF PIECE (17 to 83CM)		(86) (100)		
24					(86) (100)	24.00	
25			PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS		(100) (100) B	0	
26					(80) (100)		
27						27.00	
28					(97) (97)	0	
29					(92) (100)		
30			ANGLE OF JOINT (VARIOUS) LENGTH OF PIECE (11 TO 40CM)		(96) (100)	30.00	
31						0	
32					(97) (97)		32.07 / 976 / 32.47
33					(100) (100)	33.00	
34						0	
35					(88) (100)		
36					(100) (100)	36.00	
37			ANGLE OF JOINT (HORZL., VERTL.)			0.2	
38					(87) (100)		
39	786.93	39.07			(74) (100)	39.00	39.15 / 839 / 39.40
40					(0) (100)	0	
41					(0) (100)		
42			FRAGMENT CAUGHT UP IN HYDROTHERMALLY ALTERED RED TACHLYTIC BASALTIC LAVA MATRIX GENERALLY SOFT ROCK ARE WAX COATED EASY BROKEN WITH HAND			42.00	
43			VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)		(0) (100) C	0	
44							
45					(0) (100)	45.00	
46					(0) (100)		
47	778.65	47.35			(0) (100)	0	
48			GREY HARD BASALT METAL SOUND BY HAMMER BLOW		(90) (100)	48.00	
49							48.80 / 864 / 49.00
50			ANGLE OF JOINT (45, 80 TO VERTL.)		(89) (100)	0	
51					(98) (98)	51.00	
52					(98) (100)	0	52.46 / 1092 / 52.71
53			COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS	LENGTH OF PIECE (10 TO 59CM)			
54					(99) (99) B	54.00	
55					(99) (99)	0	
56			ANGLE OF JOINT (VARIOUS)				55.82 / 843 / 56.04
57					(95) (99)	57.00	57.33 / 1236 / 57.60
58					(100) (100)	0	
59					(100) (100)		
60	766.00	60.00				60.00	

Fig. APP.2-6 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	20/DEC./1995 ~ 9/JAN./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UM-3	Elevation	R.L. 871 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	CALYX Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		Sheet No.	OF




RED LATERITE SOIL AND PARTIALLY WEATHERED BOULDER
GENERALLY POOR RECOVERY WITH WATER FLUSH DRILLING
LATERITE
CORE RECOVERY GRADUALLY INCREASE 23M TO BOTTOM
HIGHLY WEATHERED SMALL PIECES
30.65 to 32.15m
CLOSELY JOINT SPACING SLIGHTLY WEATHERED
GENERALLY GREY HARD BASALT
METAL SOUND BY HAMMER BLOW
ANGLE OF JOINT
(30,45,HORZL.)
36.65 to 37.65m
CLOSELY JOINT SPACING
PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO LARGE GREEN INFILLINGS
ANGLE OF JOINT
(45, VERTL.)
D
C
B
1.50 km/s
FIELD PERMEABILITY TEST (30 to 60m)
840.35 30.65
838.85 32.15
824.49 46.51

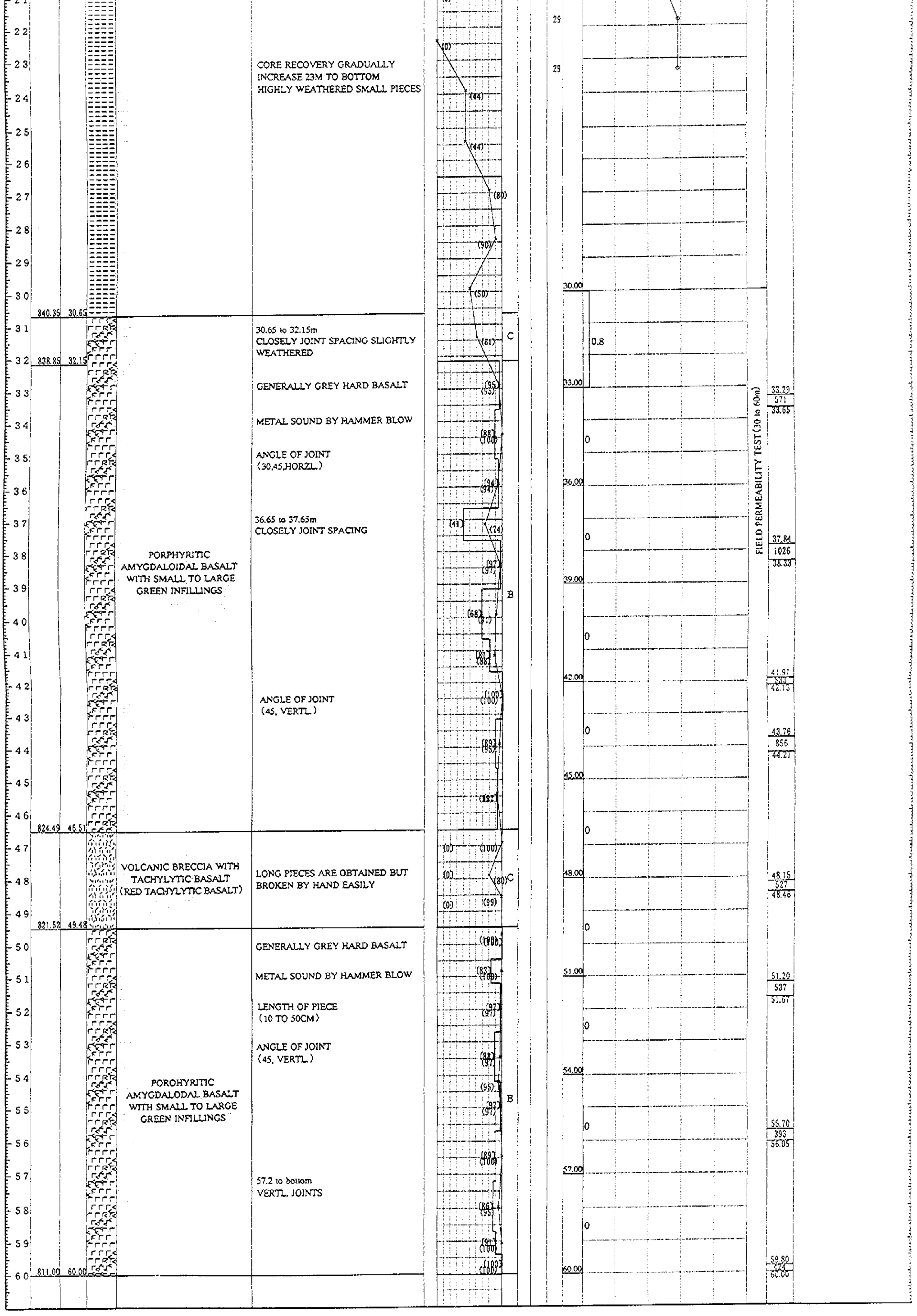
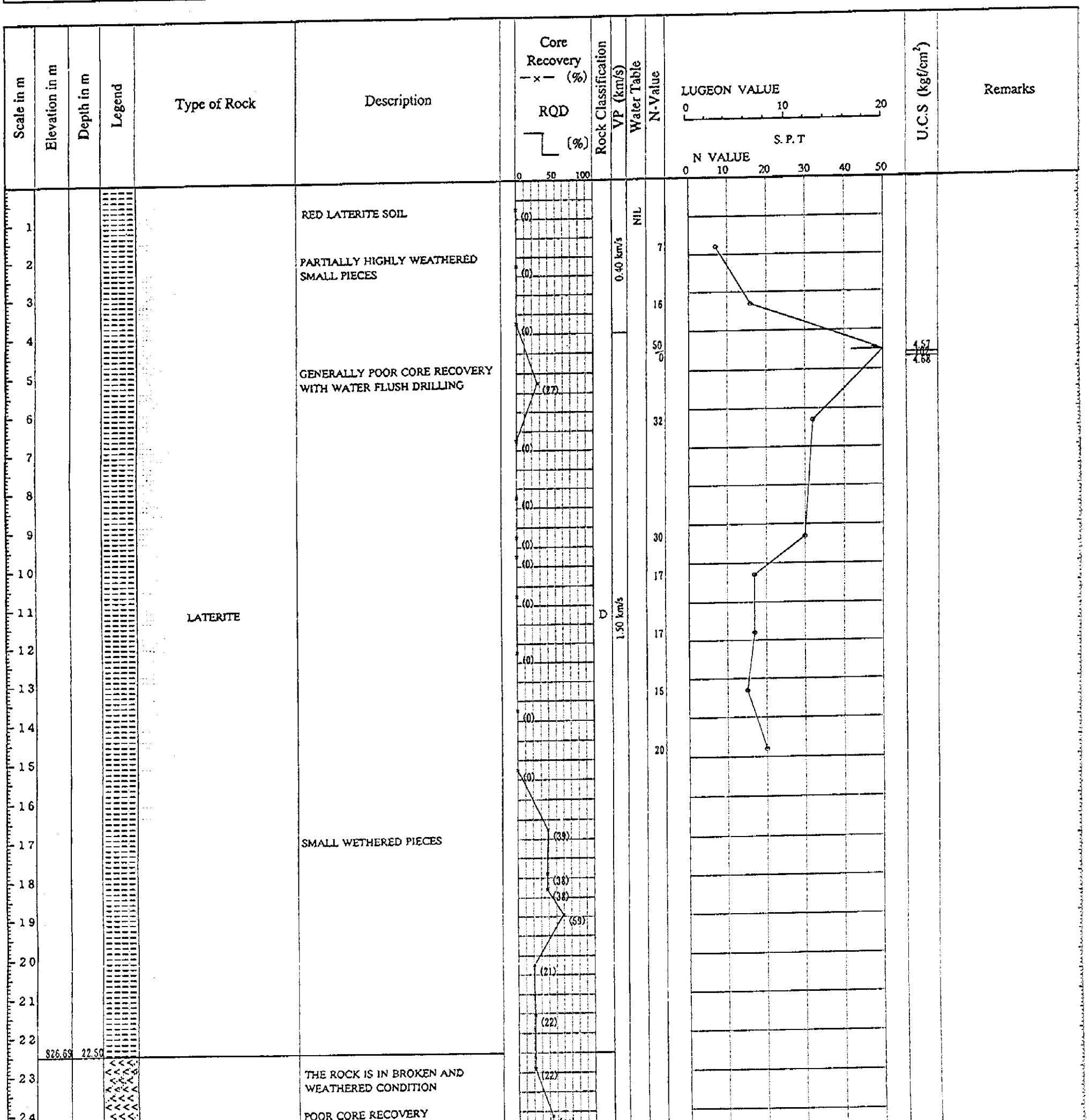

CORE RECOVERY GRADUALLY
INCREASE 23M TO BOTTOM
HIGHLY WEATHERED SMALL PIECES
840.35 30.65
30.65 to 32.15m
CLOSELY JOINT SPACING SLIGHTLY
WEATHERED
838.85 32.15
GENERALLY GREY HARD BASALT
METAL SOUND BY HAMMER BLOW
ANGLE OF JOINT
(30,45,HORZL.)
36.65 to 37.65m
CLOSELY JOINT SPACING
PORPHYRITIC
AMYGDALOIDAL BASALT
WITH SMALL TO LARGE
GREEN INFILLINGS
ANGLE OF JOINT
(45, VERTL.)
824.49 46.51
VOLCANIC BRECCIA WITH
TACHYLYTIC BASALT
(RED TACHYLYTIC BASALT)
LONG PIECES ARE OBTAINED BUT
BROKEN BY HAND EASILY
821.52 49.48
GENERALLY GREY HARD BASALT
METAL SOUND BY HAMMER BLOW
LENGTH OF PIECE
(10 TO 50CM)
ANGLE OF JOINT
(45, VERTL.)
POROHYRITIC
AMYGDALODAL BASALT
WITH SMALL TO LARGE
GREEN INFILLINGS
57.2 to bottom
VERTL. JOINTS
811.00 60.00
FIELD PERMEABILITY TEST (30 to 60m)
33.29
571
33.65
37.84
1026
38.33
41.91
42.13
43.76
856
44.21
48.15
527
48.46
51.20
537
51.67
55.70
393
56.05
59.80
60.00

Fig. APP.2-7 DRILLING LOG

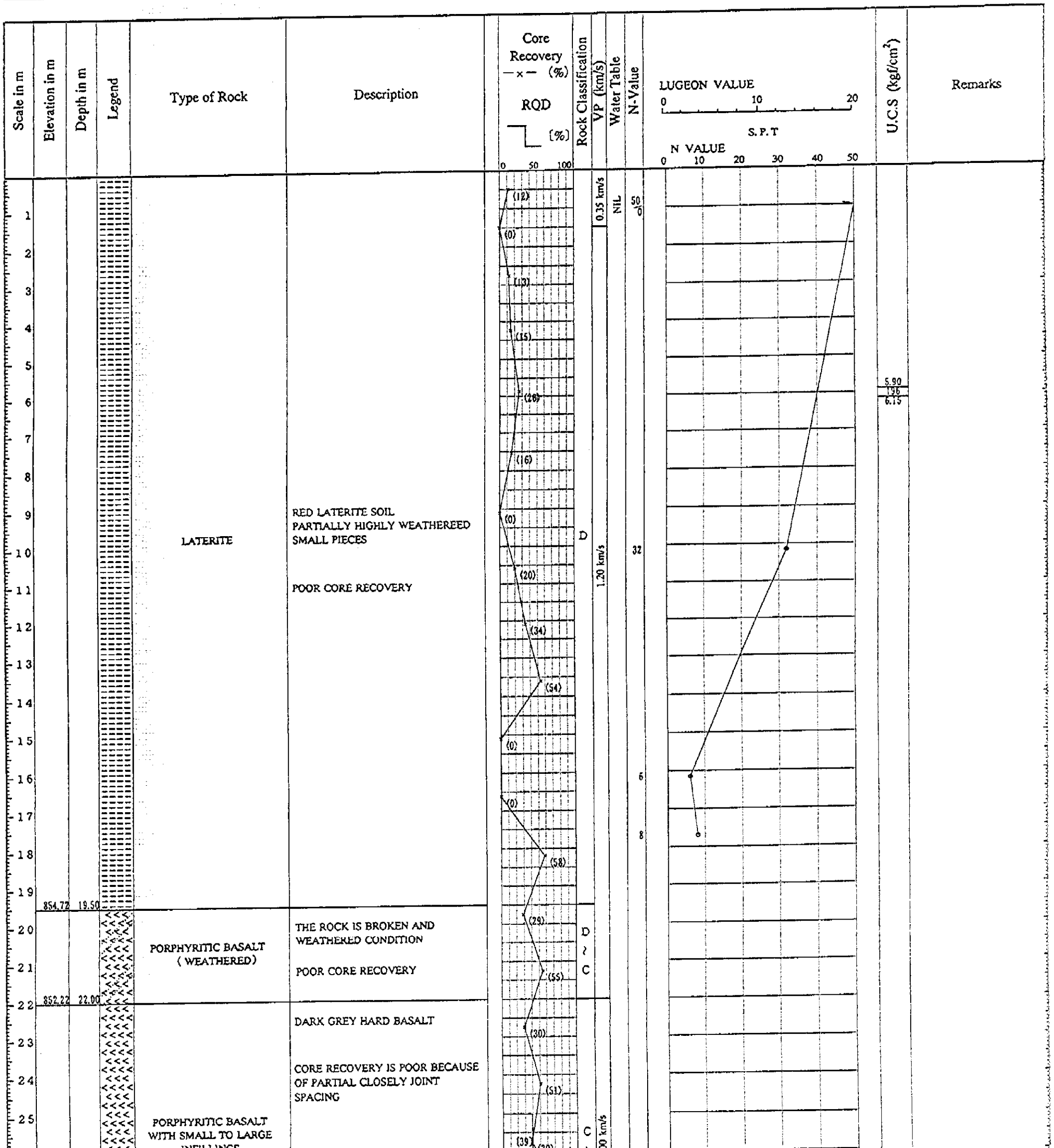
PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA								
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY				DATE	29/NOV./1995 ~ 8/DEC./1995			
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD				DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD			
B.H.No.	UM-4	Elevation	R.L. 849.195 m		Total Depth	30.00 m	Location	MARLESHWAR PROJECT SITE	
Equipment and Method	CALYX Rotary Coring Water Flush and with Diamond Bits				Diameter of Hole : NX (mm)		Sheet No.	OF	



Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Core Recovery —×— (%) / RQD [%]	Rock Classification	VP (km/s)	Water Table	N-Value	LUGEON VALUE / S.P.T / N VALUE	U.C.S (kgf/cm²)	Remarks
1					RED LATERITE SOIL	(0)			NIL				
2					PARTIALLY HIGHLY WEATHERED SMALL PIECES	(0)		0.40 km/s		7			
3										16			
4						(0)				50/0		1.57 / 4.68	
5					GENERALLY POOR CORE RECOVERY WITH WATER FLUSH DRILLING	(27)							
6										32			
7						(0)							
8						(0)							
9						(0)				30			
10						(0)				17			
11				LATERITE		(0)	D	1.50 km/s					
12						(0)				17			
13										15			
14						(0)							
15						(0)				20			
16													
17					SMALL WETHERED PIECES	(39)							
18						(38) (38)							
19						(59)							
20						(21)							
21													
22	826.69	22.50				(22)							
23					THE ROCK IS IN BROKEN AND WEATHERED CONDITION	(22)							
24					POOR CORE RECOVERY	(44)	D						
25				PORPHYRITIC BASALT (WEATHERED)	SMALL PIECES (2 TO 7CM) 24.65 to 26.15m PIECE NO.86,89,90,98,99,102,103 NO.OF SMALL PCS	(42)	~ C						
26						(77)							
27						(87)							
28	821.24	27.99		PORPHYRITIC BASALT WITH SMALL TO LARGE INFILLINGS	DARK GREY HARD BASALT	(90) (100)	B						
29					LENGTH OF PIECE (10 TO 28CM)							29.75 / 388 / 30.00	
30	819.19	30.00				(85) (85)							

Fig. APP.2-8 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	29/NOV./1995 ~ 9/DEC./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UM-5	Elevation	R.L. 874.221 m	Total Depth	30.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	CALYX Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		Sheet No.	OF



Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits	Diameter of Hole PHI (mm)		

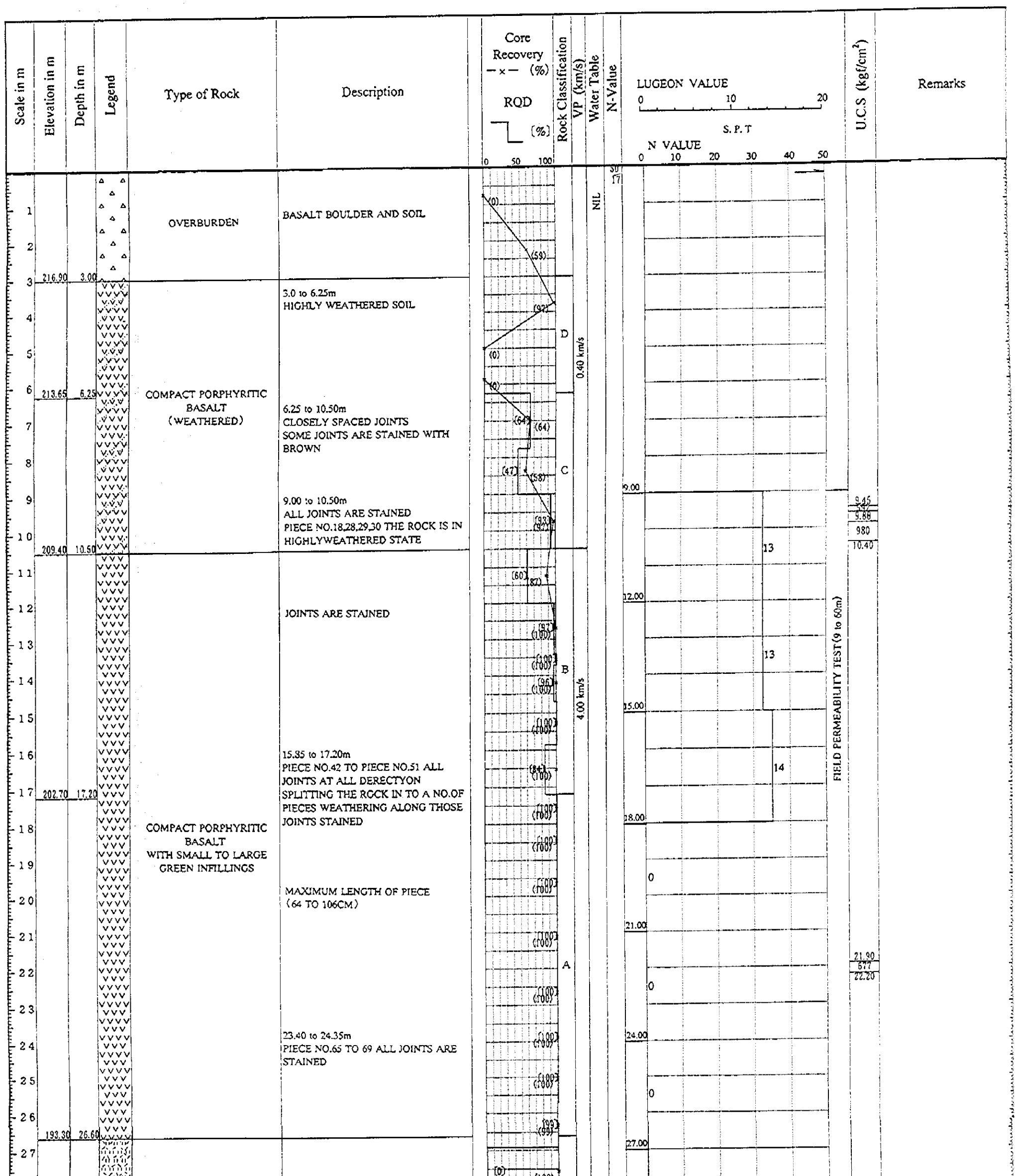
Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Rock Classification	VP (km/s)	Water Table	N-Value	U.C.S (kgf/cm²)	Remarks
1–19				LATERITE	RED LATERITE SOIL PARTIALLY HIGHLY WEATHEREED SMALL PIECES POOR CORE RECOVERY	D	0.35 km/s 1.20 km/s	NIL	50 32 6 8		
19.50	854.72										
20–22				PORPHYRITIC BASALT (WEATHERED)	THE ROCK IS BROKEN AND WEATHERED CONDITION POOR CORE RECOVERY	D ~ C					
22.00	852.22										
23–30				PORPHYRITIC BASALT WITH SMALL TO LARGE INFILLINGS	DARK GREY HARD BASALT CORE RECOVERY IS POOR BECAUSE OF PARTIAL CLOSELY JOINT SPACING	C ~ B	4.00 km/s			5.90 / 1.96 / 6.15 25.99 / 4.73 / 27.27 28.27 / 1.91 / 28.44	
30.00	844.22										

Core Recovery —×— (%)
RQD [%]
0 50 100

LUGEON VALUE 0 10 20
S.P.T
N VALUE 0 10 20 30 40 50

Fig. APP.2-9 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	28/JAN./1996 ~ 6/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-1	Elevation	R.L. 219.879 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		Sheet No.	OF

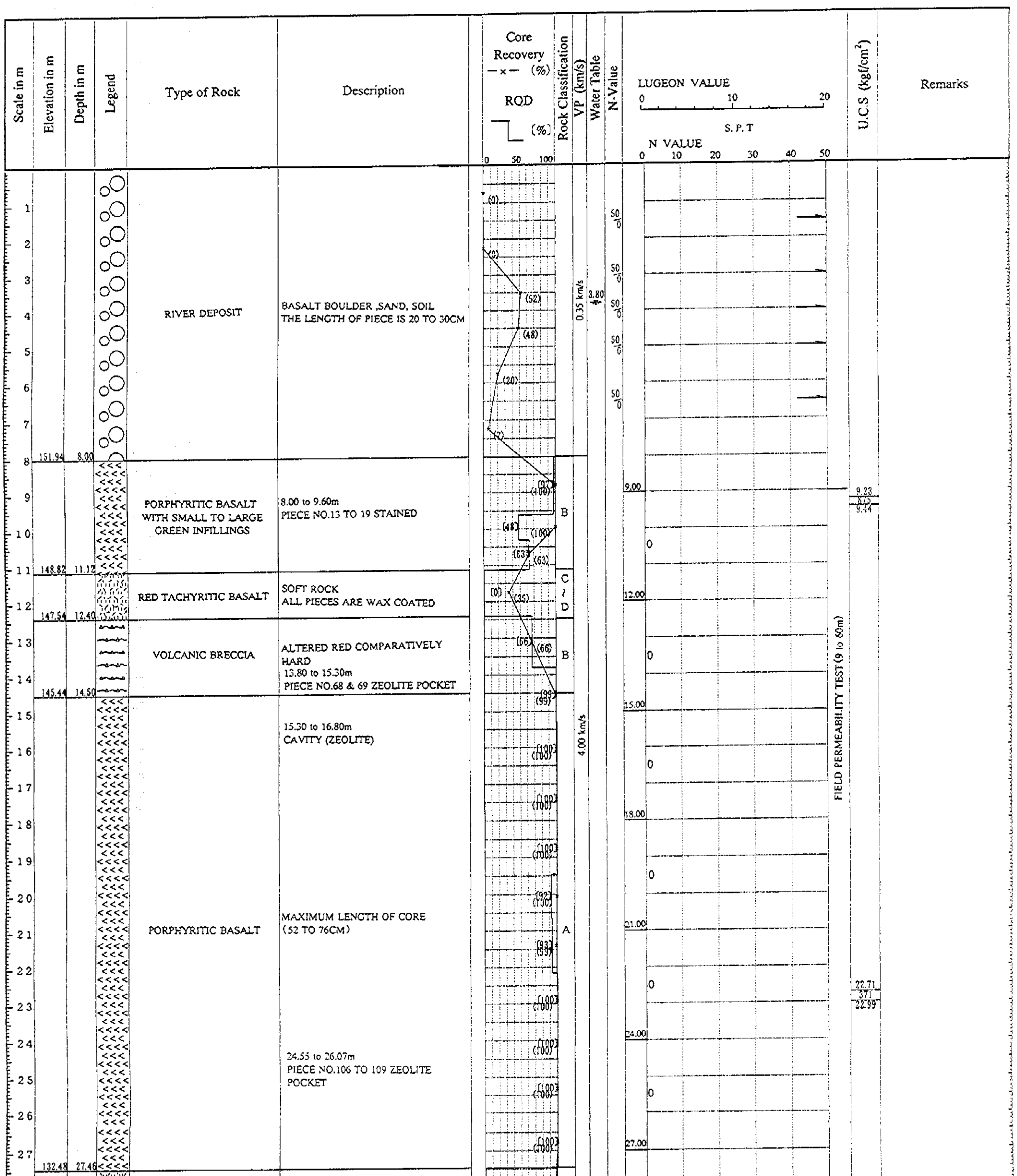


Depth	Elevation	Lithology	Description	Core recovery	Rock quality	Velocity	Permeability	Test	Water level
3									
4		COMPACT PORPHYRITIC BASALT (WEATHERED)	3.0 to 6.25m HIGHLY WEATHERED SOIL	(97)	D	0.40 km/s			
5				(0)					
6	213.65 6.25			(0)					
7			6.25 to 10.50m CLOSELY SPACED JOINTS SOME JOINTS ARE STAINED WITH BROWN	(64) (64)					
8				(47) (58)	C				
9			9.00 to 10.50m ALL JOINTS ARE STAINED PIECE NO.18,28,29,30 THE ROCK IS IN HIGHLYWEATHERED STATE	(33) (92)			9.00		9.45 / 9.88 / 980 / 10.40
10	209.40 10.50								
11		COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS		(60) (87)					
12			JOINTS ARE STAINED				12.00	13	
13				(97) (100)				13	
14				(100) (100) (86) (100)	B	4.00 km/s			
15				(100) (100)			15.00		
16			15.85 to 17.20m PIECE NO.42 TO PIECE NO.51 ALL JOINTS AT ALL DERECTYON SPLITTING THE ROCK IN TO A NO.OF PIECES WEATHERING ALONG THOSE JOINTS STAINED	(84) (100)				14	FIELD PERMEABILITY TEST (9 to 60m)
17	202.70 17.20								
18				(100) (100)			18.00		
19				(100) (100)				0	
20			MAXIMUM LENGTH OF PIECE (64 TO 106CM)						
21				(100) (100)			21.00		
22					A			0	21.90 / 677 / 22.20
23				(100) (100)					
24			23.40 to 24.35m PIECE NO.65 TO 69 ALL JOINTS ARE STAINED	(100) (100)			24.00		
25				(100) (100)				0	
26	193.30 26.60			(99)					
27		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)		(0) (100)			27.00		
28								0	
29				(0) (99)					
30							30.00		
31			FRAGMENT CAUGHT UP IN HYDROTHERMALLY ALTERED RED LAVA MATRIX AT PLACES SOME PIECES ARE COATED WITH WAX ON EXPOSURE TO THE ATOMOSPHERE, THE ROCK DISINTIGRATES IN TO SOFT LOOSE MATERIAL SOME PIECES ARE BROKEN BY HANDS	(0) (100)					31.09 / 218 / 31.37
32				(20) (100)	C			0	
33							33.00		
34				(20) (100)					
35				(0) (100)				0	
36							36.00		
37				(0) (100)					
38	181.65 38.25			(0) (100)				0	
39		COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS					39.00		
40				(90) (100)				0	
41				(100)					
42				(100)	A		42.00		
43				(100)				0	
44				(100)					
45							45.00		44.83 / 589 / 45.33
46	173.49 46.41			(100)				0	

Depth	Elevation	Description	Remarks	RQD	Core	Core Loss	Joints	Fracture Index
24			23.40 to 24.35m PIECE NO.65 TO 69 ALL JOINTS ARE STAINED	(100) (100)			24.00	
25				(100) (100)			0	
26	193.30 26.60			(99) (99)			27.00	
27		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	FRAGMENT CAUGHT UP IN HYDROTHERMALLY ALTERED RED LAVA MATRIX AT PLACES SOME PIECES ARE COATED WITH WAX ON EXPOSURE TO THE ATOMOSPHERE, THE ROCK DISINTIGRATES IN TO SOFT LOOSE MATERIAL SOME PIECES ARE BROKEN BY HANDS	(0) (100)				
28							0	
29				(0) (99)				
30				(0) (100)			30.00	
31							0	31.09 278 31.37
32				[20] (100)	C			
33				[20] (100)			33.00	
34							0	
35				(0) (100)				
36				(0) (100)			36.00	
37							0	
38	181.65 38.25			(0) (100)				
39		COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS		[90] (100)			39.00	
40							0	
41				(100) (100)				
42				(100) (100)	A		42.00	
43				(100) (100)			0	
44				(100) (100)				
45							45.00	44.83 589 45.33
46	173.49 46.41			(100) (100)				
47		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	FRAGMENT CAUGHT UP IN HYDROTHERMALLY ALTERED RED LAVA MATRIX AT PLACES PIECES ARE WAX COATED	(0) (100)			0	
48					C		48.00	
49	170.45 49.45			(0) (100)				
50		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT		(100) (100)			0	
51							51.00	
52				(100) (100)			0	
53				(100) (100)				53.52 494 53.88
54							54.00	
55				(91) (100)	A		0	
56				(100) (100)				
57			55.49 to 56.69m FROM PIECE NO.148A 3MM GREEN STAINING UPTO PIECE NO.151				57.00	
58				(84) (92)			0	57.85 655 58.17
59				(96) (100)				
60	159.90 60.00						60.00	

Fig. APP.2-10 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	16/JAN./1996 ~ 25/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-2	Elevation	R.L. 159.942 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		Sheet No.	OF



Depth	Elevation	Lithology	Description	Core recovery	Velocity	Permeability
3		RIVER DEPOSIT	BASALT BOULDER ,SAND, SOIL THE LENGTH OF PIECE IS 20 TO 30CM	(0)	0.35 km/s	
4				(52)		
5				(48)		
6				(20)		
7				(7)		
8	151.94 8.00					
9		PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS	8.00 to 9.60m PIECE NO.13 TO 19 STAINED	(97) (100)	B	
10				(48) (100)		
11	148.82 11.12			(63) (63)		
12	147.54 12.40	RED TACHYRITIC BASALT	SOFT ROCK ALL PIECES ARE WAX COATED	(0) (35)	C ~ D	
13		VOLCANIC BRECCIA	ALTERED RED COMPARATIVELY HARD 13.80 to 15.30m PIECE NO.68 & 69 ZEOLITE POCKET	(66) (66)	B	
14	145.44 14.50			(99)		
15			15.30 to 16.80m CAVITY (ZEOLITE)		4.00 km/s	
16				(100)		
17				(100)		
18				(100)		
19				(100)		
20			MAXIMUM LENGTH OF CORE (52 TO 76CM)	(92) (100)		
21		PORPHYRITIC BASALT		(93) (99)	A	
22						
23				(100) (100)		
24			24.55 to 26.07m PIECE NO.106 TO 109 ZEOLITE POCKET	(100) (100)		
25				(100) (100)		
26						
27	132.48 27.46			(100) (100)		
28			30.27 to 31.87m PIECE NO.122 TO 141 SAME LAVA FLOW BUT LAVA MATRIX IS GREY	(0) (97)		
29				(0) (100)		
30			FRAGMENTS CAUGHT UP IN HYDROTHERMALLY ALTERED RED LAVA MATRIX PIECES ARE WAX COATED , EASILY BROKEN BY HANDS PARTLY COHESIVE			
31		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)		(0) (100)	C	
32				(27) (100)		
33						
34				(0) (100)		
35	124.63 35.31			(0) (0) (100)		
36			GREY FRESH HARD BASALT			
37				(100)		
38			37.53 to 38.49m PIECE NO.155 ZEOLITE POCKET	(100) (100)		
39				(100) (100)		
40				(92) (100)		
41						
42				(100) (100)		
43			MAXIMUM ENGTH OF CORE (55 TO 134CM)			
44				(100) (100)		
45				(100) (100)		

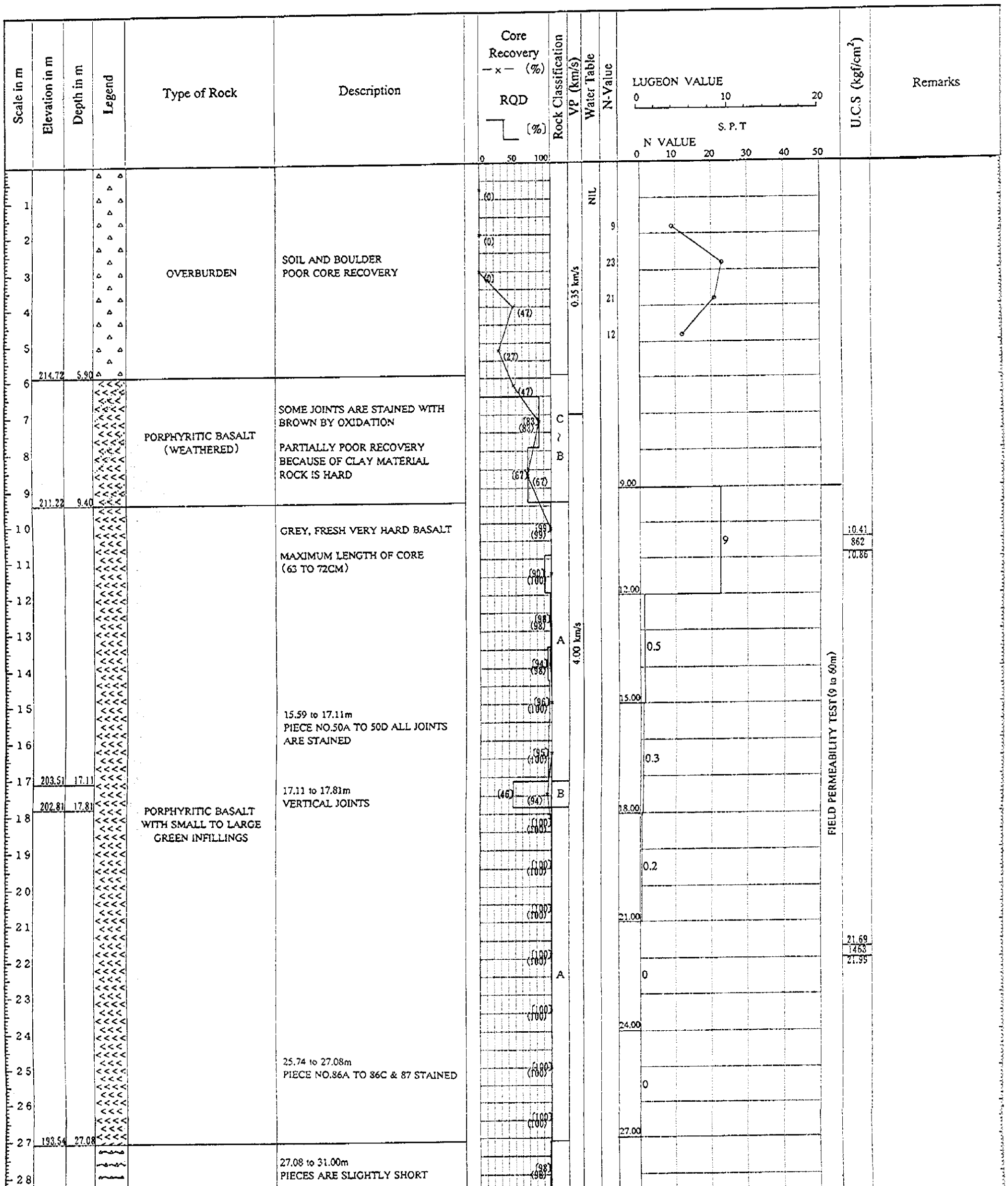
Column notes:

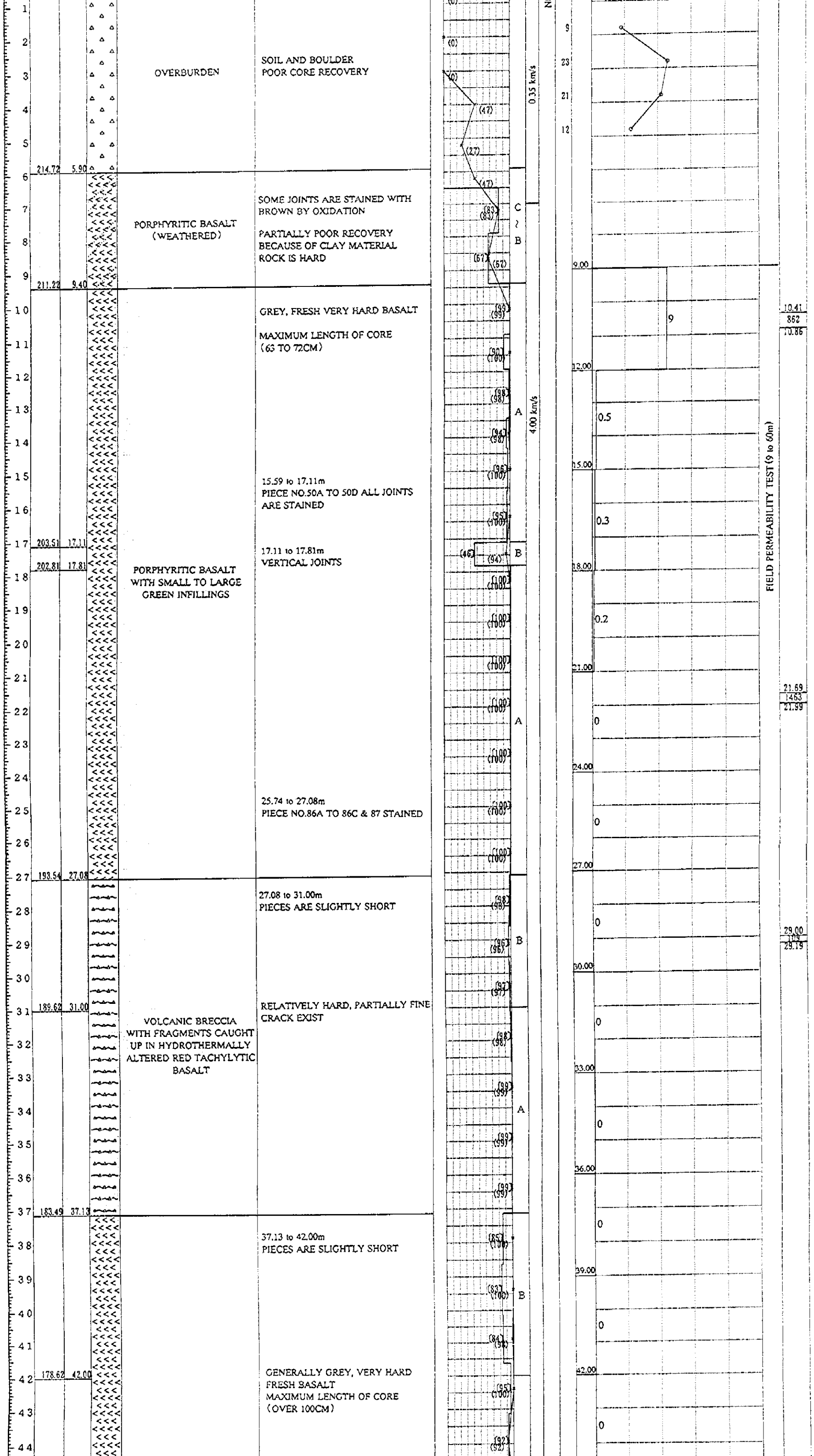
- Velocity column: 3.80 km/s
- Permeability column: 50 0 / 50 0 / 50 0 / 50 0 / 0 / 0 /

22									
23					(100)		0		22.71 / 371 / 22.99
24			24.55 to 26.07m PIECE NO.106 TO 109 ZEOLITE POCKET		(100) (100)		24.00		
25					(100) (100)		0		
26									
27	132.48	27.46			(100) (100)		27.00		
28			30.27 to 31.87m PIECE NO.122 TO 141 SAME LAVA FLOW BUT LAVA MATRIX IS GREY		[0] (97)		0		
29					[0] (100)		30.00		
30			FRAGMENTS CAUGHT UP IN HYDROTHERMALLY ALTERED RED LAVA MATRIX PIECES ARE WAX COATED , EASILY BROKEN BY HANDS PARTLY COHESIVE						
31			VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)		[0] (100)	C	0		31.87 / 120 / 32.26
32					[27] (100)		33.00		
33									
34					[0] (100)		0		
35	124.63	35.31			[0] [0] (100)				
36							36.00		
37			GREY FRESH HARD BASALT		(100) (100)		0		
38			37.53 to 38.49m PIECE NO.155 ZEOLITE POCKET		(100) (100)				
39					(100) (100)		39.00		
40					(97) (100)		0		
41									
42					(100) (100)		42.00		
43			MAXIMUM ENGTH OF CORE (55 TO 134CM)		(100) (100)		0		
44									
45					(100) (100)		45.00		45.27 / 961 / 45.68
46					(91) (100)		0		
47			COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN AND AT PLACES WHITE INFILLINGS			A			
48					(100) (100)		48.00		
49					(100) (100)		0		
50					(100) (100)				
51					(100) (100)		51.00		
52					(100) (100)		0		
53									
54					(90) (95)		54.00		
55					(93) (100)		0		
56			56.10 to 57.60m PIECE NO.230 & 231 ZEROLITE POCKET 57.60 to 59.10m PIECE NO.232 TO 238 BROWN DUE TO HYDROTHERMALALTERATION CONCENTRATION OF WHITE INFILLINGS						
57					(91) (100)		57.00		
58					(100) (100)		0		58.65 / 234 / 58.86
59	100.84	59.10							
60	99.94	60.00	RED TACHYLYTIC BASALT	PIECES ARE WAX COATED	[0] (100)	C	60.00		

Fig. APP.2-11 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	27/JAN./1996 ~ 4/FEB./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-3	Elevation	R.L. 220.618 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		Sheet No.	OF




OVERBURDEN
SOIL AND BOULDER
POOR CORE RECOVERY
214.72 5.90
PORPHYRITIC BASALT
(WEATHERED)
SOME JOINTS ARE STAINED WITH
BROWN BY OXIDATION
PARTIALLY POOR RECOVERY
BECAUSE OF CLAY MATERIAL
ROCK IS HARD
211.22 9.40
GREY, FRESH VERY HARD BASALT
MAXIMUM LENGTH OF CORE
(65 TO 72CM)
15.59 to 17.11m
PIECE NO.50A TO 50D ALL JOINTS
ARE STAINED
203.51 17.11
17.11 to 17.81m
VERTICAL JOINTS
202.81 17.81
PORPHYRITIC BASALT
WITH SMALL TO LARGE
GREEN INFILLINGS
25.74 to 27.08m
PIECE NO.86A TO 86C & 87 STAINED
193.54 27.08
27.08 to 31.00m
PIECES ARE SLIGHTLY SHORT
189.62 31.00
RELATIVELY HARD, PARTIALLY FINE
CRACK EXIST
VOLCANIC BRECCIA
WITH FRAGMENTS CAUGHT
UP IN HYDROTHERMALLY
ALTERED RED TACHYLYTIC
BASALT
183.49 37.13
37.13 to 42.00m
PIECES ARE SLIGHTLY SHORT
178.62 42.00
GENERALLY GREY, VERY HARD
FRESH BASALT
MAXIMUM LENGTH OF CORE
(OVER 100CM)
0.35 km/s
4.00 km/s
C
B
A
B
A
B
A
B
N
FIELD PERMEABILITY TEST (9 to 60m)
10.41
862
10.86
21.69
1463
21.99
29.00
1104
29.19

Depth			Description	Notes	RQD	Core	Depth	Recovery	Depth	Length
23					(100)					
24							24.00			
25				25.74 to 27.08m PIECE NO.86A TO 86C & 87 STAINED	(100)			0		
26					(100)					
27	193.54	27.08					27.00			
28				27.08 to 31.00m PIECES ARE SLIGHTLY SHORT	(98)			0		
29					(96)	B			29.00 1.09 29.19	
30					(97)		30.00			
31	189.62	31.00	VOLCANIC BRECCIA WITH FRAGMENTS CAUGHT UP IN HYDROTHERMALLY ALTERED RED TACHYLYTIC BASALT	RELATIVELY HARD, PARTIALLY FINE CRACK EXIST				0		
32					(98)					
33					(99)		33.00			
34						A		0		
35					(99)					
36					(99)		36.00			
37	183.49	37.13						0		
38				37.13 to 42.00m PIECES ARE SLIGHTLY SHORT	(85) (100)					
39					(83) (100)	B	39.00			
40								0		
41					(94)					
42	178.62	42.00		GENERALLY GREY, VERY HARD FRESH BASALT MAXIMUM LENGTH OF CORE (OVER 100CM)	(95) (100)		42.00			
43								0		
44					(92)					
45				44.72 to 46.28m ZEOLITE VEIN	(100)		45.00			
46								0	46.44 568 46.79	
47					(100)					
48			PORPHYRITIC BASALT WITH SMALL TO LARGE GREEN INFILLINGS		(100)		48.00			
49								0		
50					(100)	A				
51							51.00			
52					(100)			0		
53					(100)					
54							54.00			
55					(100)					
56								0	56.24 567 56.66	
57					(99)		57.00			
58					(100)					
59	161.61	59.01						0		
60	160.62	60.00	RED TACHYLYTIC BASALT	ALTERED RED SOFT ROCK PIECES ARE WAX COATED	(0) (100)	C	60.00			

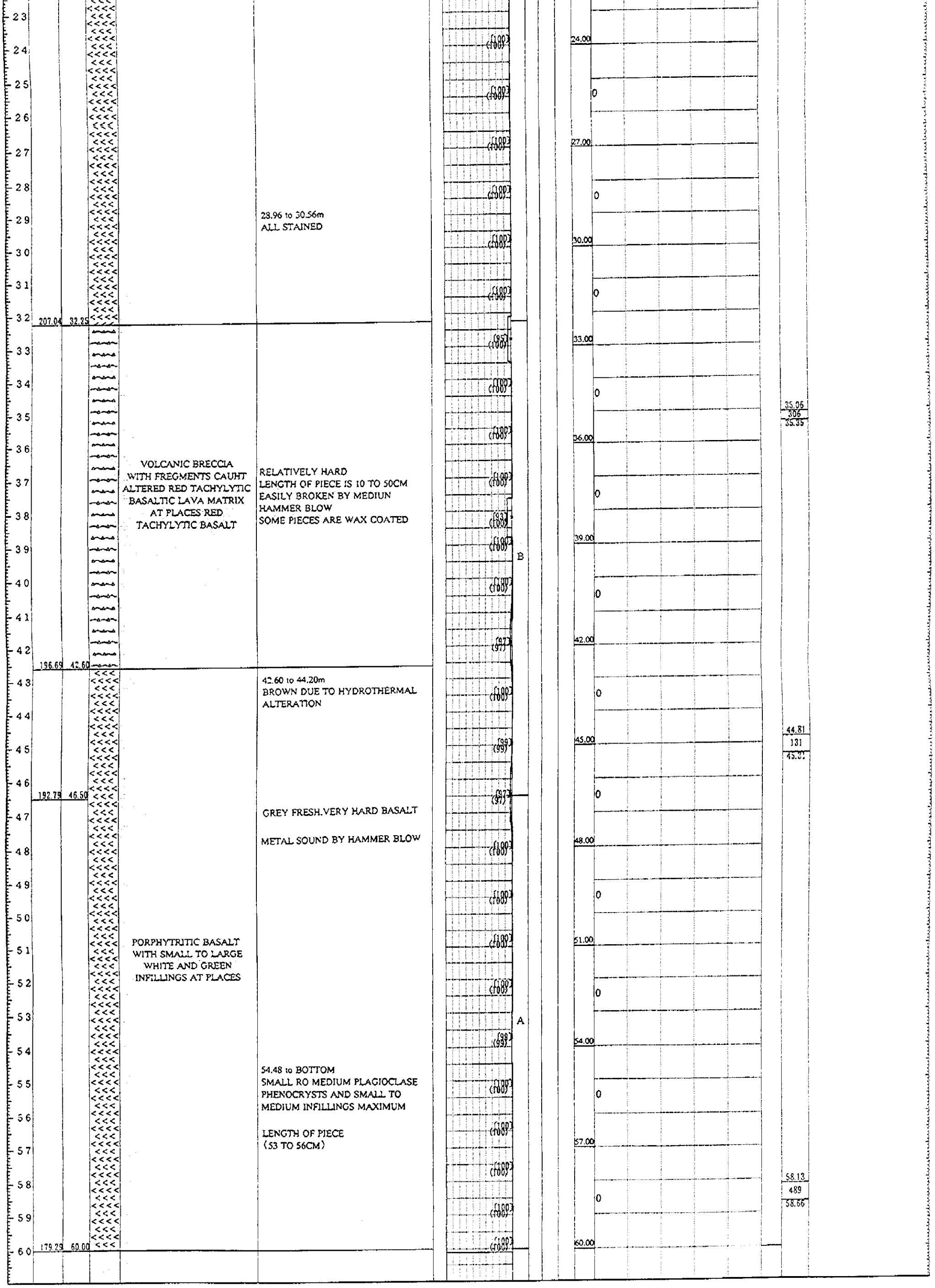
Fig. APP.2-12 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			DATE	27/DEC./1995 ~ 7/JAN./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			DRILLER	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-4	Elevation	R.L. 239.292 m	Total Depth	60.00 m	Location	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		Sheet No.	OF

Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Core Recovery —×— (%) / RQD [%]	Rock Classification	VP (km/s)	Water Table	N-Value	LUGEON VALUE / S.P.T / N VALUE	U.C.S (kgf/cm²)	Remarks
1				OVERBURDEN	BROWN SILT WITH GRAVELS	(0)			NIL				
2					BLACKISH RED WEATHERED ROCK PIECES	(0)				50/28			
3										50/28			
4	234.79	4.50				(0)		0.40 km/s					
5				LATERITE	RED LATERITE SOIL POOR RECOVERY	(0)				50/27			
6							D			50/18			
7	231.79	7.50				(0)							
8				PORPHYRITIC BASALT (WEATHERED)	ALL JOINTS AT VARIOUS ANGLES STAINED SLIGHT WEATHERED	(25) (32)	C			50/19			
9	230.29	9.00			GREY FRESH VERY HARD BASALT	(99) (99)					9.00	9.94 / 770 / 10.25	
10					METAL SOUND BY HAMMER BLOW						0		
11					11.45 to 13.10m ALL JOINTS ARE STAINED BROWN RED GREEN	(99) (99)					12.00		
12						(99) (99)							
13											0		
14						(100) (100)					15.00		
15						(100) (100)							
16						(97) (97)		4.00 km/s			0		
17											18.00		
18						(100) (100)							
19				PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS PHENOCRYSTS ARE IN CLUSTER AT PLACES SMALL TO MEDIUM GREEN INFILLINGS	18.62 to 19.99m DEPOSITION OF1 TO 2MM WEATHERED MATERIAL BROWN RED	(100) (100)					0		
20												20.20 / 375 / 20.68	
21						(100) (100)	A				21.00		
22						(100) (100)					0		
23													
24						(100) (100)					24.00		
25						(100) (100)					0		
26													
27						(100) (100)					27.00		
28													

FIELD PERMEABILITY TEST (9 to 60m)

Depth (m)	Elevation	Depth	Lithology	Description	RQD	Core	Seismic	Field Permeability Test (9 to 60m)
1			OVERBURDEN	BROWN SILT WITH GRAVELS	(0)		NIL	
2				BLACKISH RED WEATHERED ROCK PIECES	(0)			
3					(0)			
4	234.79	4.50			(0)		0.40 km/s	
5			LATERITE	RED LATERITE SOIL POOR RECOVERY	(0)			
6						D		
7	231.79	7.50			(0)			
8			PORPHYRITIC BASALT (WEATHERED)	ALL JOINTS AT VARIOUS ANGLES STAINED SLIGHT WEATHERED	(25) (32)	C		
9	230.29	9.00		GREY FRESH VERY HARD BASALT	(99)			9.94 / 770 / 10.25
10				METAL SOUND BY HAMMER BLOW	(99)			
11				11.45 to 13.10m ALL JOINTS ARE STAINED BROWN RED GREEN	(99)			
12					(100)			
13					(100)			
14					(100)			
15					(97)		4.00 km/s	
16					(100)			
17				18.62 to 19.99m DEPOSITION OF1 TO 2MM WEATHERED MATERIAL BROWN RED	(100)			
18			PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS PHENOCRYSTS ARE IN CLUSTER AT PLACES SMALL TO MEDIUM GREEN INFILLINGS		(100)	A		20.20 / 375 / 20.68
19					(100)			
20					(100)			
21					(100)			
22					(100)			
23					(100)			
24					(100)			
25					(100)			
26				28.96 to 30.56m ALL STAINED	(100)			
27					(100)			
28					(100)			
29					(100)			
30					(100)			
31					(100)			
32	207.04	32.25			(95) (100)			
33			VOLCANIC BRECCIA WITH FREGMENTS CAUHT ALTERED RED TACHYLYTIC BASALTIC LAVA MATRIX AT PLACES RED TACHYLYTIC BASALT	RELATIVELY HARD LENGTH OF PIECE IS 10 TO 50CM EASILY BROKEN BY MEDIUN HAMMER BLOW SOME PIECES ARE WAX COATED	(100)			35.06 / 306 / 35.35
34					(100)			
35					(100)			
36					(100)			
37					(100)			
38					(93) (100)			
39					(100)	B		
40					(100)			
41								
42	196.69	42.60			(97)			
43				42.60 to 44.20m BROWN DUE TO HYDROTHERMAL ALTERATION	(100)			
44								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57
58
59
60
207.04 32.25
196.69 42.60
192.79 46.50
179.29 60.00
28.96 to 30.56m
ALL STAINED
VOLCANIC BRECCIA
WITH FREGMENTS CAUHT
ALTERED RED TACHYLYTIC
BASALTIC LAVA MATRIX
AT PLACES RED
TACHYLYTIC BASALT
RELATIVELY HARD
LENGTH OF PIECE IS 10 TO 50CM
EASILY BROKEN BY MEDIUN
HAMMER BLOW
SOME PIECES ARE WAX COATED
42.60 to 44.20m
BROWN DUE TO HYDROTHERMAL
ALTERATION
GREY FRESH.VERY HARD BASALT
METAL SOUND BY HAMMER BLOW
PORPHYTRITIC BASALT
WITH SMALL TO LARGE
WHITE AND GREEN
INFILLINGS AT PLACES
54.48 to BOTTOM
SMALL RO MEDIUM PLAGIOCLASE
PHENOCRYSTS AND SMALL TO
MEDIUM INFILLINGS MAXIMUM
LENGTH OF PIECE
(53 TO 56CM)
(100)
(95)
(93)
(97)
(99)
B
A
24.00
27.00
30.00
33.00
36.00
39.00
42.00
45.00
48.00
51.00
54.00
57.00
60.00
0
35.06
306
35.35
44.81
131
45.31
58.13
489
58.66