Table 2.1(1/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 18 — 1 Ground EL. 1117.3 Date 18-Oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
		0	
		Litter (black)	
		1.0m	
		1.20m	
120	16.6		150
124	16.0		
140	19.1	Pt O.C.H (black)	
180	24.5		
		2.0m	200
120	16.6		
92	12.7		
		2.5m	250
110	15.0		
		2.80m	
295 235	32.2	Al Q.S.C (black)	

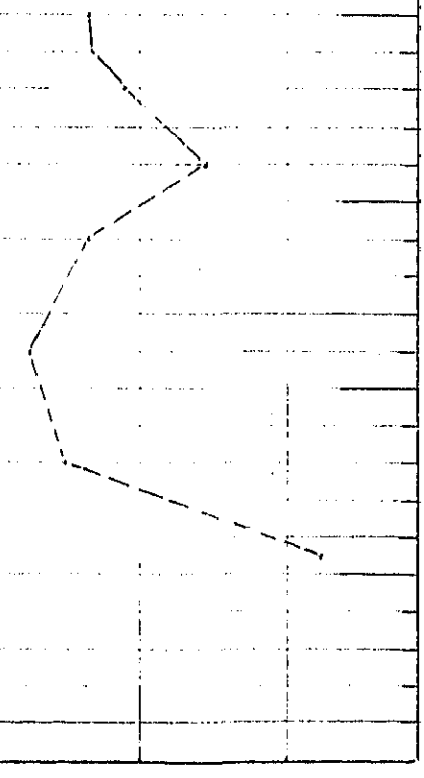


Table 2.1(2/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 16 2' Ground EL. 1116.7 Date 18-oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
			0.5m
		Litter (brownish)	1.00m
			1.25m
			1.50m
		death wood	
			2.30m
		O.C. (black)	
60	13	1.1	200
72	31	9.9	
66	20	3.2	
64	27	8.6	2.90m
32	14	4.5	300
		C.H (white) sand	
43	18	5.7	
94	40	12.7	
115	62	19.8	
175	75	23.9	M.L Laterite 350

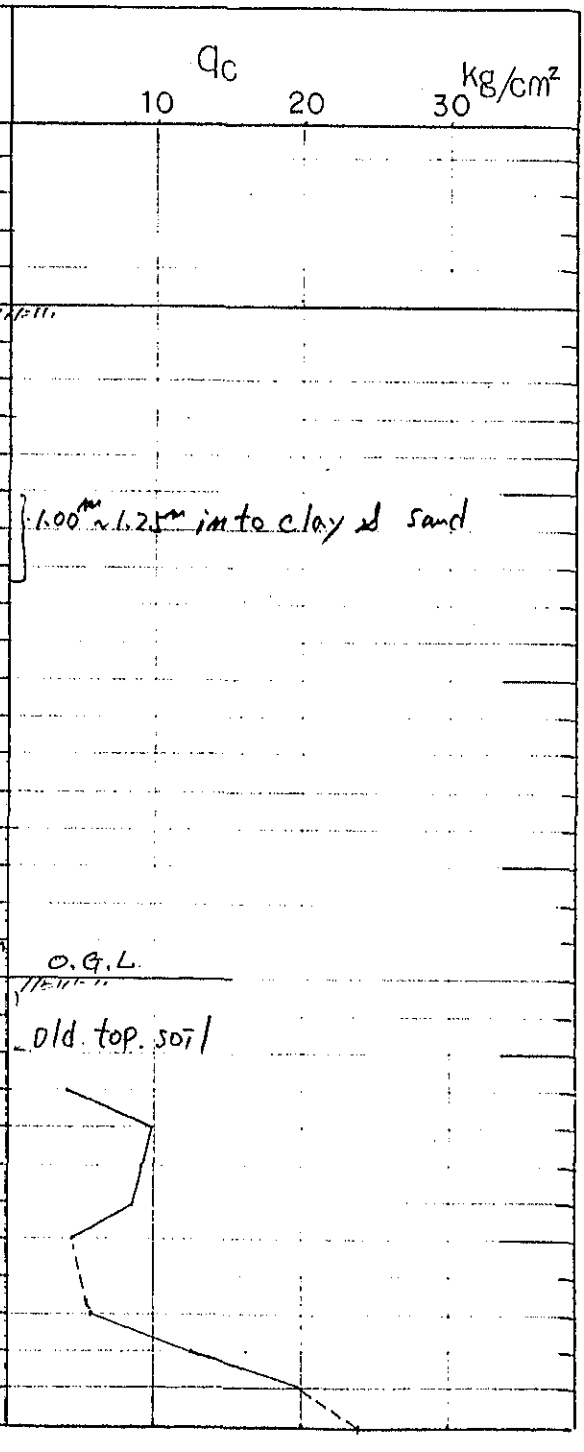


Table 2.1(3/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 18—2" Ground EL. 1116.7 Date 18-oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
			330
233	37.9	Laterite	
224	30.6	M.L	
225	30.9		380

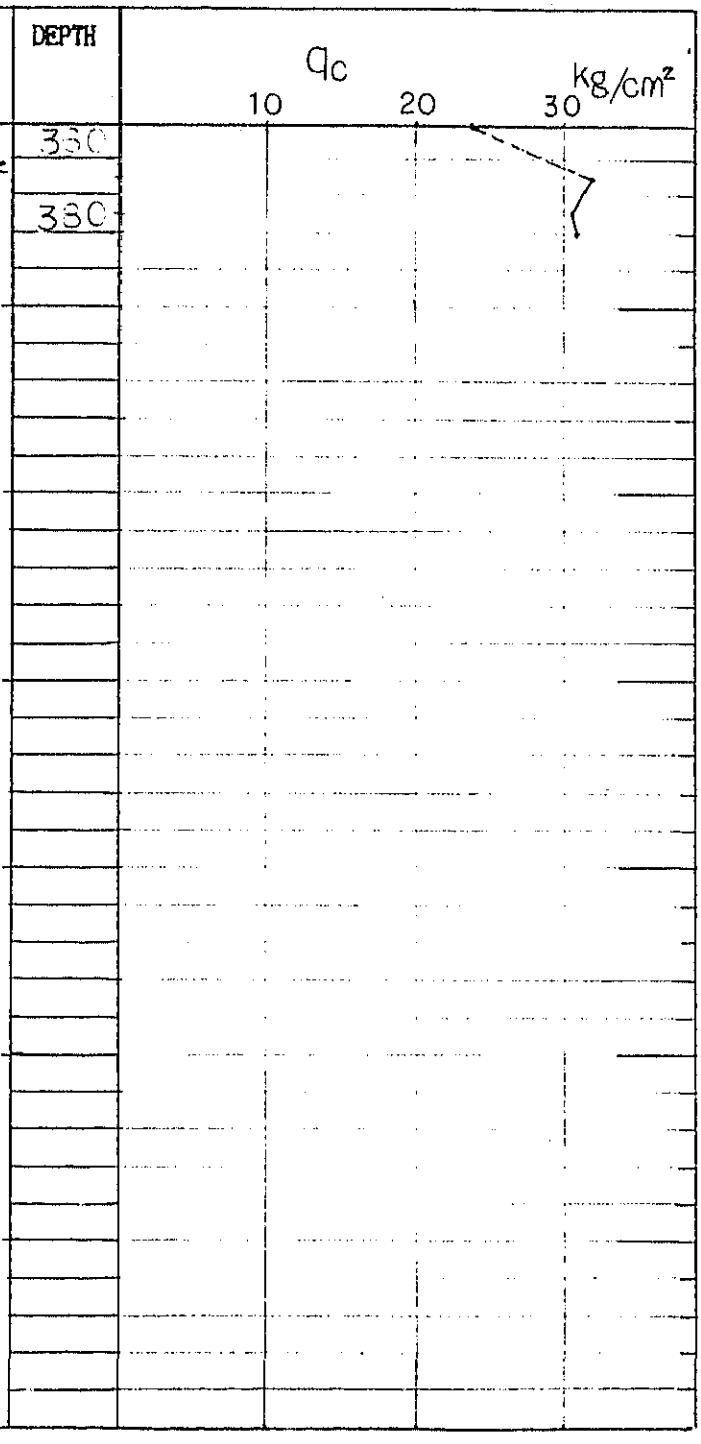


Table 2.1(4/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 18 — 3 Ground EL. 1116.8 Date 18-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14 cm^2

	PENETRATION RESISTANCE qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
				Litter	
				C·H	
	0	0	0.0	White	110
					120
					140
145	50	21	6.7		
165	49	21	6.7		
	70	30	9.6		180
	84	36	11.5		
	132	57	18.2	Sand	200
	153	66	21.0		
	145	62	19.8		220
	203	87	27.7		
					240
243	120	52	16.6		

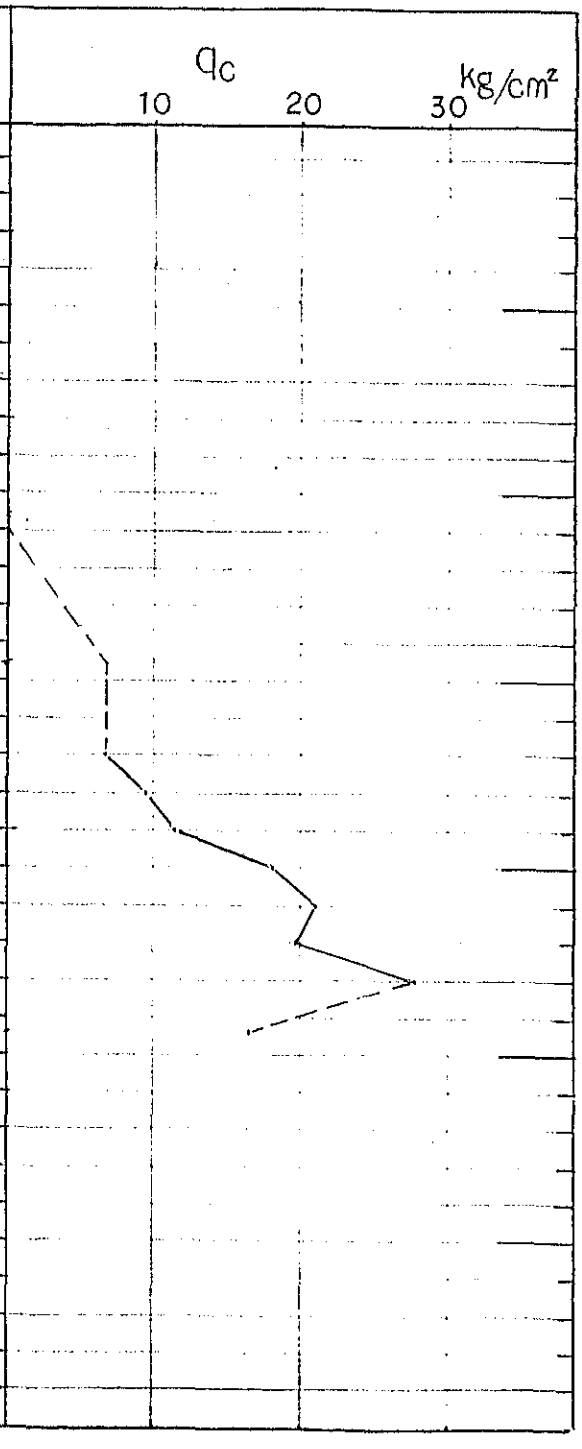


Table 2.1(5/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 18 — 4 Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
			O.H (Pt) black	
			Litter	
			death wood	
				150
36	15	4.5	Y	
40	17	5.1	OH Y black (Pt)	
42	18	5.7		
48	21	6.7		200
			Y	
61	26	8.3	Y	
			C.H	
245+ 79	34	10.9	gray	
90	39	12.1		260
265+ 120	52	16.6	Laterite M.L	

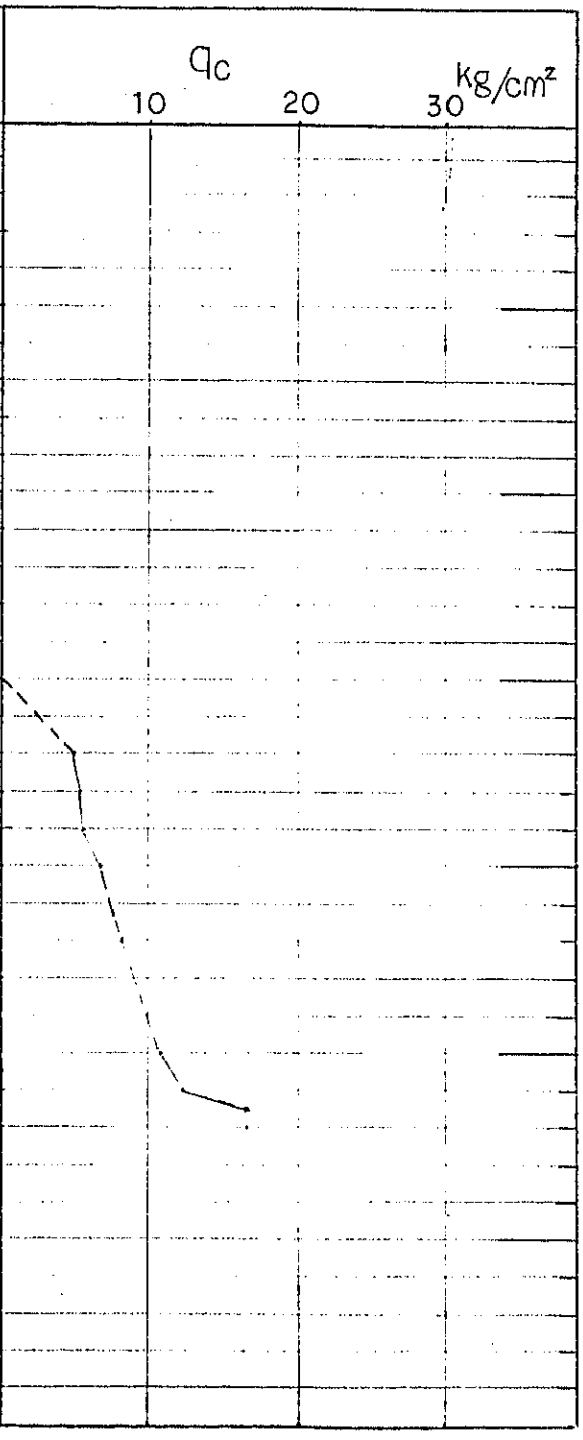


Table 2.1(6/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 - 1 Ground EL. 1119.0 Date 19-Oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
—				
—			MEDIUM	
—			AL	
—			CH	
44	19	6.1		50
55	24	7.6		
85	37	11.8	CH ? Late Veine M.L	
97	42	13.4		
78	34	10.8		
97	42	13.4		100
100	43	13.7		
110	47	15.0		
120	52	16.6		
136	59	18.8		
114	49	15.6		150
122	53	16.9		
138	59	18.8		
163	70	22.3		
200	86	27.4		
cm —				200
205 — 240	103	32.8		
215 — 248	106	33 8		
225 — 241	103	32.8		
235 — 200	86	27.4		
245 — 184	79	25.2		
250 342	≥120	38.2		250

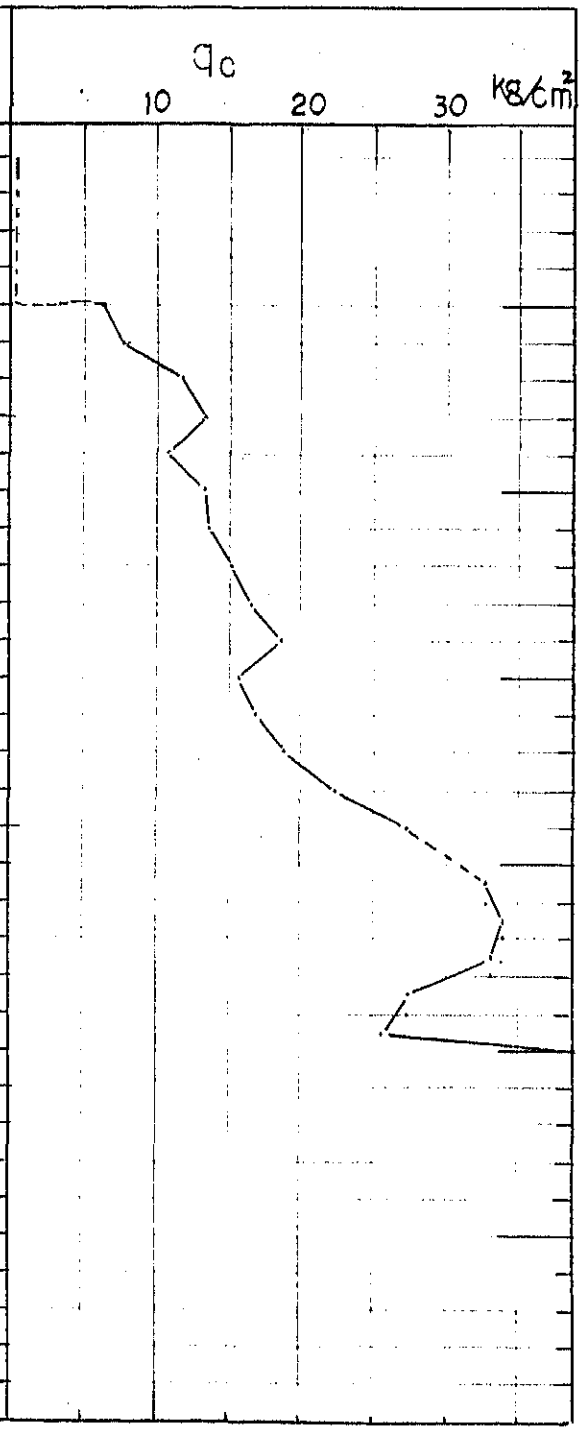


Table 2.1(7/33) RESULT OF CONE PENETRATION TEST
IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19-2 Ground EL. 1118.0 Date 19-oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
			Terrain	
			Al. C.H	
66	28	9.0		30
92	35	11.2		
88	37	11.8		
125	53	17.0	Late rite	60
120	51	16.2		
cm —			M.L	
85 155	66	21.0		90
95 96	41	13.1		
105 82	35	11.2		
80	34	10.8		120
100	42	13.4		
116	49	15.6		
218	93	29.6		150
250	106	33.8		160
429	120	38.0		170

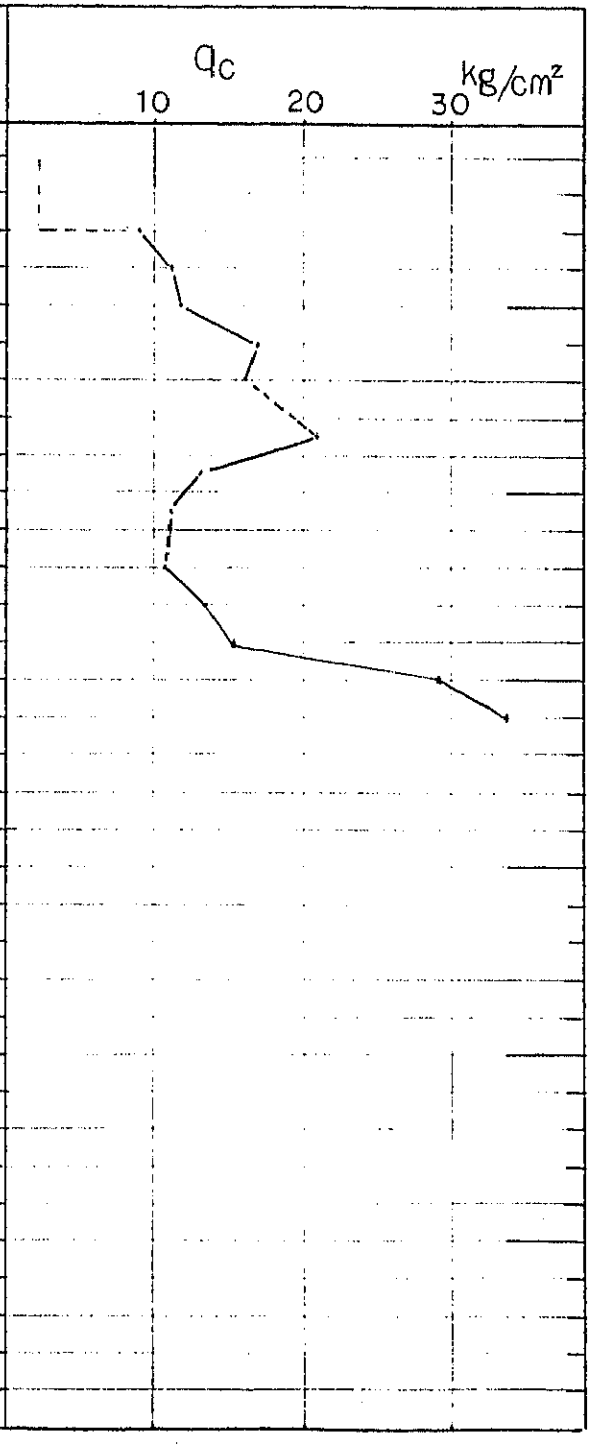


Table 2.1(8/33) RESULT OF CONE PENETRATION TEST
IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 — 3 Ground EL. 1121.0 Date 19-Oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE Qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
12	5	1·6	60
14	6	1·9	
15	6	1·9	
17	7	2·2	90
40	17	5·4	
47	20	6·4	
62	26	8·3	120
123–223	96	30·6	
125–120	52	16·6	

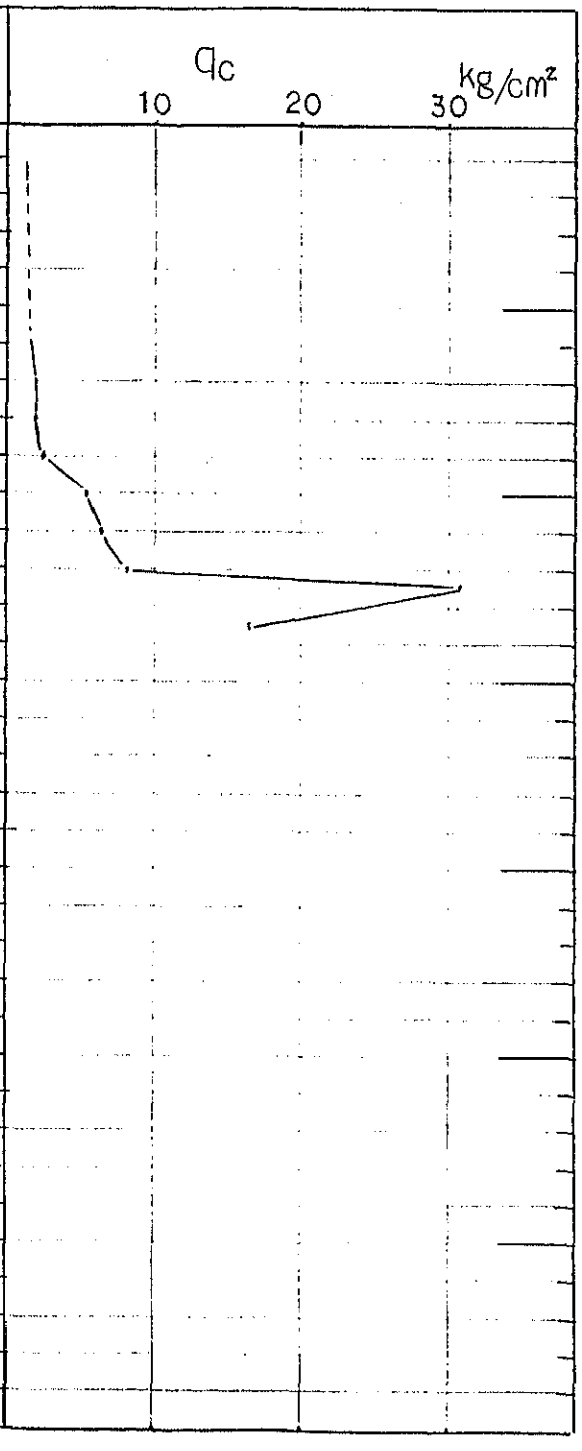


Table 2.1(9/33) RESULT OF CONE PENETRATION TEST
IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 — 4 Ground EL. 1118.3 Date 19-Oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

	PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
			Yo.C.Y.	
27	50	22	7.0	
35	51	22	7.0	
45	46	20	6.4	
55	60	26	8.3	C.H
65	58	25	8.0	
75	49	21	6.7	
85	64	28	8.9	
95	56	25	8.0	
105	50	22	7.0	
115	48	21	6.7	
125	70	31	9.9	
135	89	39	12.4	Laterite
145	115	50	15.9	
155	196	84	26.8	
165	210	90	28.7	
175	265	114	36.3	
185	120	52	16.6	

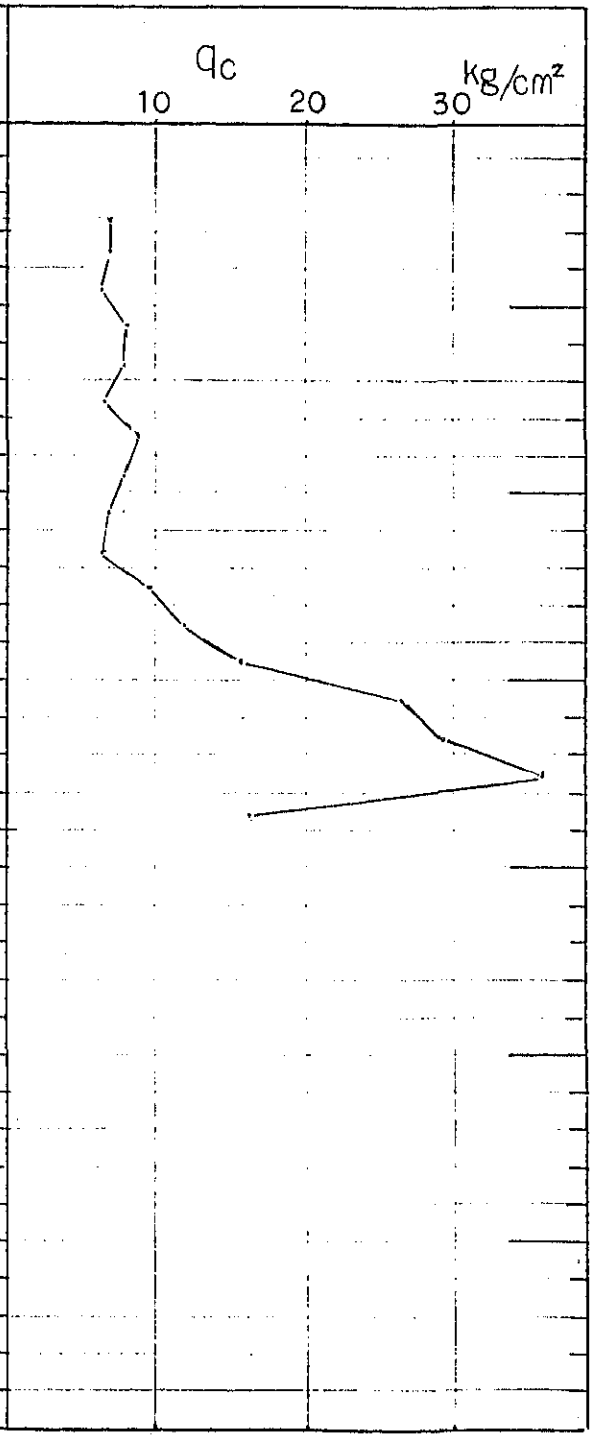


Table 2.1(10/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 - 5 Ground EL. 1117.9 Date 19-oct-85

Method or type of pene. _____

Penetrative rate _____ / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Kg	C	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
			Litter ~0.C.H	
0	0	0.0		
35	15	4.8	C.H	50
57	25	8.0		
85	37	11.8	Laterite M.L	
85	37	11.8		
108	47	15.0		
140	60	19.1		100
122	52	16.6		
137	59	18.8		
165	71	22.6		
193	83	26.4		
199	85	27.1		150
199	85	27.1		
183	78	24.8		
230	99	31.5		
234	100	31.9		190

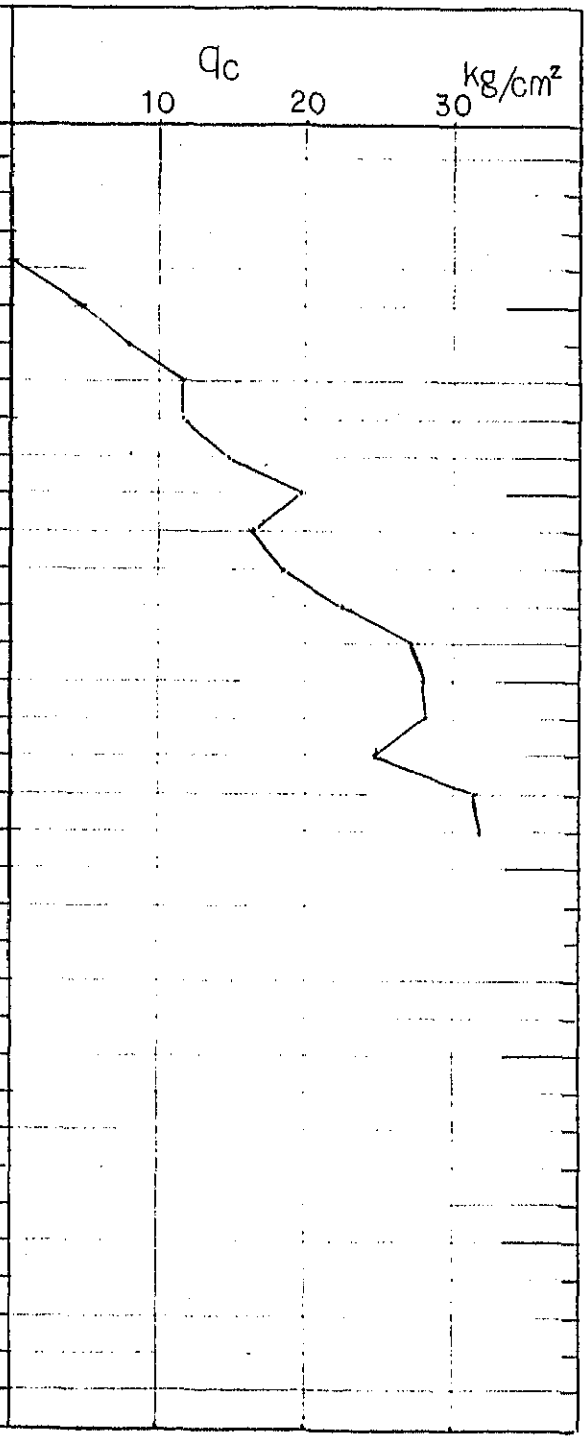


Table 2.1(11/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 - 6 Ground EL. 1117.5 Date 19-oct-85

Method or type of pene. _____

Penetrative rate ____ / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
			Litter	
0	0	0.0		20
29	13	4.1	O.H	
27	12	3.8		40
43	19	6.1		
50	22	7.0		60
50	22	7.0	C.H	
52	22	7.0		80
52	22	7.0		
46	20	6.4		10
47	20	6.4		
47	20	6.4		120
47	20	6.4		
60	26	8.3		140
147	63	20.1		
139	60	19.1		160
139	60	19.1	C.H with sand	
166	71	22.6		180
203 120	52	16.6		
83	36	11.5	Laterite M.L	210
108	46	14.6		220
149	64	20.4		230

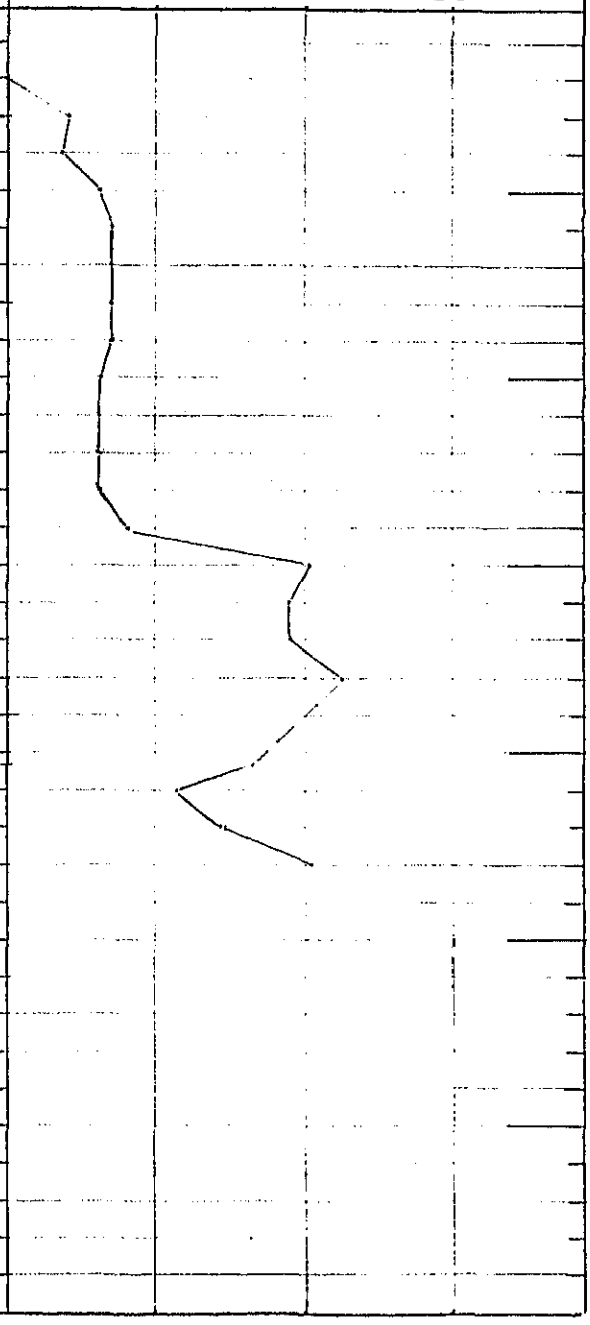


Table 2.1(12/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19－7 Ground EL. 1117.5 Date 19-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
			Litter	
			O.M	
85 0	0			
25	11	3.5		100
33	14	4.5		
34	15	4.8	CH	120
49	21	6.7		
58	25	8.0		140
97	42	13.4		
111	48	15.3		160
91	39	12.4	Laterite	
123	53	16.9	ML	180
156	67	21.3		
165	71	22.6		200
162	70	22.3		
175	75	23.9		220
215	92	29.3		230

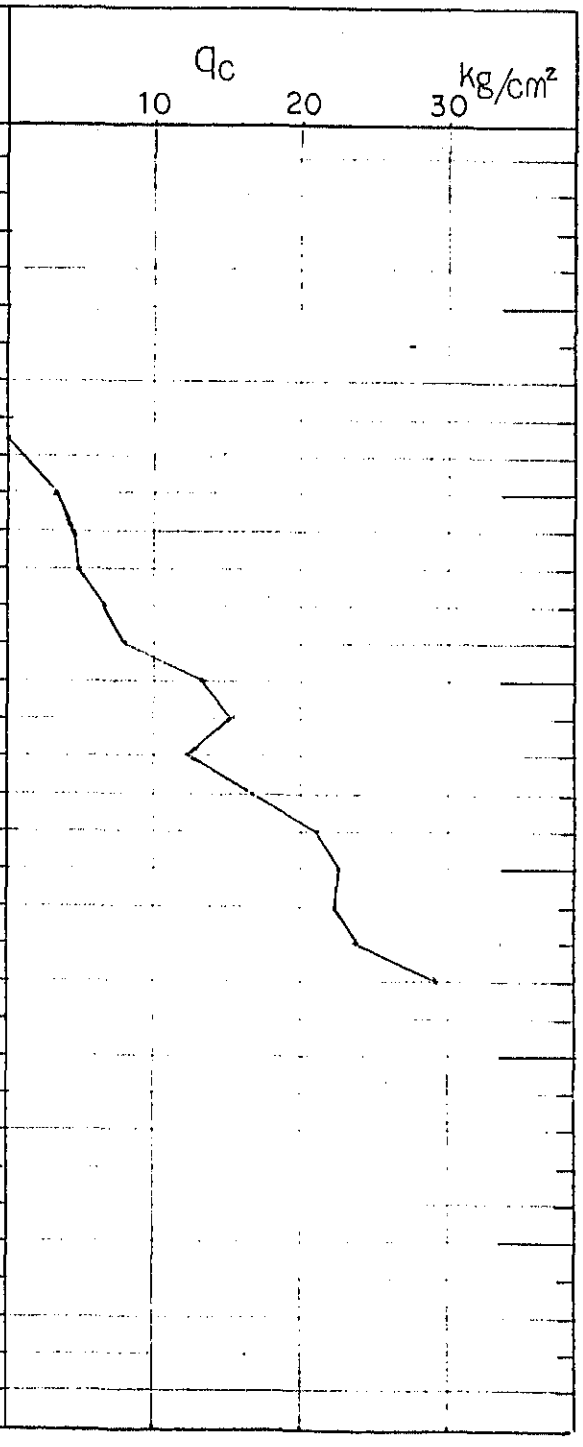


Table 2.1(13/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 — 8 Ground EL. 1119.6 Date 19-oct-85

Method or type of pene. _____

Penetrative rate ____ / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
63	8.6	black ash	10
118	16.2		
177	24.2	C.H white	
112	15.3		
111	15.3		50
129	17.8		
119	16.2		
100	13.7		
101	43	13.7	
73	31	9.9	100
70	30	9.6	
58	25	8.0	
75	32	10.2	
118	51	16.2	Laterite
109	47	15.0	M.L 150
171	74	23.6	
185	80	25.5	
211	91	29.0	
221	95	30.3	
219	94	30.0	200
261	112	35.7	210

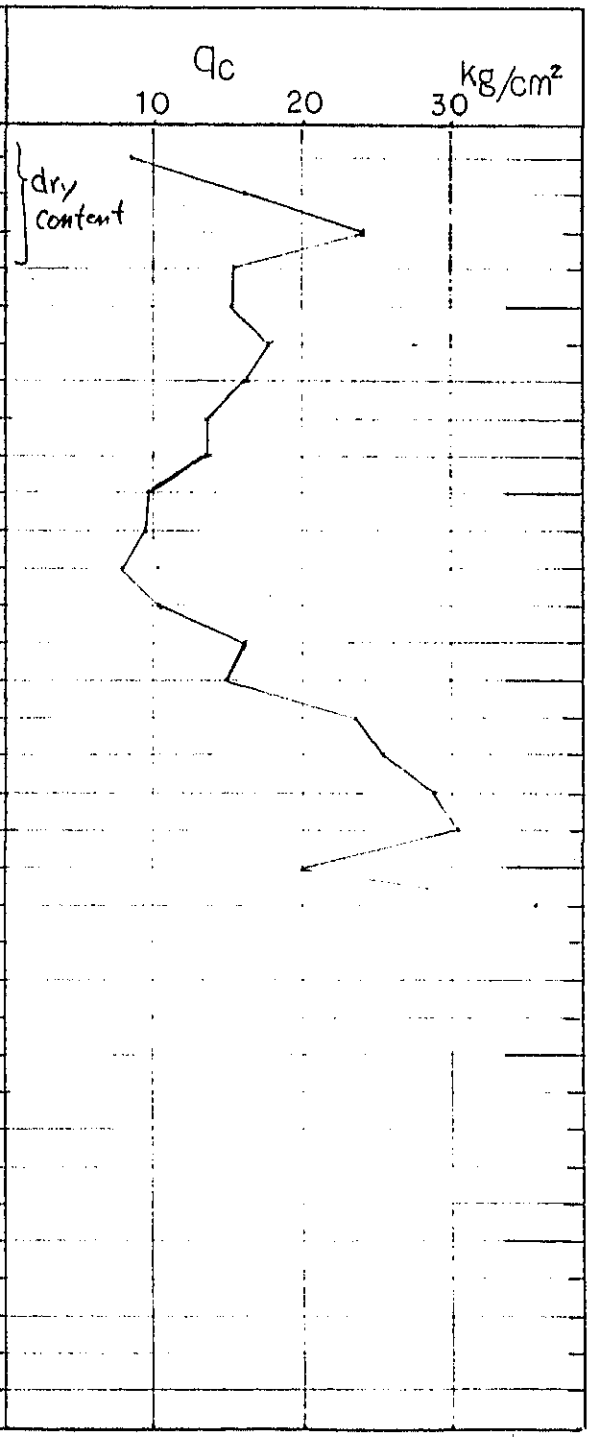


Table 2.1(14/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 19 — 9 Ground EL. 1119.2 Date 19-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH cm
59	8.0	black ash	10
76	10.0		
50	7.0		
46	6.4		
54	7.3	CH white	50
54	7.3		
60	8.3		
63	8.6		
64	8.9		
69	9.6	Laterite	100
82	12.7	M.L	
92	12.7		
98	13.4		
178	24.2		
265	36.3		150
244	33.4		
272	37.3		
120	16.6		180

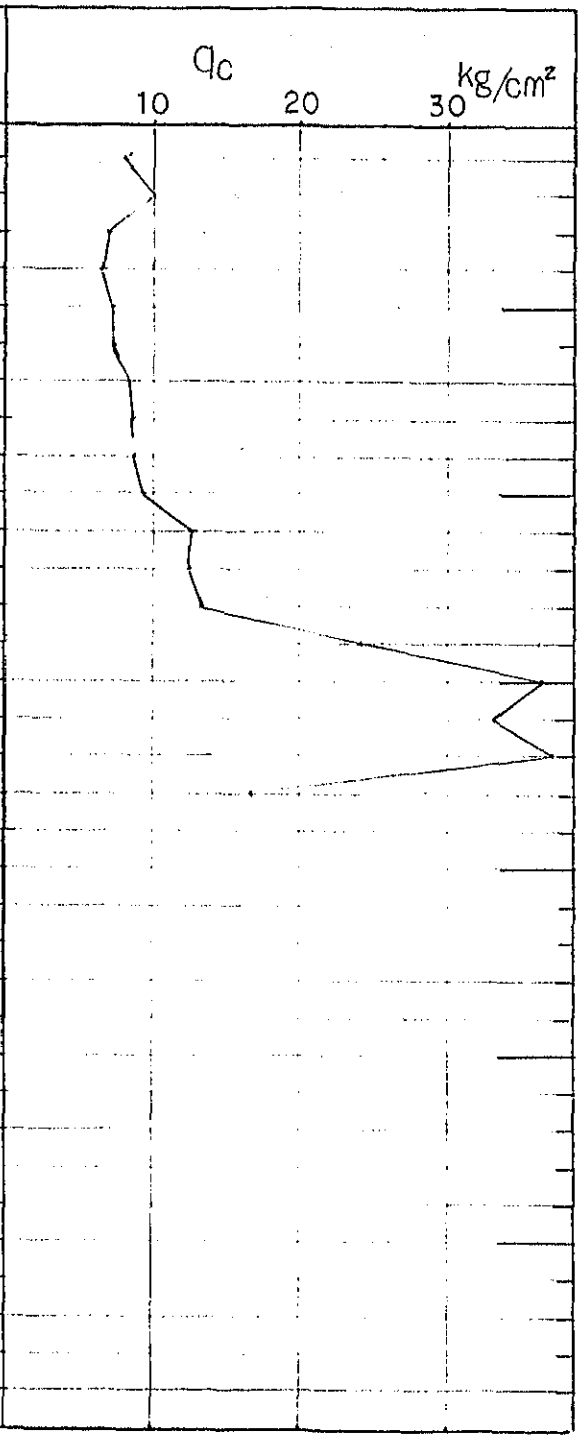


Table 2.1(15/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 10 10 Ground EL. 1116 Date 19-Oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

	PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
				Litter	
				0.H	
75	19	8	2.6	black ash	
95	97	42	13.4	CH	
105	39	17	5.4		
115	59	25	8.1		
125	75	32	10.2		
135	90	39	12.4		
145	138	59	18.8	ML	
155	136	58	18.5		
165	172	74	23.6		
175	206	89	28.3		
185	263	113	36.0		

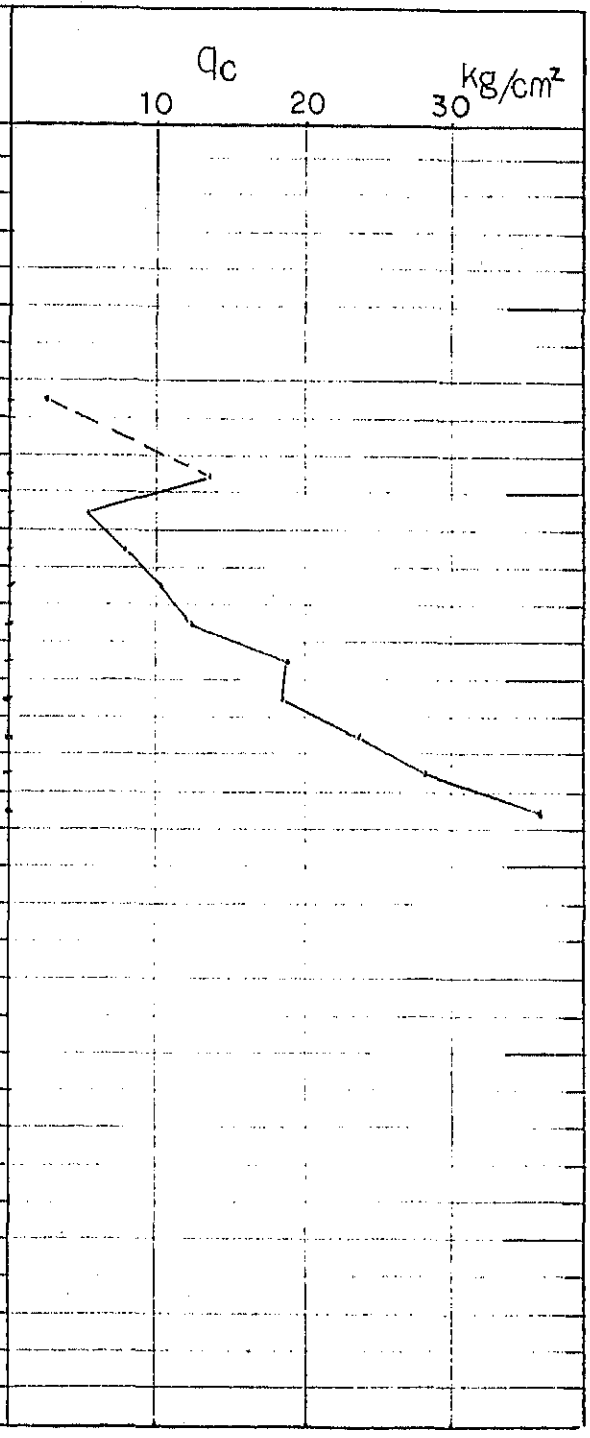


Table 2.1(16/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21-1' Ground EL. 1116.8 Date 21-Oct. 85

Method or type of pene. _____

Penetrative rate ____ / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
0	0.0	Litter	20
16	5.1		
16	5.1	~O.H	
22	7.0		50
28	8.3	C.H	
17	5.4		
21	6.7	White-	
20	6.4		
28	8.9	O.H	100
31	9.3		
34	10.8		
40	12.7		
47	15.0	M.L	
37	11.8	Laterite	150
34	10.8		
36	11.5		
32	10.2		
29	9.2		
31	9.9		200
41	13.1		
48	15.3		
46	14.7		
51	16.2		
91	29.0		250
94	29.9		
95	30.3		
98	31.2		
101	32.2		
93	29.6		300
99	31.5		
100	31.9		
97	30.9		
98	31.2		
104	33.1		350

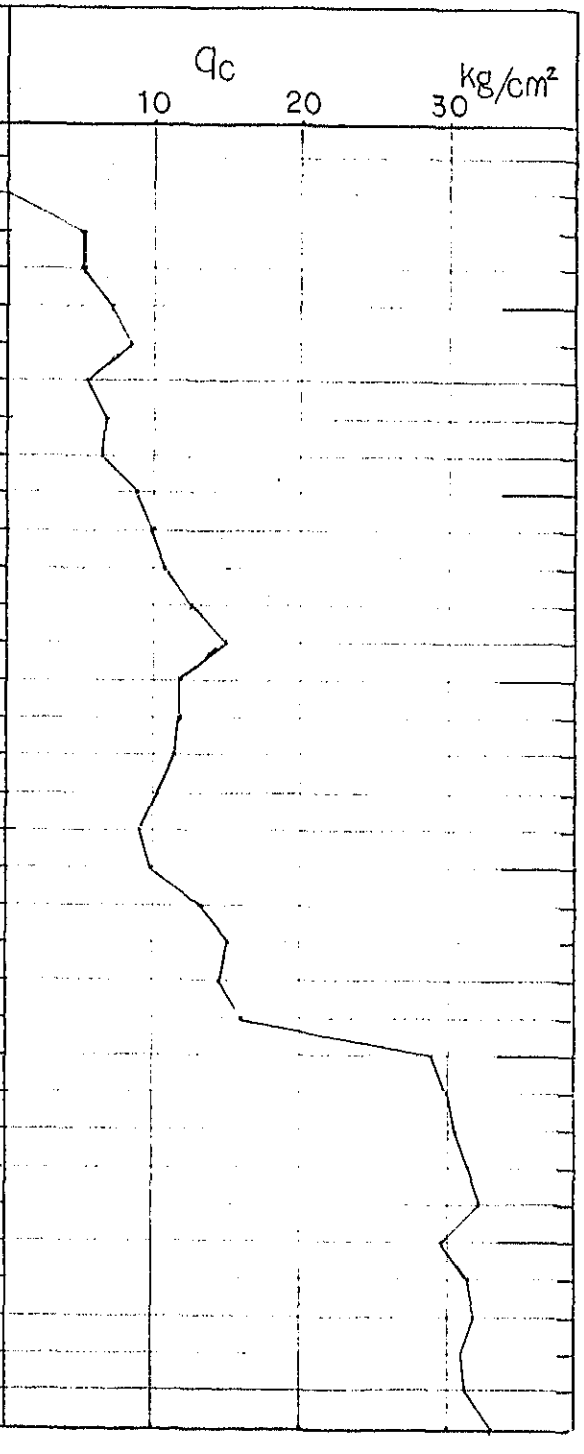


Table 2.1(17/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21-1″ Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc. kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
258	35.4	---	
235	32.2	Laterite	
223	30.6	— —	
237	32.5	ML	
120	16.6	— —	400

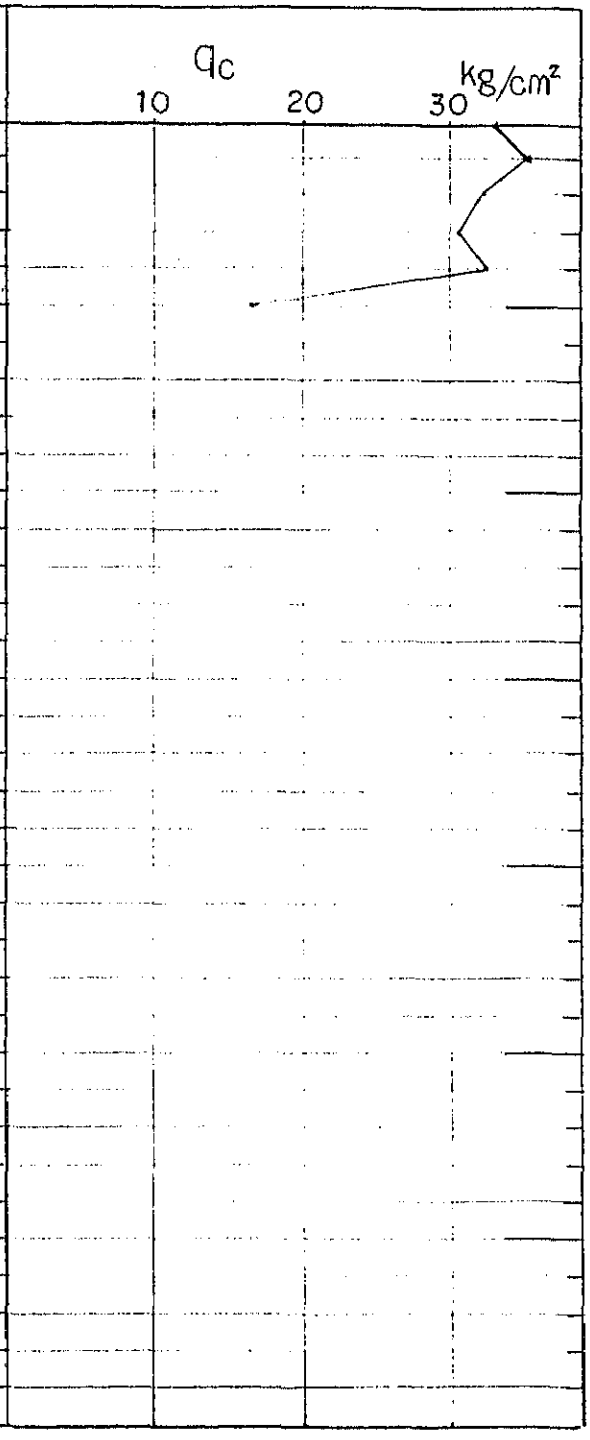


Table 2.1(18/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21—2 Ground EL. 1116.7 Date 21-Oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
17	7	2.2	Litter	10
28	12	3.8		
44	19	6.1		
46	20	6.4	CH	
32	14	4.5	brown ish	50
38	16	5.1		
42	18	5.7		
46	20	6.4	CH gray	
56	24	7.6		
48	21	6.7		100
58	25	8.0		
79	34	10.8		
90	39	12.4		
97	42	13.4	ML Latrite	
96	41	13.1		150
80	34	10.2		
85	37	11.8		
100	43	13.7		
102	44	14.0		
144	62	19.8		200
165	71	22.6		
140	60	19.1		
120	52	16.6		230

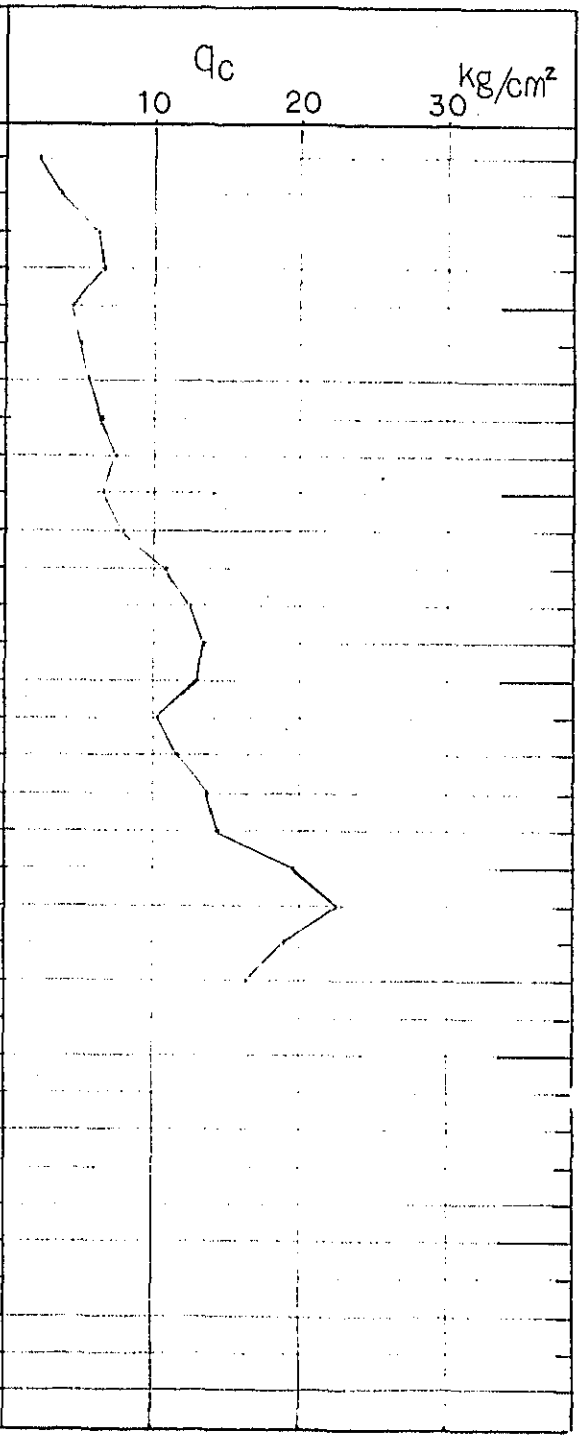


Table 2.1(19/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21 — 3' Ground EL. 1116.7 Date 21-Oct-85

Method or type of pene. _____

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
21	2·9	O.H	10
29	4·1		
15	2·2	Pt	
21	2·9		
30	4·1		50
40	5·4	death wood	
57	7·6		
55	7·6		
42	5·7		
49	6·7		100
51	7·0		
52	7·0		
72	9·9	C·H	
86	11·8		
76	10·5		150
71	9·6		
75	10·2		
73	9·9		
72	9·9		
76	10·5		200
79	10·8		
82	11·2	M.L	
85	11·8	Laterite	
104	14·3		
101	13·7		250
104	14·3		
120	16·6		
114	15·6		
111	15·3		
114	15·6		300
109	15·0		
118	16·2		
167	22·9		
140	19·1		
138	18·8		350

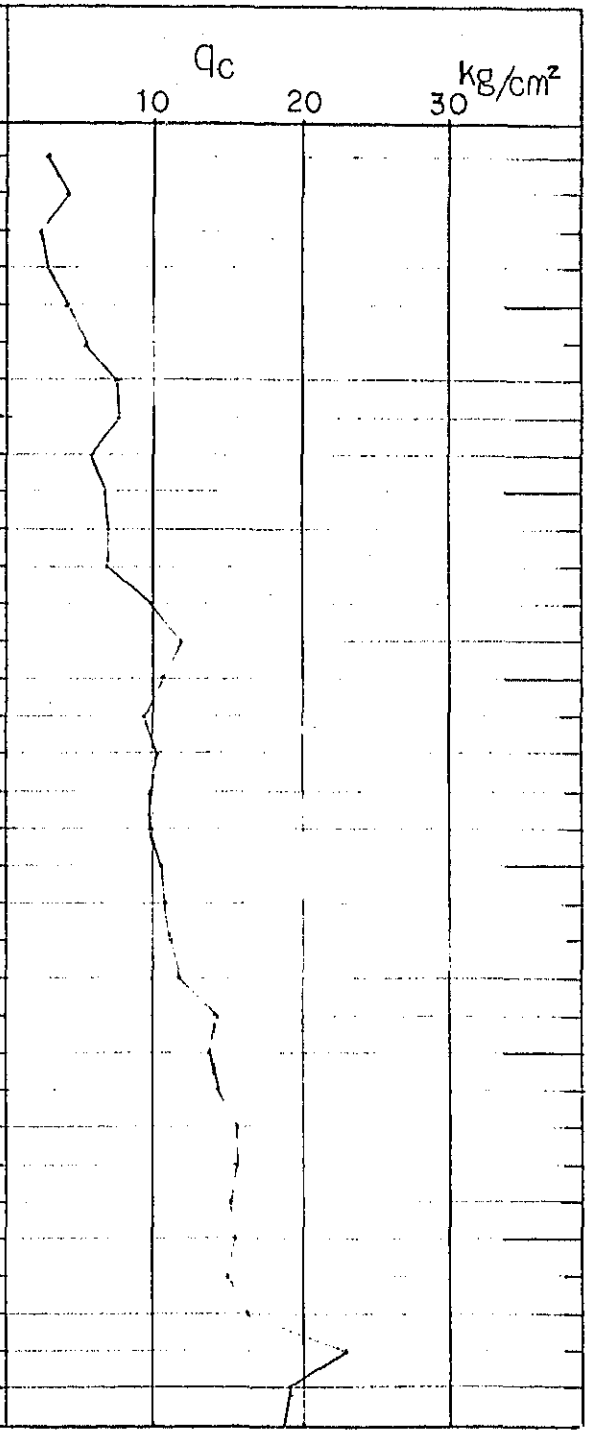


Table 2.1(20/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21--3" Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE Qc Kg	CONE BEARING CAPACITY qc(kg/cm)	GRAPHIC LOG	DEPTH
148	64	20.4	M.L	
170	73	23.3		
183	79	25.2		
250	107	34.1	Laterite	
186	80	25.5		400
195	84	26.8		
199	86	27.4		
182	78	24.8		
195	84	26.8		
195	84	26.8		450
214	92	29.3		460
120	52	16.6		470

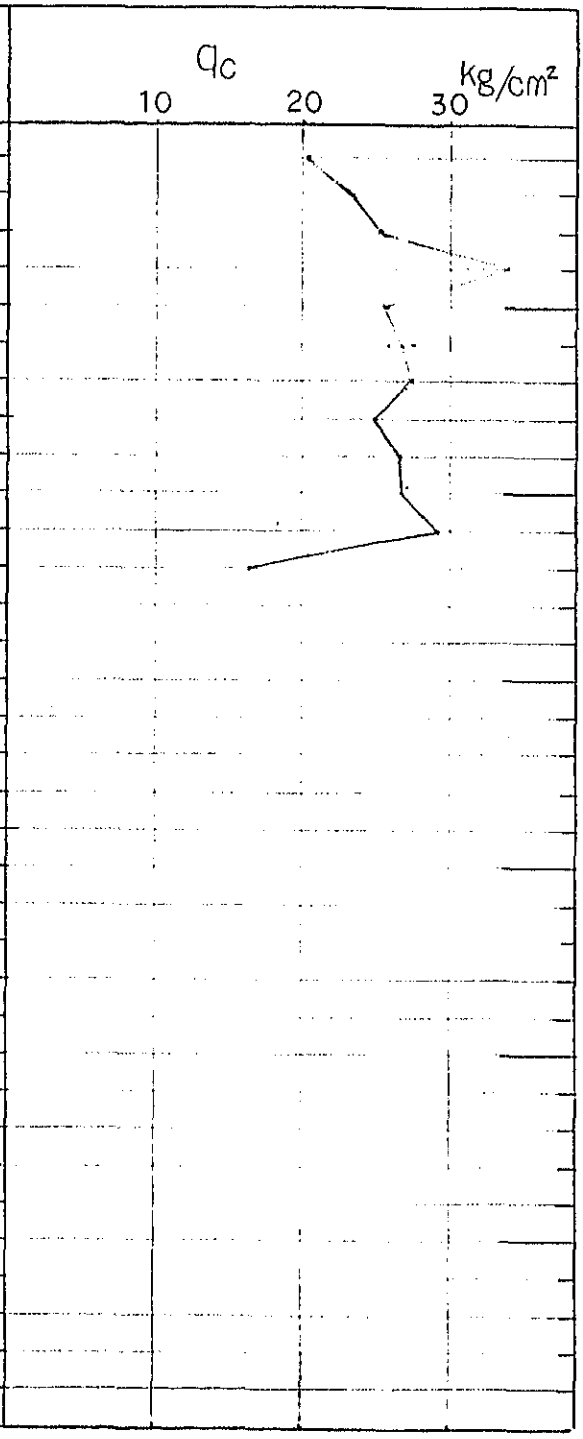


Table 2.1(21/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21 – 4 Ground EL. 1117.0 Date 21-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
		T.H	
17	2·2		20
24	3·2	O H	
43	5·7		
47	6·4		50
45	6·1		
66	8·9		
48	6·7		
41	5·7		
47	6·4	C H	100
167	22·9	Pebble	
177	24·2		
87	11·8		
124	16·9		
155	21·3	M L	150
101	13·7	Laterite	
97	42		
119	16·2		
152	65	20·7	
204	88	28·0	200
251	108	34·4	
256	110	35·0	
			230
			300
			350

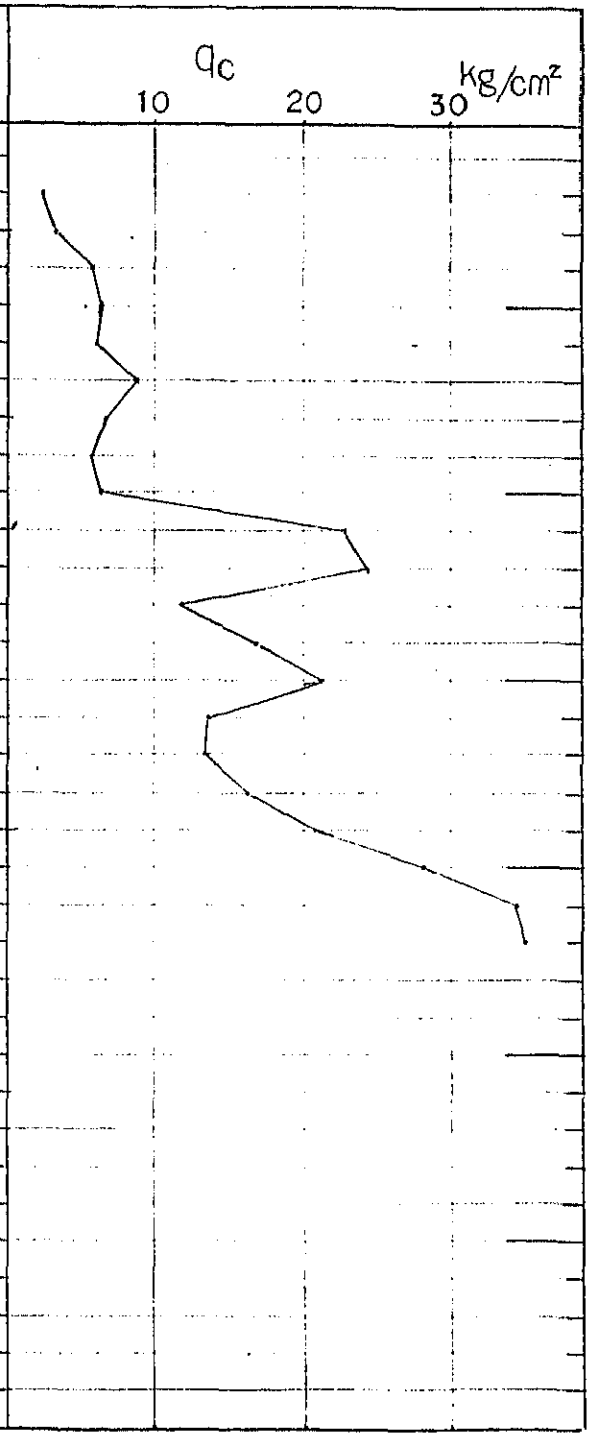


Table 2.1(22/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 21—5 Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
0	0.0	Y O H	0
12	1.6		30
11	1.6		
7	1.0	C.H	
7	1.0	(brownish)	60
50	7.0		
55	24 7.6		
75	32 10.2		90
76	33 10.5	M.L	
71	31 9.1	Laterite	
75	32 10.2		120
76	33 10.5		
88	39 12.4		
101	43 13.7		150
105	45 14.3		
153	66 21.0		
157	67 21.3		180
203	87 27.7	Sand Gr.	
260	112 35.7		200

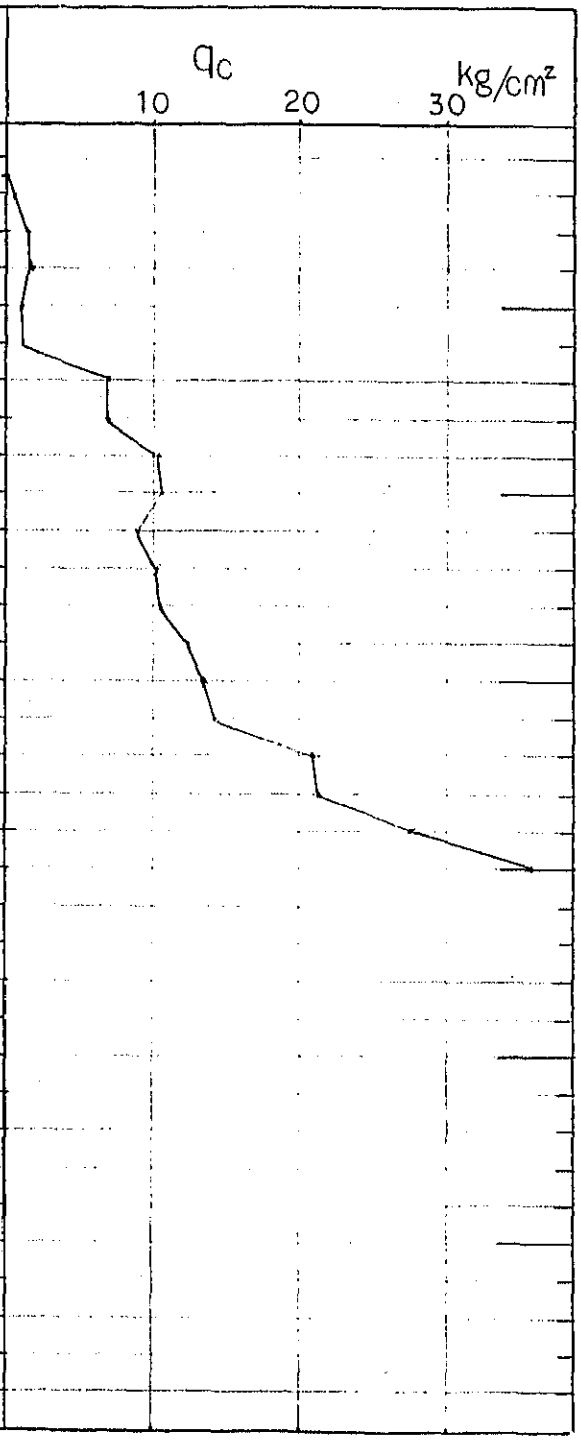


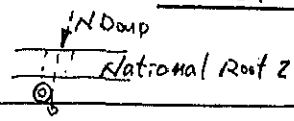
Table 2.1(23/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22-1' Ground EL. 1128.0 Date 22-OCT-85

Method or type of pene. _____

Penetrative rate _____ / cm/sec Area at the bottom of cone A= 3.14cm²



PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
1	0	0.0	10
0	0	0.0	
25	11	3.5	
25	11	3.5	
57	16	5.1	50
43	18	5.7	
26	11	3.5	
34	15	4.8	
35	15	4.8	
26	11	3.5	100
23	10	3.2	
45	19	6.1	
58	25	8.0	
48	21	6.7	
75	32	10.2	150
90	39	12.4	
125	54	17.2	
95	41	13.1	
115	49	15.5	
187	80	25.5	200
120	52	16.6	
235	101	32.2	
160	69	22.0	
172	74	23.5	
200	86	27.4	250
132	57	18.2	
89	38	12.1	
182	78	24.8	
127	55	17.5	
129	55	17.5	300
95	41	13.1	
92	40	12.7	
100	43	13.7	
113	49	15.6	
144	62	19.8	350

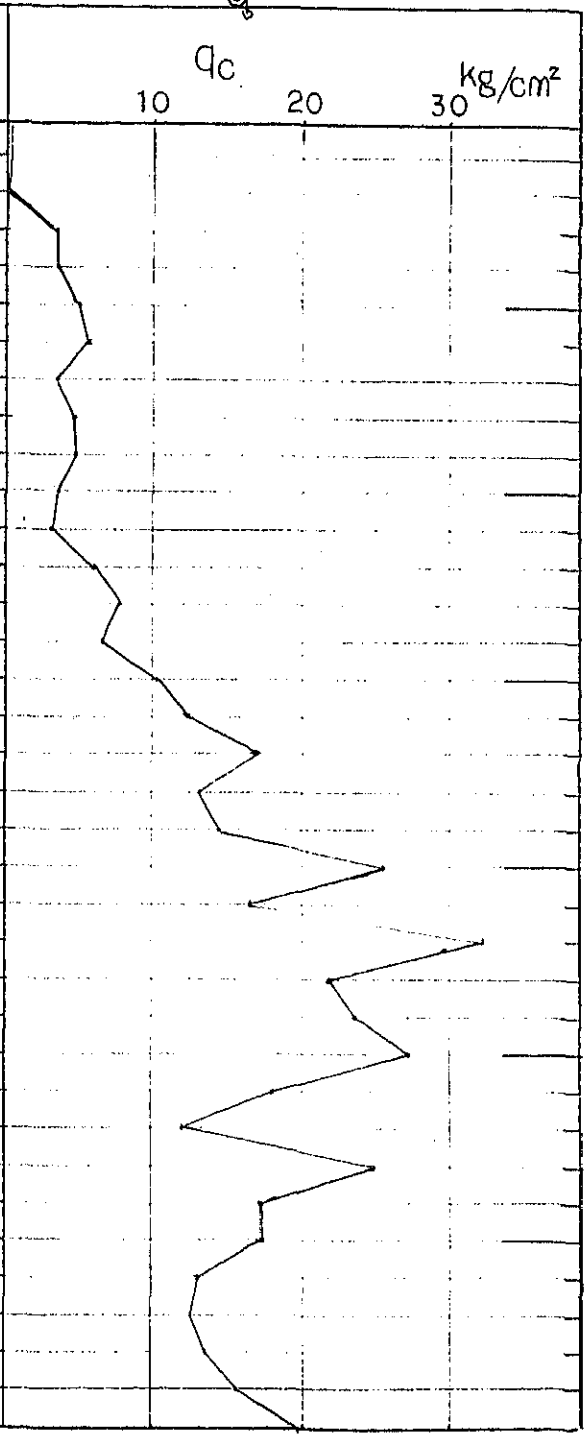


Table 2.1(24/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—1" Ground EL. 1128.0 Date 22-OCT-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
126	54	17.2		
118	51	16.2	Laterite	
125	54	17.2		
150	64	20.1	N.L	
169	73	23.3		400
152	65	20.7		
158	68	21.7		
154	66	21.0		
167	72	22.9		
163	70	22.3		450
203	87	27.7		
188	81	25.8		
200	86	27.4		
200	86	27.4		
170	73	23.3		500

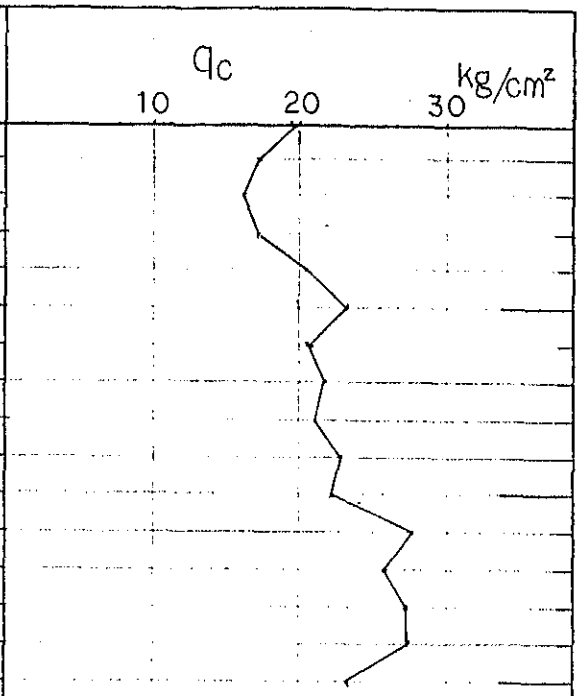


Table 2.1(25/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—2' Ground EL. 1125.3 Date 22-OCT-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc Kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
				10
			Litter	50
5	2	0.6		60
10	4	1.3		
17	7	2.2	O.H	
25	11	3.5		
24	10	3.2		100
38	16	5.1		
45	19	6.1		
48	21	6.7		
30	13	4.1	Laterite	
42	18	5.7		150
50	21	6.7	M.L	
52	22	7.0		
59	25	8.0		
65	28	8.9		
60	26	8.3		200
68	29	9.2		
70	30	9.6		
70	30	9.6		
75	32	10.2		
73	31	9.9		250
83	36	11.5		
82	35	11.2		
95	41	13.1		
92	40	12.7		
115	49	15.6		300
136	59	18.8		
125	54	17.2		
127	55	17.5		
1[illegible]	43	13.7		
101	44	14.0		350

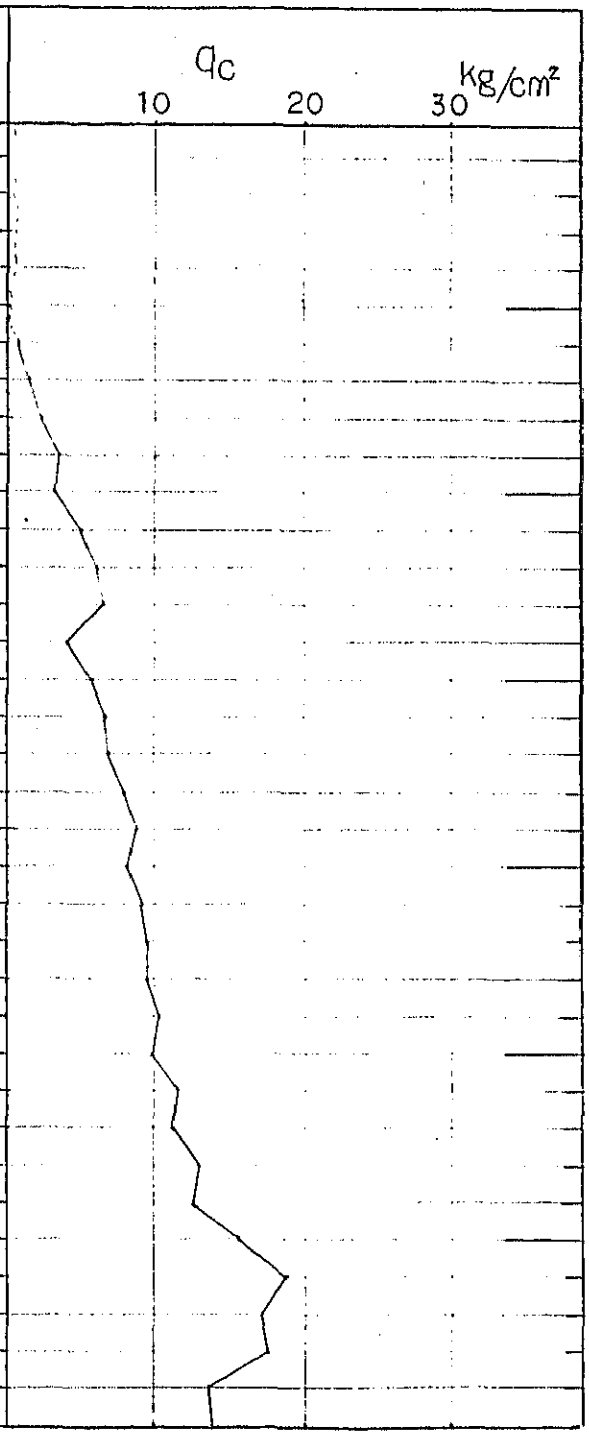


Table 2.1(26/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—2" Ground EL. 1125.3 Date 22-Oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
103	41	14.0	
105	42	14.7	Laterite
100	40	13.7	
95	41	13.1	M.L
103	44	14.0	400
105	45	14.3	
120	52	16.6	
122	52	16.6	
110	47	15.0	
141	61	19.4	450
122	52	16.6	
132	57	18.2	
176	76	24.2	
230	99	31.5	
204	88	28.0	500

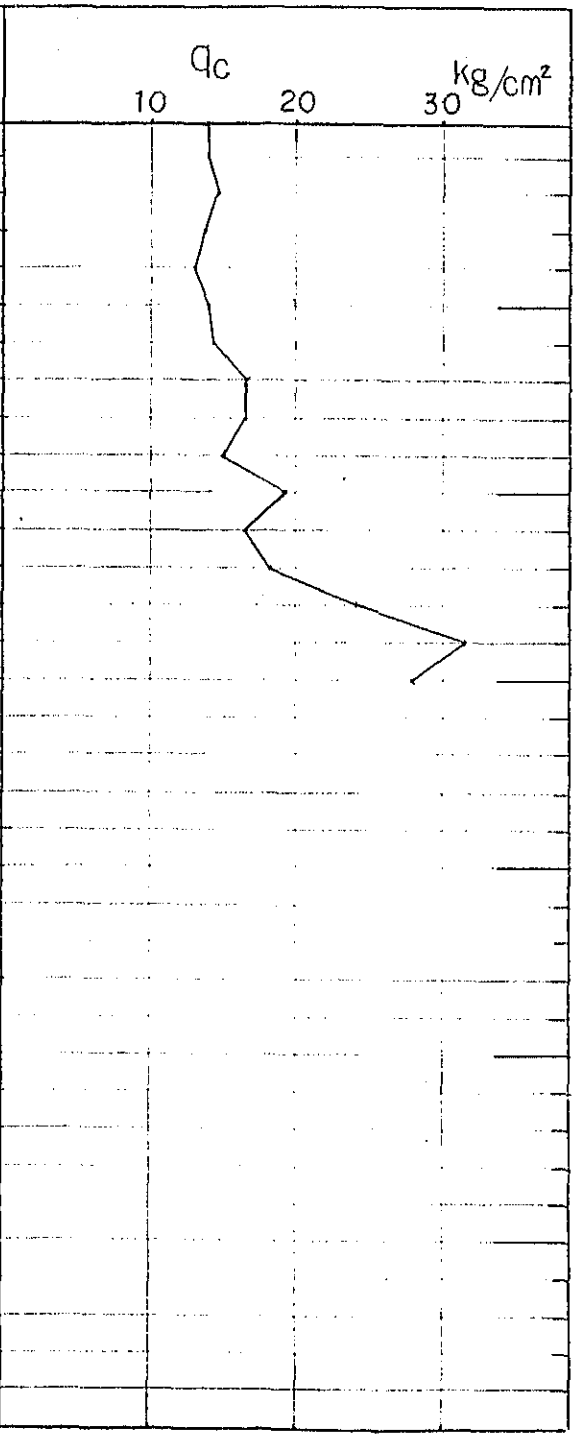


Table 2.1(27/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—3' Ground EL. 1125.3 Date 22-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
		▽	
0	0.0	Litter	
45 11	5 1.6		50
18	8 2.5		
21	9 2.9		
30	13 4.4		
38	16 5.1	Laterite	
43	18 5.7		
45	19 5.1	M.L	
36	15 4.8	~C.L	
30	13 4.1		
20	9 2.9		
28	12 3.8		
19	8 2.6		
26	11 3.5		
27	12 3.8		
32	14 4.5		
35	15 4.8		
24	10 3.2		
33	14 4.5		
42	18 5.7		
30	13 4.1		
35	15 4.8		
25	11 3.5		
38	16 5.1		
42	18 5.7		
51	22 7.0		
51	22 7.0		
58	25 8.0		
27	12 3.8		
36	15 4.8		
25	11 3.5		
17	7 2.2		

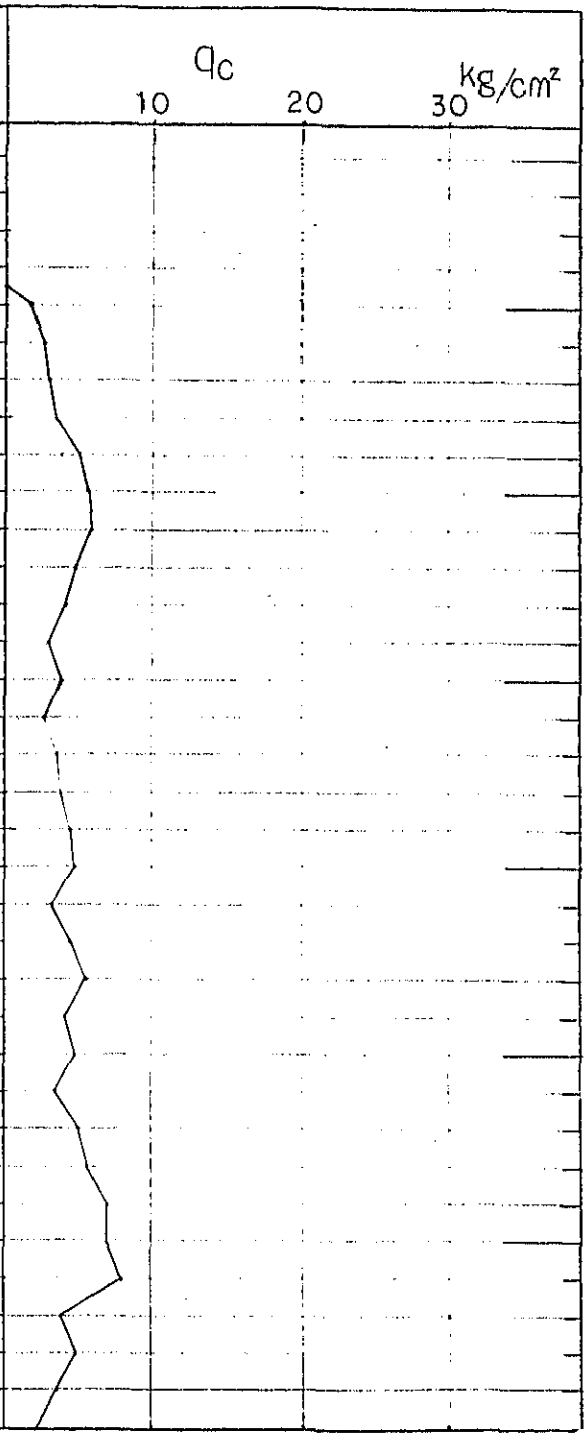


Table 2.1(28/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—3" Ground EL. 11 25.9 Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3,14 cm^2

PENETRATION RESISTANCE qc Kg	CONE BEARING CAPACITY qc(kg/cm)	GRAPHIC LOG	DEPTH
40	17	5 4	
42	18	5 . 7	
103	44	14 . 0	
141	60	19 . 1	
207	89	28 . 3	
120	52	16 . 6	
225	96	30 . 6	

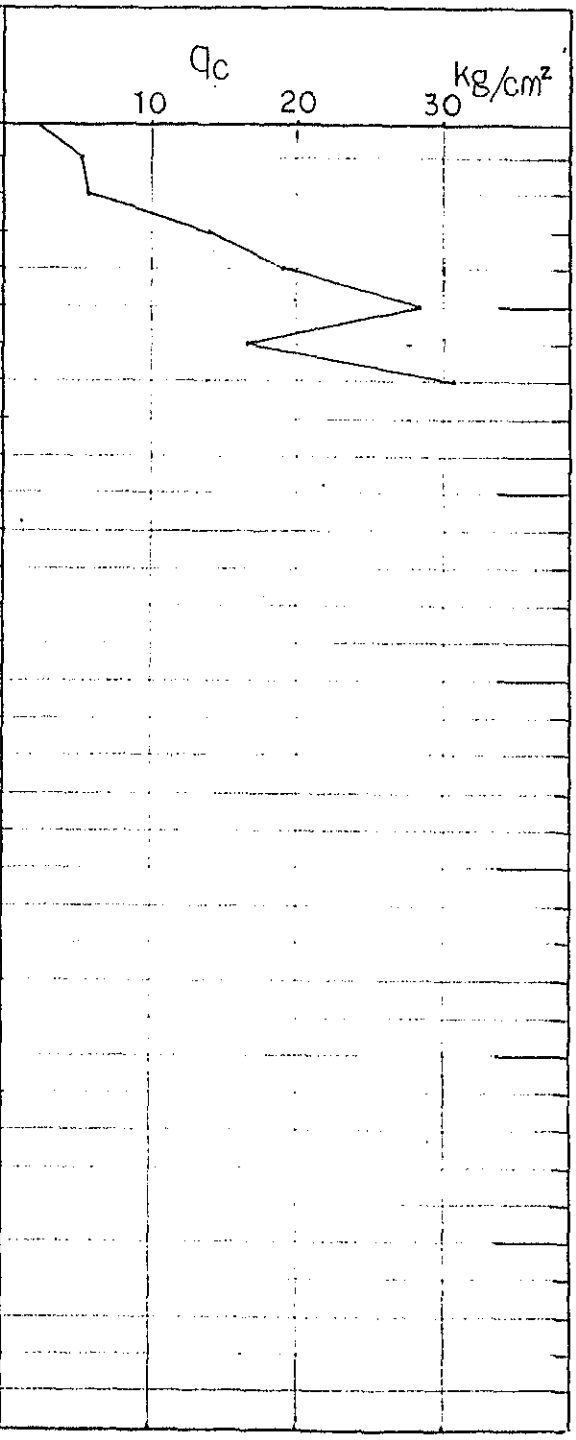


Table 2.1(29/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 22—4 Ground EL. 1125.9 Date 22-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14 cm^2

CM.	PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
55	0	0	0.0	Litter
65	14	6	1.9	
	17	7	2.2	70
	45	19	6.1	
	65	28	8.9	Laterite
	66	28	8.9	100
	50	21	6.7	M.L
	46	20	6.4	
	50	21	6.7	
	44	19	6.4	
	54	23	7.3	150
	51	22	7.0	
	49	21	6.7	
	51	22	7.0	
	56	24	7.6	
	54	23	7.3	200
	56	24	7.6	
	74	32	10.2	
	116	51	16.2	
	160	69	22.0	
	115	49	15.6	250
	240	103	32.8	
	222	95	30.3	
	263	113	36.0	280
				300

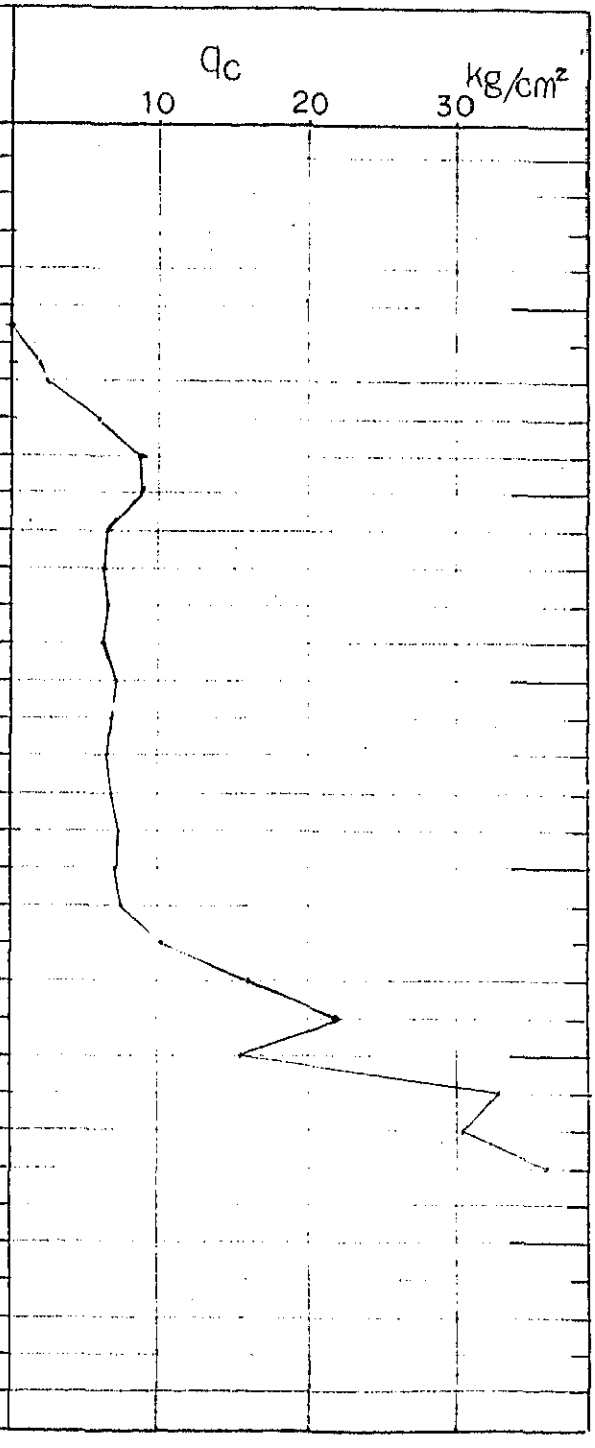


Table 2.1(30/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 30-1 Ground EL. 1112.9 Date 30-oct-85

Method or type of pene. _____

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
7	3	1.0	40
10	4	1.3	
18	8	2.6	
20	9	2.9	
22	10	3.2	80
57	24	7.6	
76	33	10.5	
53	23	7.3	
65	28	8.9	120
90	39	12.4	130
135 120	52	16.6	

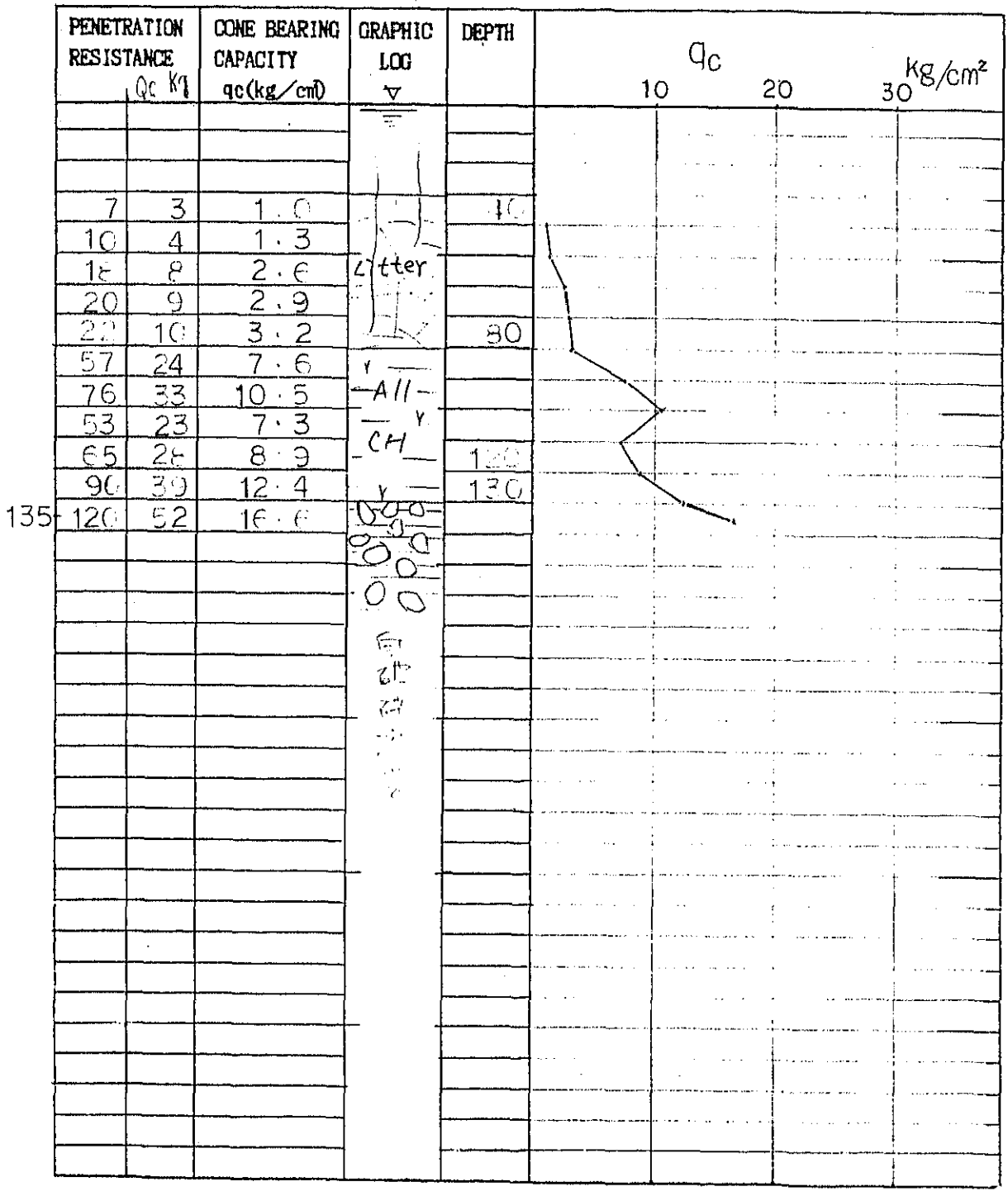


Table 2.1(31/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 3C - 2 Ground EL. 1113.0 Date 30-oct-85

Method or type of pene. _____

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
		Litter	
10	1.3		60
11	1.6		
9	1.3	OH	
14	1.9		
20	2.9		
33	4.5		
96	13.7		120
117	15.9		
278	37.9		140
145 120	52 16.6		

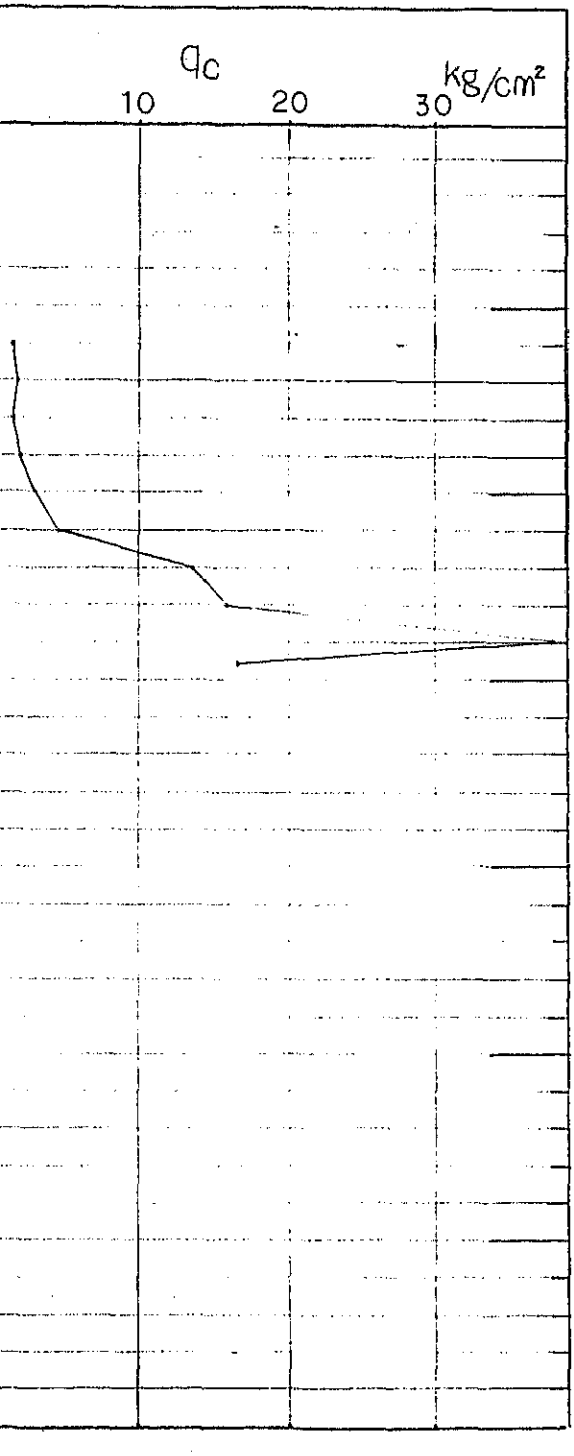


Table 2.1(32/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 30—3 Ground EL. 113.7 Date 30-oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
1	0	0.0	Filler	30
49	21	6.7		
25	11	3.5		
21	9	2.9		60
21	9	2.9	o.H	
25	11	3.5		
25	11	3.5		90
27	12	3.8		
65	28	8.9		
218	94	29.9		120
125 275	118	37.6		

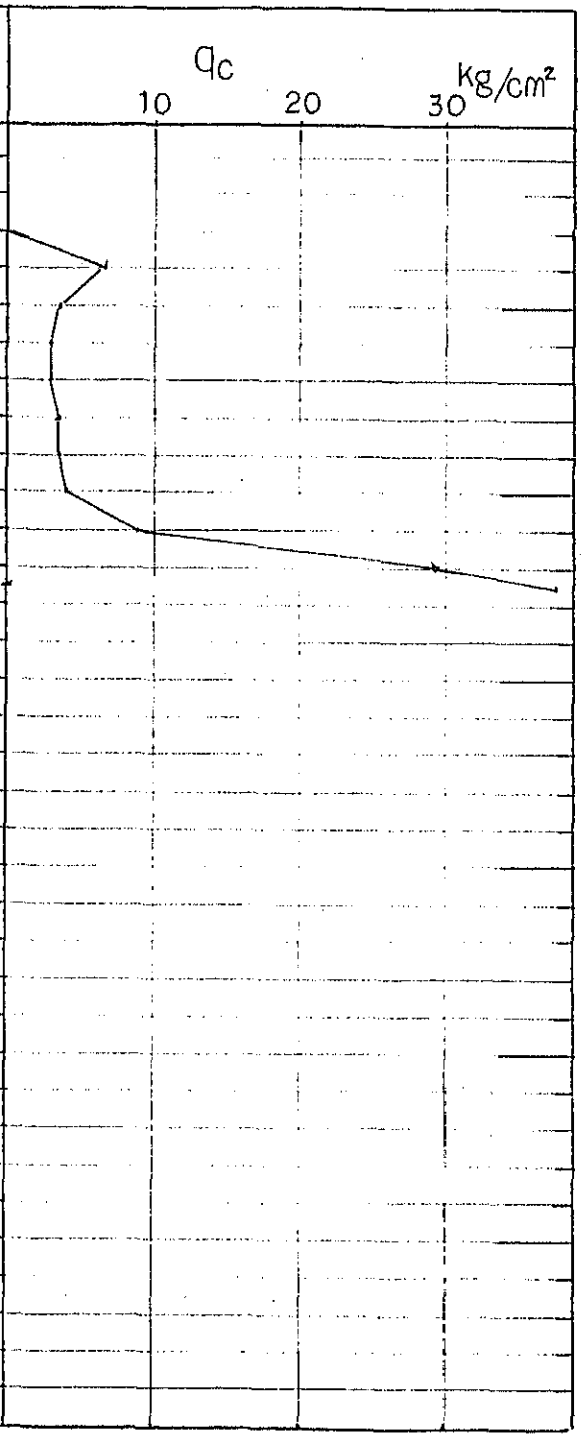


Table 2.1(33/33) RESULT OF CONE PENETRATION TEST IN THE BAIGOM PLAIN

STATIC CONE PENETRATION TEST

Hole No. 30 4 Ground EL. 1114.2 Date 30-Oct-85

Method or type of pene. _____

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
				10
210	90	28.7		20
51	22	7.0		
52	22	7.0		
101	43	13.7		
137	59	18.8		
137	59	18.8		
118	51	16.2		80
112	48	15.3		
140	60	19.1		
162	70	22.3		
158	68	21.7		
168	72	22.9		
194	83	26.4		
252	108	34.4		
205	88	28.0		160
165	120	52	16.6	

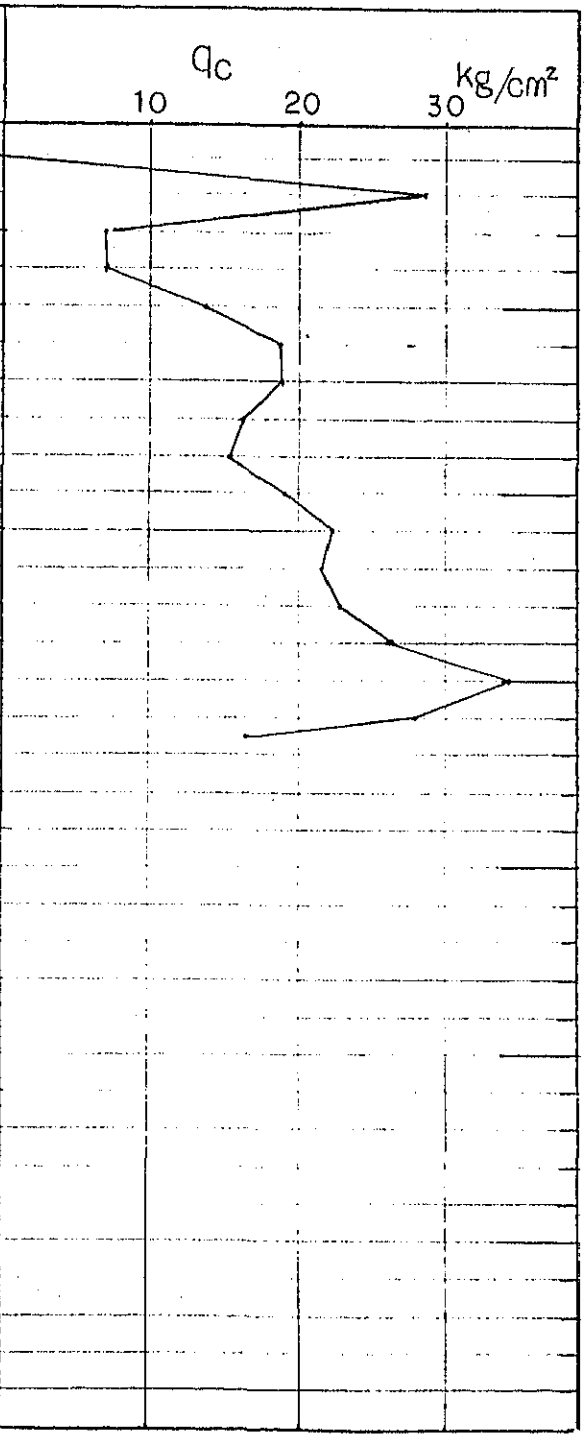


Table 2.2(1/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndcup 1

Hole No. _____ Ground EL. 1197 Date 22-Oct-85

Method or type of pene. _____ left

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
170	23.3		10
169	23.3		
114	15.6	Laterite	
85	11.8	red	
69	9.6	to	50
81	11.2	brown	
69	9.6		
80	10.8	High	
80	10.8	Weathered	
67	29	9.2	Schist 100
48	21	6.7	(mad-
62	27	8.6	schist)
69	30	9.6	
60	26	8.3	
52	22	7.0	150
172	74	23.6	
173	74	23.6	
81	35	11.2	
102	44	14.0	
115	49	15.6	200
101	43	13.7	
87	37	11.8	
117	49	15.6	
132	57	18.2	
132	57	18.2	250
146	63	20.1	
112	48	15.3	
90	43	13.7	
155	67	21.3	
192	83	26.4	300
190	82	26.1	
200	86	27.4	
191	82	26.1	
200	86	27.4	
193	83	26.4	350

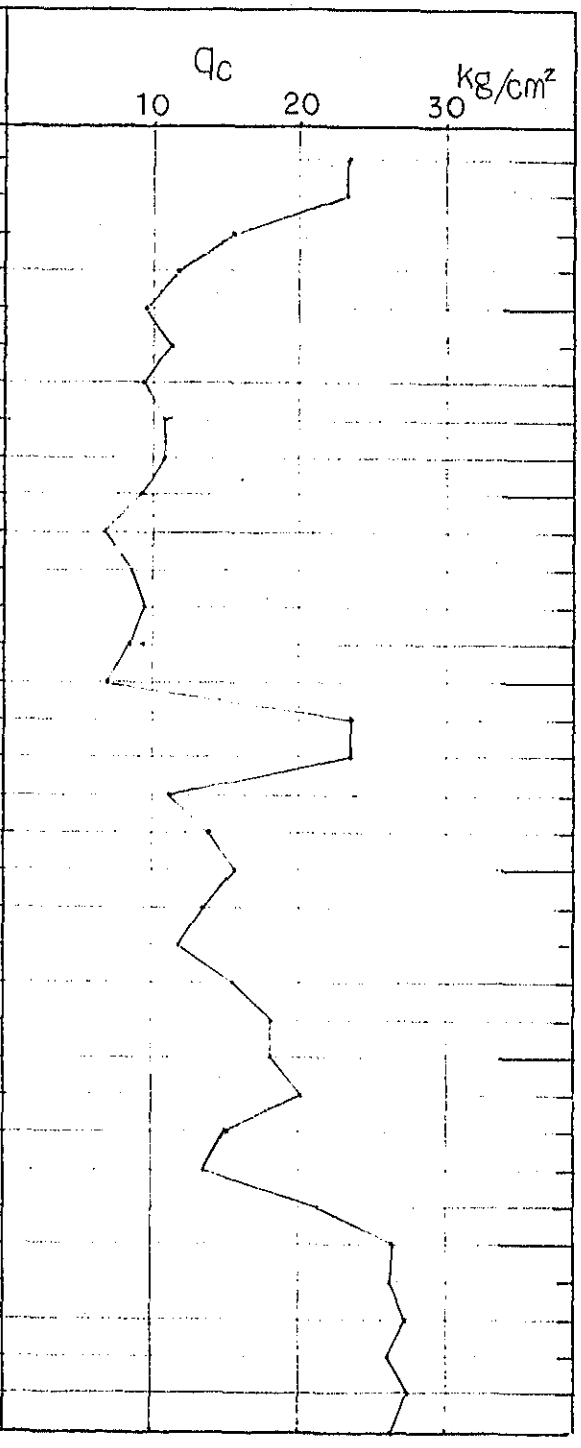


Table 2.2(2/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

"douc1"

Hole No. _____ Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH	qc 10 20 30 kg/cm²
212	91	29.0	360	

Table 2.2(3/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup2

Hole No. _____ Ground EL. 1180 Left Date 22-oct-85

Method or type of pene. _____

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
154	21.0		10
164	22.3		
131	17.8	Laterite	
95	13.1		
84	11.5	High Weathred	50
82	11.2	Schist	
100	13.7		
95	13.1		
97	13.4		
146	20.1		100
65	8.9		
88	12.1		
120	16.6		130

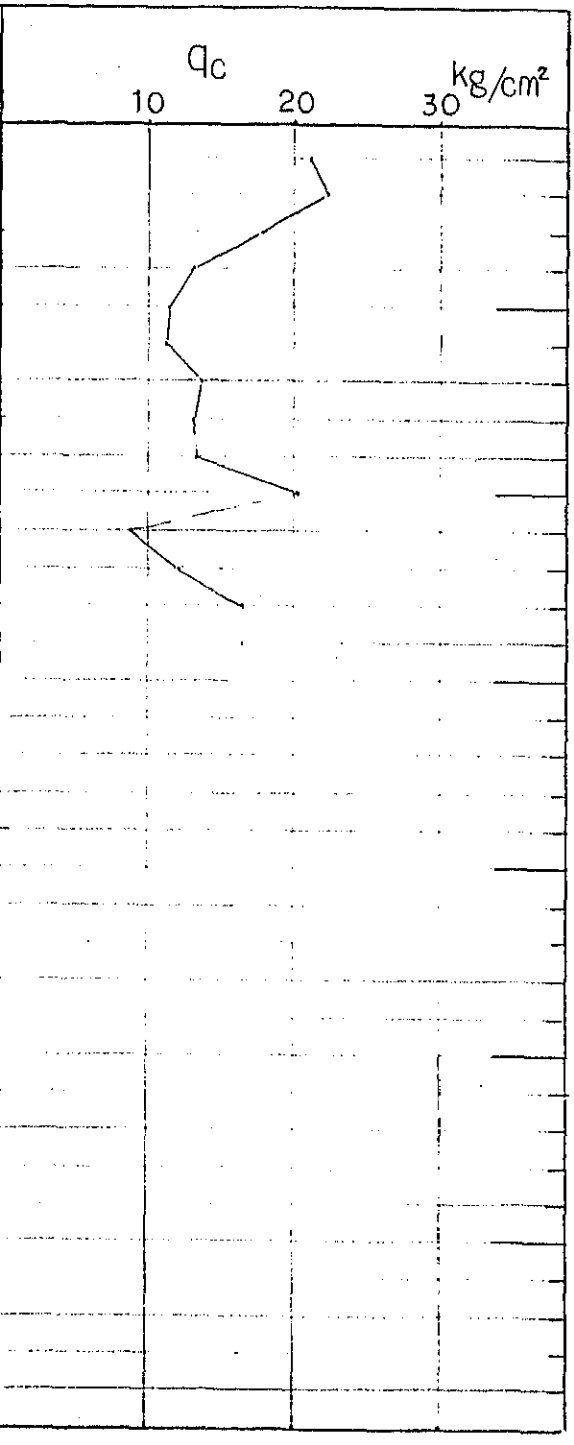


Table 2.2(4/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup 3

Hole No. _____ Ground El. 1158 Left Date 22-oct-85

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
124	15.9		10
148	20.4	Laterite	
158	21.7		
174	23.9	High weathered schist	
138	18.8		50
90	12.4		
107	14.7		
110	15.0		
141	19.4		
126	17.2		100
139	19.1		
127	17.5		
75	10.2		
99	13.7		
158	21.7		150
209	28.7		
167	22.9		
120	16.6		180

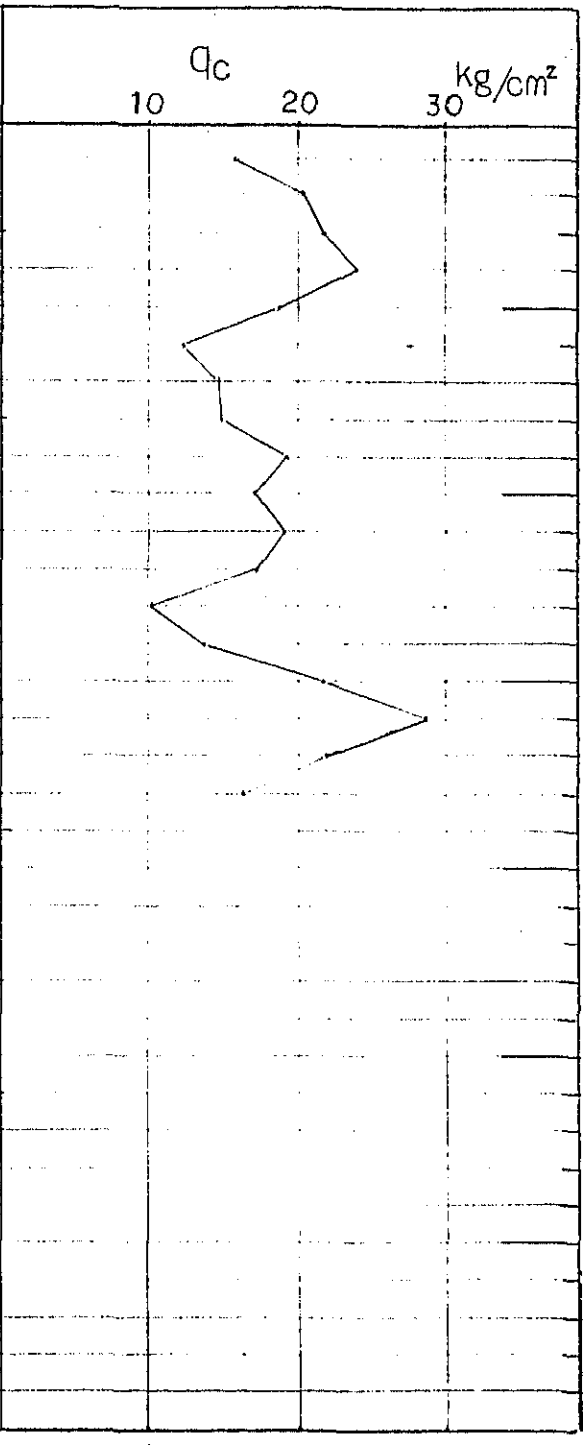


Table 2.2(5/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup4

Hole No. _____ Ground EL. 1153.5 Date 22-Oct-85

Method or type of pene. _____ River bed.

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
13 6	1.9		
11 5	1.6		20
21 9	2.9	dt	
10 4	1.3	C·H	40
88 38	16.3		
85 37	11.8	Laterite	60
117 50	15.9	M·L	
101 43	13.7		80
145 62	19.8	High Weathre	
155 67	21.3		100
120 52	16.6		120
273 117	37.3	Weather	
			140
120 52	16.6		
120 52	16.6		160
		M·L	

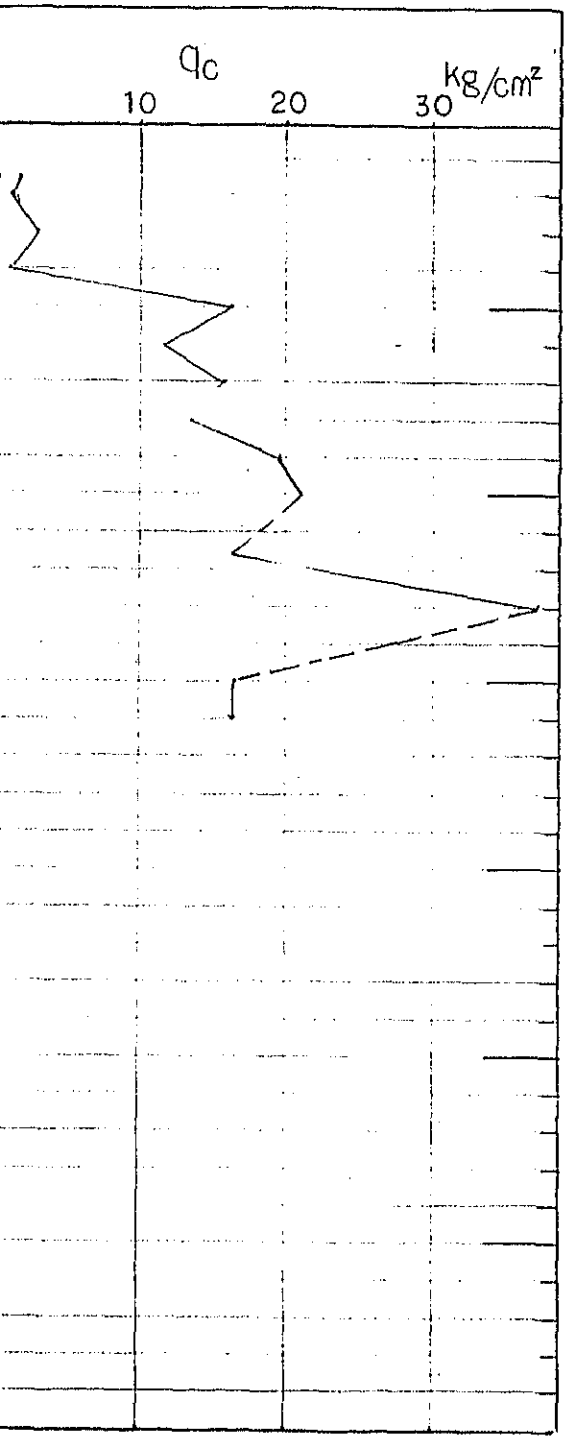


Table 2.2(6/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ncloup5

Hole No. _____ Ground EL. 1155.5 Date 22-oct-85

Method or type of pene. right

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
130	56	17・8		10
126	54	17・2	
120	52	16・6	
119	51	16・2	
111	48	15・3	Laterite	50
96	41	13・1	
110	47	15・0	M・L
93	40	12・7	
93	40	12・7	
81	35	11・2		100
71	30	9・6	
75	32	10・2	H-W
77	33	10・5	
75	32	10・2	
93	40	12・7		150
80	34	10・8	
69	30	9・6	
62	27	8・6	
66	28	8・9	
34	15	4・8		200
57	24	7・8	
59	25	8・0	
168	72	22・9	
205	88	28・0	
95	41	13・1	W	250
88	38	12・1	
68	29	9・2	
71	30	9・6	
			H・W
115	49	15・6		300
211	91	29・0	
232	100	31・9	
247	106	33・8	
243	104	33・1	W
257	110	35・0		350

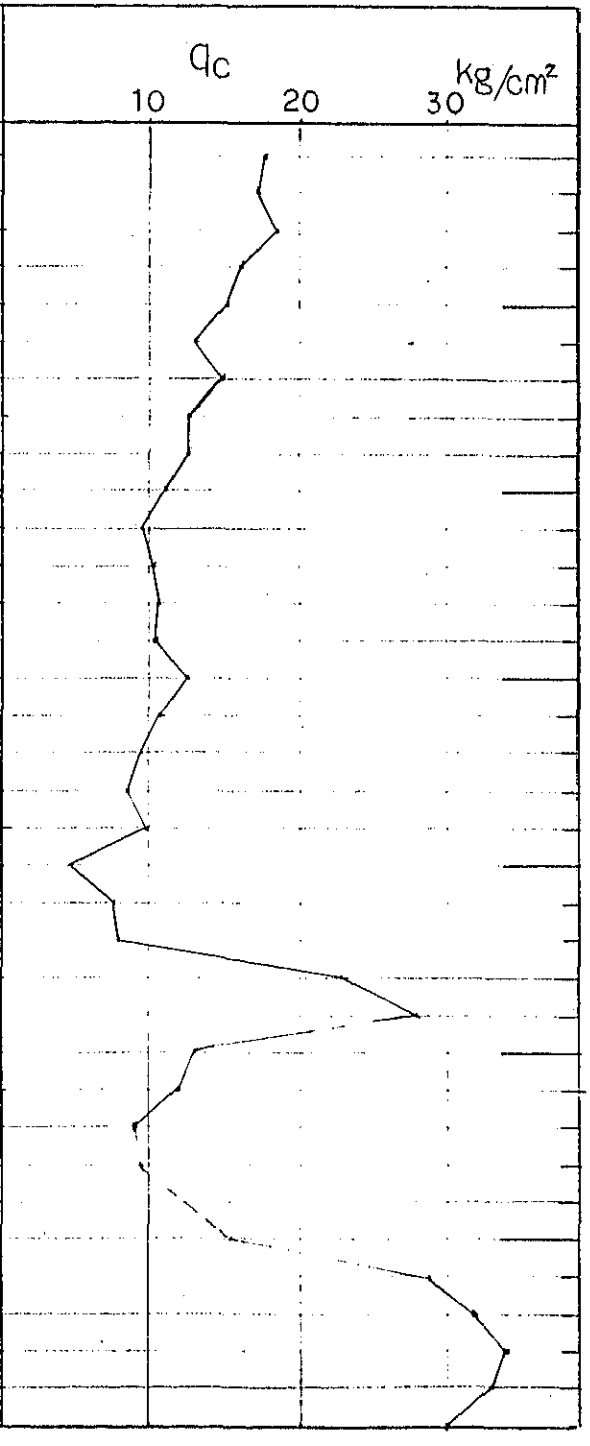


Table 2.2(7/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup 6

Hole No. _____ Ground EL. 1181 Date 22-oct-85

Method or type of pene. Right

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
81	11.2	Laterite	10
120	16.6	H.W	
168	22.9		30
198	27.1		
183	25.2		
180	77	24.5 W.	60
218	94	29.9	
270	116	36.9	80

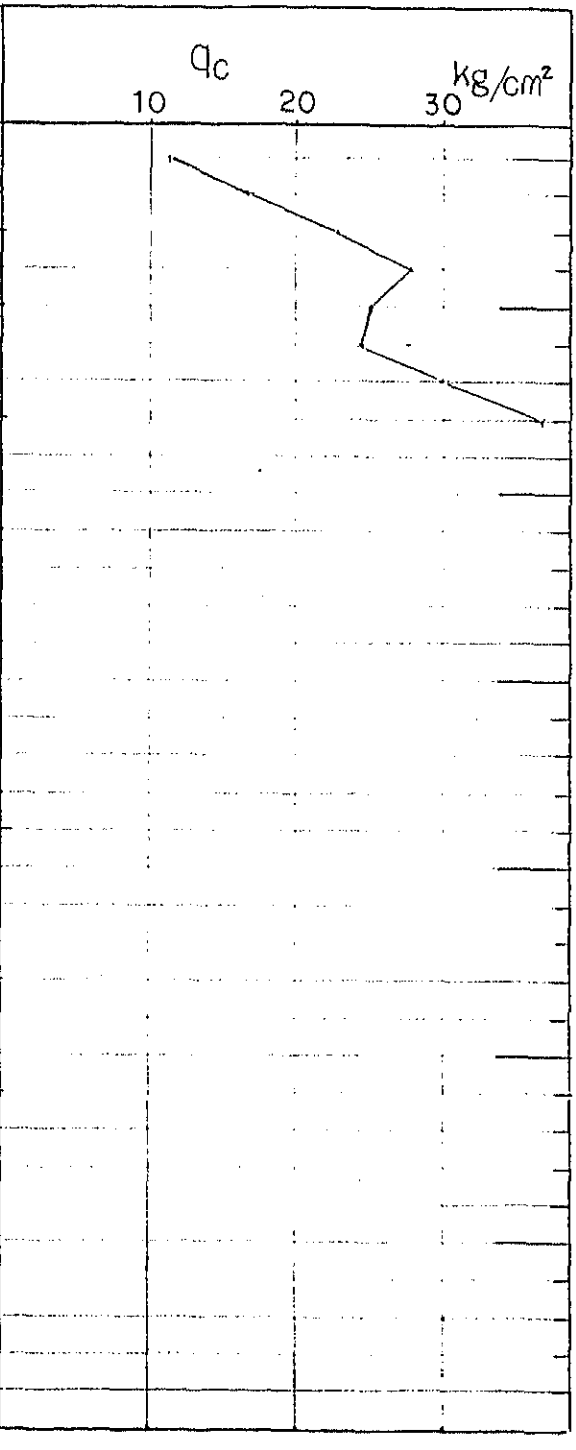


Table 2.2(8/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup7

Hole No. R Ground EL. 11.72 Date 22-oct-84

Method or type of pene. Right

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14 cm²

cm	PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
	65	28	8.9	Laterite. H-W (High Weathered)	1
	98	42	13.4		
	133	57	18.2		
	140	60	19.1		
	166	71	22.6	M.L	50
	170	73	23.3		
	167	72	22.9		
	278	119	37.9		
	278	119	37.9	W	
	192	83	26.4		100
	200	86	27.4		110
115	120	52	16.6	H-W	

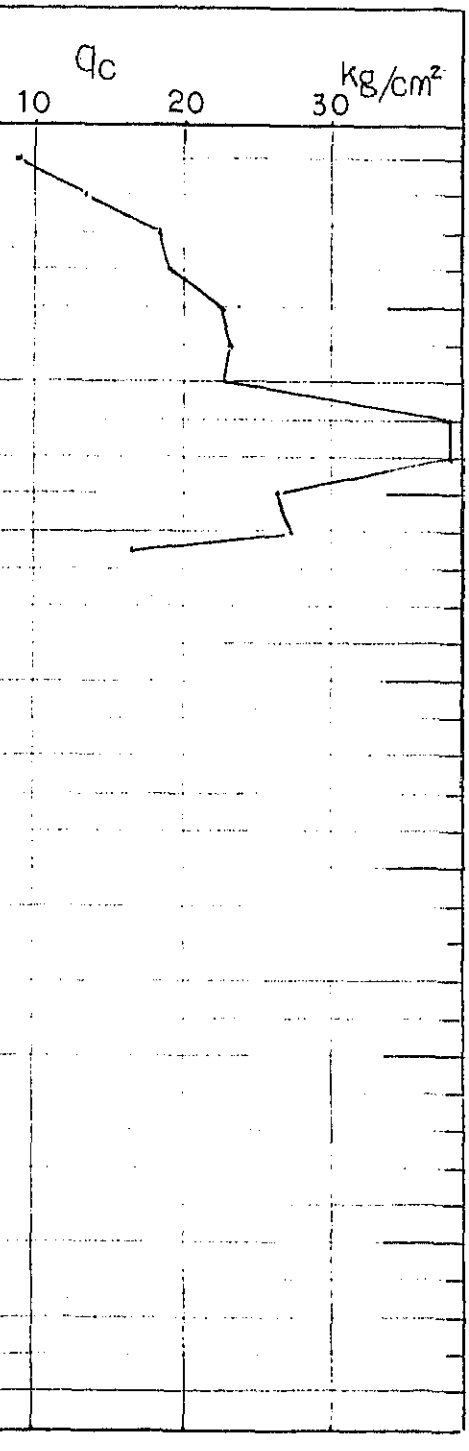


Table 2.2(9/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoup 8'

Hole No. _____ Ground EL. 1162 Date 22-Oct-81

Method or type of pene. Right

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14 cm²

PENETRATION RESISTANCE Qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
119	51	16.2		10
127	55	17.5		
135	58	18.5	Laterite	
147	63	20.1		
156	67	21.3	M.L	50
158	68	21.7		
150	64	20.4		
118	51	16.2		
101	43	13.7		
92	40	12.7		100
87	37	11.8		
81	35	11.2		
111	48	15.3		
107	46	14.7		
113	48	15.3		150
107	46	14.7		
128	55	17.5		
122	52	16.6		
150	64	20.4		
138	59	18.8		200
108	46	14.7		
150	64	20.4		
161	69	22.0		
150	64	20.4		
150	64	20.4		250
141	61	19.4		
139	60	19.1		
133	57	18.2		
122	52	16.6		
92	40	12.7		300
150	64	20.4		
145	62	19.8		
150	64	20.4		
160	69	22.0		
122	52	16.6		350

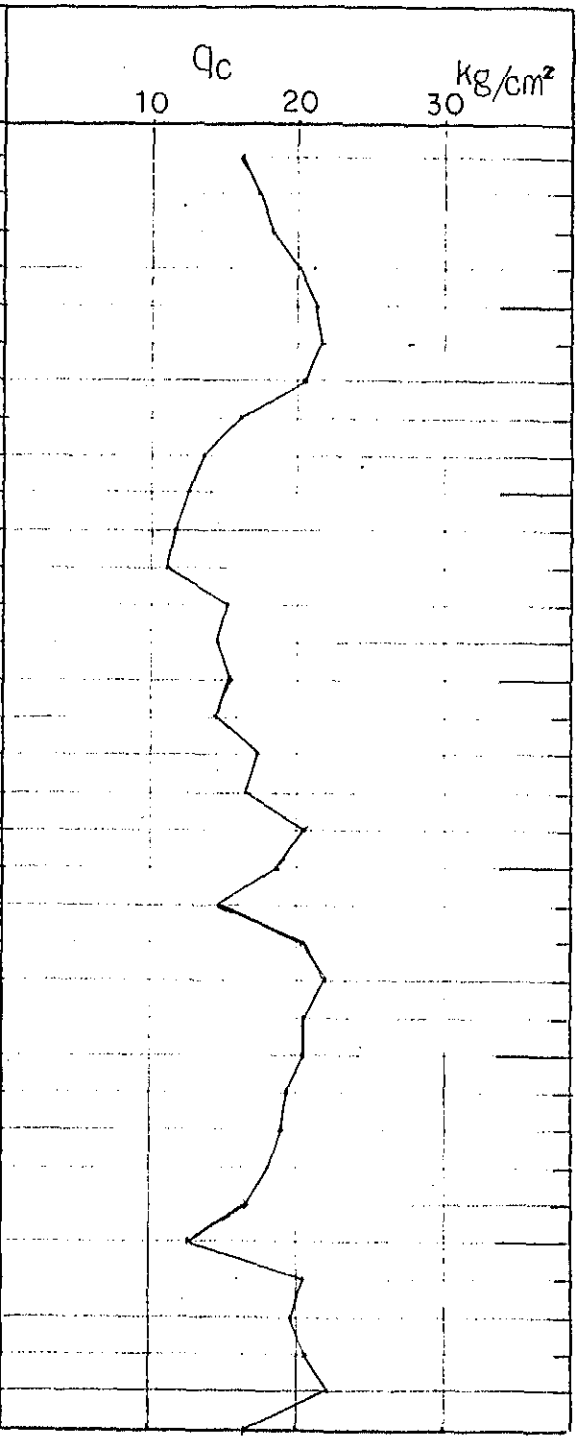


Table 2.2(10/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Ndoupg"

Hole No. _____ Ground EL. _____ Date _____

Method or type of pene. Right

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
137	59	18.8		
153	66	21.0		
154	66	21.0		
150	64	20.4		
120	52	16.6		400
				450

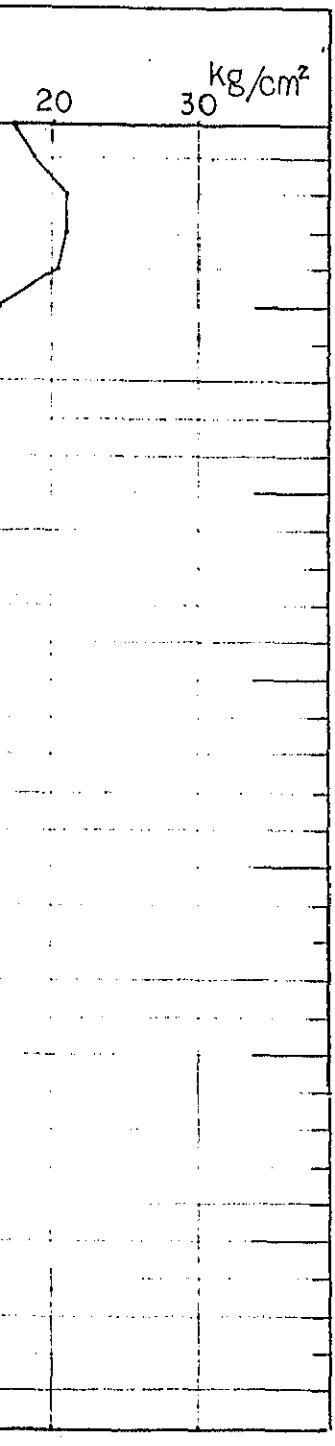


Table 2.2(11/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Njal"

Hole No. _____ Ground EL. _____ Date 22-oct-81

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
111	15 . 3		
108	14 . 7		
111	15 . 3	M.L	
104	14 . 3		
143	19 . 4	Laterite	400
168	22 . 9		
165	22 . 6	weather	
165	22 . 6	-ed	
195	26 . 8	schist	
169	23 . 3		450
170	23 . 3		
210	90	28 . 7	
120	52	16 . 6	
120	52	16 . 6	
120	52	16 . 6	500

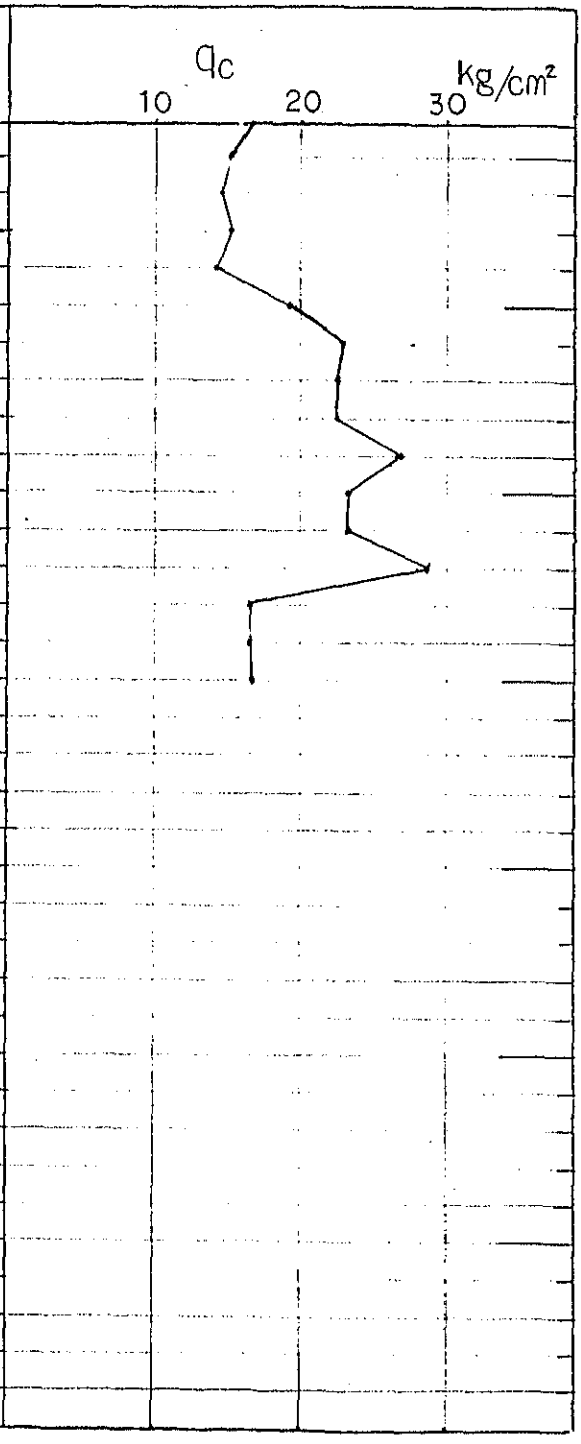


Table 2.2(12/18) RESULT OF CONE PFNETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja1'

Hole No. _____ Ground EL. 1123.5 Date 22-Oct-85

Method or type of pene. Left river

Penetrative rate 1 cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
118	51	16.2	O.C black	10
113	49	15.6		
102	44	14.0		
97	42	13.4		
78	33	10.5	dt	50
93	40	12.7	M.L ~C.L light brown	
50	21	6.7		
74	32	10.2		
85	37	11.8		
70	30	9.6	V	100
75	32	10.2	A II	
55	24	7.6		
47	20	6.4	C.H gray	
40	17	5.4		
37	16	5.1		150
43	18	5.7	brown	
35	15	4.8		
45	19	6.1	V	
69	30	9.6		
43	18	5.7		200
40	17	5.4	V	
35	15	4.8		
58	25	8.0	V	
58	25	8.0		
66	28	8.9		250
95	41	13.1		
92	40	12.7	Laterite M.L	
70	30	9.6		
85	37	11.8		
114	49	15.9		300
108	46	14.7		
112	48	15.3		
118	51	16.2		
113	49	15.6		
122	52	16.6		350

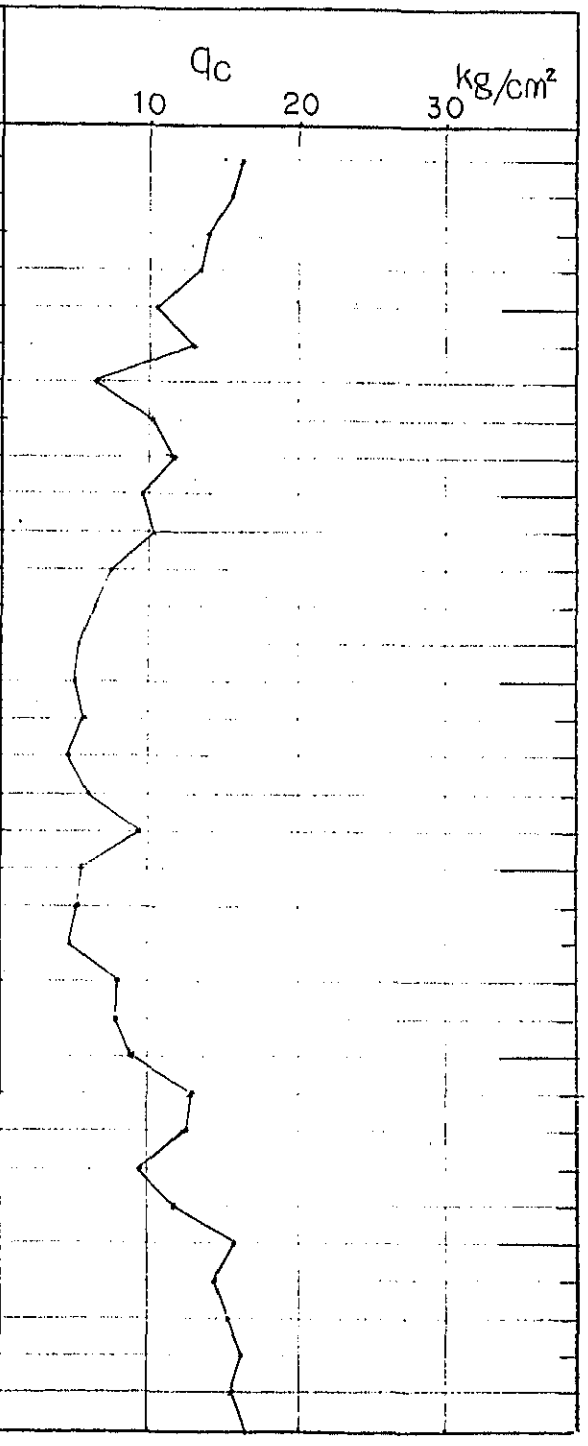


Table 2.2(13/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja2.

Hole No. _____ Ground EL. 1130 Date 22-Oct-85

Left

Method or type of pene. _____

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
53	23	7.3	topsoil,	10
81	35	11.2		
95	41	13.1		
107	46	14.7	M.L	
84	36	11.5	laterite	50
78	33	10.5		
91	39	12.4		
88	38	12.1		
99	43	13.7		
98	42	13.4		100
75	32	10.2		
80	34	10.8		
103	44	14.0		
109	47	15.0		
120	52	16.6		150

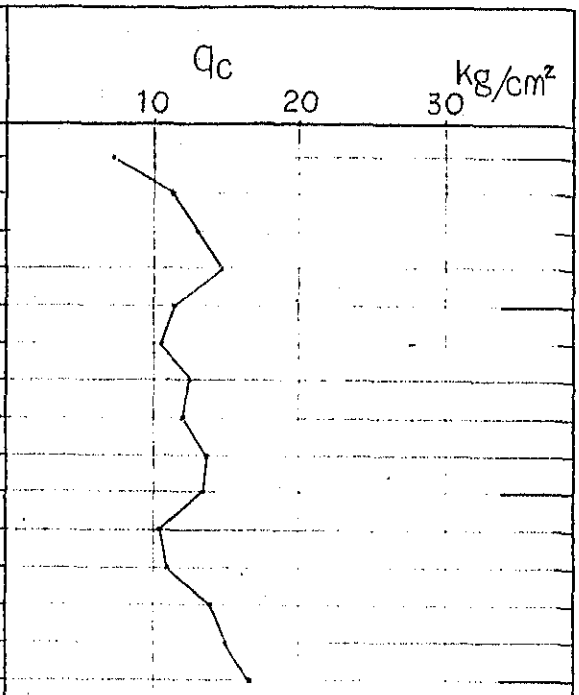


Table 2.2(14/18) RESULT OF CONE PENETRATION TEST
AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja3.

Hole No. _____ Ground EL. 1140.5 Left Date 22-oct-85

Method or type of pene. _____

Penetrative rate _____ / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc Kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
177	24.2		10
159	21.6		
171	23.3	Laterite	
161	22.0	M.L	
164	22.3		50
154	21.0		
149	20.4		
132	18.2		
149	64	20.4	
120	52	16.6	100
220	94	29.9	
214	92	29.3	
120	52	16.6	
149	64	20.4	
142	61	19.4	150
114	49	15.6	
103	44	14.0	
143	61	19.4	
268	115	36.6	
254	109	34.7	200
222	95	30.3	
120	52	16.6	220

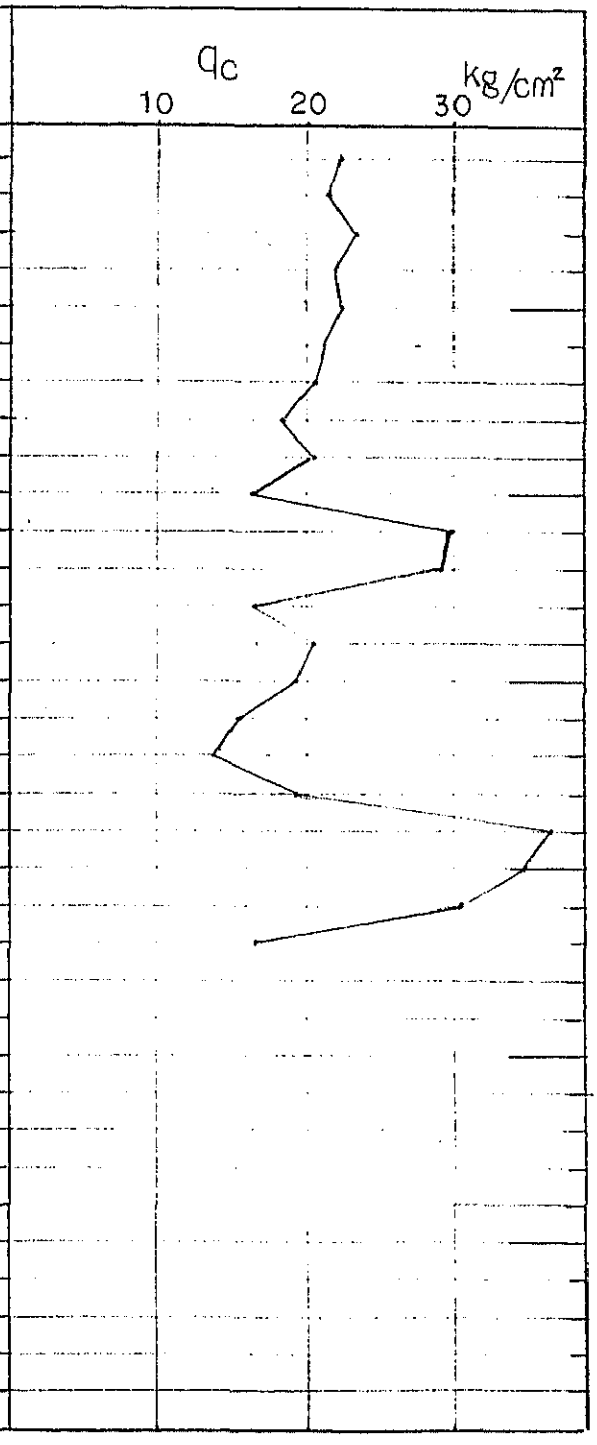


Table 2.2(15/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja4'

Hole No. _____ Ground EL. 1122.5 Date 22-oct-85

Method or type of pene. Right river

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE Qc Kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
52	22	7.0	top soil	10
61	26	8.3	Sand	
85	37	11.8	clay	
85	37	11.8	All	
70	31	9.9	All	50
63	27	8.6	Sand 30%	
63	27	8.6	silt 30%	
47	20	6.4	clay 40%	
38	18	5.1	All	
48	21	6.7	CL~CH	100
49	21	6.7		
50	22	7.0		
62	27	8.6		
64	28	8.9		
66	28	8.9		150
93	40	12.7		
84	36	11.5	Laterite	
86	37	11.8	M.L	
67	29	9.2		
68	29	9.2		200
72	31	9.9		
81	35	11.2		
82	35	11.2		
124	53	16.9		250
113	49	15.3		
104	45	14.3		
98	42	13.4		
96	41	13.1		
120	52	16.6		300
115	49	15.6		
106	46	14.7		
96	41	13.1		
115	49	15.6		
170	73	23.3		350

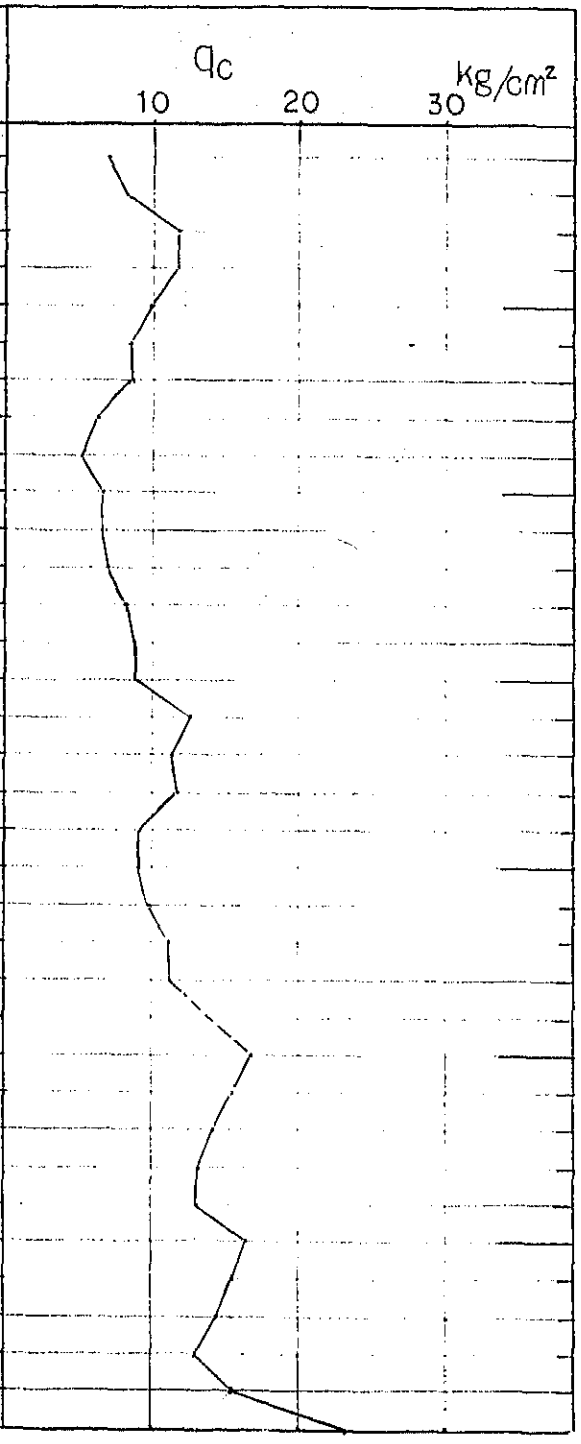


Table 2.2(16/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja4"

Hole No. _____ Ground EL. _____ Date _____

Method or type of pene. _____

Penetrative rate _____ cm/sec Area at the bottom of cone A= 3.14 cm^2

PENETRATION RESISTANCE qc kg		CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
142	61	19.4		360
120	52	16.6		370

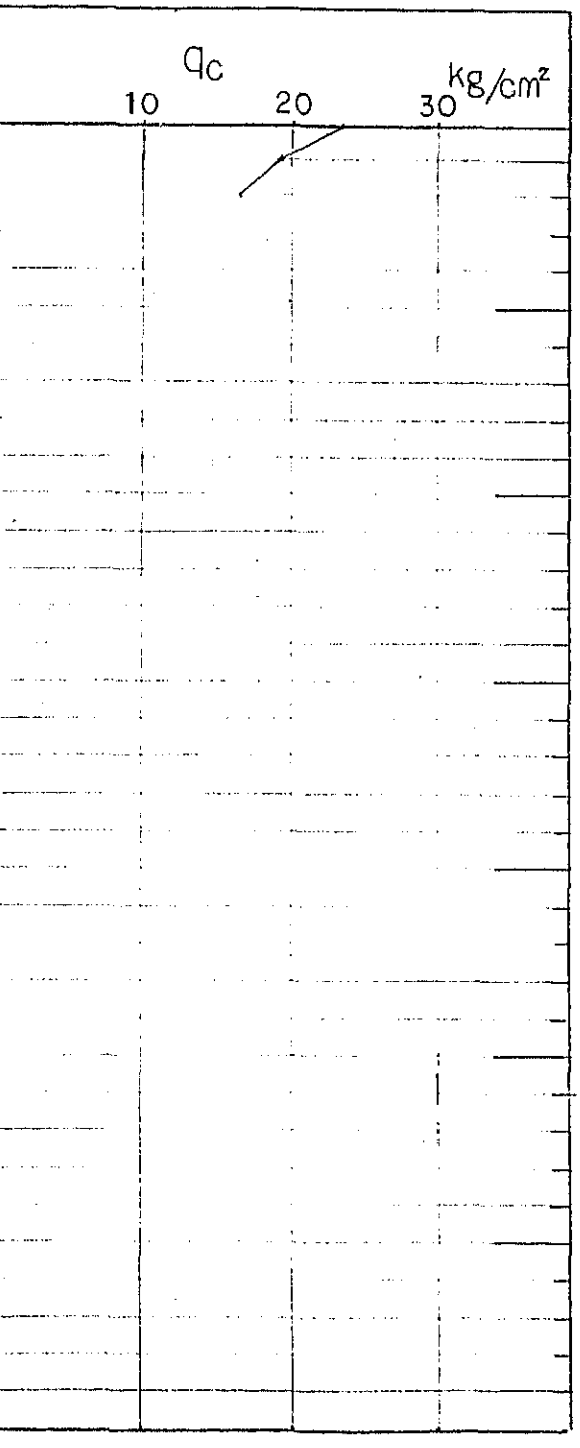


Table 2.2(17/18) RESULT OF CONE PENETRATION TEST AT THE PROPOSED SITES

STATIC CONE PENETRATION TEST

Nja5

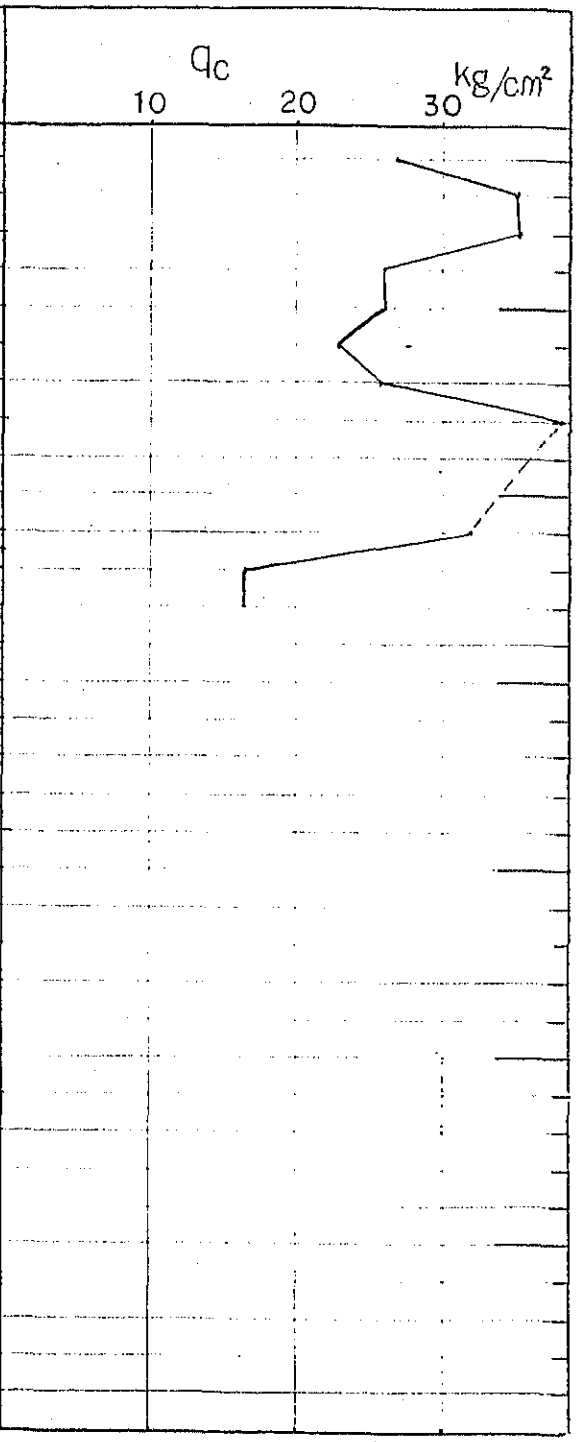
Hole No. _____ Ground EL. 1132.5 Date 22-Oct-85

Method or type of pene. _____

Penetrative rate _____ / cm/sec Area at the bottom of cone A= 3.14cm²

CM.	PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
	196	84	26.8	10
	256	110	35.0	
	256	110	35.0	
	212	91	29.0	
	190	82	26.1	50
	168	72	22.9	
	195	84	26.8	
	279	120	38.2	
				100
	233	100	31.9	
115	120	52	16.6	
	120	52	16.6	130

Laterite
S.C.
Pebble
Qz



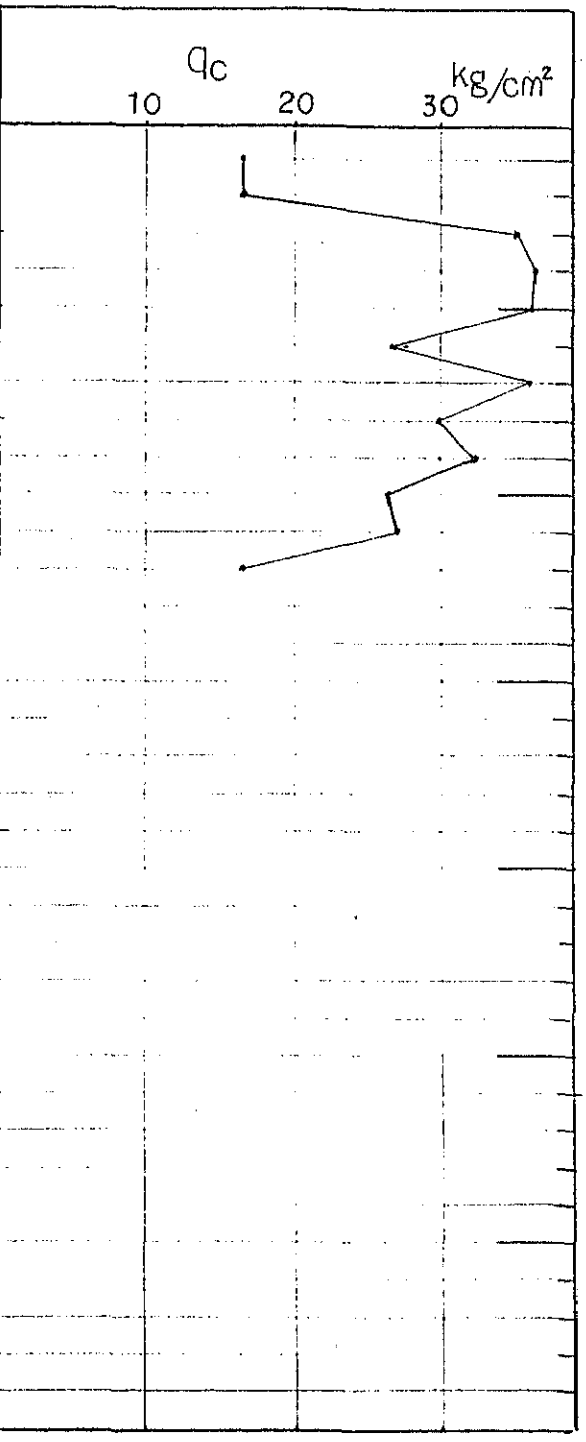
STATIC CONE PENETRATION TEST

Hole No. Nja6 Ground EL. 1147.5 Date 22-oct-85

Method or type of pene. Right.

Penetrative rate / cm/sec Area at the bottom of cone A= 3.14cm²

PENETRATION RESISTANCE qc kg	CONE BEARING CAPACITY qc(kg/cm²)	GRAPHIC LOG	DEPTH
120	52	16.6	10
120	52	16.6	
257	110	35.0	
266	114	36.3	
263	113	36.0	50
195	84	26.8	
263	113	36.0	
219	94	29.9	
234	101	32.2	
193	83	26.4	100
197	85	27.1	
120	52	16.6	120



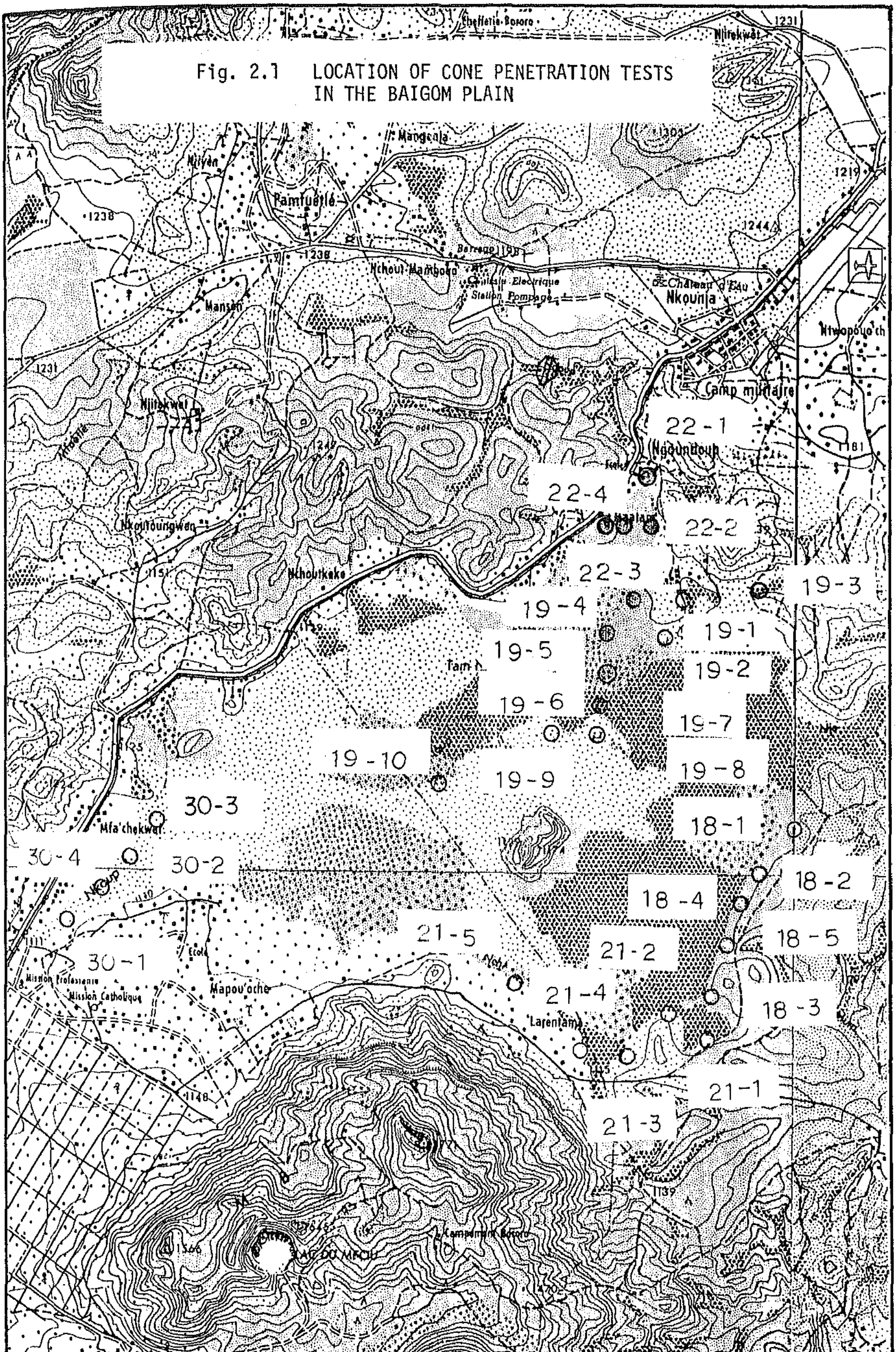


Fig. 2.1 LOCATION OF CONE PENETRATION TESTS IN THE BAIGOM PLAIN

Fig. 2.2 ISOBATH OF BEARING CAPACITY, qc>3.0 kg/cm²

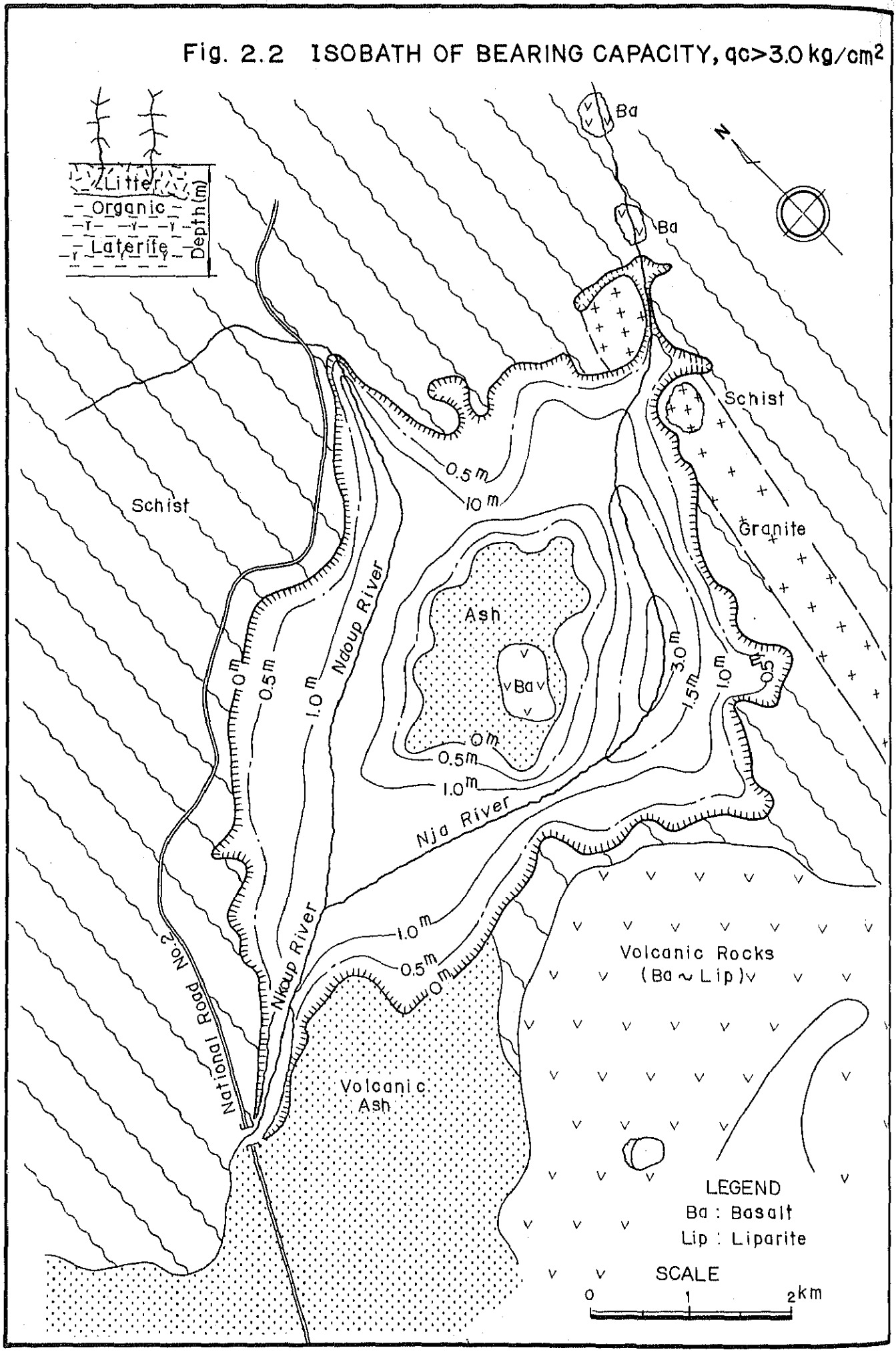
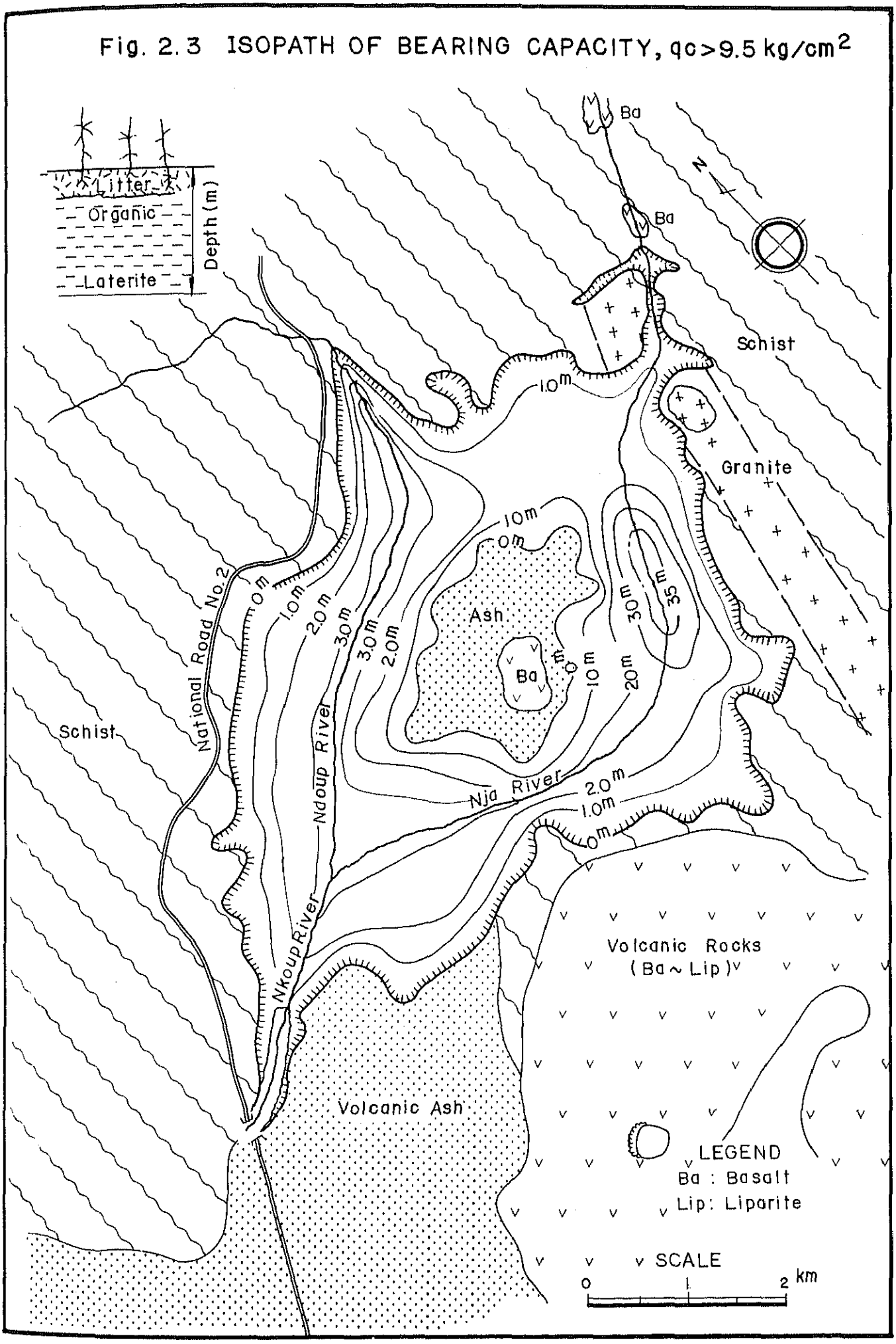


Fig. 2.3 ISOPATH OF BEARING CAPACITY, qc>9.5 kg/cm²



ANNEX III

SOILS AND LAND CLASSIFICATION

ANNEX III

SOILS AND LAND CLASSIFICATION

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CHAPTER 1 GENERAL

The soil survey and study were made to identify major soil groups and their distribution in the study area through the field investigation with the review of the previous study/1, and also to examine the suitability of each soil group for irrigation farming on the basis of the study on governing factors for land capability.

This report deals with the procedure of the field investigation and studies, and final results of the soil studies including major characteristics and land capability classes of the soil groups identified in the study area.

/1: "Première Phase de l'Etude d'Aménagement de la Plaine de Baigom, RAPPORT PEDOLOGIQUE" 1980, SEDA/ENSA

SEDA: Société d'Etudes pour le Développement de l'Afrique

ENSA: L'Ecole Nationale Supérieure Agronomique, Centre Unversitaire de Dschang

CHAPTER 2 SOILS

2.1 Procedure of Soil Survey

The physiographical condition, present land use and vegetation of the study area were firstly examined, prior to the actual field survey, through the interpretation of aerial photographs on a scale of 1/10,000, which were taken in August, 1985, just before starting the soil survey.

The preliminary soil survey was then conducted in and around the study area accompanying auger boring observations. The results of these field activities indicate the physiographical condition, present land use and vegetation are well correlated with the soil condition in the study area.

Most of the study area is mainly occupied by inundated swamp. The soil survey was carried out inside swamp area as far as possible, but still some portions were remained without entering inside. Soils in these portions were estimated based on the relation among the soil, physiographical condition and vegetation.

The soil profile survey was carried out on the basis of the information obtained through the preliminary soil survey. A total of 5 test pits were dug to a depth of about one meter or bedrock or groundwater surface. Each soil profile was observed and recorded in accordance with the standards described in the Guidelines published by FAO. Furthermore, auger boring observations were additionally practiced for adjustment of boundaries of each soil group.

2.2 Results of Soil Survey

2.2.1 Topographic condition

From the physiographic viewpoints, the lands of the study area were classified into four land-form categories such as flat lowland, flat higher terraces, slopes surrounding the flat lowland and undulating hilly area based on their formation, sloping, drainage condition, vegetation, land use, etc. These factors of each land-form category affect the soils through the soil formation process.

(1) Flat lowland

The flat lowland has almost flat slopes less than 2%, and is found all over the Baigom plain except the volcanic island located in the center of the plain. This type of land-form unit was sub-divided into 2 parts according to their drainage and water-logging conditions caused by the low drainage capacity of the Nkoup river. The lower part of flat lowland is a swampy area inundated through the year. This part acts as a natural reservoir but is not utilized as cultivated land and remains as a swampy area with natural vegetation like swampy grass and forest.

The higher part of the flat lowland is also inundated in the rainy season same as the lower part. In the dry season this part is gradually drained and becomes above the water level. This part is not used in the rainy season, but farmers cultivate food crops and vegetables in this area after becoming dried up.

The flat lowlands, both lower and higher parts, are developed on the alluvial deposits conveyed from the surrounding slopes.

(2) Flat higher terraces

Flat higher terraces are situated in the south-western part of the plain and the flat part of the volcanic island. In these areas, the land relief is almost flat with slope range less than 2%, surface drainage condition is good, but groundwater table is rather high with the depth of 30 to 50 cm from the surface. This type of land-form unit is covered with the volcanic ash. The south-western part of the Baigom plain is used for cultivation of food crops, vegetables and cash crops. On the other hand, the volcanic island is not presently cultivated, dominant vegetation in the flat part of the volcanic island is grassland, which is burned before ranging in the dry season.

(3) Slopes surrounding the flat lowland

Outside the flat lowland, gently sloping surface is developed on the old alluvium and partly on the granite rock. This land-form unit has good drainage condition but is susceptible to erosion by water in the rainy season. Western and southern parts are used as farm land to cultivate food crops, fruits trees and sugarcane. Other part is presently used for grazing cattle.

(4) Undulating hilly area

Undulating hilly area is found in the volcanic island and outer part of the study area. The soils are shallow and stony. This type of land-form unit is utilized as pasture for grazing cattle.

2.2.2 Soil classification

In the light of the physiographic condition in the study area, together with the morphological features of the soil groups and the data in the previous studies such as SEDA/ENSA report (especially the results of physio-chemical analysis of soil samples), the soils in the study area were classified into seven soil units according to the FAO/UNESCO soil classification system. They are:

Soil Unit	Study Area		Project Area	
	(ha)	(%)	(ha)	(%)
Distric Histosols	1,010	36.0	1,010	42.1
Humic Gleysols	760	27.1	760	31.6
Mollic Andosols	250	8.9	210	8.7
Humic Andosols	150	5.3	150	6.3
Humic Cambisols	220	7.1	170	7.1
Dystric Nitosols	340	12.1	30	1.3
Lithosols	70	2.5	70	2.9
Total	2,800	100.0	2,400	100.0

Dystric Histosols (Od) extend over the swampy area in the lower flat lowland around the volcanic island. These soils are saturated with water through the year and have organic layer coloured dark brown to black with low bulk density, so called histic horizon which contains decomposed plant tissue and roots with clay. The depth of histic horizon up to subsurface mineral layer ranges 50 cm to over 2 m, but the area occupied by the histic horizon with the depth more than 1 m is limited only in the south-eastern part of the lower flat lowland. Mineral layer underlying the histic horizon have fine texture like silty clay to clay coloured light grey, many reddish to yellowish brown mottles, slightly sticky and plastic characteristics. These soils are left as natural swampy bush or blasted forest of saturated condition with excessive water. To use this soil unit as cultivated land, drainage condition should be improved to stabilize the histic horizon. After improving the drainage condition, organic matter will be decomposed and oxidized, and the histic horizon will decrease thickness of the horizon subside to groundwater level or top of subsurface mineral layer. Adequate mixture of organic matter with mineral layer makes this soil unit higher in agricultural potential. However, it is essential for agricultural use to amend soil acidity and to apply adequate level of fertilizer after improving the drainage. These soils occupy 1,010 ha or 36.0% of the study area.

Humic Gleysols (Gh) extend over the flat lowland in north-western to south-western part of the swampy area. Surface layer saturated with water in the rainy season is mainly composed of dark brown organic soil containing grass root mat, of which depth ranges 20 cm to 50 cm. Underlying subsurface soil is derived from alluvial deposits, which is saturated with water and shows hydromorphic property. In general, the subsurface soil is textured fine such as clay to silty clay, coloured light grey. This soil unit is partially used as upland field depends on their drainability and moisture condition, and the rest of this soil unit is left as grassland. Although these soils have good agricultural potential after improvement of drainage condition, application of fertilizer is essential for sustaining the good yield. This soil unit occupies 760 ha or 27.1% of the study area.

Mollic Andosols (Tm) are found on the flat higher terraces in the eastern part of the volcanic island and south-western edge of the study area. This soil unit is derived from volcanic ash. Surface soil contains black organic matter with the depth of about 20 - 30 cm, low bulk density and good drainage. Subsurface soil is more than 70 cm, dark reddish brown coloured, slightly sticky plastic and massive structure. These soils in south-western edge of the study area are presently used as agricultural land for food crops and vegetables, however, eastern part of volcanic island is left as grassland because of lack of access road. This soil is good for crop production, but it is better to apply fertilizer, especially phosphorous to maintain the soil fertility. Mollic Andosols occupy 250 ha or 8.9% of the study area.

Humic Andosols (Th) extend over the flat higher terrace in the western part of the volcanic island. This soil unit is also originated from volcanic ash. The depth to the groundwater table is about 30 to 50 m. The internal drainage is imperfect. The texture is generally clay to silty clay. The surface soil contains dark brownish organic matter and sometimes contains gravel. Presently these soils are left as natural grassland which is used for pasture only in dry season. This soil without stony phase has potential for crop production. This soil unit occupies 150 ha or 5.3% of the study area.

Humic Cambisols (Bh) develop on the slope surrounding the flat low-land. These soils are formed on the residual deposits with shallow black surface layer, which is being eroded by running water. The texture is silty clay to clay loam. Presently these soils along the National Road No. 2 and at the foot of Mt. Mbetpit are used as farm land to cultivate food crop, vegetables and fruits trees, and eastern part of this soil unit is used as ranging pasture. This soil type is suitable for crop production if it is conserved from erosion.

Dystric Nitosols (Nd) are distributed over the undulating hilly area around the study area. These soils originate from highly weathered dilvium deposits. Both the internal and external drainage conditions are good. This soil unit has argillic B horizon. These soils are dark reddish brown to red in colour, fine to medium in texture, slightly sticky and plastic. Most of these soils are being used as grassland for grazing cattle or cultivated land for food crops. These soils generally have agricultural potential for upland crops. However these are marginally suitable for rice cultivation.

Lithosols (L) cover the hilly portion of the volcanic island, some spot hills along the western edge and foot of Mt. Mbetpit. They are very shallow in depth and generally stony. These soils have almost no potential for agricultural production. Lithosols occupy 70 ha or 2.5% of the study area.

The soil map of the study area is illustrated on Fig. 3.1. The results of soil analysis conducted by SEDA is summalized in Table 3.1.

CHAPTER 3 LAND CLASSIFICATION

3.1 Land Classification System

Land classification for irrigation farming was carried out according to the FAO system (Framework for land evaluation, FAO, 1976). In this system, land suitability classes reflect degrees of suitability or limitation by using three categories i.e. orders, classes and subclasses.

3.1.1 Orders

Orders are the highest categories and reflect kind of suitability such as suitable or non-suitable.

(1)	Suitable: S	Land on which the sustained use of irrigation farming are expected to yield benefits which jistify the inputs and costs, without unacceptable risk of damage on the project area.
(2)	Non-suitable: N	Land which has qualities that appear to preclude use of irrigation farming.

3.1.2 Classes

Classes reflect degrees of suitability. The classes are numbered in sequence of decreasing degrees of suitability within the order. Out of above two orders, the suitable order is subdivided into three classes, and non-suitable order has two classes.

(1)	S1 (Highly suitable)	Land having no significant limitations to sustained irrigation farming or only minor constraints that will not significantly reduce agricultural production and will not raise inputs and costs above acceptable level.
(2)	S2 (Moderately suitable)	Land having limitations which as a whole are moderately severe for sustained cultivation of crops by applying irrigation water, will reduce productivity or benefits and increase inputs or costs; but in total, benefits will be gained.
(3)	S3 (Marginally suitable)	Land having limitations which as a whole are severe for sustained irrigation farming and will so reduce production or increase costs to be marginally justified.
(4)	N1 (Currently non-suitable)	Land having limitations which appear so severe as to preclude any possibilities of successful sustained irrigation farming with existing knowledge at currently acceptable cost, and which may be surmountable in time.

(5) N2 (Permanently non-suitable) — Land having limitations which appear so severe as to preclude any possibilities of successful sustained irrigation farming.

3.1.3 Subclasses

Each class is divided into subclases which reflect kinds of limitations. In this study, required land qualities were selected in the course of the development concept revealed another part of this report, and for irrigated rice cultivation, the Japanese land classification standards (Outline of Land Classification based on Soil Survey in Japan, 1977, National Institute of Agricultural Science) were applied. Therefore, following limitation factors as required land qualities from the Japanese system were selected and applied for assessing the suitabilities.

(1) Topography (s)

(2) Gravel content (g)

(3) Thickness of top soil (t)

(4) Effective depth of soil (e)

(5) Permeability under submerged condition (1)

(6) Fertility (f)

(7) Acidity (a)

(8) Depth of organic horizon (o)

Each of above limitation factors is expressed by abbreviated symbol letter and is used as suffix of subclass nomination of land suitability.

3.2 Specification of Land Suitability

The specification and criteria for rating the limiting factors of land suitability are explained as follows:

(1) Topography (s)

This factor is due to unfavorable relief, especially slope. This factor is applied to upland crops only. The class of this factor is decided by the combination of the followings:

(a) Natural slope as a main dependent sub-factors:
5 grades as shown in the following table.

Steepness of Slope (°)	Steepness of Slope (%)	Class
less than 3	less than 6	1
3 - 8	6 - 14	2
8 - 15	14 - 28	3
15 - 25	28 - 47	4
more than 25	more than 47	4

(b) Direction of slope

(c) Artificial slope

(2) Gravel content in top soil (g)

Gravel contents in top soil are expressed by the percentage of the exposed surface area of gravel on soil profile, and are graded into the following classes:

Gravel Content (%)	Class	
	Paddy	Upland
less than 5	1	1
5 - 10	1	2
10 - 20	1	2 - 3
20 - 50	1 - 2	3 - 4
more than 50	4	4

(3) Thickness of top soil (t)

Top soil is the first horizon where plant roots can easily penetrate, and generally corresponds to the plowed layer. The classes are grouped according to the thickness of top soils as follows (when effective depth of soil (d) is placed to class 4, this factor is also placed to class 4):

Thickness of Top Soil (cm)	Class	
	Paddy	Upland
more than 25	1	1
25 - 15	1	2
less than 15	2	3

(4) Effective depth of soil (g)

Effective depth of soil is the depth up to bedrock, hard pan and gravel layer which plant roots can not penetrate. The classes are grouped, according to thickness of the effective soil depth, as follows:

Effective Depth of Soil (cm)	Classes	
	Paddy	Upland
more than 100	1	1
50 - 100	1	2
25 - 50	2	3
15 - 25	3	3
less than 15	4	4

(5) Permeability under submerged condition (1)

This factor affects irrigation water requirements, soil temperature, and leaching of the nutrients or development of reduced condition of the soil. This standard factor is evaluated mainly by the combination of soil texture and the presence of compact layer within 50 cm from the surface, as following sub-factors:

(a) Soil texture

	Content of Clay	Content of Sand
1. very fine	more than 25%	-
2. fine	15 - 25%	-
3. medium	less than 15%	less than 85%
4. coarse	less than 15%	more than 85%

(b) Compactness

1. compact: more than 14.0 kg/cm^2 by hardness meter
2. medium : 14.0 - 1.4 kg/cm^2 by hardness meter
3. loose : less than 1.4 kg/cm^2 by hardness meter

Sub-factors		Criteria	Class
Soil Texture	Compactness		Paddy
very fine	compact	Poorly to imperfectly permeable	1
very fine	medium	Poorly to imperfectly permeable	1
medium	medium	Moderately to well permeable	2
coarse	medium	Moderately to well permeable	2
coarse	loose	Well to excessively permeable	3

(6) Fertility (f)

Fertility is evaluated by the combination of the following two sub-factors:

(a) Nutrient holding capacity (evaluated by CEC)

1. high : more than 20 me/100 g
2. medium: 6 - 20 me/100 g
3. low : less than 6 me/100 g

(b) Base status in soil (evaluated by base saturation degree)

1. good : more than 50%
2. medium: 30 - 50%
3. poor : less than 30%

Sub-factors		Class	
CEC	Base Status	Paddy	Upland
high	good	1	1 - 2
high	medium	1 - 2	2
high	poor	3	2 - 3
medium	good	1	1
medium	medium	2	2
medium	poor	3	3
low	good	2	3
low	medium	2 - 3	3
low	poor	3	3

(7) Acidity (a)

Acidity is evaluated by pH.

pH	Criteria	Class	
		Paddy	Upland
more than 6.0	weak	1	1
5.0 - 6.0	medium	2	2
4.5 - 5.0	strong	3	3
less than 4.5	very strong	3	4

(8) Depth of histic horizon (o)

After improving the drainage condition, histic horizon will subside. The histic horizon in the study area contains much mineral clay of around 80%. This means that the subsidence is minimum level, but period for stabilizing subsidence depends on the depth of histic horizon. Depth is graded as follows:

Depth of Histic Horizon (cm)	Class	
	Paddy	Upland
less than 90	1	1
more than 90	2	2

The specification of land suitability class is summarized in Table 3.2.

3.3 Land Suitability

The land is evaluated by using above factors. The correlation between soil units and land suitability classes is shown in Table 3.3, and the results of land suitability classification is summarized below:

Soil Unit	Suitability Subclass Paddy/Upland	Study Area (ha)	Study Area (%)	Project Area (ha)	Project Area (%)
Dystric Histosols	S2a/S2a	710	25.3	710	29.6
	S2ao/S2ao	300	10.7	300	12.5
Humic Gleysols	S1/S1	760	27.1	760	31.6
Mollic Andosols	S1/S2	250	8.9	210	8.7
Humic Andosols	S2a/S2a	90	3.2	90	3.8
	S2a/S2sga	60	2.1	60	2.5
Humic Cambisols	S2tℓ/S2sgte	220	7.9	170	7.1
Dystric Nitosols	S3ℓ/S2sgtefa	340	12.1	30	1.3
Lithosols	N1e/N1se	70	2.5	70	2.9
Total		2,800	100.0	2,400	100.0

Note: The above project area of 2,400 ha is the gross area surrounded by the proposed irrigation canals and includes the volcanic island.

According to the above suitability classification, the soils in the study area are generally suitable for the cultivation of irrigated rice and upland crops except for Lithosols, however, it will be essential to amend soil acidity especially for the areas of Dystric Histosols, Humic Adosols and Dystric Nitosols and to apply fertilizers after improvement of the drainage condition.

The land suitability classification map is illustrated in Fig. 3.2.

Table 3.1(1/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Total Nitrogen		Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)		(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F1	0-20	5.6	4.8	6.35	10.96	3.47	19	19.6	4.7	4.4	0.8	0.1	10.0	51.0	58.0	41.6	0.4	-
	20-40	5.9	4.5	5.64	9.72	3.37	10	22.5	4.6	3.5	0.3	0.2	8.5	37.8	59.9	39.4	0.1	-
E1	0-30	4.6	4.0	4.77	8.22	2.98	15	17.8	1.1	1.2	0.3	0.0	2.6	14.6	33.9	28.9	37.2	6.0
F2	0-8	5.2	4.7	9.53	16.43	7.46	22	27.8	9.0	4.6	0.8	0.3	14.7	32.9	35.8	41.3	22.9	-
	8-30	5.0	4.5	2.24	3.86	1.78	23	17.7	4.1	2.3	0.3	0.1	6.8	38.4	63.5	21.5	15.0	-
	50-80	6.3	4.7	0.83	1.43	0.67	24	9.3	3.2	2.5	0.2	0.1	6.0	64.5	48.3	43.3	8.4	-
E2	0-30	5.4	4.8	4.46	7.69	0.42	22	21.3	2.7	2.6	0.6	0.1	6.0	28.2	46.7	44.8	8.5	-
F3	0-9	5.4	4.5	-	-	0.96	24	22.2	5.8	4.3	1.1	0.2	11.4	51.4	19.8	78.3	1.9	-
	9-29	4.9	4.2	6.7	11.5	0.35	17	17.5	1.4	2.0	0.2	0.1	3.7	21.1	55.8	42.4	1.8	-
	60-80	5.2	4.4	8.2	1.4	0.07	18	15.5	1.8	2.0	0.2	0.1	4.1	26.5	46.8	49.4	3.6	-
	85-100	5.7	4.8	9.2	1.6	0.08	4	10.9	1.6	2.5	0.2	0.1	4.4	40.4	50.9	40.4	8.7	-
F4	0-20	5.6	4.2	25.8	4.5	0.21	18	13.9	2.1	2.4	0.4	0.1	5.0	36.0	31.1	37.4	31.5	-
	20-43	5.1	4.6	13.1	2.3	0.13	14	11.5	0.4	0.6	0.2	0.1	1.3	11.3	44.0	28.3	27.7	-
	43-74	5.1	4.4	7.4	1.3	0.09	7	8.2	0.5	0.3	0.2	0.1	1.1	13.4	40.9	34.8	24.3	-
	74-103	5.1	4.4	6.5	1.1	0.08	8	8.9	0.6	0.2	0.1	0.0	0.9	10.6	54.4	38.1	7.5	-
	103-180	5.3	4.5	6.1	1.1	0.07	10	10.2	0.8	0.2	0.1	0.1	1.2	11.8	42.3	37.6	20.1	-
F5	0-30	5.6	4.6	9.6	16.6	0.59	18	26.4	1.4	0.9	0.4	0.2	2.9	11.0	52.6	43.1	4.3	-
	30-55	4.6	4.0	2.9	4.6	0.18	45	13.2	0.8	0.6	0.1	0.0	1.5	11.4	41.9	21.7	36.4	-
F6	0-22	4.7	4.2	7.8	13.5	0.56	34	33.8	5.6	0.4	0.6	0.1	6.7	19.8	38.7	54.5	6.8	-
	22-80	4.8	4.3	1.7	2.9	0.14	25	13.5	2.0	1.4	0.2	0.1	3.7	27.4	53.2	38.2	8.6	-
	80+	5.0	4.5	1.1	1.9	0.08	26	9.0	1.5	1.1	0.1	0.0	2.7	30.0	33.9	20.0	46.1	-
E3	310	5.4	4.6	5.1	8.8	0.40	8	26.0	6.1	3.3	0.6	0.1	10.1	58.8	52.0	41.6	3.4	-

Table 3.1(2/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Total Nitrogen		Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)		(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F7	0-27	5.5	4.4	6.8	11.7	0.58	38	34.0	8.6	3.1	0.9	0.3	12.9	37.9	35.6	54.4	10.0	-
	27-40	5.1	4.1	1.8	3.1	0.18	21	18.8	1.1	0.9	0.3	0.1	2.4	12.8	41.2	41.2	17.7	-
E4	0-25	5.6	4.6	6.5	11.1	0.36	32	28.8	5.0	3.0	0.3	0.1	8.4	29.2	13.3	83.8	2.9	-
F8	0-13	4.5	4.0	4.3	7.4	0.49	34	24.4	2.4	1.0	0.5	0.1	4.0	16.4	42.8	45.4	11.8	-
	13-57	4.6	4.1	1.6	2.7	0.19	21	15.3	2.0	1.8	0.2	0.1	4.1	26.8	46.0	41.9	12.1	-
	57-90	5.0	4.4	0.7	1.2	0.08	18	9.1	2.7	1.7	0.2	0	4.6	50.5	47.7	32.8	19.5	-
E5	0-25	4.5	4.0	26.1	45.0	0.4	34	48.0	8.3	4.4	1.1	0.2	14.0	29.2	34.1	63.2	2.7	-
F9	0-12	5.3	4.2	3.5	6.1	2.8	17	11.0	2.6	3.4	0.6	0.1	6.7	60.9	24.1	29.2	46.7	5
	12-24	4.6	4.0	2.2	3.7	1.4	29	11.0	1.4	0.5	0.1	-	2.0	18.9	22.6	29.6	47.8	-
	24-56	4.7	4.1	1.5	2.7	1.5	25	8.0	1.0	0.9	0.2	0.1	2.2	25.0	28.9	33.4	31.7	-
	56-110	5.1	4.5	4.9	8.5	0.6	24	6.7	0.9	0.5	0.2	0.1	1.7	25.3	28.1	36.1	35.8	-
E6	0-30	5.6	4.8	3.7	6.4	2.2	14	15.0	2.3	1.4	0.6	0.1	4.4	29.3	23.6	34.2	42.2	-
	30-50	5.0	4.4	1.6	2.8	1.1	5	9.7	0.8	0.5	0.3	0.0	1.6	16.5	24.8	30.9	44.3	-
F10	0-19	4.9	4.3	6.8	11.7	3.7	19	22.9	6.5	1.7	1.5	0.1	9.8	42.8	35.4	58.0	6.6	-
	19-41	5.1	4.6	4.0	6.9	2.6	12	14.6	1.9	1.0	0.3	0.1	3.3	22.6	56.8	35.7	7.5	-
	41-76	6.1	4.7	1.3	2.8	1.2	32	12.8	2.2	2.1	0.2	0.1	4.6	35.9	51.2	41.8	7.0	-
E7	0-30	5.9	4.8	5.8	10.1	0.5	28	22.5	2.4	1.9	0.4	0.2	4.9	19.2	49.7	48.0	2.3	-
E8	0-30	5.2	4.4	5.6	9.7	0.4	22	26.4	2.7	2.1	0.4	0.1	5.3	20.1	57.3	40.1	2.6	-
E9	10-70	4.6	4.1	9.0	15.6	0.7	30	36.0	3.3	3.0	0.5	0.2	9	25.0	74.7	22.7	2.6	-
E31	0-30	5.0	4.4	6.5	11.1	0.4	31	36.4	11.6	7.3	0.7	0.3	19.9	54.7	53.0	42.5	4.5	-

Table 3.1(3/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F11	0-18	8.1	4.0	4.8	8.2	0.3	18	17.1	1.4	0.4	0.2	0.1	2.1	12.3	52.4	40.5	7.1	-
	18-27	4.8	4.0	2.1	3.6	0.2	24	16.8	1.3	0.8	0.2	0.1	2.4	14.3	38.2	43.1	18.7	-
	27-80	4.9	4.1	1.8	3.1	0.1	11	13.9	0.8	0.7	0.1	0.1	1.7	12.2	43.5	40.1	16.4	-
	80-100	4.0	4.3	8.2	1.4	0.1	45	8.3	0.8	1.0	0.1	0.1	2.0	24.1	38.9	45.4	15.7	-
F12	0-20	5.2	4.3	3.6	6.2	0.2	5	10.1	2.9	1.6	0.2	0.1	4.8	47.5	24.3	49.5	26.2	-
	20-40	5.0	4.5	9.2	1.6	0.1	8	5.7	1.1	1.2	0.1	0.1	2.5	43.9	21.1	48.0	22.9	-
F13	0-17	5.1	4.5	8.9	1.5	0.5	14	31.0	2.6	1.0	0.3	0.1	4.0	12.9	63.3	37.0	0.7	-
	36-57	4.8	4.0	1.8	3.2	0.1	20	16.4	1.0	1.2	0.1	0.1	2.4	14.6	56.5	42.7	0.8	-
	70-96	5.4	4.4	1.1	1.9	0.1	24	15.8	1.6	1.4	0.1	0.1	3.2	15.9	14.7	85.0	0.3	-
F10	0-30	4.8	4.2	5.1	8.8	0.5	37	29.1	4.2	2.8	0.5	0.2	7.7	26.5	63.3	37.0	0.7	-
	50-90	4.6	4.1	1.2	2.1	0.1	27	13.3	3.0	2.8	0.4	0.1	6.3	47.4	56.5	42.7	0.8	-
E11	0-25	5.0	4.5	-	-	-	25	38.5	4.8	2.5	1.7	0.5	9.5	24.7	14.7	85.0	0.3	-
E12	0-25	4.5	4.1	6.4	11.0	0.6	20	28.1	1.8	2.6	0.4	0.2	5.0	17.8	60.6	38.6	0.8	-
E13	0-40	5.0	4.2	8.2	14.1	0.7	20	35.0	2.9	2.6	0.5	0.2	6.2	17.7	59.7	39.7	0.6	-
E14	0-30	4.8	4.3	8.6	14.8	0.7	-	34.4	4.4	4.0	0.6	0.4	9.4	27.3	56.2	42.7	1.1	-
	30-60	5.0	4.4	6.2	10.6	0.5	-	29.1	5.9	4.0	0.3	0.4	10.6	36.4	66.1	32.2	1.7	-
F14	11-32	4.8	4.3	7.8	13.5	0.4	24	28.6	0.8	1.0	0.4	0.1	2.3	8.0	41.5	51.8	6.7	-
	32-55	5.5	4.2	2.6	4.5	0.3	20	25.1	1.0	2.8	0.3	0.1	4.2	16.7	48.8	35.2	16.0	-
	55-90	5.2	4.3	0.8	1.4	0.1	28	9.7	2.9	2.4	0.2	0.1	5.6	57.7	41.3	51.1	7.6	-
	116-130	5.5	4.3	0.9	1.5	0.1	28	12.8	4.1	2.5	0.3	0.2	7.1	55.5	51.0	46.5	2.5	-
	130-150	5.6	4.1	0.7	1.3	0.1	26	16.8	7.4	4.3	0.3	0.1	12.1	72.0	63.6	34.9	1.5	-

Table 3.1(4/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F15	0-16	5.3	4.8	6.3	10.8	0.37	24	62.5	8.9	7.1	0.3	0.1	16.4	26.2	34.6	56.1	6.7	-
	16-39	5.6	4.7	4.0	6.9	0.23	20	31.6	8.5	5.7	0.2	0.3	14.7	46.5	38.8	51.5	16.0	-
	39-56	5.7	4.8	4.9	8.4	0.27	28	33.6	11.1	5.9	0.2	0.2	17.4	51.8	40.4	46.4	7.6	-
	56-99	5.8	4.9	1.6	2.8	0.10	28	29.0	15.5	4.6	0.1	0.1	20.3	70.0	46.3	38.5	2.5	-
	99-117	6.3	5.0	1.6	2.8	0.10	26	24.7	8.9	3.7	0.1	0.3	13.0	52.6	51.4	34.6	1.5	-
F16	0-19	5.6	5.0	4.2	7.3	3.85	51	22.5	2.4	1.4	0.4	0.2	4.4	19.6	35.9	55.6	8.5	-
	19-40	5.4	4.8	4.0	6.9	2.16	41	27.1	11.3	5.1	1.7	0.1	18.2	67.2	36.2	55.8	8.0	-
	40-90	6.5	5.4	8.6	1.5	0.73	30	12.9	3.0	2.2	0.7	0.0	5.9	45.7	61.0	32.9	6.1	-
F17	0-15	5.5	4.8	7.8	13.5	4.76	14	30.3	6.2	5.3	0.6	0.1	12.2	40.3	38.6	55.5	5.9	-
	15-31	5.6	4.5	3.6	6.2	2.69	11	26.4	6.1	3.1	0.4	0.1	9.7	36.7	47.8	43.6	8.6	10
	31-62	5.7	4.6	1.6	2.8	1.26	28	22.0	5.3	4.7	0.1	0.3	10.4	47.3	57.8	36.2	6.0	-
	62-102	6.0	5.4	1.0	1.7	0.91	28	18.8	5.9	3.1	0.1	0.2	9.3	49.5	52.1	41.0	6.9	-
E15		5.1	4.6	-	-	1.67	21	48.8	23.8	6.0	1.1	0.8	31.7	65.0	51.5	46.5	2.0	-
F18	0-25	5.9	5.2	4.0	6.9	0.27	134	27.4	15.3	8.0	1.6	0.2	25.1	91.6	30.2	61.5	8.3	7
	25-40	5.5	5.0	3.5	6.0	0.19	45	22.5	9.0	5.5	1.5	0.1	16.5	71.6	45.7	48.3	6.0	-
	40-100	5.6	5.1	1.1	1.8	0.11	15	18.5	4.0	2.4	0.9	0.1	7.4	40.0	63.8	32.5	3.7	-
F19	0-19	5.8	5.0	5.1	8.8	0.32	12	32.0	14.6	10.7	1.9	0.2	27.4	85.6	20.5	50.8	28.7	34
	19-29	6.6	5.3	3.2	5.5	0.22	8	27.0	12.1	8.5	1.8	0.3	22.7	84.1	28.1	51.1	20.8	22
	29-74	6.1	5.1	1.5	2.6	0.11	12	39.4	10.3	14.0	1.2	0.3	25.8	65.5	42.8	46.9	10.3	-
	74-94	7.2	6.2	0.3	1.6	0.10	42	23.5	7.5	4.0	0.9	0.2	12.6	53.6	61.1	30.6	8.3	-
	94-160	6.5	5.8	0.6	1.0	0.06	45	15.3	6.5	2.5	0.6	0.2	9.8	64.1	55.1	37.7	7.2	-
E16	0-30	4.6	4.0	3.3	5.7	0.16	6	12.8	0.6	1.2	0.2	0.1	2.1	16.4	36.3	30.6	33.1	7

Table 3.1(5/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F20	0-10	4.8	4.1	6.4	10.9	0.51	27	27.5	6.1	3.7	0.3	0.1	10.2	37.1	27.5	24.3	43.2	-
	10-27	5.4	4.2	2.3	4.0	0.21	26	20.1	3.8	1.4	0.1	0.1	5.4	26.9	35.6	52.1	12.3	-
	27-52	5.6	4.4	1.1	1.8	0.11	30	10.3	3.8	1.2	0.1	0.1	5.2	50.5	28.5	64.6	6.9	-
	52-75	5.8	4.9	0.7	1.1	0.11	26	8.3	3.2	0.9	0.1	0.1	4.3	51.8	29.7	41.5	28.8	-
	75-94	4.9	4.3	0.3	0.6	0.07	26	5.9	2.1	1.0	0.1	0.1	3.3	55.9	19.4	59.2	21.4	-
E17	0-30	4.8	4.1	3.1	5.3	0.03	15	17.5	4.2	1.9	0.4	0.1	6.6	37.7	44.6	43.4	12.0	-
F21	0-17	5.8	5.4	3.8	6.5	0.25	13	16.5	4.5	2.0	1.1	0.1	7.7	46.7	30.8	32.5	36.7	-
	17-34	5.0	4.5	2.8	4.8	0.16	5	15.8	1.8	0.5	1.8	0.3	3.5	22.2	27.9	43.6	28.5	-
	34-65	4.9	4.0	2.0	3.5	0.12	4	15.7	2.0	0.4	0.3	0.0	2.7	17.2	37.5	35.9	26.6	-
	80-100	5.0	4.1	1.0	1.6	0.12	4	11.2	8.2	0.8	0.2	0.0	9.2	82.1	38.0	32.1	29.9	-
	110-125	5.7	4.9	0.9	1.6	0.09	10	6.3	2.3	1.0	0.2	0.1	3.6	57.1	31.5	37.8	30.7	-
E18	0-25	4.7	4.3	4.8	8.2	0.27	11	14.0	2.1	1.5	0.5	0.1	4.2	30.0	84.3	26.0	49.7	-
F22	0-22	5.1	4.2	5.1	8.8	0.29	21	19.9	2.9	1.4	1.4	0.1	5.8	29.1	25.3	53.1	21.6	2
	22-45	5.0	4.4	3.5	6.0	0.26	23	17.8	2.4	0.9	0.3	0.1	3.7	20.8	26.3	50.2	22.8	5
	45-89	4.6	4.1	2.0	3.5	0.12	20	14.9	2.9	1.4	0.3	0.1	4.7	31.5	23.8	47.5	29.2	0
	89-110	6.5	4.9	1.3	2.2	0.08	37	7.4	0.1	0.2	0.1	0.1	0.5	6.8	43.2	18.1	58.7	0
E19	0-30	5.1	4.6	3.7	6.4	0.21	10	17.3	4.7	3.3	0.4	0.1	8.5	49.1	21.9	34.7	43.4	2
	30-50	5.2	4.4	3.2	5.5	0.19	8	13.0	1.7	1.5	0.4	0.1	3.7	28.5	28.3	31.6	40.1	7
E20	0-25	4.7	4.2	3.3	5.7	0.18	7	16.2	1.5	1.5	0.4	0.1	3.5	21.6	44.3	39.5	16.2	0
	25-50	5.0	4.2	0.8	1.3	0.09	8	11.5	0.9	0.2	0.4	0.0	1.5	13.0	50.2	35.0	14.8	2
	75-100	5.6	4.3	0.6	1.0	0.06	7	10.5	0.8	0.6	0.5	0.0	1.9	18.1	37.6	34.6	27.8	10
E21	0-25	5.1	4.1	4.4	7.5	0.22	8	18.9	3.3	2.0	0.7	0.1	6.1	32.3	38.7	45.9	15.4	8

Table 3.1(6/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
F22	0-22	5.1	4.2	5.1	8.8	0.30	21	19.9	2.9	1.4	1.4	0.1	5.8	29.1	25.3	53.1	21.6	2
	22-45	5.0	4.4	3.5	6.0	0.36	23	17.8	2.4	0.9	0.3	0.1	3.7	20.8	26.3	50.2	22.8	5
	45-89	4.6	4.1	2.0	3.5	0.12	20	14.9	2.9	1.4	0.3	0.1	4.7	31.5	23.8	47.5	29.2	0
	89-110	6.5	4.9	1.3	2.2	0.84	30	7.4	0.1	0.2	0.1	0.1	0.5	6.8	43.2	18.1	38.7	0
E19	0-30	5.1	4.6	3.7	6.4	0.21	10	17.3	4.7	3.3	0.4	0.1	8.5	49.1	21.9	34.7	43.4	2
	30-50	5.2	4.4	3.2	5.5	0.19	8	13.0	1.7	1.5	0.4	0.1	3.7	28.5	28.3	31.6	40.1	7
E20	0-25	4.7	4.2	3.5	5.7	0.18	7	16.2	1.5	1.5	0.4	0.1	3.5	21.6	44.3	39.5	16.2	0
	25-50	5.0	4.2	0.8	1.3	0.09	8	11.5	0.9	0.2	0.4	0.1	1.6	13.9	50.2	35.0	14.8	2
	75-100	5.6	4.3	0.6	1.0	0.06	7	10.5	0.8	0.6	0.5	0.1	2.0	19.0	37.6	34.6	27.8	10
E21	0-25	5.1	4.1	4.4	7.5	0.22	8	18.9	3.3	2.0	0.7	0.1	6.1	32.3	38.7	45.9	15.4	8
F23	0-5	5.5	4.7	7.1	12.2	0.40	15	24.3	6.9	4.5	0.7	0.2	12.3	50.6	55.2	42.6	2.2	-
	5-35	5.1	4.4	4.6	8.0	0.29	22	22.8	5.7	4.3	0.4	0.1	10.5	46.1	51.8	46.4	1.8	-
	35-50	5.6	4.6	1.8	3.1	0.12	-	12.0	4.2	2.6	0.1	0.1	7.0	58.3	44.2	51.5	4.3	-
F24	0-19	5.1	4.4	5.7	9.8	0.26	31	24.3	2.4	1.8	0.3	0.1	4.6	18.9	39.9	32.4	27.7	0
	19-45	4.6	4.1	4.3	7.4	0.19	19	11.8	0.4	1.1	0.1	0.0	1.6	13.6	58.5	14.3	27.2	0
	45-66	4.5	4.0	1.6	2.7	0.10	17	6.1	0.3	0.1	0.1	0.1	0.6	9.8	50.9	15.6	33.5	0
	66-83	4.5	4.0	1.4	2.4	0.10	11	5.9	0.4	0.1	0.0	0.0	0.5	8.5	50.6	10.4	38.5	0
	83-113	5.1	4.5	0.7	1.1	0.05	28	6.1	0.1	0.5	0.1	0.1	0.8	13.1	49.1	14.4	36.5	0
	120-135	5.4	4.5	0.5	0.9	0.05	14	6.0	0.1	0.5	0.1	0.1	0.8	13.3	56.3	14.5	29.2	0
	135-150	5.7	4.6	0.5	0.9	0.06	21	11.0	0.5	0.8	0.1	0.1	1.5	13.6	61.6	11.7	26.7	0
F25	0-15	4.8	4.2	6.4	11.0	0.38	23	18.6	0.4	1.2	0.2	0.0	1.8	9.7	48.8	19.8	31.4	0
	15-30	4.8	4.2	1.8	3.2	0.22	26	25.7	1.7	0.8	0.0	0.1	2.6	10.1	51.3	40.1	8.6	0
	30-54	5.2	4.6	1.1	2.0	0.15	19	30.6	0.4	0.5	0.0	0.0	0.9	2.9	39.0	7.6	53.4	0
	76-87	5.6	4.6	1.5	2.7	-	21	26.3	0.1	1.3	0.0	0.1	1.5	5.7	56.1	30.8	13.1	0

Table 3.1(7/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Base					Base Saturation degree	Particle Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
E22	0-10	5.4	4.4	-	-	0.06	50	23.8	0.5	0.2	0.4	0.2	1.3	5.5	36.3	41.8	21.9	-
E23	0-30	5.4	4.9	6.3	10.8	0.35	21	23.0	3.8	2.3	0.2	0.0	6.3	27.4	40.8	46.4	12.8	0
F26	0-20	5.7	4.9	7.4	12.7	0.43	21	21.7	9.9	3.8	0,8	0.2	14.7	67.7	29.0	61.1	9.4	0
	20-30	5.1	4.5	4.9	8.5	0.39	26	26.4	2.5	1.9	0.4	0.1	4.9	18.6	35.5	52.0	12.5	0
	30-48	5.0	4.4	1.7	2.9	0.13	6	11.9	0.7	0.6	0.2	0.1	1.6	13.4	33.5	48.9	17.6	0
	48-90	5.2	4.4	0.6	1.0	0.10	6	21.3	3.2	2.5	0.1	0.1	5.9	27.7	66.7	26.1	7.2	0
	90-130	5.3	4.4	0.7	1.2	0.09	8	14.5	3.4	2.1	0.1	0.1	5.7	39.3	62.7	30.0	7.3	0
E24	0-25	5.0	4.5	7.8	13.5	0.04	20	28.7	7.4	5.7	0.5	0.3	13.9	48.4	45.4	48.3	6.3	0
E25	0-25	5.4	4.4	5.8	10.1	0.03	12	28.3	2.4	1.9	0.6	0.1	5.0	17.7	41.3	54.8	3.9	0
E26	0-30	5.6	4.4	4.5	7.8	0.29	22	27.8	5.2	4.0	0.6	0.1	9.9	35.6	31.4	61.2	7.4	0
F27	0-8	5.5	4.3	7.0	12.0	0.37	40	29.1	5.3	3.5	0.9	0.1	9.8	33.7	41.6	53.6	4.8	0
	8-23	5.3	4.3	5.0	8.7	0.32	24	21.6	2.3	2.1	0.6	0.1	5.1	23.6	54.4	40.6	5.0	0
	30-50	5.6	4.2	1.5	2.7	0.17	22	16.1	3.9	1.8	0.3	0.1	6.1	37.9	62.9	31.5	5.6	0
	50-70	5.2	4.0	1.0	1.6	0.12	19	19.6	5.5	3.3	0.3	0.1	9.2	46.9	68.8	28.6	2.6	0
E27	0-30	4.9	4.4	3.3	5.7	0.25	14	36.2	8.5	4.6	0.3	0.1	13.5	37.3	53.0	33.9	13.1	0
E28	0-25	5.5	4.5	4.7	8.1	0.38	11	34.5	5.4	4.1	0.8	0.1	10.4	30.1	41.0	53.4	5.6	0
F28	0-15	5.1	4.6	7.1	12.2	0.36	44	33.8	6.1	5.0	0.6	0.1	11.8	34.9	29.9	34.2	35.9	-
	15-49	5.6	5.0	3.5	6.0	0.22	21	26.0	3.2	1.5	0.4	0.1	5.2	20.0	37.9	59.3	2.8	0
	49-71	6.3	5.4	2.0	3.5	0.16	20	22.0	2.4	2.3	0,2	0.1	5.0	22.7	31.1	65.9	2.0	3
E29	0-25	5.8	4.6	5.2	9.0	0.47	20	36.0	11.1	4.4	1.1	0.1	16.7	46.4	29.1	65.6	5.3	0

Table 3.1(8/8) RESULTS OF SOIL ANALYSIS CONDUCTED BY SEDA

Sample No.	Depth	pH		Total Carbon	Organic Matter	Total Nitrogen	Available Phosphate	CEC	Exchangeable Cation					Base Saturation degree	Particule Distribution			
		H_2O	KCl						Ca	Mg	K	Na	Total		Clay	Silt	Sand	Gravel
	(cm)			(%)	(%)	(%)	(ppm)	(ml/100g)	(ml/100g)					(%)	(%)	(%)	(%)	(%)
E30	0-30	5.6	4.4	5.2	9.0	0.32	27	38.8	11.2	7.4	0.8	0.2	19.6	50.5	36.1	57.7	6.2	0
	30-50	5.7	4.5	5.6	9.7	0.30	23	41.5	11.3	6.3	0.9	0.1	18.6	44.8	34.2	62.4	3.4	0
	50-75	5.8	5.2	3.0	6.6	0.23	21	26.0	9.7	5.4	1.0	0.1	16.2	62.3	45.5	50.1	4.4	0
	75-105	5.4	4.9	2.2	3.8	0.16	33	30.6	7.6	2.8	1.1	0.1	11.6	37.9	52.4	43.9	3.7	0
F29	0-15	5.5	4.9	6.8	11.7	0.60	19	43.8	23.8	11.2	0.8	0.3	36.1	82.4	37.1	61.0	1.9	-
	15-50	6.0	5.4	3.2	5.4	0.28	32	40.0	12.0	11.6	0.5	0.3	24.4	61.0	35.5	62.6	1.9	-
F30	0-7	4.8	4.4	8.1	14.1	0.39	27	37.6	11.5	8.3	1.5	0.1	21.4	56.9	23.6	72.3	4.1	0
	7-23	5.0	4.3	2.5	4.2	0.25	6	22.3	5.8	4.5	0.5	0.1	10.9	48.9	42.1	51.9	6.0	-
	23-38	5.7	4.8	1.7	2.9	0.17	7	16.5	6.2	5.5	0.3	0.2	12.1	73.3	43.6	46.4	5.0	0
	38-72	5.8	4.8	2.2	3.8	0.17	9	23.0	6.4	8.7	0.3	0.1	15.5	67.4	49.8	44.1	6.1	0
F31	0-7	4.9	4.2	7.5	2.9	0.39	21	28.8	6.5	5.5	0.6	0.2	12.8	44.4	38.6	58.9	4.5	0
	7-20	4.8	4.3	3.2	5.6	0.27	5	18.4	5.8	3.1	0.5	0.2	9.6	52.2	47.1	49.5	4.4	0
	20-50	5.0	4.3	2.3	4.0	0.15	6	22.5	6.9	4.4	0.4	0.2	11.9	52.9	51.8	43.9	4.3	0
F32	5-15	5.2	4.3	2.6	4.4	0.18	-	18.8	6.0	3.2	0.4	0.1	9.7	51.6	54.9	38.1	7.0	0
	15-50	5.6	5.0	1.1	1.9	0.14	-	18.3	7.1	4.5	0.4	0.2	12.2	66.7	49.9	14.8	6.3	0
E32	0-20	5.1	4.4	4.2	7.3	0.38	30	34.4	4.1	4.1	1.0	0.1	9.3	27.0	41.0	56.0	3.0	0
F33	0-25	5.7	5.0	5.3	9.1	0.30	110	38.0	11.6	10.4	2.9	0.2	25.1	66.1	25.0	68.2	6.8	0
	27-75	5.6	4.7	2.0	3.4	0.20	21	31.4	7.1	5.2	1.6	0.1	14.0	44.6	46.0	47.5	6.5	0
	75-150	5.3	4.6	1.3	2.3	0.14	9	25.0	6.5	3.3	0.6	0.1	10.5	42.0	58.5	38.2	3.3	0
F34	0-7	5.8	5.2	13.1	22.5	0.66	7	38.3	13.7	14.9	0.8	0.2	29.6	77.3	36.3	60.1	3.6	0
	7-30	4.7	4.1	4.5	7.7	0.30	10	24.1	2.4	4.5	0.2	0.1	7.2	29.9	49.3	45.7	5.0	0

Table 3.2 SPECIFICATION OF LAND SUITABILITY CLASSIFICATION

Factors	1 Highly Suitable	2 Moderately Suitable	3 Marginally Suitable	4 Non-Suitable
1. Topography (s)				
paddy	-	-	-	-
upland	less than 3°	3 - 8°	8 - 15°	more than 15°
2. Gravel content (g)				
paddy	less than 20%	20 - 50%	-	more than 50%
upland	less than 5%	5 - 10%	10 - 20%	more than 20%
3. Thickness of top soil (t)				
paddy	more than 15 cm	less than 15 cm	-	-
upland	more than 25 cm	15 - 25 cm	less than 15 cm	
4. Effective depth of soil (d)				
paddy	more than 50 cm	25 - 50 cm	15 - 25 cm	less than 15 cm
upland	more than 100 cm	50 - 100 cm	15 - 50 cm	less than 15 cm
5. Permeability (l)				
paddy	poorly to imperfectly permeable	moderately to well permeable	well to excessively permeable	-
upland	-	-	-	-
6. Fertility (f)				
CEC (ml/100g)	more than 20	6 - 20	less than 6	-
base saturation degree	more than 50%	30 - 50%	less than 30%	-
7. Acidity (a)				
pH	6.0 - 7.5	5.0 - 6.0	4.5 - 5.0	below 4.5
8. Depth of histric horizon (o)				
	less than 90 cm	more than 90 cm		

Table 3.3 SOIL UNIT AND LAND SUITABILITY CLASS

		Dystric Histosols		Humic Gleysols		Mollic Andosols		Humic Andosols		Humic Cambisols		Dystric Nitosols		Lithosols	
		Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland
(1) Topography	(s)	-	1	-	1	-	1	-	1-2	-	2	-	2	-	4
(2) Gravel content	(g)	-	1	1	1	1	1	1	1-2	1	2	1	2	2	3
(3) Thickness of top soil	(t)	1	1	1	1	1	1	1	1	2	2	1	2	2	3
(4) Effective soil depth	(e)	1	1	1	1	1	1	1	1	1	2	1	2	4	4
(5) Permeability under submerged condition	(l)	1	-	1	1	1	1	1	-	2	-	3	-	2	2
(6) Fertility	(f)	1	1	1	1	1	1	1	1	1	1	2	2	3	3
(7) Acidity	(q)	2	2	1	1	1	1	2	2	1	1	2	2	2	
(8) Depth of organic horizon	(o)	1-2	1-2	1	1	1	1	1	1	1	1	1	1	1	
Land Suitability Class (paddy / upland)		S2a / S2a S2ao / S2ao		S1 / S1		S1 / S1		S2a / S2a S2a / S2sga		S2t1/S2sgt1		S3l/S2sgtefa		N1e / N1s1	

Fig. 3.1 SOIL MAP

Soil Unit	Study Area (ha)	Project Area (ha)
Distric Histosols	1,010	1,010
Humic Gleysols	760	760
Mollic Andosols	250	210
Humic Andosols	150	150
Humic Cambisols	220	170
Dystric Nitosols	340	30
Lithosols	70	70
Total	2,800	2,400

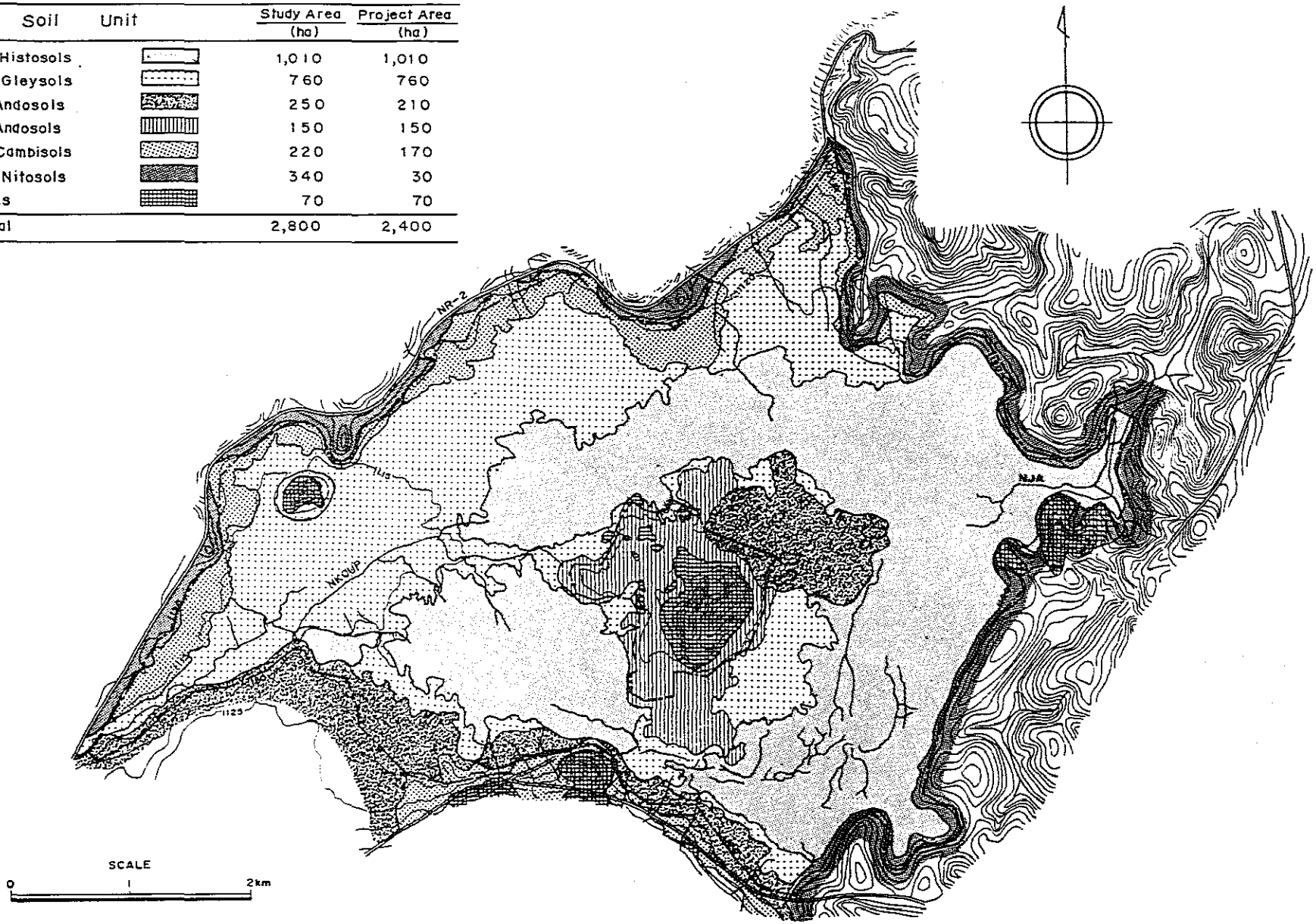
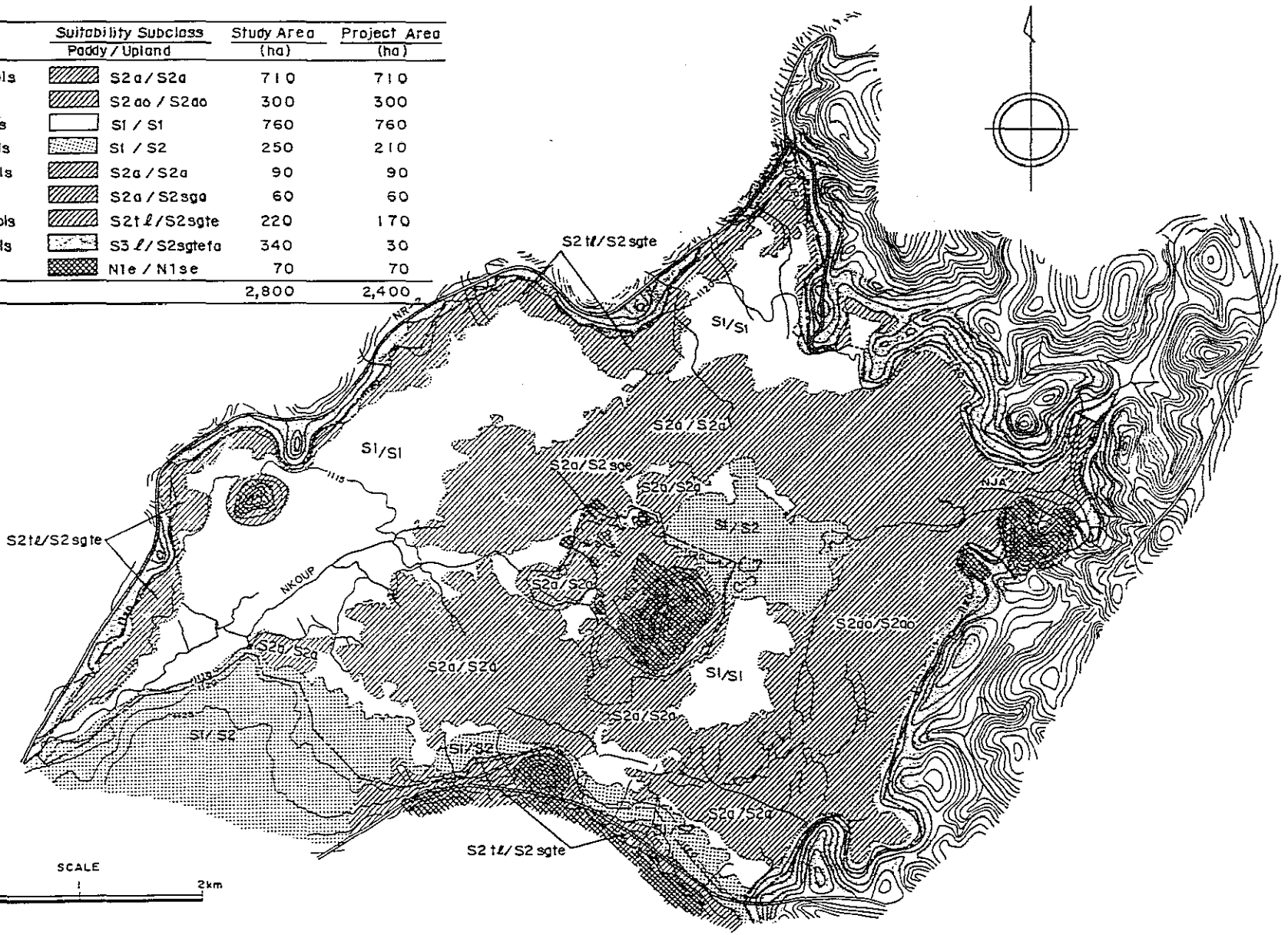


Fig. 3.2 LAND SUITABILITY CLASSIFICATION MAP

Soil Unit	Suitability Subclass Paddy / Upland	Study Area (ha)	Project Area (ha)
Dystric Histosols	S2a / S2a	710	710
	S2ao / S2ao	300	300
Humic Gleysols	S1 / S1	760	760
Mollic Andosols	S1 / S2	250	210
Humic Andosols	S2a / S2a	90	90
	S2a / S2sga	60	60
Humic Cambisols	S2tℓ / S2sgte	220	170
Dystric Nitosols	S3 ℓ / S2sgtefa	340	30
Lithosols	N1e / N1se	70	70
Total		2,800	2,400



ANNEX IV

SOCIO-ECONOMY

ANNEX IV

SOCIO-ECONOMY

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CHAPTER 1 GENERAL ECONOMIC BACKGROUND

1.1 Land and Population

The Republic of Cameroon with an area of 465,458 km^2 is sandwitched between Central Africa and West Africa and between French-speaking and English-speaking zones (both French and English are official languages). The country has a triangular shape and is bounded by Nigeria to the west, Chad to the north, Centrafrica to the east, Gabon, Congo and Equatorial Guinea to the south, and 250 km of the Atlantic coastline to the southwest.

The country is referred to as "Africa in miniature" as its climate and vegetation are a capsule replica of those of the African Continent. Its territory extends from sand beaches on the coastline (250 km) along the Gulf of Guinea and thick and wet jungles in the south through grass hills, plateaux and mountains in the west and center to dry savanna in the north.

Lying between the latitudes 2° and 14° North, Cameroon has a complete sequence of intertropical climate, from Equatorial in the south to Sahelian in the north. However, the relief moderates the severe temperature contrasts on low plateaux and plains.

According to the national population census in April 1976, the population of Cameroon was 7,661,000. As of June 1984, the total population of Cameroon was estimated to be around 9,578,000. The annual growth rate of population between the census year of 1976 and 1984 was 2.83%, which is higher than the growth rate of 2.4% forecasted in the Fifth Five-Year Economic, Social and Cultural Development Plan (1981 - 1986). The population density is 20.6 persons per square kilometer.

The population is unevenly distributed and concentrated in the western and north-western regions. West, North-West and Littoral Provinces are the most densely populated areas, with densities estimated to be respectively 95.2, 66.9 and 47.2 persons per km^2 in 1986.

About 43% of the population is under 15 years old. The working population accounts for 38.7% of the total population, with 79.4% of the working force belonging to the primary (agricultural) sector, 6.7% to the secondary (industrial) sector, and 13.9% to the tertiary (service) sector.

Based on the trend of changes in urban and rural populations from 1976 to 1983, it was estimated that about 63% of the total population lives in rural areas, while the population in urban areas has constantly increased at an average annual growth rate of 5.5%. This shows that people have emigrated from rural areas into urban areas, seeking jobs and better condition of living.