

APPENDIX A**The Soil Profile for 24 Sites in Central Khartoum.**

Site 1 / The Proposed Departure Terminal Khartoum Airport

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-3 m	sandy silty clay	20.0	17.0	14	48.1	24.3	-	25000	0.3
3-11m	Sandy silt	19.2	14.9	28	-	23	44.9	34000	0.3
11--	Sand	-	-	-	-	39.07	45	34000	0.3

No water was encountered.

Site 2 / The Sudanese Company for Insurance and Re-Insurance.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-5.5	Clay	-	-	-	-	-	-	25000	0.35
5.5-7.5	Sandy silty clay	16.7	12.7	32	20.7	36	-		
7.5-9.5	Sandy clayey silt	-	-	-	-	35.48	29.5	23000	0.3
9.5-16.5	Micaceous sand	18.2	13.0	35	27.6	17	30.2	23000	0.3
16.5--	Sandstone	-	-	-	-	-	-	100000	0.25

G.W.T. at 10 m

Site 3 / Derwish Building

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-9m	Sandy silty clay	17.4	13.3	28.0	41	15.9	7	20000	0.35
9-19	Clayey sand	-	-	-	-	35	8.9	25000	0.30
19-26	sandy silty clay	-	-	-	-	-	-	-	-

G.W.T. at 5.0 m

Site 4 / Internal Security Office Building Khartoum.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-3	Silty sand	-	-	-	-	27.76	22	27000	0.3
3-7.5	Sandy silty clay	20.1	16.6	19.7	47.2	25	36.5	40000	0.35
7.5-9.5	Silty sand	-	-	-	-	39.09	43.33	50000	0.3
9.5--	Sand	-	-	-	-	35.57	29.83		

G.W.T. at 12 m

Site 5 / The Proposed National Records Building.

Depth	Soil type	γ_b	γ_d	N.M.C	C	ϕ	S.P.T.	E	γ
0-3	Silty sand	-	-	-	-	35.02	27.8	25000	0.3
3-5	Silty clay	19.6	16.1	21.4	47.2	25	-	40000	0.35
5-7	Clayey silt	-	-	-	-	42.32	>50	30000	0.3
7--	Silty sand	-	-	-	-	37.46	37	50000	0.3

Site 6 / Mak-Nimir Bridge.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-1	Filling material	-	-	-	-	-	-	20000	0.35
1-5	Clay	20.0	16.4	21.2	60.8	24.25	50		
5-9	Silty sandy clay	-	-	24	-	35.00	27.7	25000	0.3
9--	Sand	-	-	-	-	36.25	32.4	35000	0.3

G.W.T. at 11 m

Site 7 / The Islamic Co-Operation Bank.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-3	Sandy silty clay	19.9	16.8	24	34.0	26	29.67	20000	0.35
3-9	Silty sand	-	-	-	-	37.60	37.52	15000	0.3
9--	Sand stone	-	-	-	-	34.58	26.18	27000	0.3

G.W.T. at 10 m

Site 8 / Building of Custom Institute at Elriyad-Khartoum.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-1	Sandy clay	18.2	15.05	20	47.2	25	-	20000	0.35
1-5.5	Sand					41.00	>50	25000	0.30
5.5-11.5	Sandy silt	-	-	-	-	41.00	>50	25000	0.30
11.5--	Sand	-	-	-	-	45.00	>50	40000	0.25

G.W.T. at 13 m

Site 9 / Petroleum Laboratory at 61st Street.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	%pass	E.	γ
0-3.5	Clay	19.4	15.94	22.08	137.5	13.6	-	72.1	20000	0.35
3.5-9	Sandy silt	-	-	-	-	41.70	>50	79.23	17250	0.3
9-20	Silty sand	-	-	-	-	36.23	32.33	35.97	27600	0.3

G.W.T. AT 13 m

Site 10 / National Electricity Corporation Head Quarters Khartoum.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-3	Clay	19.6	16.0	21.47	102.3	19	-	20000	0.35
3-8	Silty clay	17.35	12.2	42.375	28.5	13.5	-	20000	0.35
8-11	Silty sand	18.8	14.6	29.6	24.2	20	12	17250	0.3
11-18	sand	-	-	-	-	34.91	27.4	27600	0.3
18--	Mudstone	-	-	-	400	45	-	100000	0.25

G.W.T. at 8 m

Site 11 / National Electricity Corporation Burri Power Station.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-9	Sandy silty clay	19.5	15.1	29	44.9	11	-	20000	0.35
9-13	Sandy silt	-	-	-	-	28.98	6.33	25000	0.30
13--	Sand	-	-	-	-	35	16	40000	0.25

G.W.T. at 6

Site 12 / Dental Hospital Khartoum.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	\emptyset	S.P.T.	E.	γ
0-3	Clayey sand	-	-	-	-	32	42	27000	0.3
3-8.5	Sandy silty clay	18.2	15.05	20	47.2	25	-	40000	0.35
8.5--	sand	-	-	-	-	40	>50	70000	0.25

Site 13 / Tuti Island Bridge.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-6.5	Silty clay	19.68	15.5	25.58	70.33	7.25	23	26400	0.35
6.5-20	Silt	18.18	13.03	32.85	27.81	11.56	37	28300	0.3

G.W.T. at 7.0 m

Site 14 / Chinese Embassy Building.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-6.5	Highly plastic clay	19.59	16.18	21.81	74.67	17.14	>50	25000	0.35
6.5-18	Silty sand	20	-	-	-	41	>50	38300	0.3
18-20	Sandstone	20	-	-	400	45	>50	100000	0.25

G.W.T. at 11.36 m

Site 15 / White Nile Bridge (Khartoum Side).

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-3.5	Silty clay	18.9	14.8	27	32.2	-	-	16100	0.35
3.5-8.5	Clayey sand	19	-	-	-	33.8	23	17850	0.3
8.5-20	Sandy clay	20	-	-	-	42	>50	40000	0.3

G.W.T. at 3.5 m

Site 16 / French Bank Building.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-9.5	Highly plastic clay	20	-	28.22	51.72	12	-	25000	0.35
9.5-20	sand	20	-	-	-	40	43	33100	0.30

Site 17 / Wahat Al-Khartoum Building.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-11.0	clay	17.55	-	31.18	43	30	-	20000	0.35
11-16.5	Sand	20	-	-	-	39	40	30400	0.30
16.5-20	Sand clay	20	-	-	-	45	>50	46000	0.28

Site 18 / Kamal Hamza Building.

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-8.5	Silt	17.76	13.1	31.39	61.3	16.5	44	24000	0.35
8.5-19	Silty sand	20	-	-	-	33.5	22	17000	0.30
19-20	Sandstone	20	-	-	400	45	>50	100000	0.25

Site 19 / Fedail Building.

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-1.0	Clayey sand	20	-	-	-	34.56	26	20000	0.30
1-4.0	Highly plastic clay	19.75	16.23	25.5	62.35	11.5	-	23400	0.35
4-8.0	Silt	13.7	10.7	24.5	-	37.93	38.83	29750	0.30
8-20	Silty sand	20	-	-	-	38.78	42	32280	0.30

Site 20 / Animal Resources Bank.

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-3.5	Clayey sand	20.15	16.8	15.77	58	6.5	-	22000	0.30
3.5-5	Highly plastic clay	19.6	15.5	27.75	123	7	25	47000	0.35
5-10	Silt	16.9	12.1	39	7	39	>50	46000	0.30
10-20	Silty sand	20	-	-	-	40	46	35000	0.30

Site 21 / Hotel and Commercial Development (Elmugran).

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-16	Clay	19.91	-	31.8	56	16.6	28	27000	0.30
16-18	Silty sand	20	-	-	-	40	47	36000	0.30
18-20	sandstone	20	-	-	400	43	>50	100000	0.25

Site 22 / Ariab Company Building.

Depth	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-8.5	Silty clay	18.98	16.01	20.86	129	25.63	>50	32250	0.35
8.5-20	Silty sand	20	-	-	-	41	>50	38300	0.3

G.W.T. at 12.0 m

Site 23 / Marys Cathedral.

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-1.0	Silty sand	20	-	-	-	34.8	-	20000	0.30
1-13.0	Clay	17.2	-	34.27	50	10	-	19000	0.30
13-20	Silty sand	20	-	-	-	41	>50	40000	0.30

Site 24 / Saha Alkhadra Housing Project.

Depth m.	Soil type	γ_b	γ_d	N.M.C.	C	ϕ	S.P.T.	E.	γ
0-4	Clayey sand	20	-	-	-	38.6	41	31650	0.30
4-10	Highly plastic clay	18.23	14.84	24.24	86.93	16.03	>50	34000	0.35
10-20	Silty sand	20	-	-	-	44	>50	46000	0.30