

7. LABORATORY TEST RESULTS OF BLACK COTTON SOIL

CTL CENTRAL TESTING LABORATORIES LTD.

P. O. Box 10597 Tel. 65802723

Client: **HOWLEM CONSTRUCTION CO. (E.A.) LTD**

Location: **NAIROBI BY PASS**

Nairobi

SOIL TEST RESULTS SUMMARY SHEET

Sheet No. 2 of 3
Date: 20/8/1990

TEST NO.	SITE NAME	DEPTH (m)	GRADING % PASSING											COMPACTION	BULK DENSITY (kg/m³)	FREE WATER (%)	STRENGTH TESTS													
			75		60		42.5		30		20		N.C.P. (%)				S.C.P. (%)	U.C.P. (%)	S. C. (%)	C.B.R. (%)	H.C.F. (kN/m²)									
			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm										mm	mm	mm	mm	mm	mm			
4585	1B1																													
4586	" 2	62-21	100	90	79	75	68	64	58	51	42	40	37	31	27	26	25	25	24	22	21	1300	30			22	100	1.1	0.50 - 1.00	
4587	1B3	78-33	16																											0.20 - 0.40
4588	2B1	73-30																												0.00 - 1.70
4589	2B2	47-17			100	97	97	95	91	83	80	68	64	60	52	47	45	44	43	42	39	36								1.70 - 1.90
4590	3B1																					1330	30							0.10 - 1.10
4591	" 2	67-26			100	93	83	75	70	62	57	50	48	46	42	39	38	37	37	36	35	1250	32							1.10 - 1.40
4591	" "																					1380	27 (TURK)							" "
4592	3B3	80-42	20																											0.60 - 0.80
4592	4B1	73-40																												0.00 - 0.50
4594	" 2	73-34			100	95	95	88	81	66	59	53	46	44	42	36	34	33	33	32	31	1300	21							0.50 - 0.90
4595	5B1																					1340	31							0.00 - 0.50
4596	5B2	54-18			100	85	74	68	60	50	43	39	33	31	29	25	23	21	21	20	20	1370	25							0.00 - 0.50
4597	5B3	78-30	14																											0.50 - 1.00
4598	6B1	79-42																												0.20 - 0.40
4599	7B1																													0.00 - 0.60
4600	7B2	74-43	20																			1390	29							0.00 - 0.60
4601	8B1	73-32																												0.20 - 0.40
4602	9B1	41-16																												0.00 - 0.60
4603	9B2																					1590	23							0.10 - 0.30
4604	9B3	39-14	8																											0.30 - 0.60
4605	10B1	83-30																												0.20 - 0.40
4606	" 2	70-31																												0.70 - 1.10
4606	" "																													1.10 - 1.30

CTL CENTRAL TESTING LABORATORIES LTD.

Client: THE HOWLEM CONSTRUCTION CO. (E.A.) LTD P. O. Box 18887 Tel: 558422/23

Sheet No. 1 of 1
Date: 14/10/1991

SOIL TEST RESULTS SUMMARY SHEET

Location: NAIROBI, BY PASS. Tel: 558422/23

Job No.

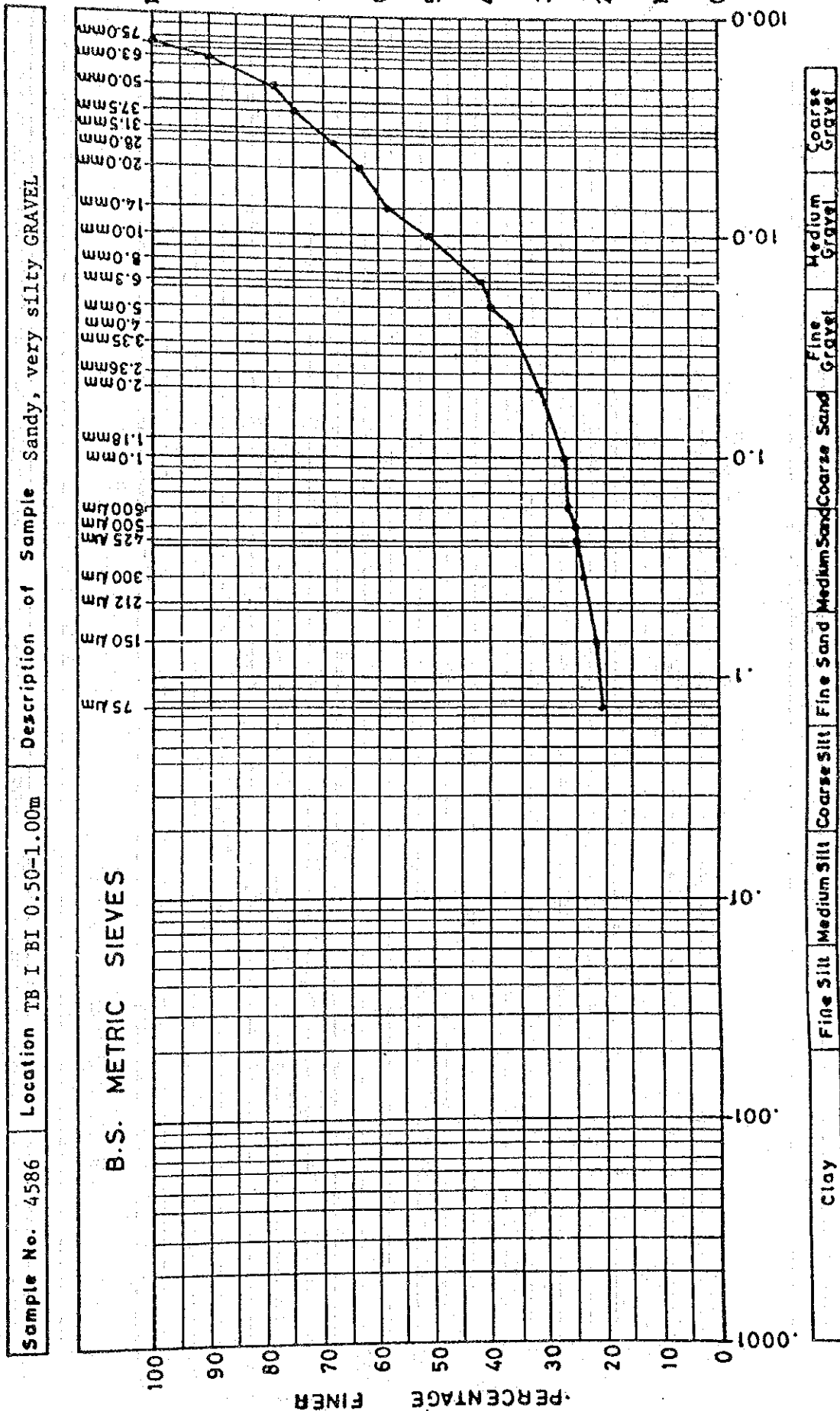
SAMPLE NO	SITE MARKING	L.I. P.I.		ASTM SPEC	MATERIAL	CLASSIFICATION	GRADING % PASSED										COMPACTION					STRENGTH TESTS		SAMPLE															
		L.L. (%)	P.I. (%)				75	83	83	50	37.5	20	15	10	6.3	5	4	2	1	500	500	500	500	500	500	500	150	75	M.C.	H.C	W.C.P.	W.C.P.	%	%	DEPTH (cm)				
7724	TC31	55	18	9			100	99	93	85	77	71	64	61	59	51	44	40	38	36	34	29	25	1360	30									B1	1.00-1.30				
7725	"	52	21	10			100	99	98	98	98	98	98	98	98	97	96	95	93	90	87	86	83	81	1310	32									B2	2.50-2.70			
7726	TC32	50	18	9			100	99	98	99	99	99	99	98	98	96	94	1460	33																B1	1.80-2.20			
7727	"	53	21	10			100	99	98	97	93	89	88	87	86	83	81	1310	32																	B2	3.00-3.40		
7728	TC33	37	16	8			100	99	98	95	90	87	87	85	84	79	76	1580	23																	B1	0.40-0.70		
7729	"	"	"	"																																BLOCK	0.40-0.70		
7730	"	"	"	"			100	83	70	59	51	40	35	32	27	25	23	19	15	12	11	10	9	7	6	1420	23									B2	0.80-1.00		
7731	TC34	59	30	14			100	98	97	96	96	95	92	90	1350	25																					B2	0.30-0.80	
7732	"	"	"	"																																	BLOCK	0.20-0.50	
7733	TC35	51	21	11			100	99	99	99	99	98	98	97	97	94	92	1420	30																		B1	1.00-1.30	
7734	TC36	57	23	11			100	99	98	93	92	92	92	91	90	89	1510	29																			B1	2.90-3.20	
7735	"	53	21	10			100	99	97	96	94	89	86	84	83	82	79	76	1480	30																		B2	4.00-4.20
7736	TC37	40	18	9			100	97	93	90	90	89	88	83	80	1480	22																				B2	0.20-0.40	
7737	"	"	"	"																																	BLOCK	0.20-0.40	

CIL CENTRAL TESTING LABORATORIES LTD.

P.O. BOX 18507 TEL. 559422/23

NAIROBI.

PARTICLE SIZE DISTRIBUTION



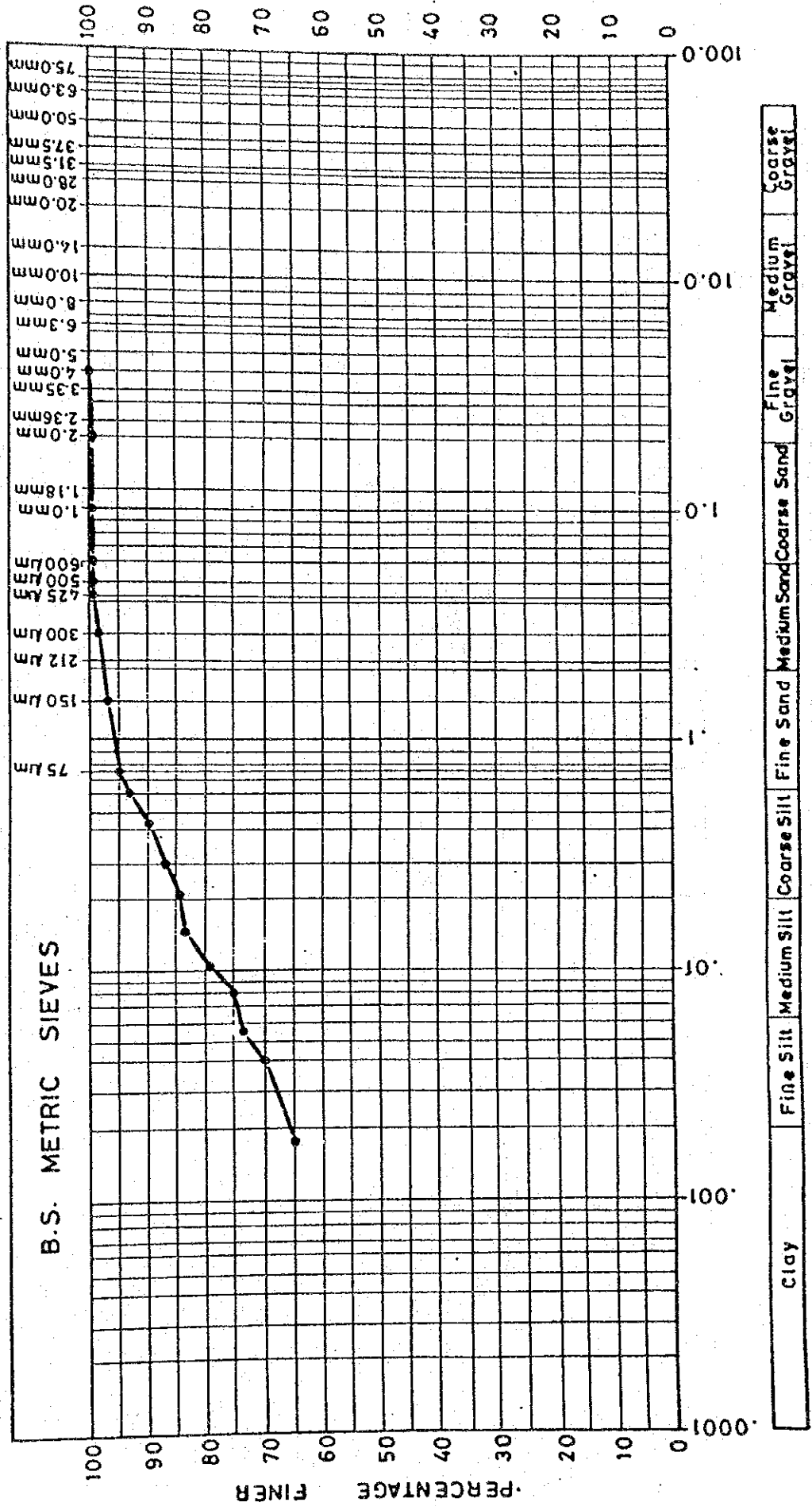
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NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4587	Location TBI BS3 0.20 - 0.40m	Description of Sample Slightly gravelly, sandy, very silty CLAY
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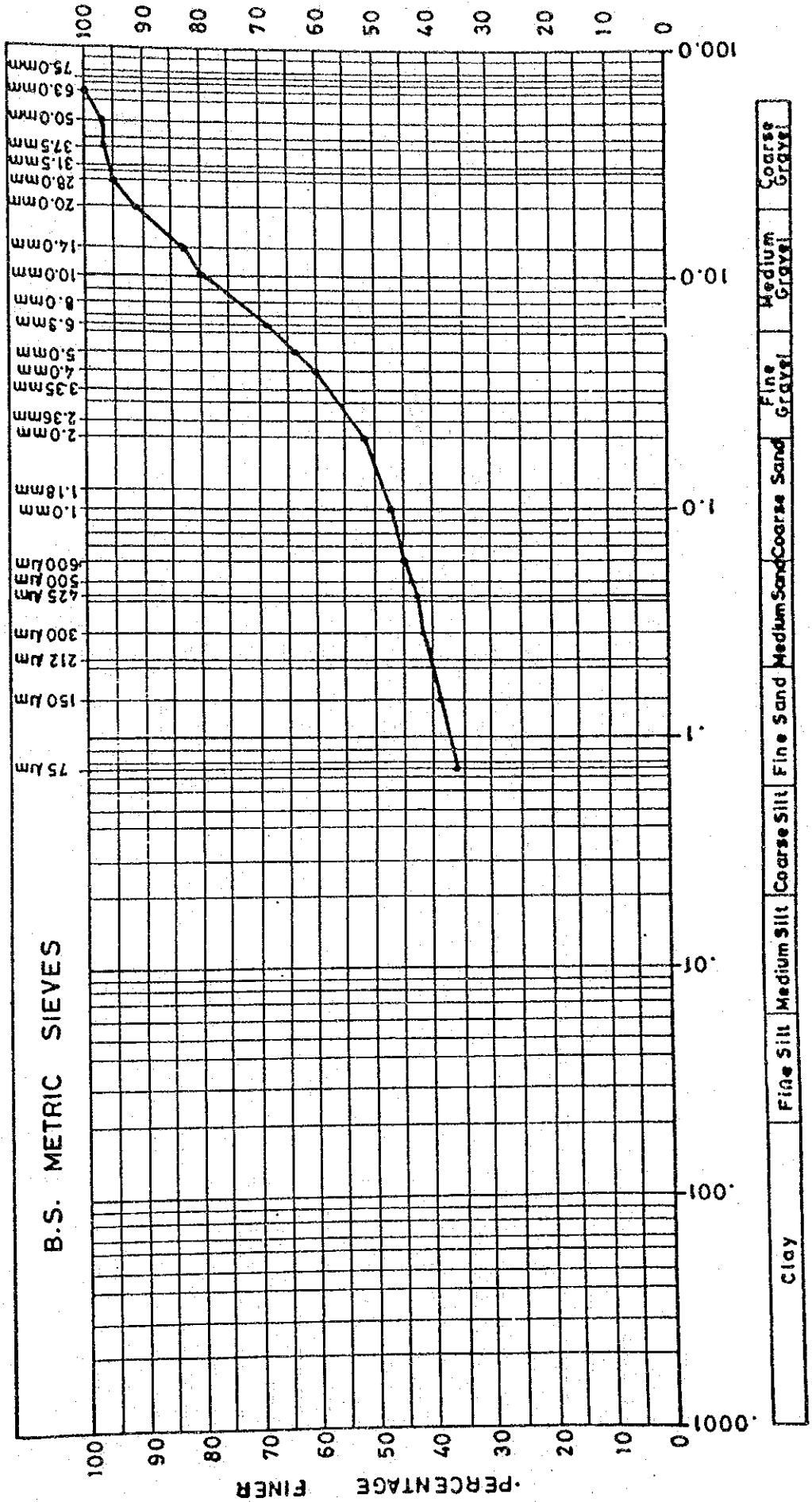


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PARTICLE SIZE DISTRIBUTION

Sample No. 4589	Location TB 2 B2 1.70-1.90m	Description of Sample Sandy, very silty GRAVEL
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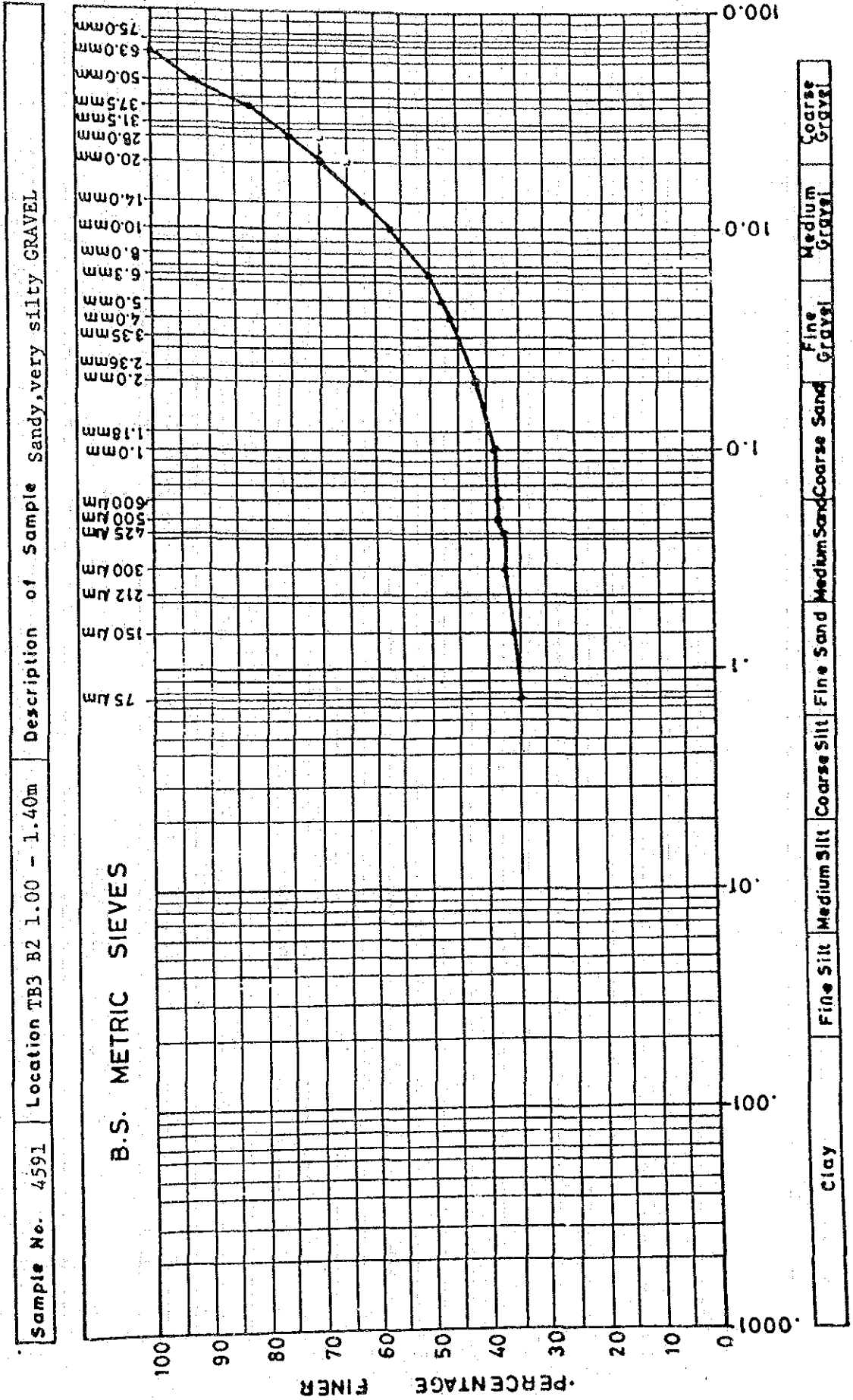


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PARTICLE SIZE DISTRIBUTION



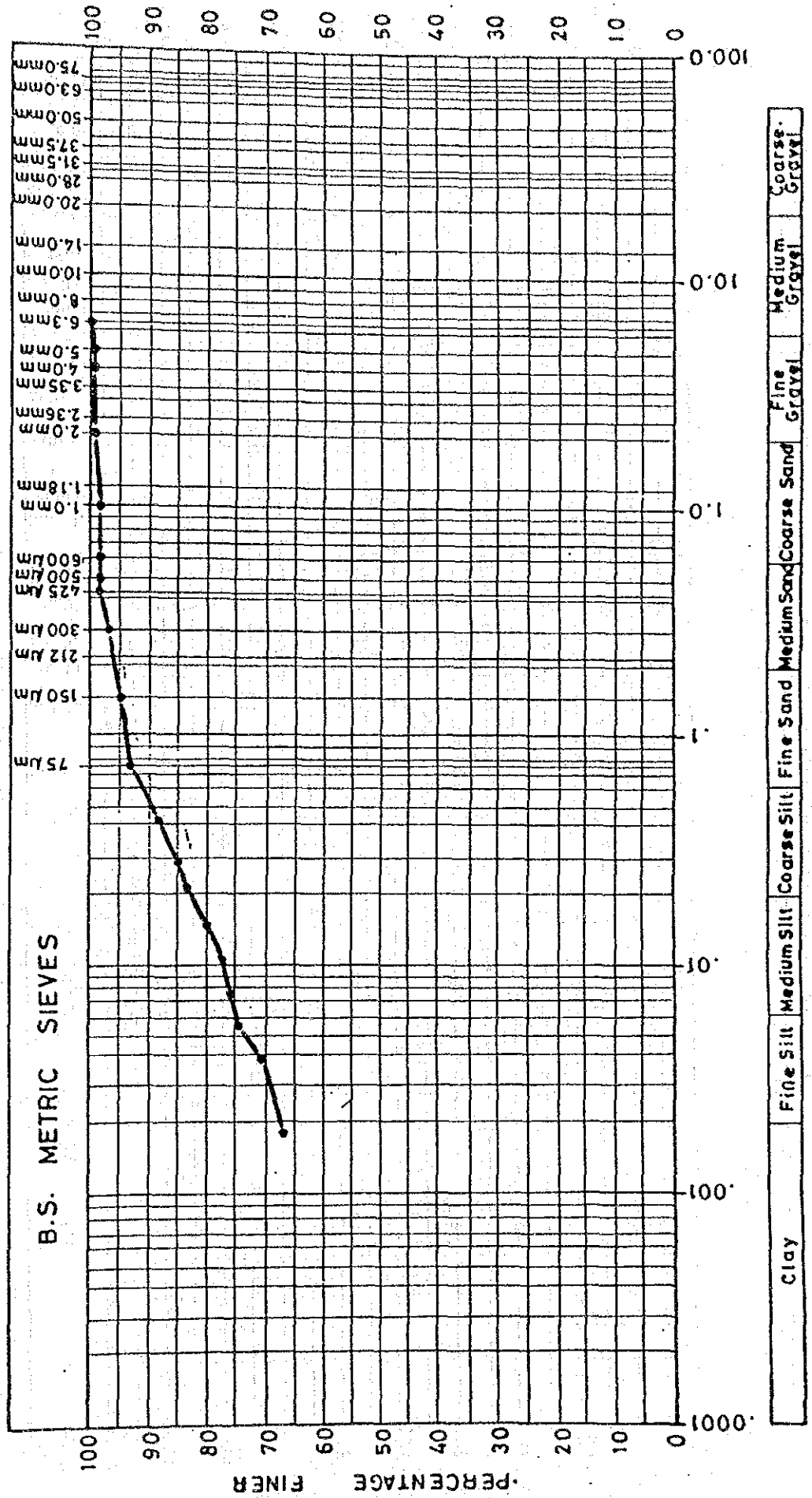
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NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4592	Location TB3 BS3 0.60-0.80m	Description of Sample Slightly gravelly, sandy, very silty CLAY
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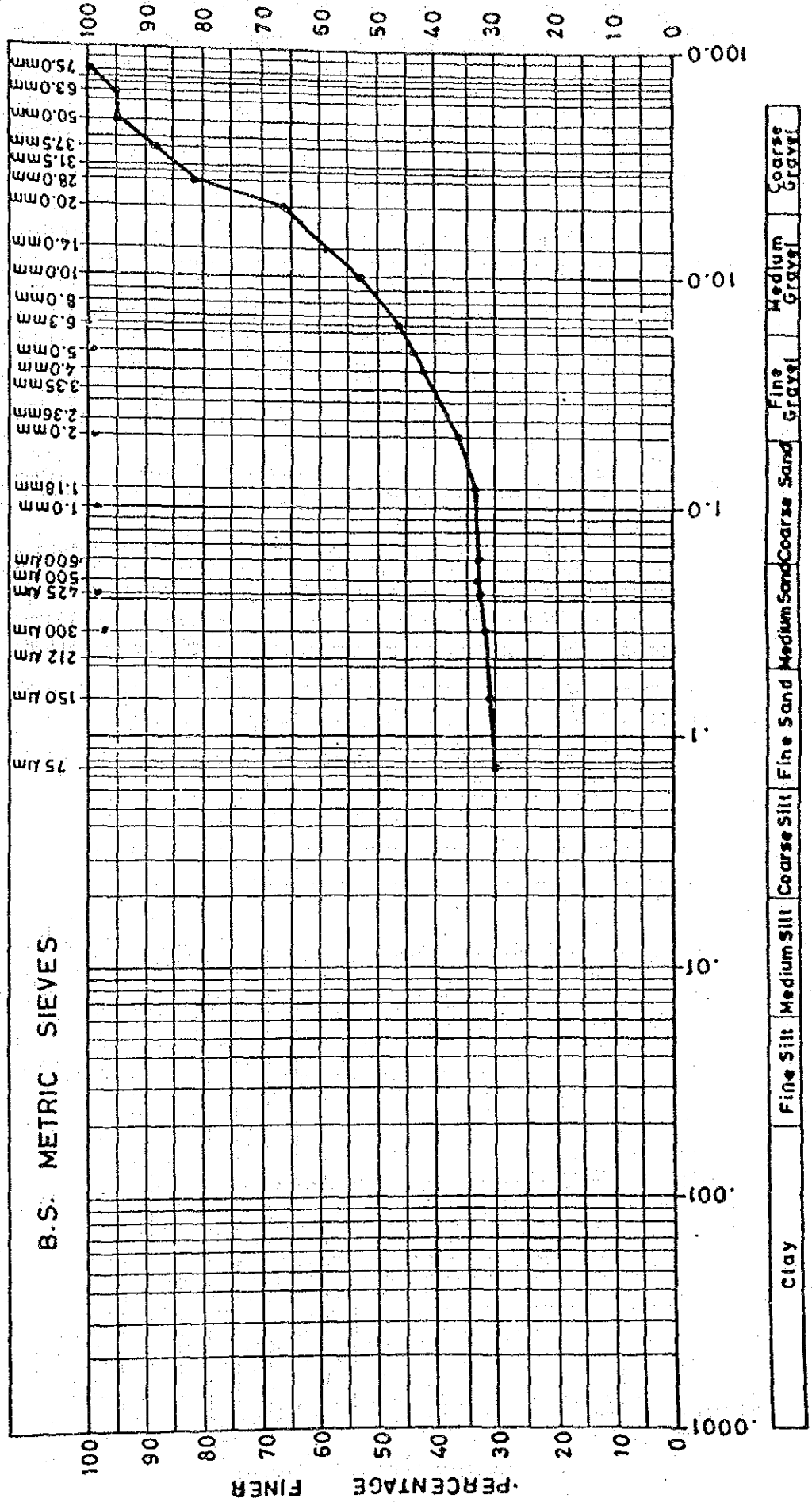
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NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4594	Location TB4 B2 0.50 - 0.90m	Description of Sample Very silty, sandy GRAVEL
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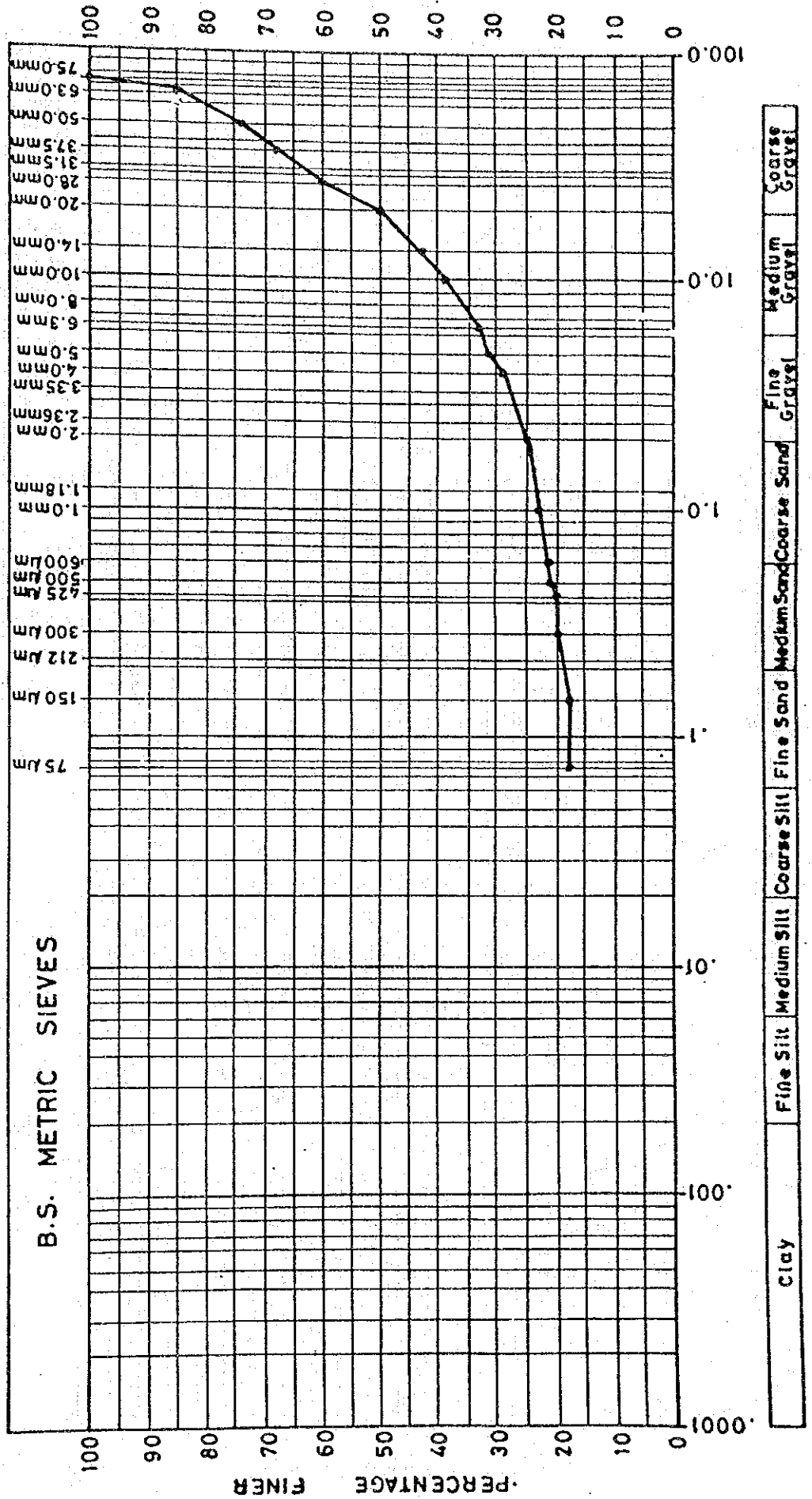


CIL CENTRAL TESTING LABORATORIES LTD.

P.O. BOX 18507 TEL. 559422/23
NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4596	Location TB5 B2 0.50 - 1.00m	Description of Sample	Sandy, silty GRAVEL.
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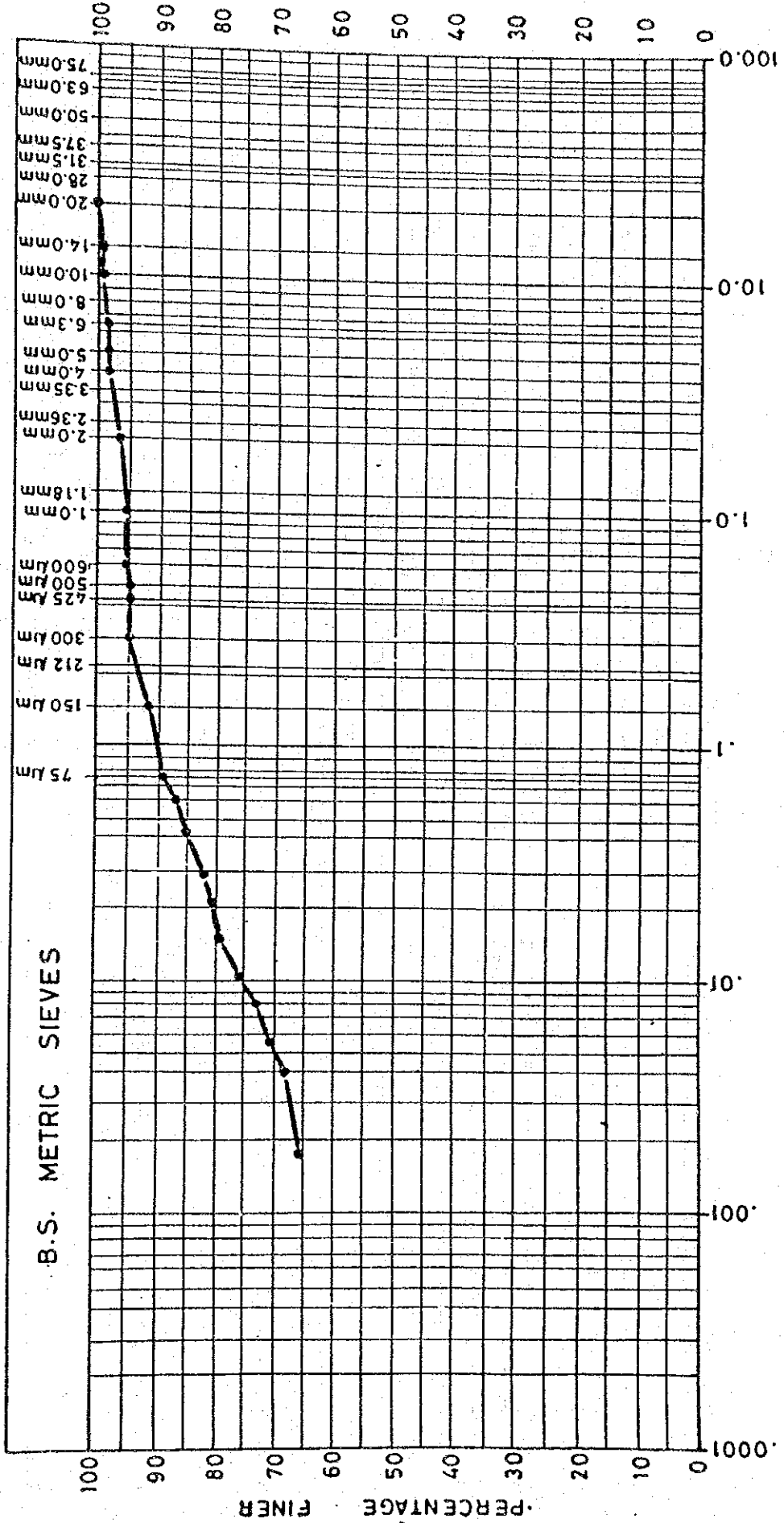


CIL CENTRAL TESTING LABORATORIES LTD.

P.O. BOX 18507 TEL. 559422/23
NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4597	Location TB5 BS3 0.20-0.40m	Description of Sample Slightly gravelly, sandy, very silty CLAY
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Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel
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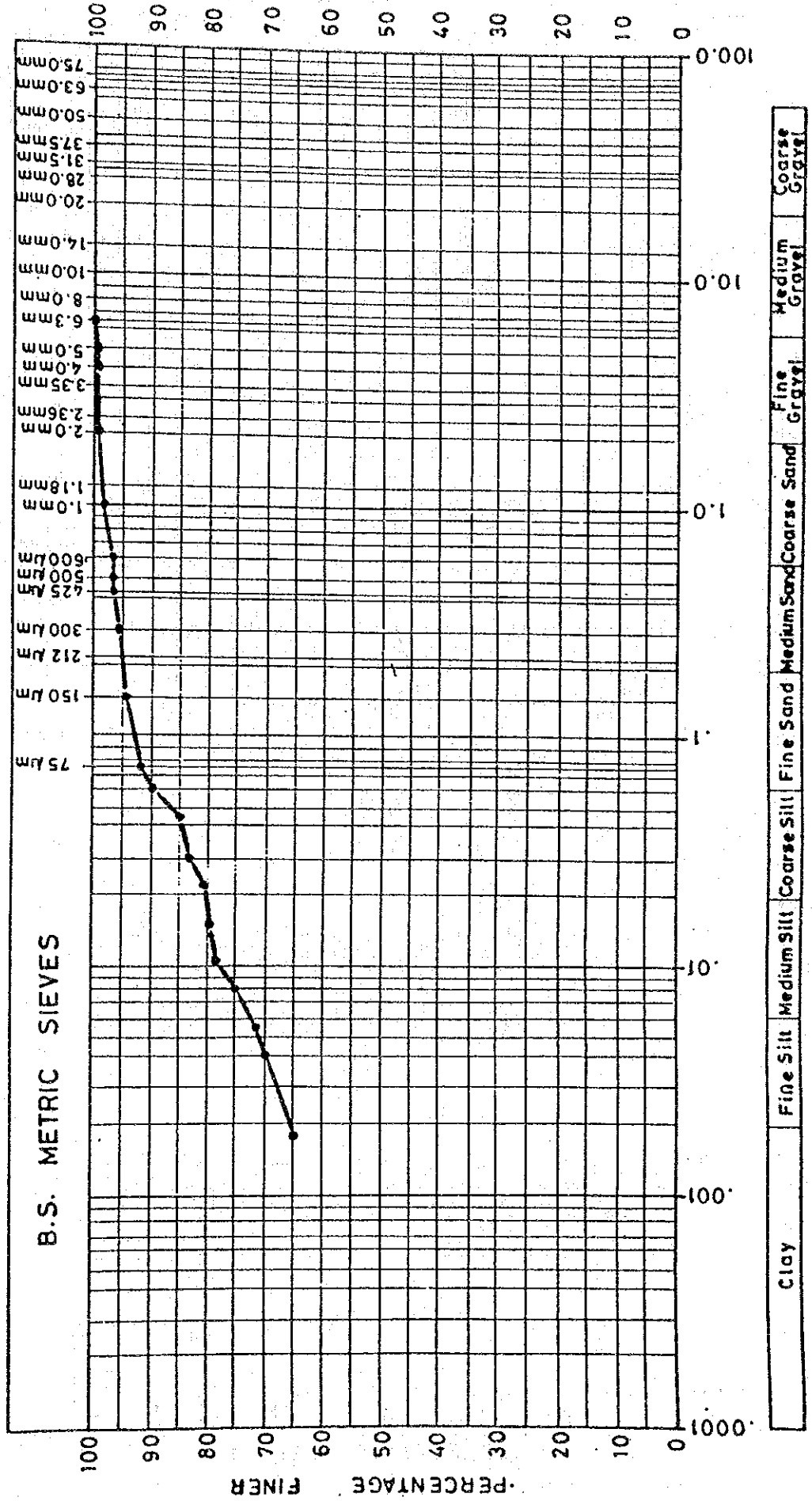
CIL CENTRAL TESTING LABORATORIES LTD.

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NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 4600 Location TB7 BS2 0.20-0.40m Description of Sample Slightly gravelly, sandy, very silty CLAY

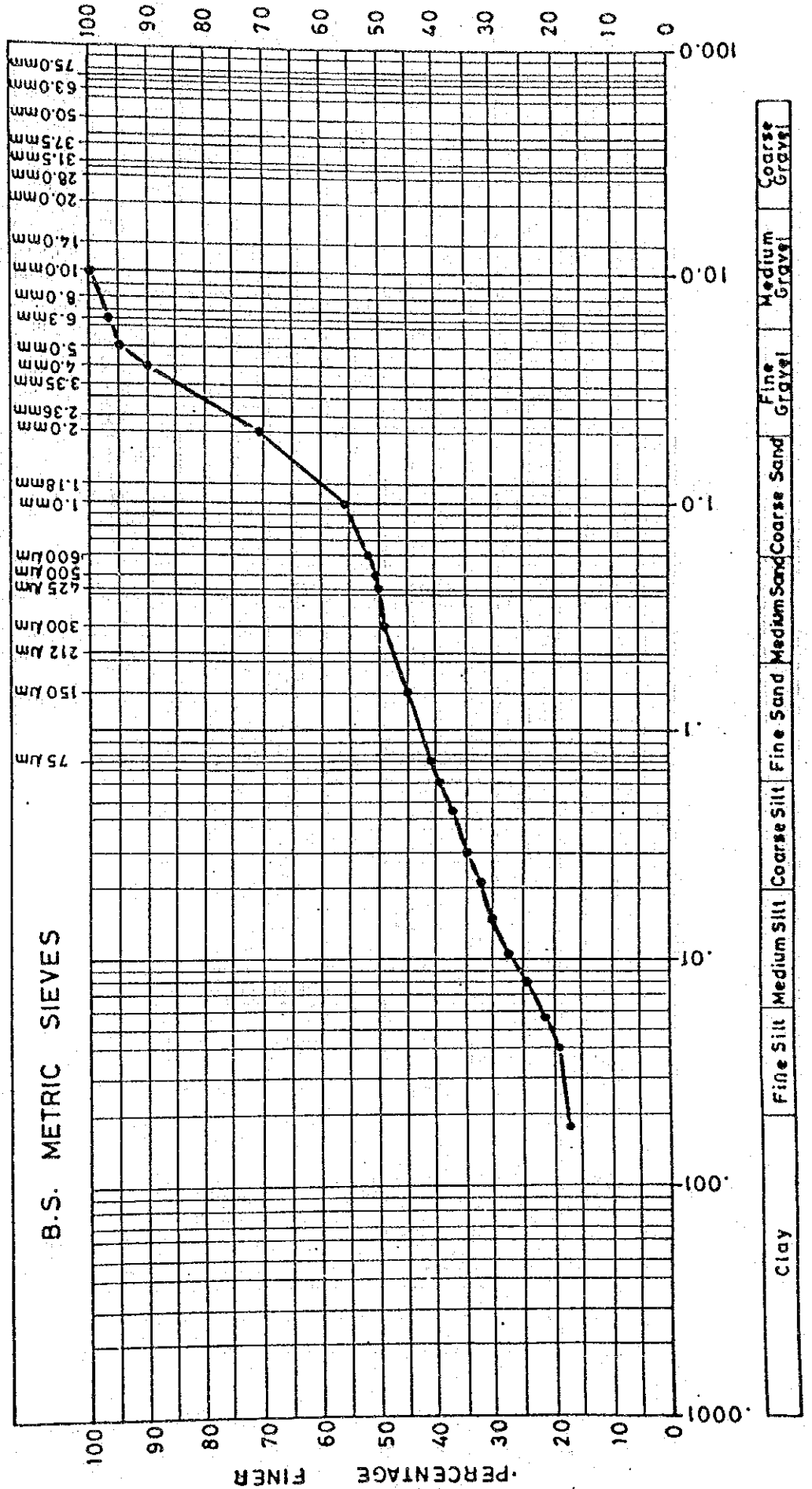


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PARTICLE SIZE DISTRIBUTION

Sample No. 4604	Location TB9 BS3 0.20 - 0.40m	Description of Sample Very silty, clayey, GRAVEL/SAND
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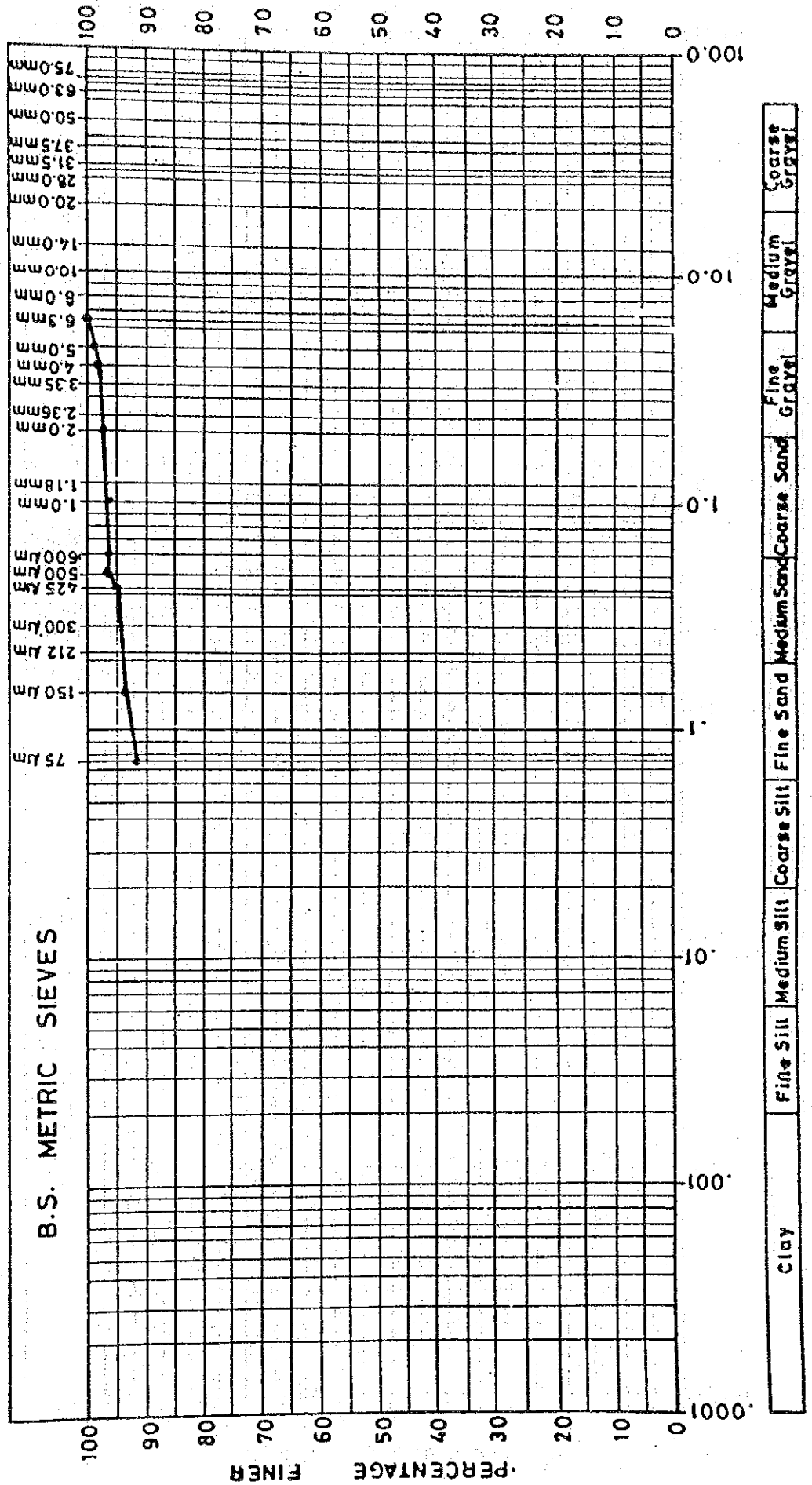


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PARTICLE SIZE DISTRIBUTION

Sample No. 4606	Location TB10 B2 1.10 - 1.30m	Description of Sample	Sandy SILT
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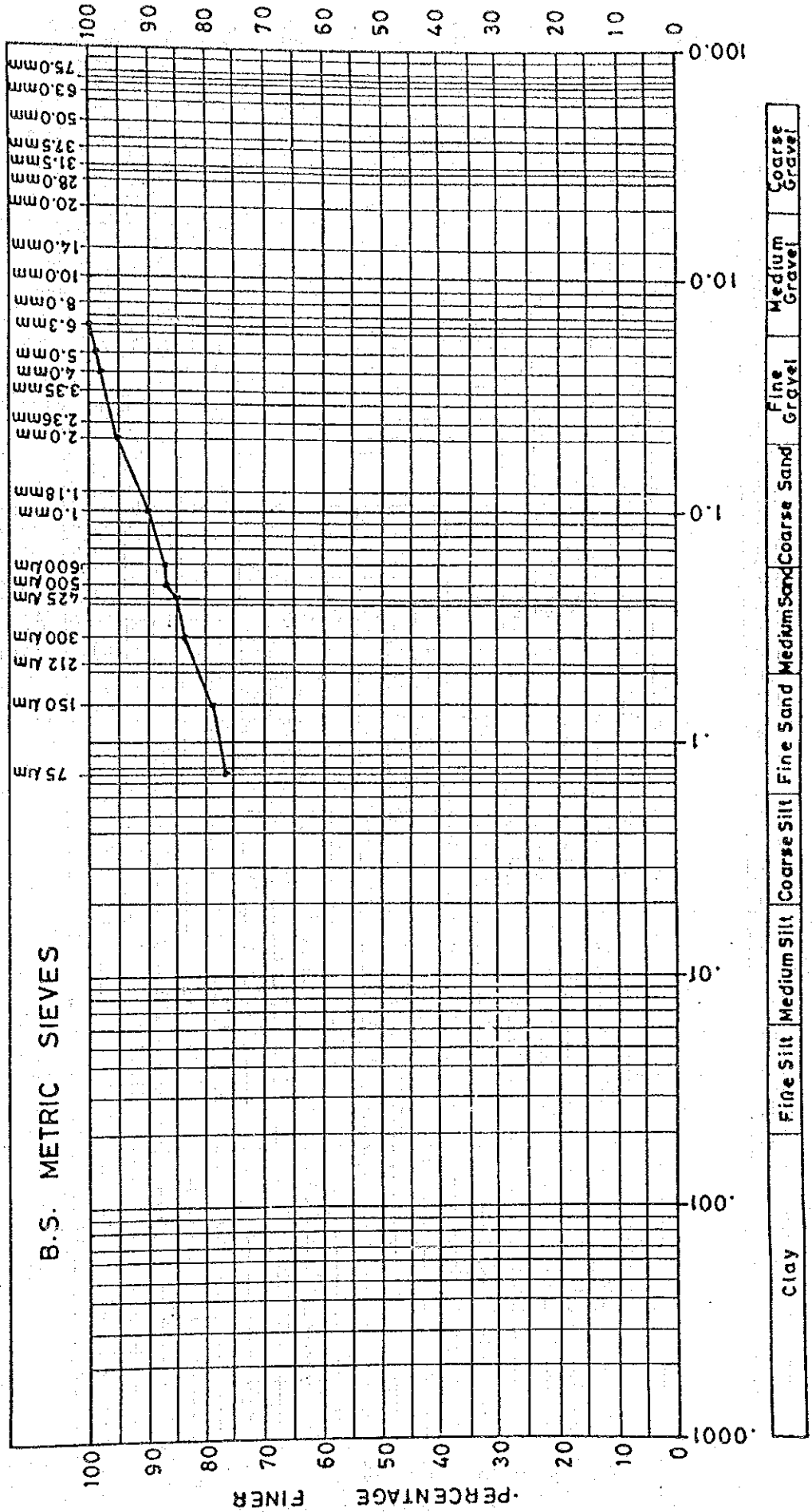


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PARTICLE SIZE DISTRIBUTION

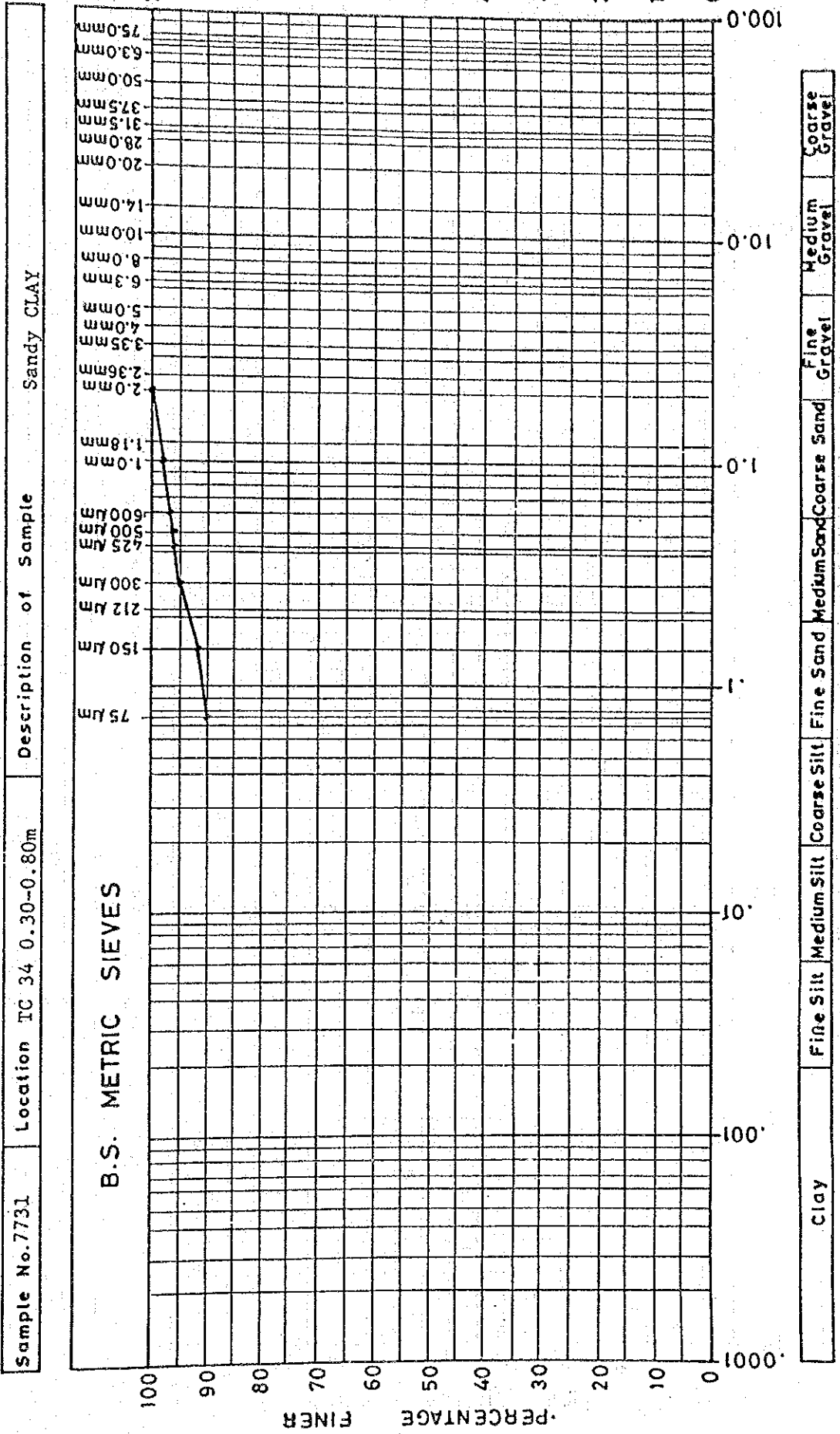
Sample No. 7728	Location TC 33 0.40-0.70m	Description of Sample Gravelly, sandy, CLAY
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NAIROBI.

PARTICLE SIZE DISTRIBUTION



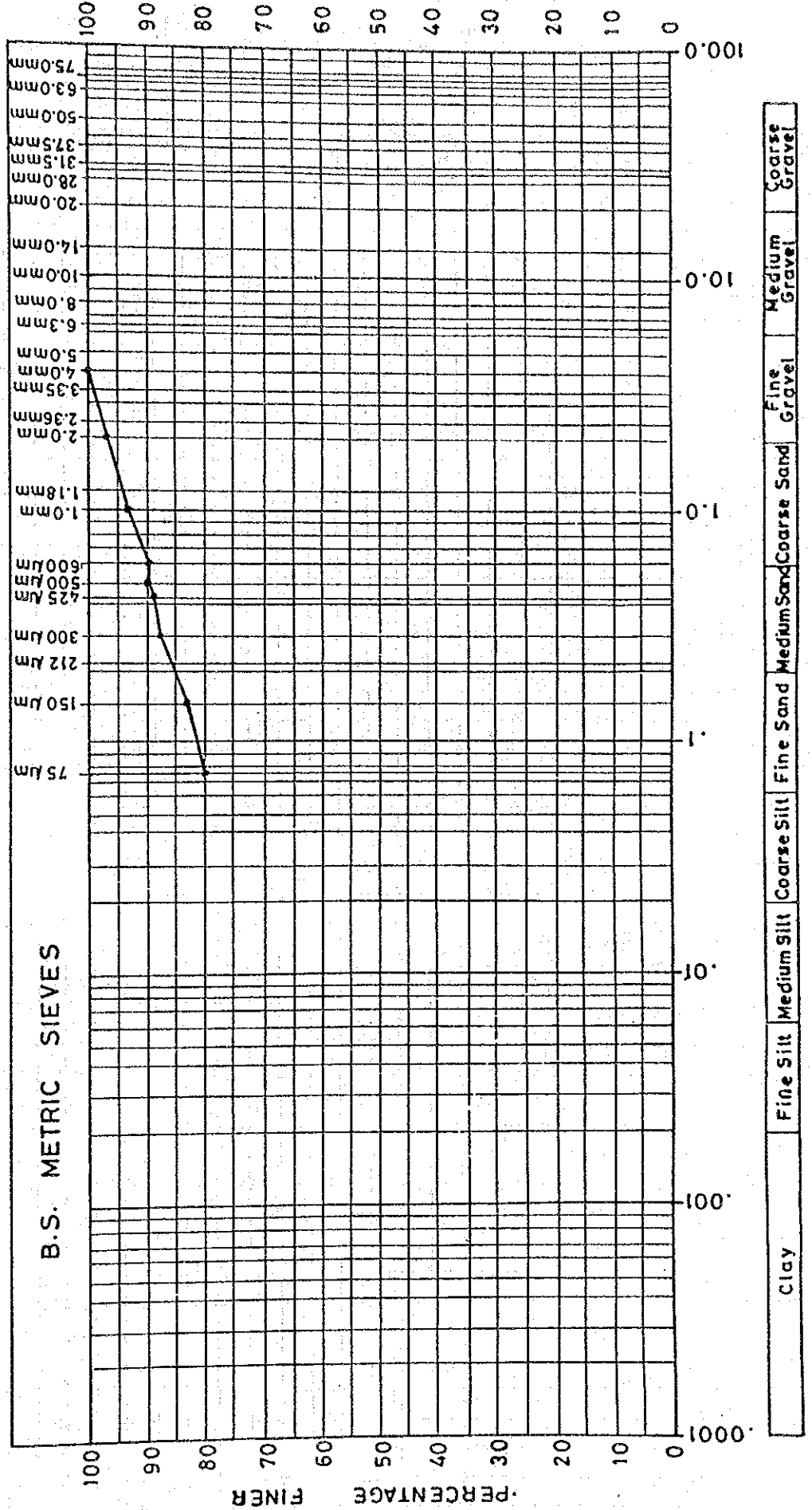
CIL CENTRAL TESTING LABORATORIES LTD.

P.O. BOX 18507 TEL. 559422/23

NAIROBI.

PARTICLE SIZE DISTRIBUTION

Sample No. 7736	Location IC37 0.20-0.40m	Description of Sample Gravelly, sandy CLAY
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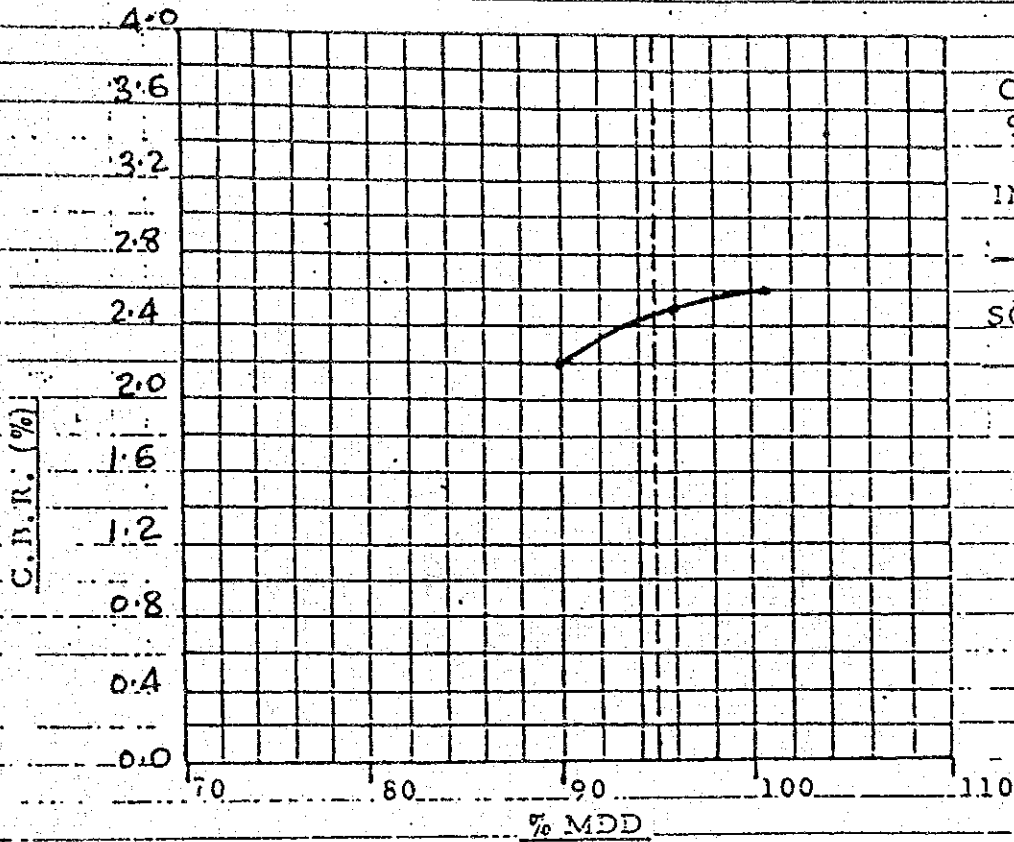
CENTRAL TESTING LABORATORIES LTD.
P. O. Box 18507,
NAIROBI.

CALCULATIONS

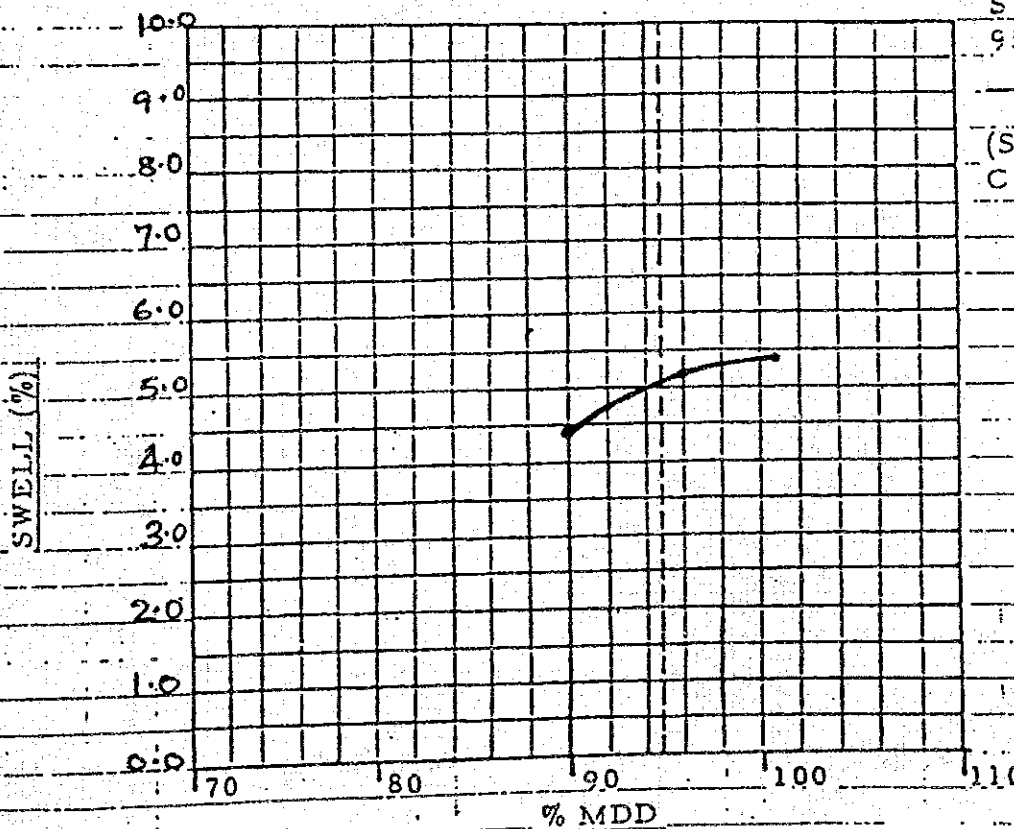
FOR 3 POINT C. B. R.
AND SWELL MEASUREMENT

S/No.	Date	Sample	Dimensions
4591	20/8/1990	TB3 B2	1.10-1.40m

Client MOWLEM CONSTRUCTION CO. (E.A.) LTD Location NAIROBI BY PASS

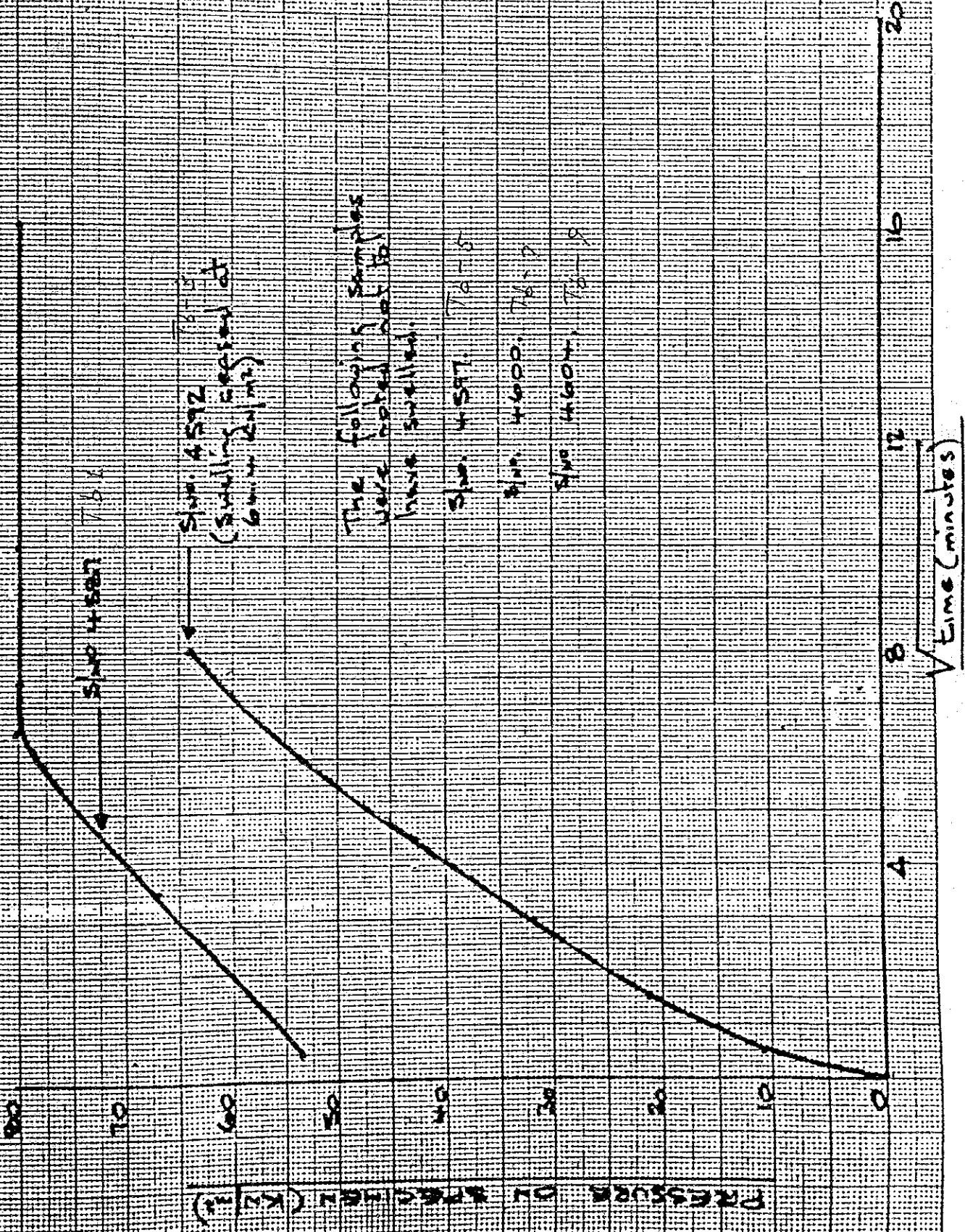


C. B. R. AT
95% MDD: -
IMMEDIATE: -
%
SOAKED: -
3 %



SWELL AT
95% MDD: -
5.0 %
(SOAKED
C. B. R. ONLY)

HOWSON CONSTRUCTION CO. (EIA) LTD
 NARARA BYPASS
 SWELLING PRESSURE TESTS



CENTRAL TESTING LABORATORIES LTD
P.O. Box 18507, NAIROBI, KENYA

MOWLEM CONSTRUCTION CO. (E.A.) LTD.

CONSOLIDATION TEST

4504 :sample number TB9 BS3 0.2m-0.4m
Sample Descr.:- Brown, very silty, clayey GRAVEL/SAND
2.48 :relative density of soil
1.33 :dry density of sample
20.03 :initial height of sample
0.87 :initial void ratio
0.09 :void ratio reduction factor
-0.00 :dial gauge constant (positive if increases with settlement
if not then negative)

pressure	dialread	htchange	voidchge	voidratio	sqrt90	cv m2/yr	mv m2/MN
-	2596	0.000	0.000	0.872	-	-	-
26.8	2497	0.251	0.023	0.848	1.8	14.2	0.47
53.6	2334	0.665	0.062	0.810	2.0	10.5	0.76
107.3	2010	1.488	0.139	0.733	2.3	7.8	0.79
214.5	1660	2.377	0.222	0.650	2.0	9.0	0.45
429.0	1246	3.429	0.320	0.551	2.5	5.2	0.28
26.8	1366	3.124	0.292	0.580			

CENTRAL TESTING LABORATORIES LTD
P.O. Box 18507, NAIROBI, KENYA

MOWLEM CONSTRUCTION CO. (E.A.) LTD.

CONSOLIDATION TEST

4592 :sample number TBS BS3 0.6m-0.2m

Sample Descr.:- Black, slightly gravelly, sandy, very silty CLAY

2.50 :relative density of soil

1.09 :dry density of sample

21.50 :initial height of sample

1.29 :initial void ratio

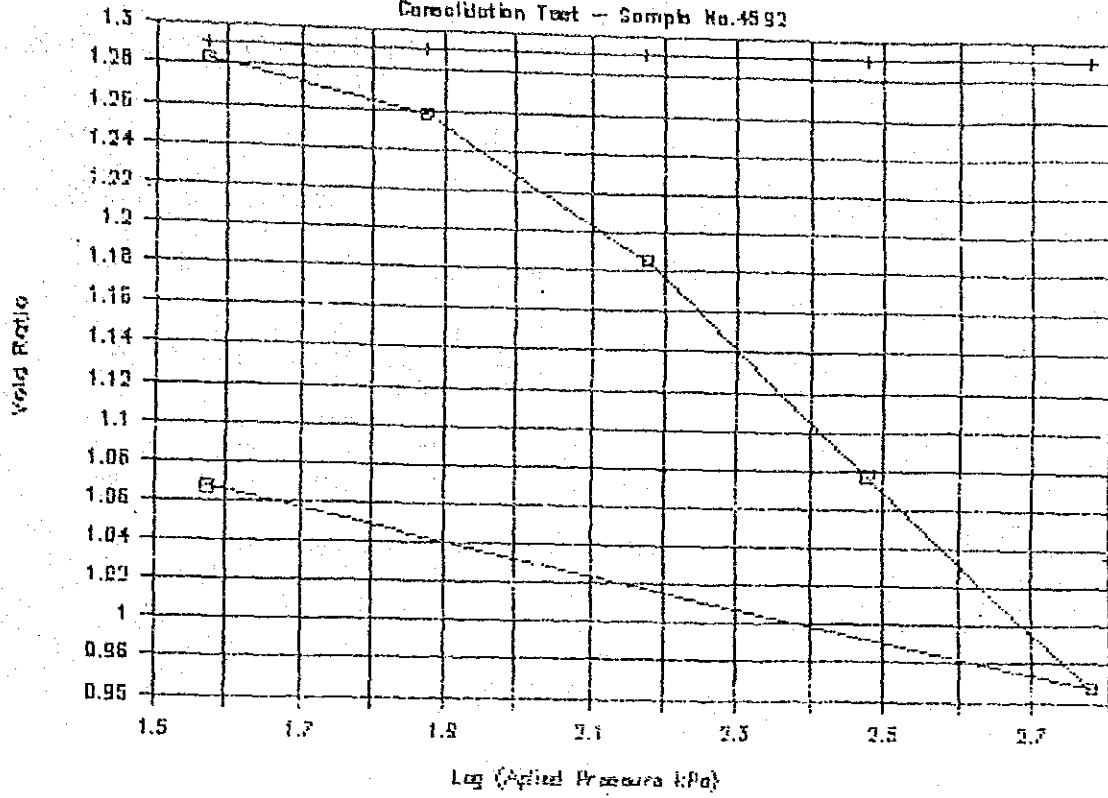
0.11 :void ratio reduction factor

0.00 :dial gauge constant (positive if increases with settlement
if not then negative)

pressure	dialread	htchange	voidchge	voidratio	sqrt90	cv m2/yr	mv m2/MN
	30	0.000	0.000	1.291			
37.5	60	0.076	0.008	1.283	2.0	12.7	0.09
75.0	152	0.310	0.033	1.258	2.5	8.0	0.29
150.0	422	0.996	0.106	1.185	4.5	2.4	0.43
300.0	820	2.007	0.214	1.078	7.0	0.9	0.73
600.0	1228	3.043	0.324	0.967	9.0	0.5	0.18
37.5	858	2.103	0.224	1.067			

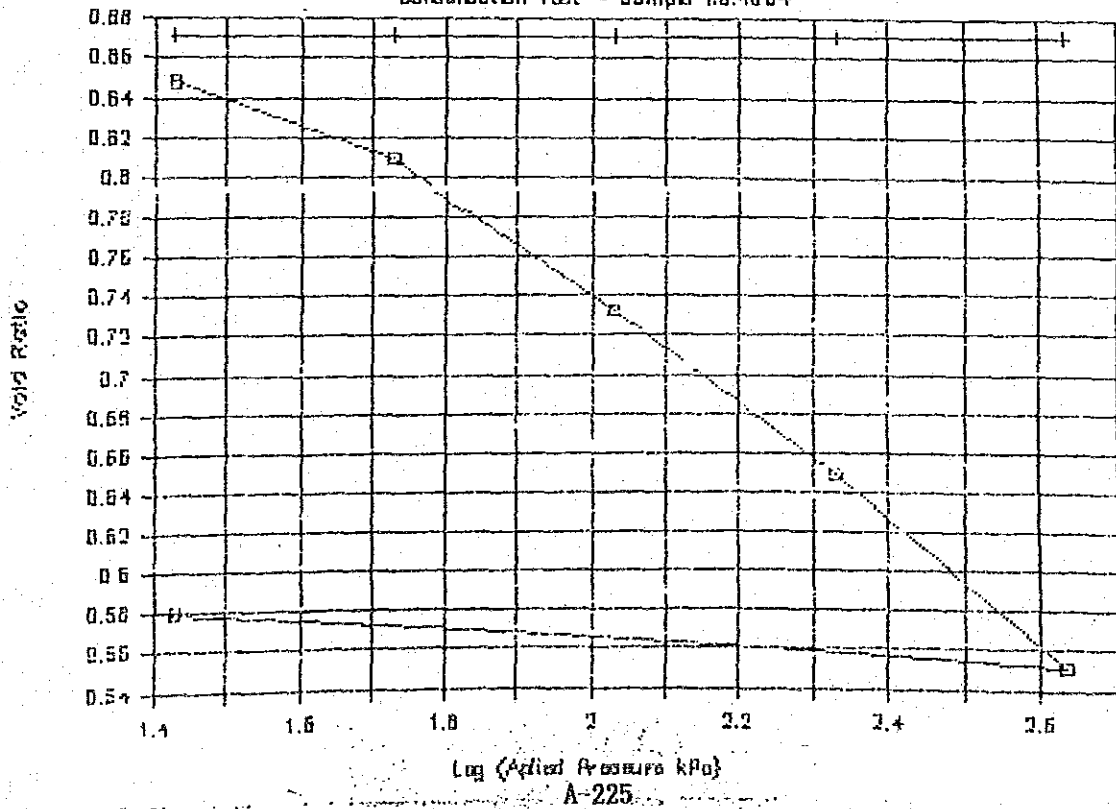
CENTRAL TESTING LABORATORIES LTD

Consolidation Test - Sample No. 4592



CENTRAL TESTING LABORATORIES LTD

Consolidation Test - Sample No. 4504



13-Aug-90

CENTRAL TESTING LABORATORIES LTD
P.O. Box 18507, NAIROBI, KENYA

NAIROBI BY PASS
TB3 BS3 0.6m-0.8m
QUICK UNDRAINED TRIAXIAL
4592 Sample No.

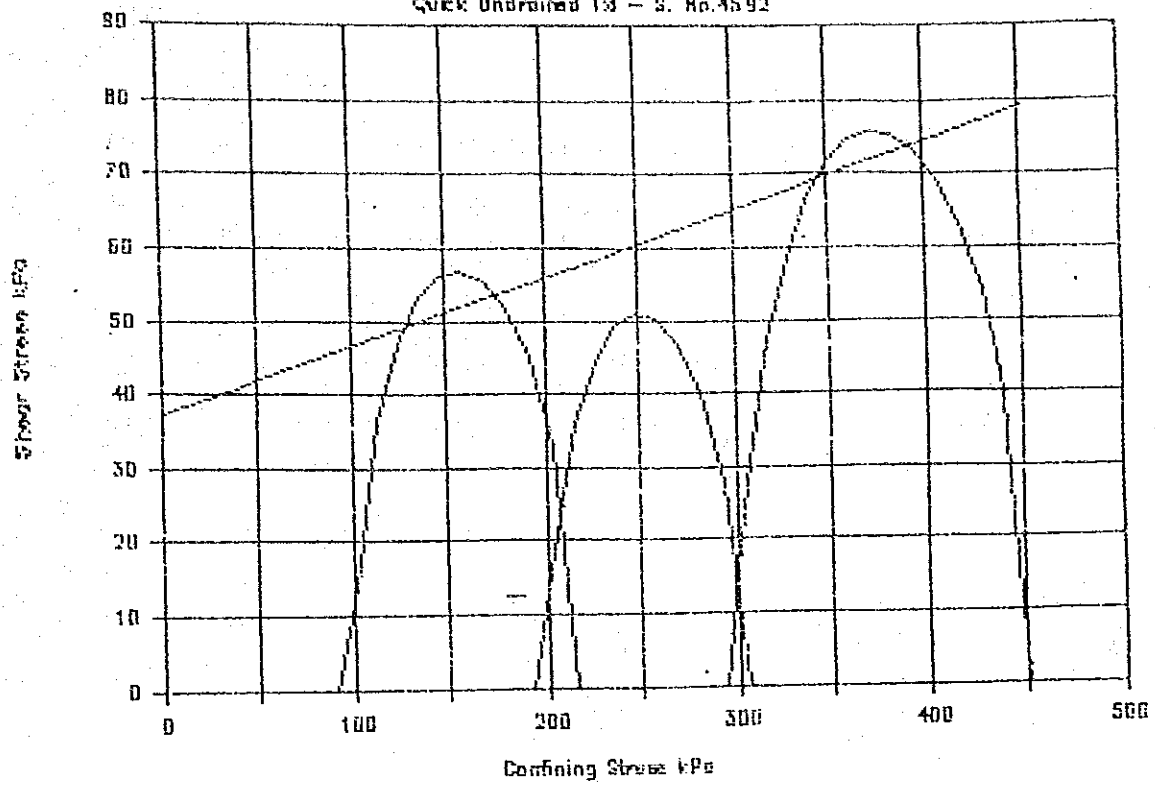
Description:- Black, slightly gravelly, sandy, very silty CLAY

Specimen No.	Bulk Density kg/m ³	Moisture Content %	Confining Pressure kN/m ²	1/2 Deviator Stress kN/m ²
1	1646	40.0	100	57
2	1648	40.2	200	51
3	1650	41.5	300	75

Slope 5.3 degrees Intercept — 37 kN/m²

CENTRAL TESTING LABORATORIES LTD

Quick Undrained Test - S. No. 4592



20-Aug-90

CENTRAL TESTING LABORATORIES LTD
P.O. Box 18507, NAIROBI, KENYA

NAIROBI BY PASS

TB9 BS3 0.2m-0.4m

QUICK UNDRAINED TRIAXIAL

4604 Sample No.

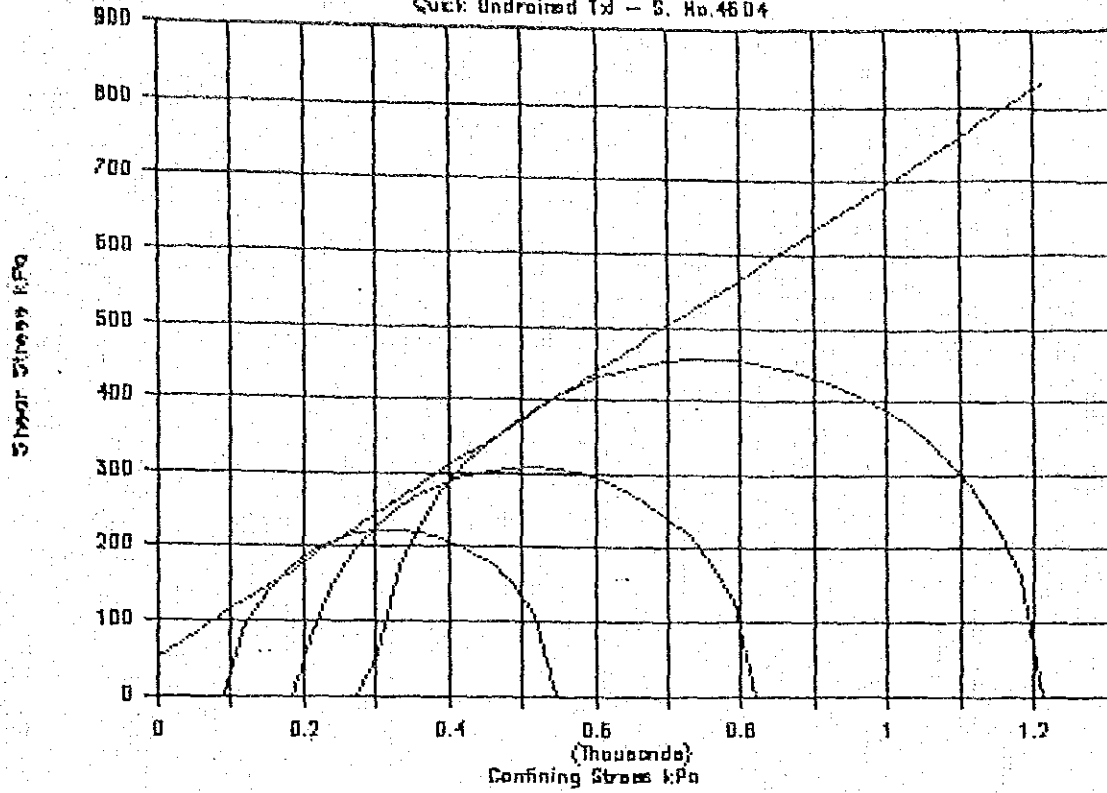
Description:- Brown, clayey MURRAM with grass root fibres

Specimen No.	Bulk Density kg/m ³	Moisture Content %	Confining Pressure kN/m ²	Deviator Stress kN/m ²
1	1659	16.2	100	223
2	1660	16.3	200	309
3	1661	16.3	300	457

Slope 32.8 degrees Intercept 51 kN/m²

CENTRAL TESTING LABORATORIES LTD

Quick Undrained Test - S. No. 4604



THE MOWLEM CONSTRUCTION CO. (F.A.) LTD.
 NAIROBI BY PASS

SWELLING PRESSURE TESTS

1140

1100

1000

900

800

700

600

PRESSURE ON SPECIMEN (KN/M²)

S/N 07729 T₀-33
 (Swelling ceased at 10.9 KN/m²)

S/N 07732 T₀-34
 (Swelling ceased at 7.2 KN/m²)

S/N 07737 T₀-37
 (Swelling ceased at 8.02 KN/m²)

4 6 8 10 12 14 16 18 20

Time (minutes)

8. LABORATORY TEST RESULTS OF GRAVEL MATERIAL SITE

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY MODULUS	GRADING - % PASSING						COMPACTION			STRENGTH TESTS						MOISTURE CLASSIFICATION	MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	SAMPLE LOCATION						
	LL	PI			BS SIEVE			No.			M.D.D. 15/m ³	O.M.C. %	STABILIZER %	1 DAY CURE MDD	C.B.R. %		SWELL D.C. %	SWELL I.D.C. %	U.C.S. M/m ²									
					3/4"	3/8"	No. 20	No. 40	No. 60	4 DAY SOAK					7 D.S. %	7 D.S. M.D.D.												
4525	45	13	7	312	58	49	40	32	24	21	19	1540	24	80	95	35	95	0.1									MUTUINI	
4526	49	19	9	722	100	97	80	50	38	35	34	1760	20	50	95	30	95	0.4									MUTUINI	
4525	44	12		298										1/2													MUTUINI	
	47	7		168								1600	23	1/4														
				0										1/6														
	46	11		264										1/2														
				0								1620	24	1/4														
				0										1/6														
4526	47	17		646										1/2													MUTUINI	
	45	15		570								1800	18	1/4														
	47	14		522										1/6														
	46	15		570										1/2														
	48	14		532								1800	18	1/4														
	48	12		456										1/6														

FOR QUARRY PLAN SEE FIG. No.

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY MODULUS	GRADING - % PASSING				COMPACTION		STRENGTH TESTS				MOISTURE HARDNESS G = GOOD A = ADEQUATE P = POOR	CLASSIFICATION	SAMPLE LOCATION		
	LL	PI			3/4"	3/8"	No. 40	No. 200	M.D.D. kg/m ³	B.S.S. %	STABI-LISER %	1 DAY CURE	% M.D.C.	% 4 DAY				C. B. R. %	SWELL 7 D.C. %
4522	44	17	73	63	43	21	10	6	5	2020	15	120	96	90	96	0.1		FORBST GUARD	

FOR QUARRY PLAN SEE FIG. No.

WANIOHI CONSULTING ENGINEERS . . . TABLE No.

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY INDEX	GRADING - % PASSING						COMPACTION		STRENGTH TESTS										MODULE HARDNESS	CLASSIFICATION	SAMPLE LOCATION			
	LL	PI			BS SIEVE			No.			M.D.D. kg/m ³	O.M.C. %	STABILIZED %	1 DAY CURE %	4 DAY SOAK		C.B.R. %		SWELL %	D.C. %	D.C. %	D.C. %				U.C.S. x 10 ³ N/m ²		
					3/4"	3/8"	3/16"	No.	NA	No.					200	% MDD	% SOAK	% MDD									% MDD	% MDD
4555	50	19	9	437	61	46	35	28	23	21	20	1510	24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIBERA
4555	50	12	6	276										2	2	---	---	---	---	---	---	---	---	---	---	---	---	KIBERA
	49	10	5	230								1520	24	1	1	---	---	---	---	---	---	---	---	---	---	---	---	
	49	9	5	207										1	3	---	---	---	---	---	---	---	---	---	---	---	---	
	48	9	8	207										2	2	---	---	---	---	---	---	---	---	---	---	---	---	
	49	8	4	184								1580	23	2	4	---	---	---	---	---	---	---	---	---	---	---	---	
				0										2	6	---	---	---	---	---	---	---	---	---	---	---	---	

FOR QUARRY PLAN SEE FIG. No.

SAMPLE No.	ATTERBERG LIMITS		PLASTICITY INDEX	SHRINKAGE %	MOHRS	GRADING - % PASSING BS SIEVE							COMPACTION		STRENGTH TESTS										CLASSIFICATION	MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	SAMPLE LOCATION			
	LL	PL				3/4"	3/8"	No. 7	No. 30	No. 60	No. 200	M.D.D. kg/m ³	B.S.	STABILIZER %	1 DAY CURE	% MDD	4 DAY SDAK	% MDD	C.B.R. %	SWELL %	D.C. %	7 D.S. %	U.C.S. kN/m ²							
4581	49	19	10	95	86	67	51	44	40	39	1730	20		9	90	0.2														THANDI
4582	41	13	7	68	62	49	31	20	17	16	1890	18		26	95	0.33														THANDI
4583	35	14	7	93	86	67	43	34	30	29	1890	15		7	90	0.04														THANDI
4584	51	16	9	93	79	57	36	28	25	24	1800	20		45	100	0.15														THANDI
4582	39	12	6	240																										THANDI
	40	10	5	200																										THANDI
	NP		1	0																										THANDI
	NP		2	0																										THANDI
	NP		1	0																										THANDI
	NP		0	0																										THANDI
4584	42	14	7	392																										THANDI
	41	13	6	364																										THANDI
	38	12	6	336																										THANDI
	41	13	6	364																										THANDI
	42	10	5	280																										THANDI
	NP		1	0																										THANDI

FOR QUARRY PLAN SEE FIG. No.

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY INDEX	MOHRS	GRADING - % PASSING				COMPACTION		STRENGTH TESTS							MODULE HARDNESS	CLASSIFICATION	SAMPLE LOCATION					
	LL	PI				No. 3/4	No. 3/8	No. 20	No. 40	No. 60	No. 100	B.S.S. M.D.D. kg/m ³	B.S.S. O.M.C. %	STABI-LISER UP %	1 DAY CURE	C. B. R. %		SWELL (7 D.C. MDD) %				7 D.S. M.D.D. %	7 D.C. M.D.D. %			
	37	10														5	180							5	18	16
4571			62	52	39	26	18	16	15	1800	20		85	90	0.05											CHURCH
4572	40	13	75	66	50	29	21	19	18	1910	18		39	91	0.08											CHURCH
4573	51	15	97	89	66	40	31	28	26	1710	21		110	101	0.22											CHURCH
4572	37	12											75	100	0.23											CHURCH
	41	11								1890	19			95	160	<1										
	42	9												95	190	<1										
	41	11												95	250	<1										
	44	9								1910	18			95	180	<1										
														95	270	<1										
														95	370+	<1										

FOR QUARRY PLAN SEE FIG. No.

WANICHI CONSULTING ENGINEERS

TABLE No.

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY MODULUS	GRADING - % PASSING BS SIEVE						COMPACTION		STRENGTH TESTS							MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	CLASSIFICATION	SAMPLE LOCATION					
	LL	PI			3/4"	3/8"	No. 20	No. 40	No. 60	No. 100	No. 200	M.D.D. 19/m ³	O.M.C. %	STABILIZER %	1 DAY CURE	% MOD. SOAK	4 DAY % MOD. SOAK	C.B.R. %	SWELL/D.C. %				SWELL/D.C. %	U.C.S. kN/m ²	D.C. %	D.S. M.D.D.	
																											3/4"
4574	44	16	68	52	37	26	22	21	19	1930	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA	
4575	51	20	99	96	76	49	43	40	38	1750	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA	
4576	47	17	59	45	31	19	12	10	9	1740	20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA	
4577	46	16	63	54	40	23	16	14	13	1900	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA	
4575	47	18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA
4577	37	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	KIRIBA	
36	9	4	---	---	---	---	---	---	---	1920	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
37	9	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NP	2	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NP	2	0	---	---	---	---	---	---	---	1930	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NP	1	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

FOR QUARRY PLAN SEE FIG. No.

TABIE N1

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY MODULUS	GRADING - % PASSING BS SIEVE						COMPACTION			STRENGTH TESTS							MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	CLASSIFICATION	SAMPLE LOCATION		
	LL	PI			3/4"	3/8"	No. 20	No. 40	No. 60	No. 100	No. 200	B.S.S.		STABILIZER %	1 DAY CURE	C. B. R. %		SWELL P.D.C. %	7 D.S. M.D.D.	7 D.C. %				U.C.S. KN/M ²	
												M.D.D. kg/m ³	OMC %			% MDD	% SDAK								% MDD
4521		NP	2	0	61	44	31	21	9	4	2	1240	29	120	95	90	90	90	0.2	0.3	150	< 1			WAIGANJO
4521		NP	1	0								1300	24						230	< 1					WAIGANJO
		NP	1	0															230	< 1					
		NP	0	0															210	< 1					
		NP	1	0								1320	27						250	< 1					
		NP	1	0															370+	< 1					
		NP	0	0																					

FOR QUARRY PLAN SEE FIG. No.

TARIF No

ENGINEERS

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE %	PLASTICITY MODULUS	GRADING - % PASSING BS. SIEVE						COMPACTION		STRENGTH TESTS						MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	CLASSIFICATION No. 1 c.	SAMPLE LOCATION									
	LL	PI			No. 75	No. 100	No. 200	M.D.D. kg/m ³			B.S.S.		STABILIZER %	1 DAY CURE	% MDD	% SOAK	C. B. R. %					SWELL P.D.C. %	SWELL %	U.C.S. x 10 ³ lb/in ²						
								3/4"	3/8"	3/16"	No. 4	No. 10					M.D.D.	O.M.C.						%	%	%	%	7 D.C.	7 D.S.	M.C.D.
4578	41	12	6	240	58	50	42	29	20	18	17	1710	23						26	90	0.15							KAREN		
																			50	95	0.28									
4579	34	13	7		58	48	36	24	17	16	15	1989	17						75	100	0.39							KAREN		
																			12	90	0.15									
																			21	95	0.24									
4580	37	11	5		58	49	37	22	14	11	10	1910	15						30	100	0.29							KAREN		
																			23	90	0.11									
																			95	95	0.22									
																			110	100	0.23								KAREN	
4579	38	12	6	204																										
	36	11	5	187																										
	40	10	5	170																										
	38	10	5	170																										
	37	8	4	136																										
	NP	2	0	0																										

FOR QUARRY PLAN SEE FIG. No.

SAMPLE No.	ATTERBERG LIMITS		LINEAR SHRINKAGE	PLASTICITY MODULUS	GRADING - % PASSING BS SIEVE							COMPACTION			STRENGTH TESTS										MODULE HARDNESS G = GOOD A = ADEQUATE P = POOR	CLASSIFICATION	SAMPLE LOCATION									
	LL	PI			3/4"	3/8"	3/16"	No. 7	No. 30	No. 60	No. 200	M.D.D. 1g/m ³	B.S.S.	O.M.C. %	1 DAY CURE	1 DAY MDD	1 DAY SOAK	% MDD	C.B.R. %	SWELL D.C. %	SWELL %	D.C. %	D.C. %	U.C.S. kN/m ²												
																												1.10	95	50	95	0.1	0.2	170	101	0.2
4519	41	12	58	45	28	14	5	3	3	2000	1.4	1.10	1.10	95	50	95	0.1	0.2	170	101	0.2	1.1	95	110	130	210	270	370		CARNIVORE						
4520	45	18	85	70	50	29	19	16	15	1300	1.3	35	35	95	45	95	0.3	0.3	24	91	0.2	1.1	95	110	130	210	270	370		CARNIVORE						
4556	51	15	100	97	85	47	41	40	39	1630	20			6	90	0.3	0.6	7	95	0.6	1.1	95	110	130	210	270	370		CARNIVORE							
																			10	100	1.1															
4519	38	12																																		
	39	10								2020	15																									
		NP	2	0																																
		NP	2	0																																
		NP	1	0						2050	15																									
		NP	1	0																																

FOR QUARRY PLAN SEE FIG. No.

9. LABORATORY TEST RESULTS OF HARD STONE MATERIAL SITE

AGGREGATE TEST RESULTS SUMMARY SHEET

SAMPLE NO	SIEVE MARKING	GRADING % PASSING													SILT CONTENT %	10% FINE	L.A. %	FLAKINESS %	BITUMEN AFFINITY %			11.25/4.75 S.S.S. CRUSING	SULPHATE RESIDUOUS %		SPECIFIC GRAVITY		WATER ABS		
		75	83	93	100	1.18	2.36	4.75	7.5	15	30	60	100	MC					80	100	2.0		4.75	2.4	2.8	APP			
4513	DBT	100	93	73	44	31	20	17	14	10	7	5	4	3	2	1	22	NP	34	>95	>95	>95	4.3	4.9	4.9	2.42	2.69	2.60	3.2
4516	KIT	100	92	69	40	29	16	13	11	7	4	2	2	1	1	1	17	NP	26	>95	>95	>95	5.1	3.6	3.1	2.39	2.44	2.51	2.0
4517	RUN	100	94	80	47	33	21	18	15	11	8	6	5	4	3	3	34	NP	17	>95	>95	>95	30.8	26.4	21.7	2.40	2.50	2.68	4.5
4518	MUT	100	94	79	49	35	23	19	16	12	8	5	4	4	3	1	37	NP	20	>95	>95	>95	39.5	37.1	28.1	2.45	2.59	2.82	5.2
4553	KIB	100	96	81	56	43	31	27	24	18	12	8	6	5	4	1	42	NP	20	<95	<95	<95	272.0	24.2	26.0	1.95	2.19	2.62	16.4
4554	NP 2	100	96	88	66	53	41	37	34	27	20	14	11	11	7	2	48	NP	10	<95	<95	<95	33.3	48.2	43.3	1.53	1.89	2.39	24.3
4570	RAY	100	86	67	39	27	15	13	10	7	4	2	2	1	1	0	21	NP	39	>95	>95	>95	3.1	2.9	2.63	2.52	2.65	2.65	2.9
4625	CAR	100	94	81	54	41	30	26	23	18	13	10	9	8	6	3	31	NP	22	>95	>95	>95	59.5	55.8	37.7	2.40	2.53	2.77	4.9

- DBT - DBT - EXISTING QUARRY
- KIT - KITENGELA - NEW QUARRY
- RUN - RUNGIRI
- MUT - MUTHIGA
- KIB - KIBERA
- MAX - Max-INN
- CAR - CARNIVORE

