11. Other Relevant Data

C.E.C.

Consulting Engineering Center
(Sajdi & Partners)

مَركز الإستشارات الهندسيّة
(سَجدي وشركاه)

Date: 17/5/2000

Ref.: 2000/103

M-S/Kume Sekkei Co., Ltd.
Tokyo – Japan

Attn. Mr. Tetsuro Nishimura
Project – Manager

Subject	:	*Site Investigation Report.*
Project	:	*Topographic & Geotechnical Surveys for T.C. Control Center / Aden – Yemen.*

Dear Sir,

We are pleased to submit this report of geotechnical investigation of the subject project site.

The work was executed in accordance with the agreement signed with you.

Thanking you for your confidence looking forward for further cooperation.

Best Regards,

Eng. Jamal F. Birjas
Yemen Branch Manager
C. E. C

تلفون ٥١٥٦٢٥١ - فاكس ٥١٥٢٨٢٧-٦-٩٦٢ - ص.ب ٩٦١١٠٥ عمّان ١١١٩٦ الأردن • فرع اليمن : ص.ب ١٩٠٦٦ - فاكس ٢٠٨٠٧٣ - صنعاء - الجمهورية اليمنية
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CONTENTS

1.0 INTRODUCTION.

1.1 Why this Investigation?

Investigation of the underground conditions at a site is prerequisite to the economical design of the substructure elements. It is also necessary to obtain sufficient information for feasibility and economic studies for a proposed project. Public building officials may require soil data together with the recommendations of the geotechnical consultant prior to the issuance of building permit.

Elimination of the site exploration, which usually ranges from about 0.5 to 1.0 percent of total construction cost only, to find after construction has started that the foundation must be redesigned is certainly false economy.

This is generally recognized, and it is doubtful if any major structures are currently designed without site investigation being undertaken.

According to Bowles J.E., with the scarcity of building sites in urban areas and with considerable urban renewal and the accompanying backfill, often with no quality control, the underground conditions can have significant variation within a few meters in any direction.

For these reasons, an adequate ground subsurface investigation is an essential preliminary to the execution of this important project.

1.2 Objectives of Study.

The objective of the study is to describe, classify and test the soil strata at different locations to determine the surface and subsurface conditions with the mechanical, physical & chemical properties of soil strata in order to investigate the foundations problems to come up with most optimum solution that will sustain the loads with minimum cost.

Another main objective is to make topographic map of the site.

1.3 Scope of Work.

The scope of work consists of the following items to accomplish the objectives of the study.

1. Making visit to site to collect information about present land, surface topography and surface drainage.

2. Drilling two bore holes, at prescribed locations to20m depth each.

3. Performing the (SPT) test in both holes every 1.0 m.

4. Collecting disturbed & undisturbed samples from all holes.

5. Carrying out laboratory tests on the collected samples to measure the mechanical, physical & chemical properties of soil at the deep holes and the physical properties at the shallow holes

6. Developing conclusions and recommendations for foundation design & construction.

7. Prepare topographic maps for the site along with longitudinal and transverse sections.

2.0 SITE AND PROJECT DESCRIPTION.

2.1 Site Description.

The site under concern it located at the crossing of the main road penetrating Al-Mansourah town in Aden city, and a secondary road in Al-Mansourah. It is empty part of a large plot used as a compound of primary health center that has been occupied in two places with two single story buildings. The empty area allocated for this project is close to the main road of Al-Mansourah.

The area is almost flat, with many wild trees in it and on its periphery.

Two small wooden poles & steel poles exists at the boundary of the plot which are used for electrical cables.

The site can be reached through the secondary road crossing Al-Mansourah main road.

2.2 Project Description.

The project is a two story building ,each story is 1000m^2 which will be used as expansion of national tuberculoses control center. The project is a grant from Japan government to the government of Yemen.

Most probably the building will be concrete structure.

2.3 Existing Facilities.

The site is furnished with all municipal facilities, telephone cables, electrical supply, water manias and waste water network. These facilities exists at the two existing building in the plot and surrounding the specified project area but do not penetrate it. Location plan is attached.

3.0 ON-SITE EXPLORATION AND TESTING

3.1 Boring.

During the period between 24th and 26th April 2000,we drilled two bore holes at the third points on the diagonal line connecting the west – South corner with the East – north corner.

The location of the holes was predetermined in – situ by the client and our representative.

The bore holes were drilled to a depth of 20m each.

We drilled the holes using the Hollow – Stem Auger of 7 "out side diameter and 3.25" in side diameter. This technique of drilling was advanced up to the sandy gravel layer where it was ineffective to proceed with this, tricon pit percussion with water and GS stabilizing agent were used to the end of boring.

GS was used to prevent the sides of bore hole from collapse under pressure of the under ground water.

Drilling was executed using our ring type (Mobile drill, Model B-34) mounted on Mercedes truck.

3.2 Sampling.

Samples of soil representing all strata were collected in three forms;

- Undisturbed samples: which were taken utilizing the double – split Shelby tube, with sampling length of 45cm, and thin wall cutting edge, that results in min. disturbance of samples. These samples were taken in the cohesive layers,

- Semi-undisturbed samples: these samples were taken as out crop of the SPT sampler.
  These samples couldn't be considered true undisturbed because the ratio of cutting edge thickness to the open area of sampler is high, which will result in considerable disturbance to the samples, but these samples are good representative for some physical properties of soil such as gradation, Atterberg limits, specific gravity ....etc.

- Disturbed samples : taken as an out crop of the Hollow Stem and percussion drillings .With percussion drilling, large gravel is reduced to ¾" size and the sample is collected by screening and settling the return water carrying soil particles, location of bore holes are shown on the location plan.

3.3 Standard Penetration Test (SPT).

During the drilling of bore holes , the drilling tools were removed at regular intervals, then split spoon was inserted. The sampler was first seated 15cm to penetrate any cutting and then driven an additional 30cm with blows of 63.5 kg monkey free falling 760mm. The number of blows required to derive the additional 30cm was recorded as the standard penetration Number (N). The results are tabulated in table (1).

Table No. (1) :
Standard Penetration Test (S.P.T).

Depth	BH.1	BH2	Depth	BH.1	BH.2
1.0	11	10	11.0	21	17
2.0	14	9	12.0	18	18
3.0	13	14	13.0	16	17
4.0	18	18	14.0	21	37
5.0	17	14	15.0	34	48
6.0	17	17	16.0	47	60
7.0	16	18	17.0	57	60
8.0	17	19	18.0	60	60
9.0	18	16	19.0	60	60
10.0	14	22	-	-	-

3.4 Surveying.

Topographic survey was executed as chain and level survey.

It aims at setting out the main features of the plot with the neighboring buildings and streets.

Relative level of certain points were taken by ordinary level, the levels were related to an arbitrary bench mark with level equal 5.0m a.s.l (arbitrary). It was taken at the tile finish of building B (see attached drawing).

The plot was divided into grids of 10 m X 10m with starting base line 5m away from the edge of Building A.

4.0 LABORATORY TESTING.

Selected soil samples were tested to measure their geotechnical engineering properties, laboratory testing include:

- Natural moisture content (BS 1377);
- Grain size distribution (BS 1377);
- Specific gravity (BS 1377);
- Atterberg limits (Liquid & Plastic) (BS 1377);
- Shear tests (ASTEM D-3080);
- Hydrometer analysis (BS 1377);
- Chemical test (BS 1377);
- Density Test (BS 1377);
- Consolidation Test (BS 1377);
- Permeability Test (BS 1377);

Summary of results of Laboratory tests are presented in table 2,3,4,5.

Table No. (2)

Physical Properties of disturbed & semi disturbed samples.

BH. No.	Sample No.	Depth M	M.C %	% Passing Sieve No.				Hydrometer			Atterberg Limits		SP. Gr.	Shear Parameters		Permeability
				4	10	40	200	Sand %	Silt %	Clay %	L.L	PI		ϕ°	C KN/m²	mm/sec.
1	1	0.0 – 0.5	11.3	97.7	90.2	71.3	27.6									
	2	0.5 – 1.0											2.772			
	3	1.0 – 1.5														
	4	1.5 - 2.8	21.3	90.3	87.2	81.6	71.3	28.7	61.4	9.9	36.4	8.3	2.738			
	5	2.8 – 5.0														8.3×10^{-7}
	6	5.0 – 5.5	32.4	97.2	91.2	84.5	75.7									
	7	5.5 – 7.5														
	8	7.5 – 9.5														
	9	9.5 – 12.0									33.8	6.1				
	10	12.0 – 12.5	32.1	94.4	90.1	79.9	70.3	29.7	59.3	11.0			2.744			
	11	12.5 – 15.0									35.3	7.7				
	12	15.0 – 16.3														
	13	16.3 – 17.8	24.7	85.7	73.2	44.9	21.3							37	2.0	97×10^{-3}
	14	17.8 – 19.0												34	0.0	
	15	19.0 – 20.0	23.3											34	0.0	

Table No. (3)

Physical Properties of disturbed & semi disturbed samples.

BH. No.	Sample No.	Depth M	M.C %	% Passing Sieve No.				Hydrometer			Atterberg Limits		SP. Gr.	Shear Parameters		Permeability
				4	10	40	200	Sand %	Silt %	Clay %	L.L	PI		ϕ°	C KN/m²	mm/sec.
2	1	0.0 – 0.3														
	2	0.0 – 1.5									31.2	5.8				
	3	1.5 – 2.8	20.3	94.4	88.3	80.2	74.7	25.3	65.4	9.3			2.738			
	4	2.8 – 3.5									34.3	7.2				
	5	3.5 – 5.5														7.2×10^{-7}
	6	5.5 – 8.5	33.4	90.0	97.2	85.3	73.6									
	7	8.5 – 11.0									35.1	7.8				
	8	11.0 – 13.0														
	9	13.0 – 15.0	32.8	96.2	91.3	84.2	77.1									
	10	15.0 – 16.0														
	11	16.0 – 17.5												34	0.0	
	12	17.5 – 19.0	24.4	84.4	68.2	33.1	19.6									
	13	19.0 – 20.0												32	1.0	

Table No. (3):
Physical Properties of undisturbed samples.

BH No.	Sample No.	Depth %	M.C %	% Passing Sieve No.				Hydrometer			Atterberg Limits	
				4	10	40	200	Sand %	Silt %	Clay %	L.L	PI
1	1	2.5 – 2.95	33.7	94.8	91.2	84.3	74.6				34.8	6.8
	2	8.0 – 8.45	33.9	99.2	97.6	90.3	77.8	22.2	64.8	13.0		
	3	15.5 – 15.95	31.8	91.4	88.2	80.1	70.6				32.1	5.9
2	1	3.5 – 3.95	34.3	99.7	94.9	85.3	76.2	23.8	61.1	15.1		
	2	9.0 – 9.45	33.8	97.3	91.8	81.2	71.6				33.3	7.1
	3	14.0 – 14.45	32.1	94.3	88.8	80.3	74.2	25.8	66.7	7.5		

Table No. (4):
Mechanical Properties of undisturbed samples.

BH No.	Sample No.	Depth %	M.C %	% Passing Sieve No.				Bulk dens. KN/cm³	Uncom. Compression qu KN/m²	Triaxial Shear		Consolidation	
				4	10	40	200			ϕ	C	EKN/m²	Cc
1	1	2.5 – 2.95	33.7	94.8	91.2	84.3	74.6	18.8	79	15	26	19200	0.134
	2	8.0 – 8.45	33.9	99.2	97.6	90.3	77.8	19.1	90				
	3	15.5 – 15.95	31.8	91.4	88.2	80.1	70.6	19.6	54				
2	1	3.5 – 3.95	34.3	99.7	94.9	85.3	76.2	18.7	94	12	31	22100	0.116
	2	9.0 – 9.45	33.8	97.3	91.8	81.2	71.6	18.9	82				
	3	14.0 – 14.45	32.1	94.3	88.8	80.3	74.2	19.1	66				

Table No. (5):
Chemical Analysis

	Soil			Water			
BH No.	Depth	$SO3^{=}$ (%)	Cl^{-} (%)	BH No.	Depth	$SO3^{=}$ (PPM)	Cl^{-} (PPM)
1	4.0	0.008	0.03	2	7.0	105	2140
2	9.0	0.030	0.090				

5.0 GEOLOGY &SUBSURFACE CONDITIONS

Since Cambrian times thick sequences of sedimentary rocks have been deposited forming the upper part of the Arabian shield together with its Precambrian basement. In present geodynamics the Arabian shield is moving northwards separating itself from the large African shield and simultaneously being affected by the large Indian – Australian shield which is drifting eastwards and by this making the Arabian Peninsula dipping slightly towards the eastern Arabian Gulf leading to a present eastern inclination of the Arabian shield is of about 1 to 2 degrees. The southern basement flank of the Arabian shield is geologically formed by older Precambrian rock formations strongly stressed, broken, faulted and fissured with intruded dike swarms up to the subcrustal magma chamber of the lower crust. The intruded volcanic material is forming volcanic piles. Those volcanic piles average more than 1200m in thickness forming the high Yemen lava plateau with alternating flows of basalt interbedded with acid effusive ingnimbrites that range in composition from rhyolite to comendite. These basalt flows of the Trap Series rest on shallow marine Mekj-zir sandstone and conglomerates considered in the inner part of the Paleocene and spread in the Pliocene/Pleistocene far into the coastal plain of the Aden region interwedged there with thick quaternary sediments of evaporate and marine. These in confirmation with the preliminary soil investigation might form the upper subsoil layers of the considered site in the Aden Airport area.

In summary quite irregular subsoil conditions of geologically comparatively young origin and this under the influences of ongoing plate tectonic movements may have to be expected.

Close inspection of soil samples retrieved from the two bore holes indicates almost a homogeneous layer of fine damp to dry, gray color fine silty sand up to a depth of 0.4m, this layer comprise the top soft soil.

Underneath this layer a clayey silt layer extends to a depth of 16.0m, this layer is characterized by its stratification of sub layers 1.0 – 3.0m thickness each.

The clay content in each sub layer differs slightly from others, but with general common characteristics such as dark brown Reddish color, stiff formation, low plasticity and medium compressibility and has some pea size gravel.

This layer overly another stratified silty gravel – sand layer which is gray to light brown in color, with very dense formation, very low compressibility.

6.0 Carrying capacity of soil

The analysis will consider shallow footing through theoretical and empirical approaches

Theoretical approach :

First: We will consider isolated footing dimensions of $2.0 \times 2.0 m^2$ at a depth of 1.5m.

The following Terzaghi equation corrected by schultz will be adopted to calculate the safe bearing capacity :

$$Qull = (1 + 0.3\ B/L)\ CNc + \gamma_1 D_1 Nq + (1 - 0.2\ B/L)\ B\gamma_2 N\gamma/2$$

Where:

Qult	=	Ultimate bearing capacity
B,L	=	Width & Length of footing
$\gamma 1, \gamma 2$	=	Density of soil above & beneath footing respectielly
C	=	Cohesion
D	=	Depth of footing
N1,Nq,Nγ	=	Factors dependent on angle of internal friction

The controlling stratum is at BH2, with

ϕ = 12, C = 31 KN/m²
Nc = 10.9, Nq = 3.42, Nγ = 1.22

Qult = 544 KN/m² For a factor of safety = 3

Qall = 181 KN/m²

Second: For strip footings with B = 1.0m at the same above conditions :

Qult = 439.7KN/m²
Qall = 147KN/m² For a factor of safety = 3

Empirical Approach

From the standard penetration test;

The average uncorrected (SPT vales to a depth = 5B below footing depth; i.e. to a depth = 10mm = 16

Taking into consideration the overburden effect and built up water pressure

SPT corrected = 13

Applying the following equation:

$$Qall = (N/F2)(B+0.3/B)^2$$

Where :

F2	=	A factor dependent on B
B	=	Width of footing
N	=	Corrected SPT value
Qall	=	162 KN/m²

7.0 SETTLEMENT ANALYSIS

The following equation is applied to calculate the settlement under isolated and strip footings.

$$\Delta H = (Cc + H/1+e_0) \log (P_0 + \Delta P/\Delta P)$$

Where:

Cc	=	Compressibility Index
H	=	Thickness of affected layer by the applied load
ΔP	=	Average applied load at center of affected layer
e	=	Initial voids ratio
P_0	=	Over burden stress at center of affected layers.

It we apply a load equal the safe bearing capacity calculated preciously

Then for a 2.5m × 2.5m isolated footing

ΔH = 6.7cm

For strip footing with B = 1.0m

ΔH = 3.4cm

8.0 DYNAMIC & SIESMIC FACTORS.

The clay silt soil has the following Dynamic characteristics.

Poison's ratio μ	=	0.38
Shear modulus (G)	=	7200 KN/m²
Compression wave νc	=	143m/sec.
Shear wave	=	61m/sec.

9.0 CONCLUSIONS AND RECOMMENDATIONS

1. To enhance the soil strength and minimize the settlement, we recommend to design the building on strip footing.

2. If strip footing are inadequate mainly in the middle area of the building, isolated square or rectangular footing are recommended with width not exceeding 2.5m.

3. To minimize the settlement and increase the soil carrying capacity, we recommend to make soil replacement under the footing. To increase the safe soil capacity to 2.0 Kg/cm², the soil replacement should be 1.5m below footing level, to increase the soil capacity to 1.8Kg/cm², the replacement should be to 1.2 m below bottom level of footings.

4. Although the above figures are within the range of the calculated bearing capacity, but applying these figures without replacement will give high values of settlement, so the replacement is recommended to keep the safe bearing capacity in the range of 1.8 – 2.0Kg/cm² with settlement less than 1.5cm.

   Also soil replacement will enhance the soil underneath footing against dynamic loading.

5. For soil replacement it is recommended to consider the following factors:

   - The soil used for replacement should be well graded granular material with max. size less than 4" and less then 10% should be passing sieve No. 200.
   - The width of replacement should be at least 30.0 cm out side the edges of footings from all sides.
   - The soil should be placed in layers less than 20.0 cm thickness and compacted to a minimum of 95% of max. dry density obtained in the laboratory.

6. The soil is stiff but can be excavated with simple mechanical equipment such as backhoe.

7. It is not recommended to use the excavated material in back fill operations around footings or directly below tiles.

8. Due to the high concentration of chlorides ,we recommend using ordinary Portland cement in amount not less than 425 kg/m3.

10. 0 REFERENCES

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8. Tsytovich N. Soil Mechanics. Mir Publishers. Moscow. 1986.

11.0 APPENDIX

CONSULTING ENGINEERING CENTER

JOB : 103/2000
SAMPLE No. : Sample 4
SITE : B. H. 1

C.E.C

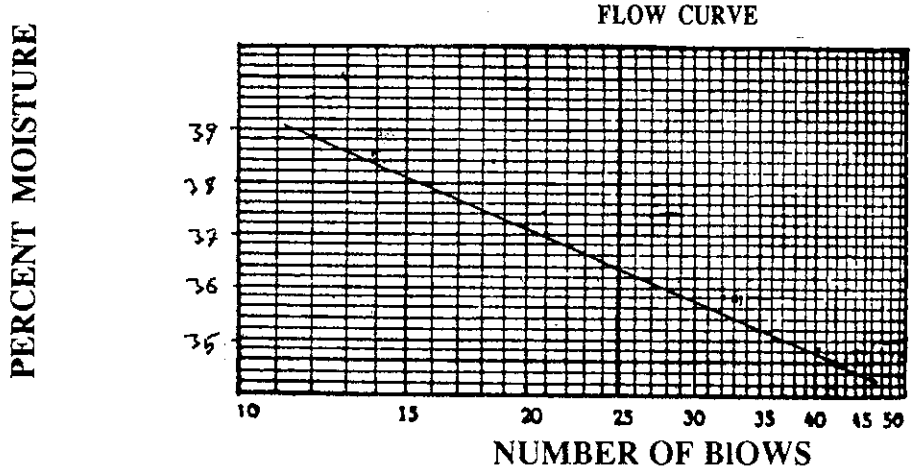
SOIL CONSISTENCY TEST

Sample Description

LIQUID LIMIT - PLASTIC - PLASTICITY INDEX

		Plastic Limit		Liquid Limit			
	Trial No.	1	2	1	2	1	2
	Dish No.	40	I	26	7	D	14
	No. of Blows	-	-	12	21	32	40
1	Wt. Dish + Wet Soil gr.	28.90	31.02	47.95	38.13	41.58	46.18
2	Wt. Dish + Dry Soil gr.	28.34	30.33	44.50	33.65	37.76	40.77
3	Wt. of Dish gr.	26.34	27.88	35.61	21.54	27.09	25.23
4	Wt. of Water (1-2) gr.	0.56	0.69	3.45	4.48	3.80	5.41
5	Wt. of Dry Soil (2-3) gr.	2.00	2.45	8.89	12.11	10.67	15.54
6	% Moisture (4/5 X 100)	28.00	28.2	38.8	37.00	35.60	34.80
7	A verage Plastic Limit %	28.1					

FLOW CURVE



SHRINKAGE TEST

1	Shrinkge Dish No.	gr.		8	Vol. Shrinkage Dish (V)	ml	
2	Wt. of Dish + Wet Soil	gr.		9	Vol. Dry Soil (Vo)	ml	
3	Wt. of Dish + Dry Soil	gr.		10	V - Vo = (8 - 9)		
4	Wt. of Dish	gr.		11	$\frac{v - Vo}{Wo} \times 100 = \left(\frac{10}{6} \times 100\right)$		
5	Wt. of Water (2-3)	gr.					
6	Wt. of Soil (Wo) = (3-4)	gr		12	Strinkage Limit (7 - 11) %		
7	% Moisture (5/6 x 100)			13	Shrinkage Ratio (6/6)		

Liquid Limit =	36.4	Pastic Limit =	28.1	Plasticty Index =	8.3	Shrinkage Limit =

Soil Mechanics Laboratory Testing : **CONSISTENCY TESTS** Sample No. :

Tested & Computed by : ..... Material Engineer : ..... Date : .....

CONSULTING ENGINEERING CENTER

JOB : 103/2000

SAMPLE No. : 9

SITE : B. H. 1

C.E.C

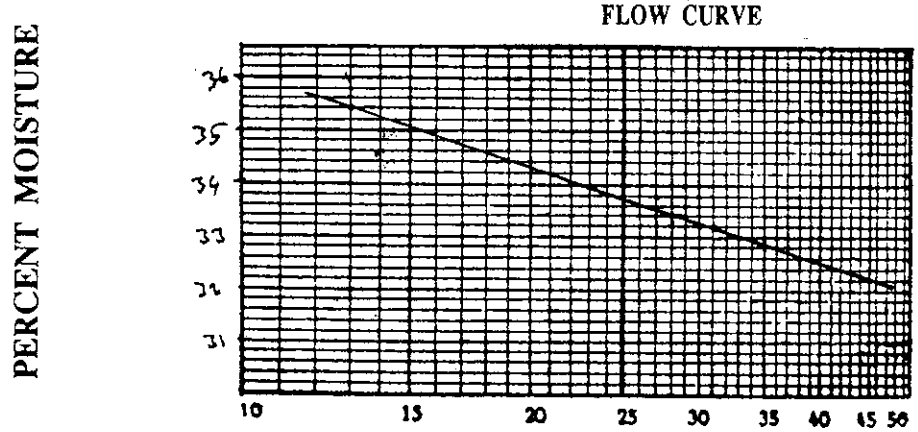
SOIL CONSISTENCY TEST

Sample Description

LIQUID LIMIT - PLASTIC - PLASTICITY INDEX

		Plastic Limit		Liquid Limit			
	Trial No.	1	2	1	2	1	2
	Dish No.	15	22	J	Q	12	34
	No. of Blows	-	-	13	23	31	39
1	Wt. Dish + Wet Soil gr.	27.47	33.28	68.23	53.58	43.50	47.48
2	Wt. Dish + Dry Soil gr.	27.09	32.58	60.68	48.89	38.18	40.87
3	Wt. of Dish gr.	25.71	30.07	39.35	35.10	22.16	20.59
4	Wt. of Water (1-2) gr.	0.38	0.70	7.55	4.69	5.32	6.61
5	Wt. of Dry Soil (2-3) gr.	1.38	2.51	21.33	13.79	16.02	20.28
6	% Moisture (4/5 X 100)	27.50	27.90	35.40	34.00	33.20	32.60
7	A verage Plastic Limit %	27.7					

FLOW CURVE



SHRINKAGE TEST

1	Shrinkge Dish No.	gr.		8	Vol. Shrinkage Dish (V)	ml	
2	Wt. of Dish + Wet Soil	gr.		9	Vol. Dry Soil (Vo)	ml	
3	Wt. of Dish + Dry Soil	gr.		10	V - Vo = (8 - 9)		
4	Wt. of Dish	gr.		11	$\frac{v - Vo}{Wo} \times 100 = \left(\frac{10}{6} \times 100\right)$		
5	Wt. of Water (2-3)	gr.					
6	Wt. of Soil (Wo) = (3-4)	gr		12	Strinkage Limit (7 - 11) %		
7	% Moisture (5/6 x 100)			13	Shrinkage Ratio (6/6)		

Liquid Limit =	33.8	Pastic Limit =	27.7	Plasticty Index =	6.1	Shrinkage Limit =	

Soil Mechanics Laboratory Testing : **CONSISTENCY TESTS** Sample No. :

Tested & Computed by : ..... Material Engineer : Q. N. ..... Date : .....

CONSULTING ENGINEERING CENTER

JOB : 103/2000
SAMPLE No. : 11
SITE : B. H. 1

C.E.C

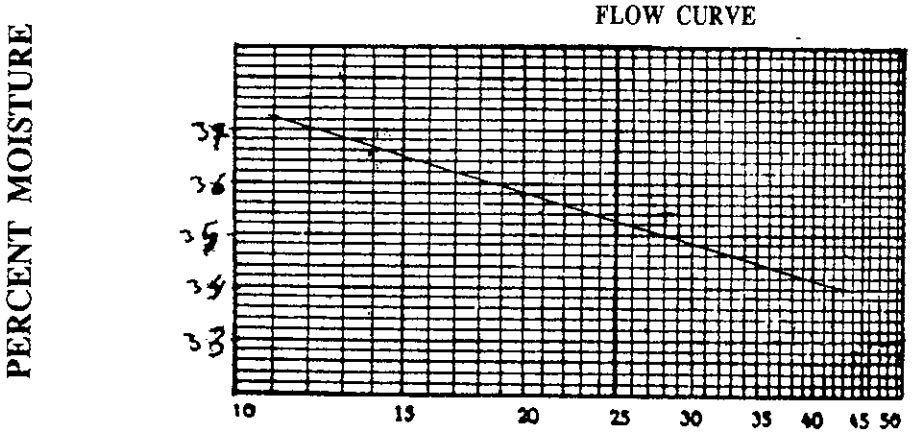
SOIL CONSISTENCY TEST

Sample Description

LIQUID LIMIT - PLASTIC - PLASTICITY INDEX

		Plastic Limit		Liquid Limit			
	Trial No.	1	2	1	2	1	2
	Dish No.	20	Y	A	B	I	2
	No. of Blows	-	-	11	20	29	38
1	Wt. Dish + Wet Soil gr.	23.21	26.81	25.63	38.53	52.64	41.72
2	Wt. Dish + Dry Soil gr.	22.85	26.37	23.07	35.07	46.22	36.51
3	Wt. of Dish gr.	21.54	24.78	16.19	25.41	27.88	21.28
4	Wt. of Water (1-2) gr.	0.36	0.44	2.56	3.46	6.42	5.21
5	Wt. of Dry Soil (2-3) gr.	1.31	1.59	6.88	9.66	18.34	15.23
6	% Moisture (4/5 X 100)	27.50	27.70	37.20	35.80	35.00	34.200
7	A verage Plastic Limit %	27.6					

FLOW CURVE



SHRINKAGE TEST

1	Shrinkge Dish No.	gr.		8	Vol. Shrinkage Dish (V)	ml	
2	Wt. of Dish + Wet Soil	gr.		9	Vol. Dry Soil (Vo)	ml	
3	Wt. of Dish + Dry Soil	gr.		10	V - Vo = (8 - 9)		
4	Wt. of Dish	gr.		11	$\frac{v - Vo}{Wo} \times 100 = \left(\frac{10}{6} \times 100 \right)$		
5	Wt. of Water (2-3)	gr.					
6	Wt. of Soil (Wo) = (3-4)	gr		12	Strinkage Limit (7 - 11) %		
7	% Moisture (5/6 x 100)			13	Shrinkage Ratio (6/6)		

Liquid Limit =	35.3	Pastic Limit =	27.6	Plasticty Index =	7.7	Shrinkage Limit =

Soil Mechanics Laboratory Testing : **CONSISTENCY TESTS** Sample No. :

Tested & Computed by : ..... Material Engineer : Q. N ..... Date : .....

CONSULTING ENGINEERING CENTER

JOB : ....2000/103.....
SAMPLE No. : ...4.....
SITE : .....B.H.2..Depth..2.8...-..3.5..

C.E.C

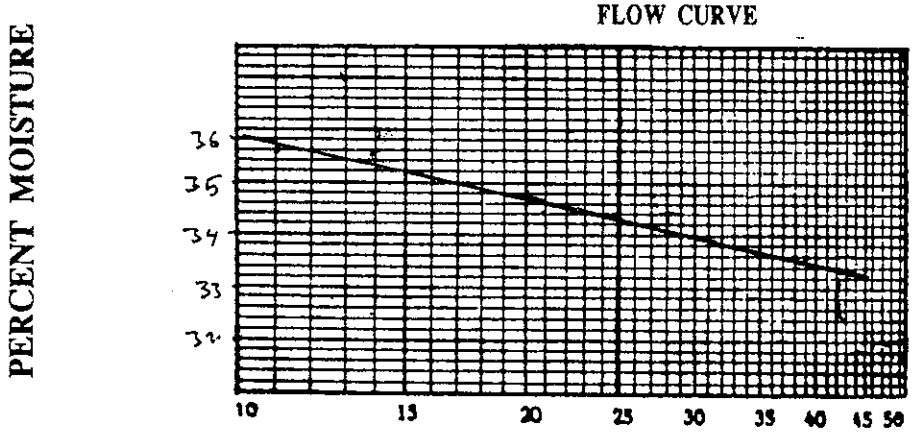
SOIL CONSISTENCY TEST

Sample Description

LIQUID LIMIT - PLASTIC - PLASTICITY INDEX

			Plastic Limit		Liquid Limit			
	Trial No.		1	2	1	2	1	2
	Dish No.		5	6	23	24	28	29
	No. of Blows		-	-	11.00	20.00	31.00	42.00
1	Wt. Dish + Wet Soil	gr.	26.20	21.73	60.91	56.08	53.98	42.02
2	Wt. Dish + Dry Soil	gr.	25.20	20.68	53.09	49.67	49.39	36.33
3	Wt. of Dish	gr.	21.48	16.83	31.12	31.25	35.89	19.29
4	Wt. of Water (1-2)	gr.	1.00	1.05	7.82	6.41	4.59	5.69
5	Wt. of Dry Soil (2-3)	gr.	3.72	3.85	21.97	18.42	13.50	17.04
6	% Moisture	(4/5 X 100)	26.90	27.30	35.60	34.80	34.00	33.40
7	A verage Plastic Limit	%	27.1					

FLOW CURVE



SHRINKAGE TEST

1	Shrinkge Dish No.	gr.		8	Vol. Shrinkage Dish (V)	ml	
2	Wt. of Dish + Wet Soil	gr.		9	Vol. Dry Soil (Vo)	ml	
3	Wt. of Dish + Dry Soil	gr.		10	V - Vo = (8 - 9)		
4	Wt. of Dish	gr.		11	$\frac{v - Vo}{Wo} \times 100 = \left(\frac{10}{6} \times 100 \right)$		
5	Wt. of Water (2-3)	gr.					
6	Wt. of Soil (Wo) = (3-4)	gr		12	Strinkage Limit (7 - 11) %		
7	% Moisture (5/6 x 100)			13	Shrinkage Ratio (6/6)		

Liquid Limit =	34.3	Pastic Limit =	27.1	Plasticty Index =	7.2	Shrinkage Limit =

Soil Mechanics Laboratory Testing : **CONSISTENCY TESTS** Sample No. :

Tested & Computed by : ..... Material Engineer : .....O..N..... Date : .....

CONSULTING ENGINEERING CENTER

JOB : ....2000/103.....
SAMPLE No. : ...2.....
SITE : Bh2,..Depth..9.0..-..9.45....

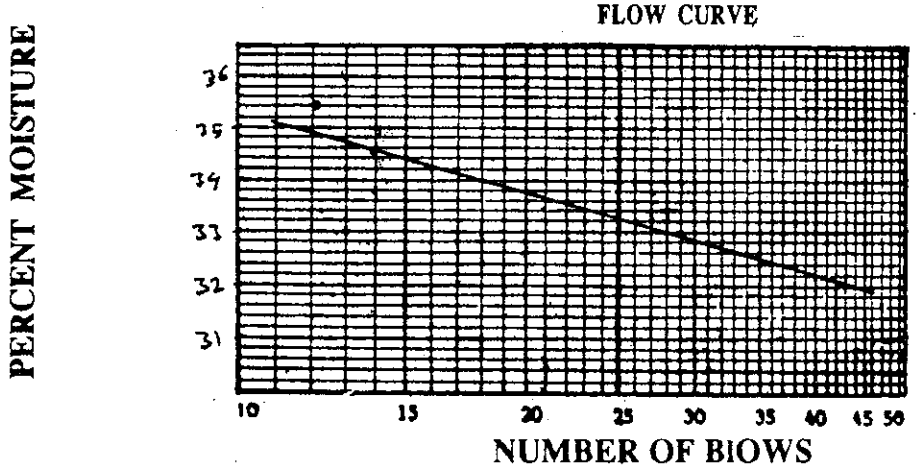
SOIL CONSISTENCY TEST

Sample Description

LIQUID LIMIT - PLASTIC - PLASTICITY INDEX

		Plastic Limit		Liquid Limit			
	Trial No.	1	2	1	2	1	2
	Dish No.	3	4	23	24	D	H
	No. of Blows	-	-	12.00	20.00	28.00	35.00
1	Wt. Dish + Wet Soil gr.	24.19	27.53	51.88	50.29	52.96	48.64
2	Wt. Dish + Dry Soil gr.	23.75	26.82	46.51	45.48	46.54	42.66
3	Wt. of Dish gr.	22.08	24.10	31.12	31.25	27.09	24.32
4	Wt. of Water (1-2) gr.	0.44	0.71	5.37	4.81	6.42	5.98
5	Wt. of Dry Soil (2-3) gr.	1.67	2.72	15.39	14.23	19.45	18.34
6	% Moisture (4/5 X 100)	26.30	26.10	34.90	33.80	33.00	32.60
7	A verage Plastic Limit %	26.2					

FLOW CURVE



SHRINKAGE TEST

1	Shrinkge Dish No.	gr.		8	Vol. Shrinkage Dish (V)	ml	
2	Wt. of Dish + Wet Soil	gr.		9	Vol. Dry Soil (Vo)	ml	
3	Wt. of Dish + Dry Soil	gr.		10	V - Vo = (8 - 9)		
4	Wt. of Dish	gr.		11	$\frac{v - Vo}{Wo} \times 100 = \left(\frac{10}{6} \times 100\right)$		
5	Wt. of Water (2-3)	gr.					
6	Wt. of Soil (Wo) = (3-4)	gr		12	Strinkage Limit (7 - 11) %		
7	% Moisture (5/6 x 100)			13	Shrinkage Ratio (6/6)		

Liquid Limit =	33.3	Pastic Limit =	26.2	Plasticty Index =	7.1	Shrinkage Limit =

Soil Mechanics Laboratory Testing : **CONSISTENCY TESTS** Sample No. :

Tested & Computed by : ..... Material Engineer : ....Q.N..... Date : .....

C.E.C.

HYDROMETER TEST

KIND OF MATERIAL	:	**ITEM No.**	:
SAMPLED AT	: BH 1 Sample 4	**DATE**	:
		TESTED BY	:

- **Hydrometer Type:**

% Passing sieve No. 10 = 87.2
Wt. Of sample = 100

- **Readings**

Time minuets	Hydrometer Reading Corrected	% Finner	Diameter mm.
10	55	53.9	0.0337
30	50	49.0	0.0205
60	43	42.1	0.0155
1440	31	30.4	0.0035
2880	20	19.6	0.0026
4320	12	11.7	0.0020

% Clay in test = 11.7
% Clay in Sample = 9.9

Material Eng. O.N
CEC

C.E.C.

HYDROMETER TEST

KIND OF MATERIAL	:	**ITEM No.**	:
SAMPLED AT	: BH 1 Sample 10	**DATE**	:
		TESTED BY	:

- **Hydrometer Type:**

% Passing sieve No. 10 = 90.1
Wt. Of sample = 100 gm

- **Readings**

Time minuets	Hydrometer Reading Corrected	% Finner	Diameter mm.
10	60	58.8	0.0318
30	52	51.0	0.0201
60	45	44.1	0.0152
1440	32	31.4	0.0035
2880	20	19.6	0.0026
4320	13	12.7	0.0021

% Clay in test = 12.7
% Clay in Sample = 11.0

Material Eng. O.N
CEC

C.E.C.

Sp.Gr. & ABSORPTION OF COARSE & FINE AGGREGATE

JOB : 2000/103
DATE :
LOCATION: BH 1

SAMPLE No. :2
OPERATOR :

Sp.Gr. & ABSORPTION OF COARSE AGGREGATE				Result
1	Wt. Of Dry sample (gr.)	(A)	199.9	
2	Wt. Of Saturated surface of dry sample(gr.)	(B)	-	
3	Wt. Of (Flask + Water + Sample) (gr.)	(C)	937.3	
4	Wt. Of (Flask + Water till Mark) (gr.)	(D)	809.5	
5	Sp. Gravity (dry sample) = A/(B + D)- C	=		-
6	Sp. Gravity (Sat. surf. dry) = B/(B + D)– C	=		-
7	Sp. Gravity (Apparent) = A/(A + D) – C	=		2.772
8	% age of water absorption = (B – A)/A × 100			-

Material Eng. Q.N

C.E.C.

Sp.Gr. & ABSORPTION OF COARSE & FINE AGGREGATE

JOB : 2000/103 **SAMPLE No.** :10
DATE : **OPERATOR** :
LOCATION: BH 1

Sp.Gr. & ABSORPTION OF COARSE AGGREGATE				Result
1	Wt. Of Dry sample (gr.)	(A)	200.0	
2	Wt. Of Saturated surface of dry sample(gr.)	(B)	-	
3	Wt. Of (Flask + Water + Sample) (gr.)	(C)	936.6	
4	Wt. Of (Flask + Water till Mark) (gr.)	(D)	809.5	
5	Sp. Gravity (dry sample) = A/(B + D)- C	=		-
6	Sp. Gravity (Sat. surf. dry) = B/(B + D)– C	=		-
7	Sp. Gravity (Apparent) = A/(A + D) – C	=		2.744
8	% age of water absorption = (B – A)/A × 100			-

Material Eng. Q.N

C.E.C.

Sp.Gr. & ABSORPTION OF COARSE & FINE AGGREGATE

JOB : 2000/103 **SAMPLE No.** :4
DATE : **OPERATOR** :
LOCATION: BH 1

Sp.Gr. & ABSORPTION OF COARSE AGGREGATE				Result
1	Wt. Of Dry sample (gr.)	(A)	199.6	
2	Wt. Of Saturated surface of dry sample(gr.)	(B)	-	
3	Wt. Of (Flask + Water + Sample) (gr.)	(C)	936.2	
4	Wt. Of (Flask + Water till Mark) (gr.)	(D)	809.5	
5	Sp. Gravity (dry sample) = A/(B + D)- C	=		-
6	Sp. Gravity (Sat. surf. dry) = B/(B + D)– C	=		-
7	Sp. Gravity (Apparent) = A/(A + D) – C	=		2.738
8	% age of water absorption = (B – A)/A × 100			-

Material Eng. Q.N

C.E.C.

Sp.Gr. & ABSORPTION OF COARSE & FINE AGGREGATE

JOB : 2000/103 **SAMPLE No.** :14
DATE : **OPERATOR** :
LOCATION: BH 1

Sp.Gr. & ABSORPTION OF COARSE AGGREGATE				Result
1	Wt. Of Dry sample (gr.)	(A)	200.4	
2	Wt. Of Saturated surface of dry sample(gr.)	(B)	-	
3	Wt. Of (Flask + Water + Sample) (gr.)	(C)	940.9	
4	Wt. Of (Flask + Water till Mark) (gr.)	(D)	809.5	
5	Sp. Gravity (dry sample) = A/(B + D)- C	=		-
6	Sp. Gravity (Sat. surf. dry) = B/(B + D)– C	=		-
7	Sp. Gravity (Apparent) = A/(A + D) – C	=		2.897
8	% age of water absorption = (B – A)/A × 100			-

Material Eng. Q.N

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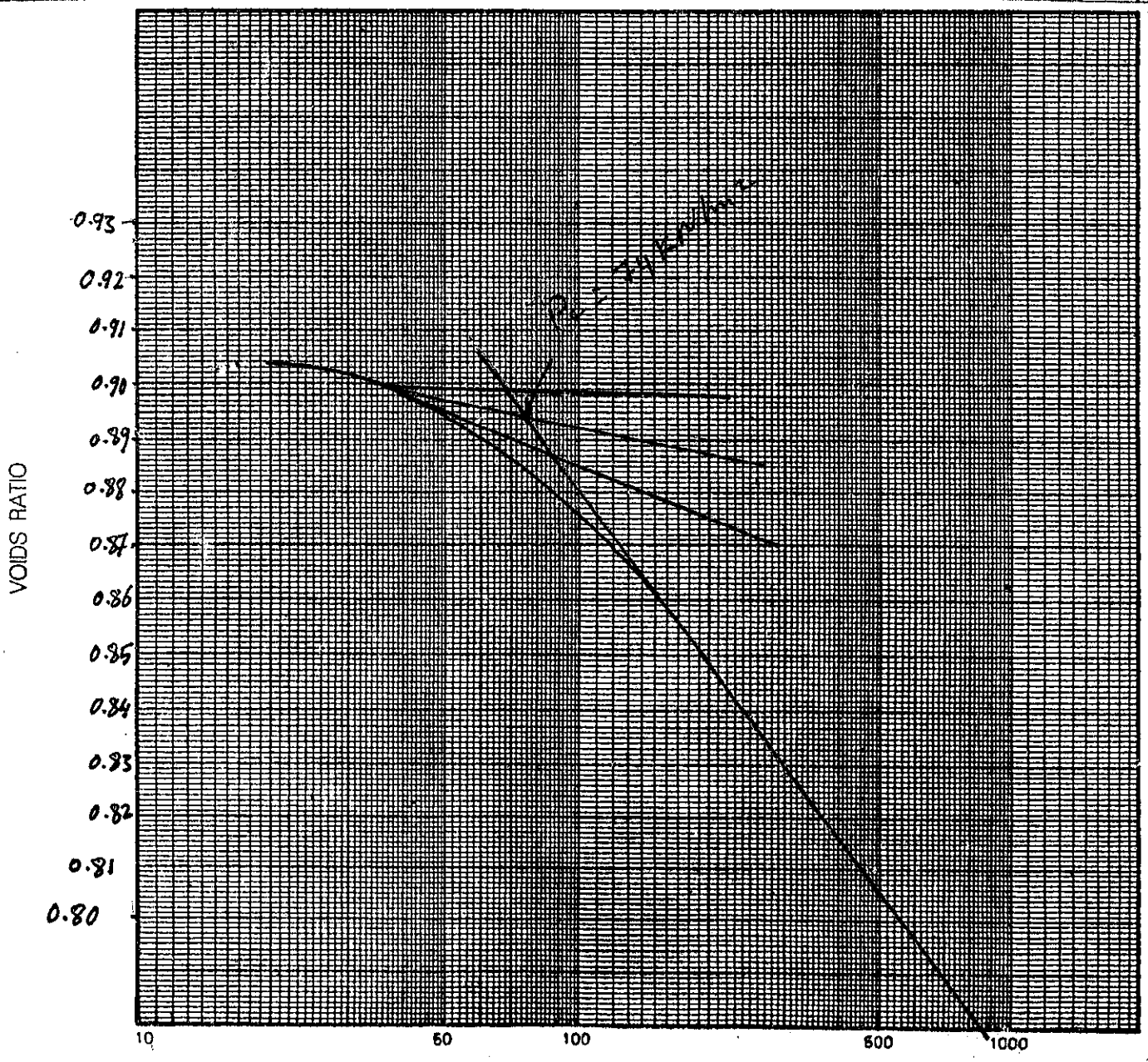
CONSULTING ENGINEERING CENTER

C.E.C

CONSOLIDATION TEST RESULTS

CONTRACT : ..... DATE: .....

Borehole Sample No.	Depth m	Initial Moisture Content %	Initial Bulk Density Kg/m³	S. G.	Pressure Range kN/m²	Mv m²/kN	Cv Log t method mm²/s	DESCRIPTION
B.H 2								
	3.5-3.95	34.3	1.90	2.699				
Sample								



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C.E.C.

DIRECT SHEAR TEST

Project :
Location : BH 1
Sample 15

Tested by :
Date :

Area of Sample = 36 cm²

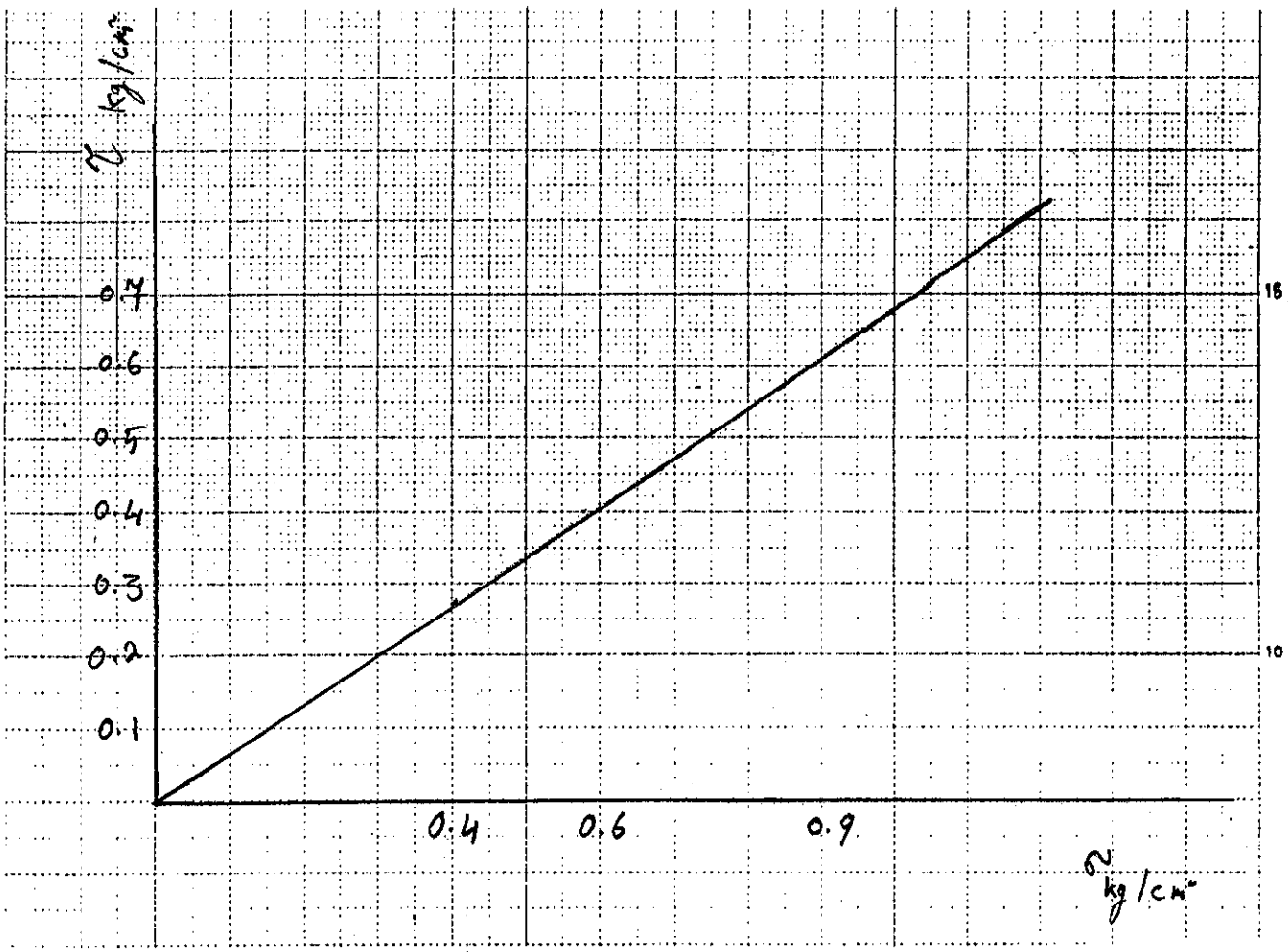
Ring factor = 0.205 KN/div.

Test Readings:

Normal load	*Dial Reading*
14.5	48
24.5	81
34.5	113.5

Test Results:-

θ = 34° C = 0.0 KN/m²



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C.E.C.

DIRECT SHEAR TEST

Project	**:**	***Tested by***	**:**
Location	**: BH 1**	***Date***	**:**
	Sample 13		

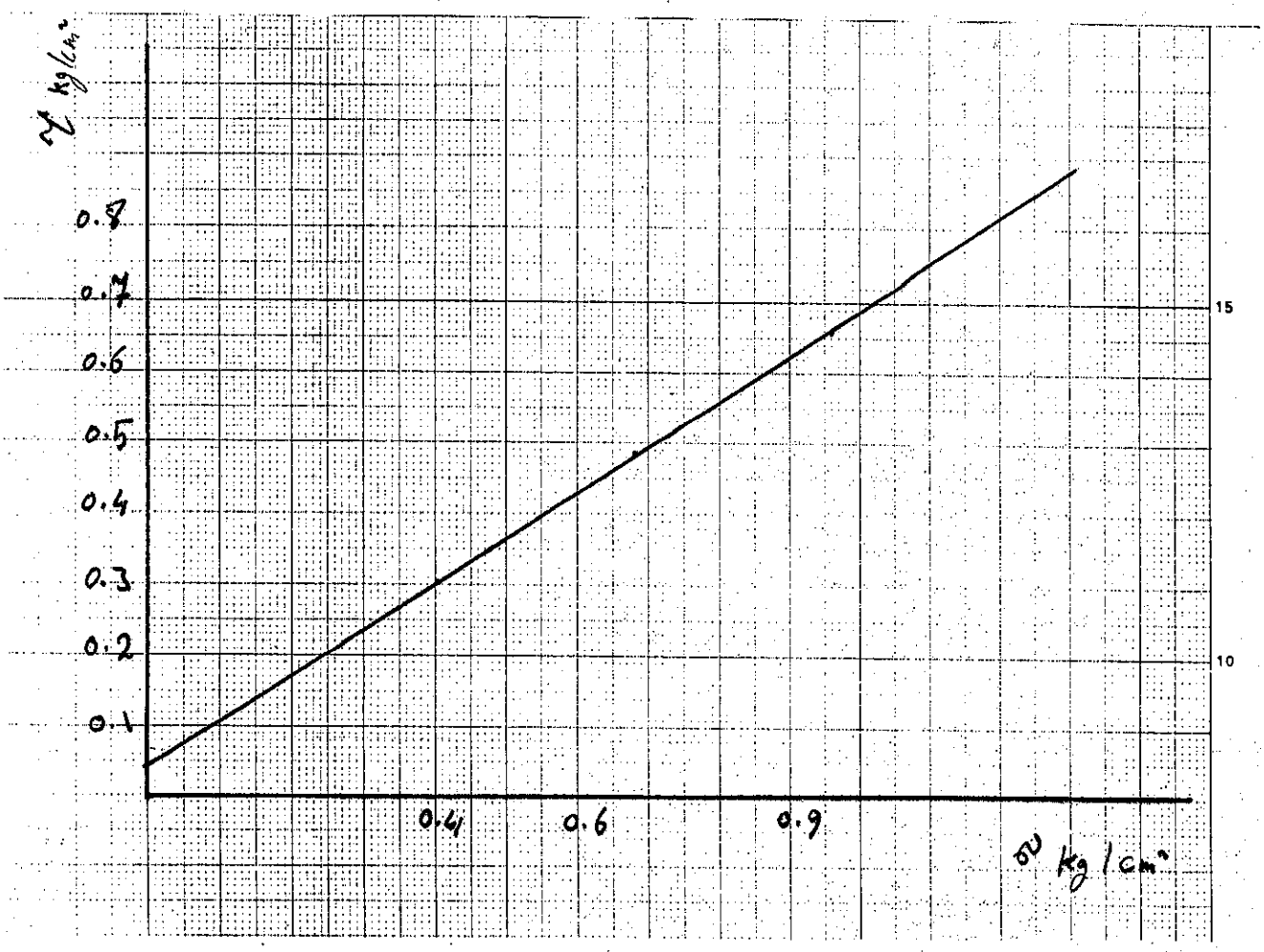
Area of Sample = 36 cm^2 *Ring factor* = 0.205 KN/div.

Test Readings:

Normal load	***Dial Reading***
14.5	46
24.5	77.5
34.5	109

Test Results:-

θ = 33° C = 4.0 KN/m^2



C.E.C.

DIRECT SHEAR TEST

Project	:	*Tested by*	:
Location	: BH 1 Sample 14	*Date*	:

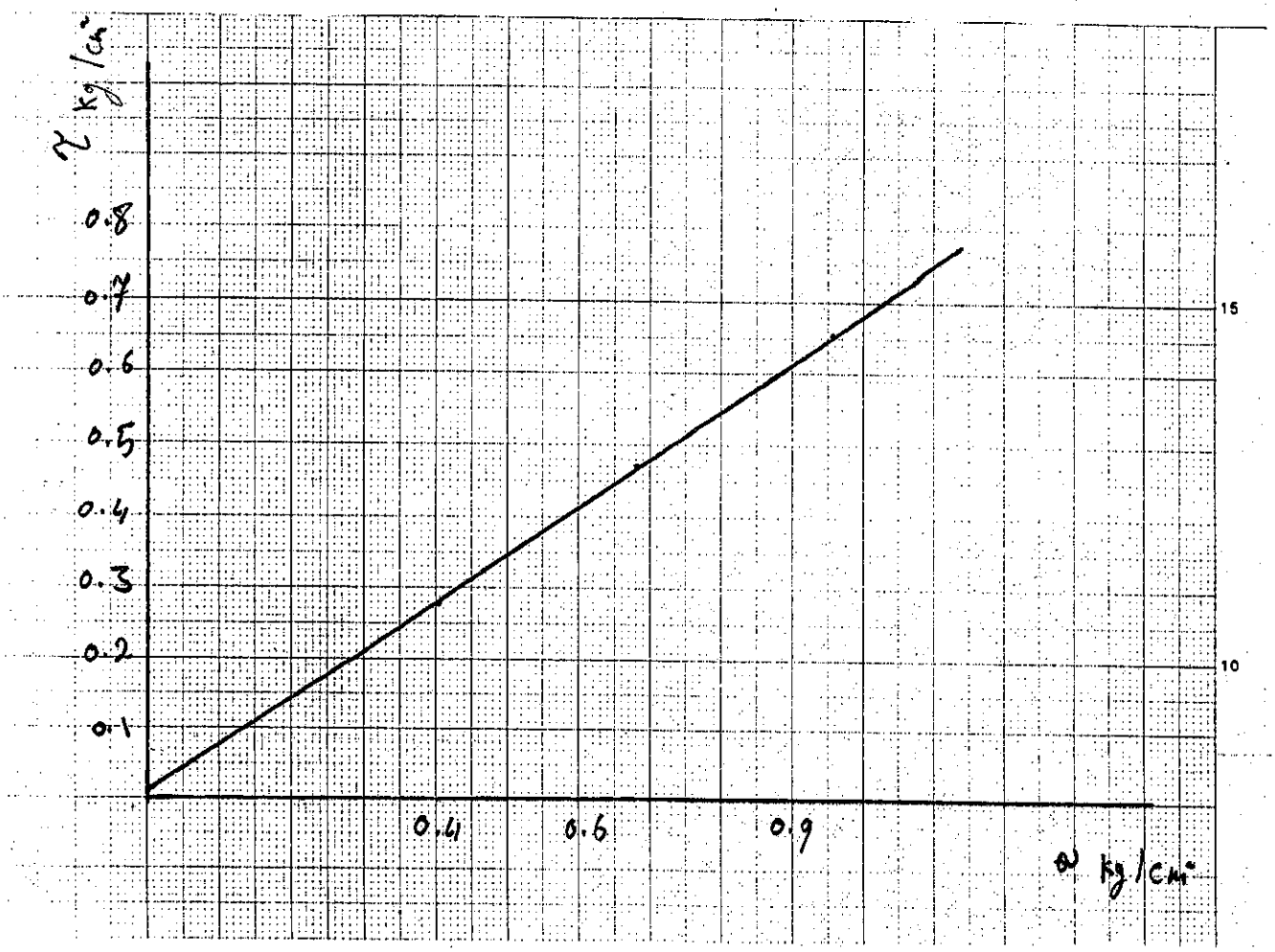
Area of Sample = 36 cm² *Ring factor* = 0.205 KN/div.

Test Readings:

Normal load	***Dial Reading***
14.5	47.5
24.5	80.5
34.5	113.5

Test Results:-

θ = 34° C = 1 KN/m²



C.E.C.

DIRECT SHEAR TEST

Project	**:**	***Tested by***	**:**
Location	**: BH 2**	***Date***	**:**
	Sample 13		

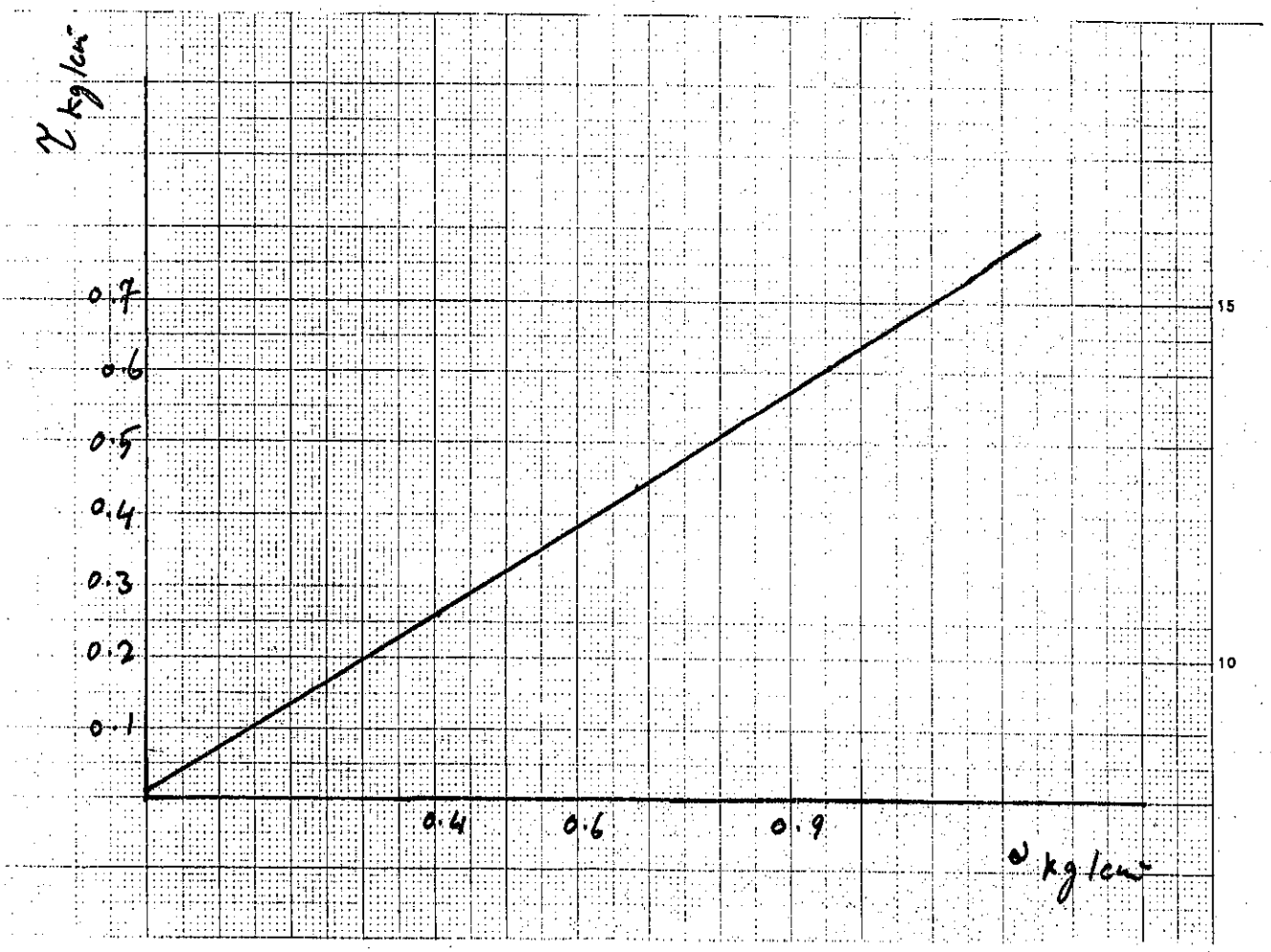
Area of Sample = 36 cm² *Ring factor* = 0.205 KN/div.

Test Readings:

Normal load	***Dial Reading***
14.5	44
24.5	75
34.5	105

Test Results:-

θ = 32° C = 1.0 KN/m²

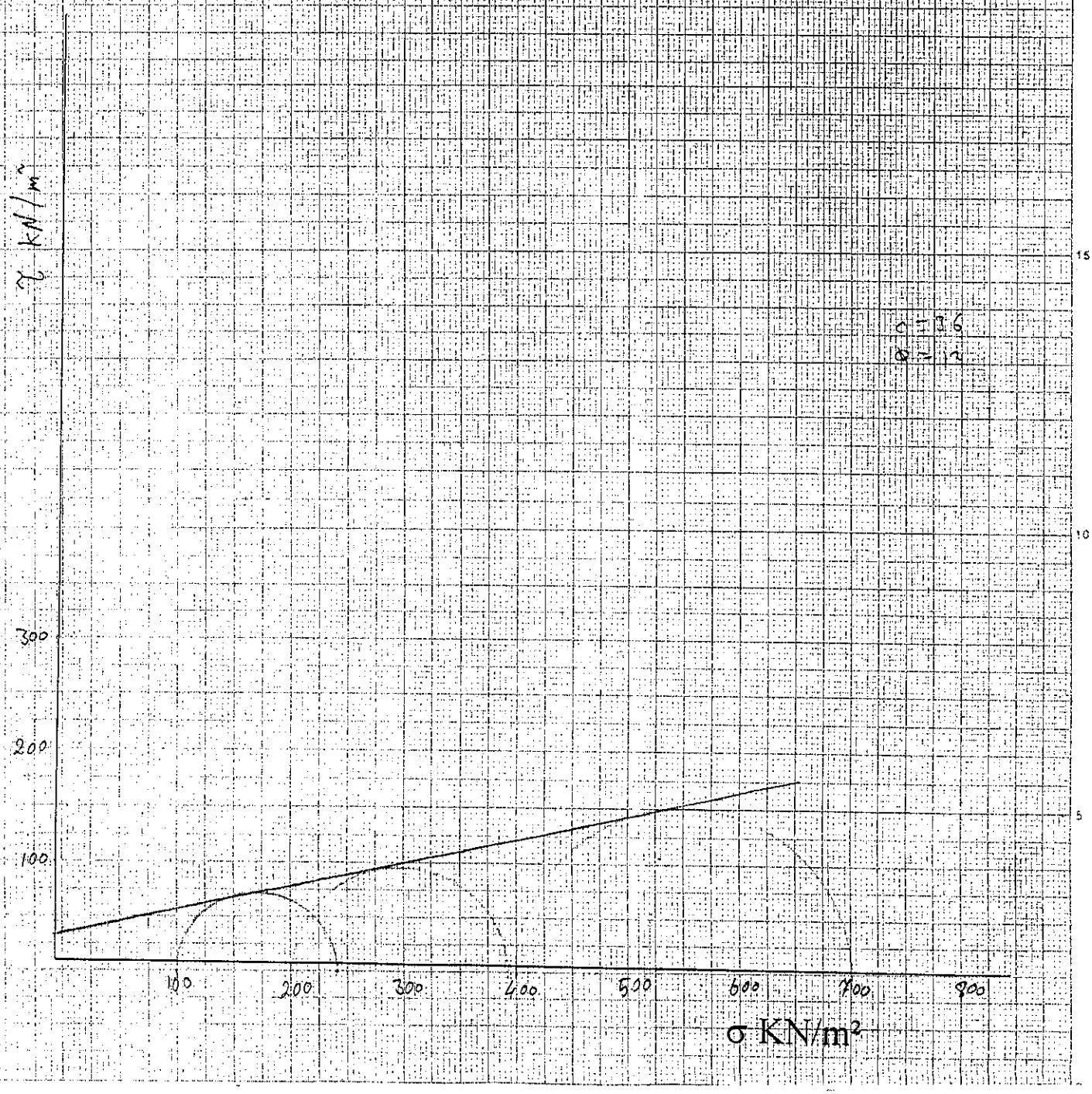


BH NO. 2 L = 7.0 cm

Depth 9.0 - 9.45 D = 3.4 cm

Stress ring factor = 0.0.25 KN/div

σ_3 (KN/m²)	Final load Reading	Final defor. Reading	ΔL (mm)	Unit Strain	Corrected area (cm²)	Deviator stress (KN/m²)
100	56	51.5	5.95	0.085	9.35	141
200	78	63.0	6.30	0.090	9.90	194
400	120	57.4	5.74	0.082	9.82	299



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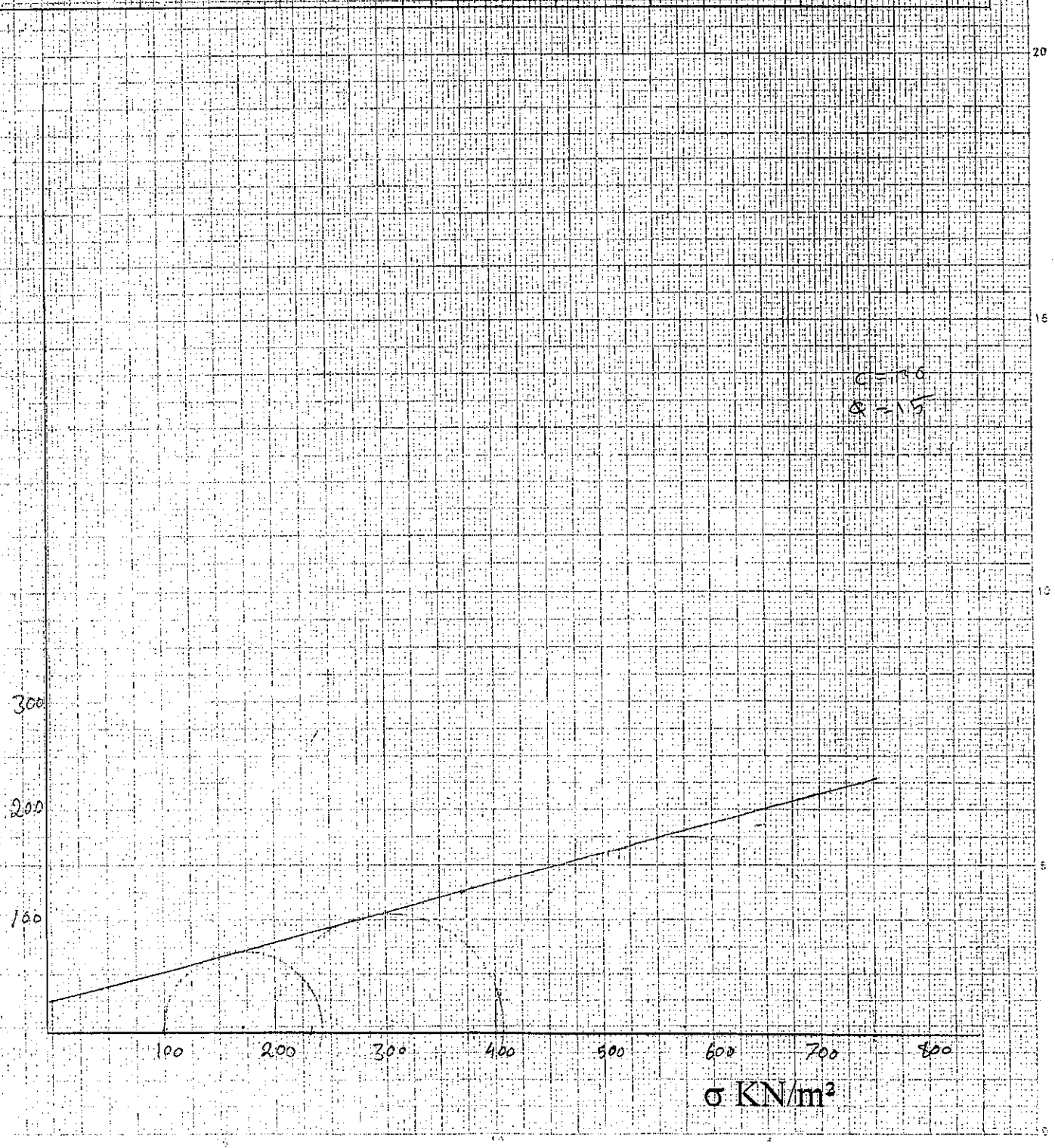
BH NO. 1 L = 6.96 cm

Depth 2.5 - 2.95 D = 3.4 cm

Stress ring factor = 0.026 KN/div.

σ_3 (KN/m²)	Final load Reading	Final defor Reading	Δ L (mm)	Unit Strain	Corrected area (cm²)	Deviator stress (KN/m²)
100	55	68.1	6.81	0.097	8.97	138
200	83	61.9	6.19	0.089	9.09	207
400	139	64.6	6.46	0.093	9.92	347



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C.E.C.

PERMEABILITY TEST

TYPE OF SOIL : -
SAMPLE NO. : (5)
LOCATION : BH.1

JOB :2000/103
DATE :

- **Test method :** Falling head method.

- **Specimen size :**

D = 9.6cm, A = 72.4cm²
L = 13.2cm, γ = gr./cm³

- **Water flow :** Down ward

Total time = 86400 Sec.
Total discharge (Q) = 2583 mm³
Q = 0.0299 mm³/sec.
Temp. = 20c°
Rt. = 1
Difference in head (h) = 165 cm

i = h/i = 12.5
k = (q/i) × (Rt/A) = 3.3×10^{-7} mm/sec.

- **REMARKS**

Material Eng. Q.N
C. E. C

C.E.C.

PERMEABILITY TEST

TYPE OF SOIL : -
SAMPLE NO. : (13)
LOCATION : BH.1

JOB :2000/103
DATE :

- **Test method :** Falling head method.

- **Specimen size :**

D = 9.6cm, A = 72.4cm²
L = 13.2cm, γ = gr./cm³

- **Water flow :** Down ward

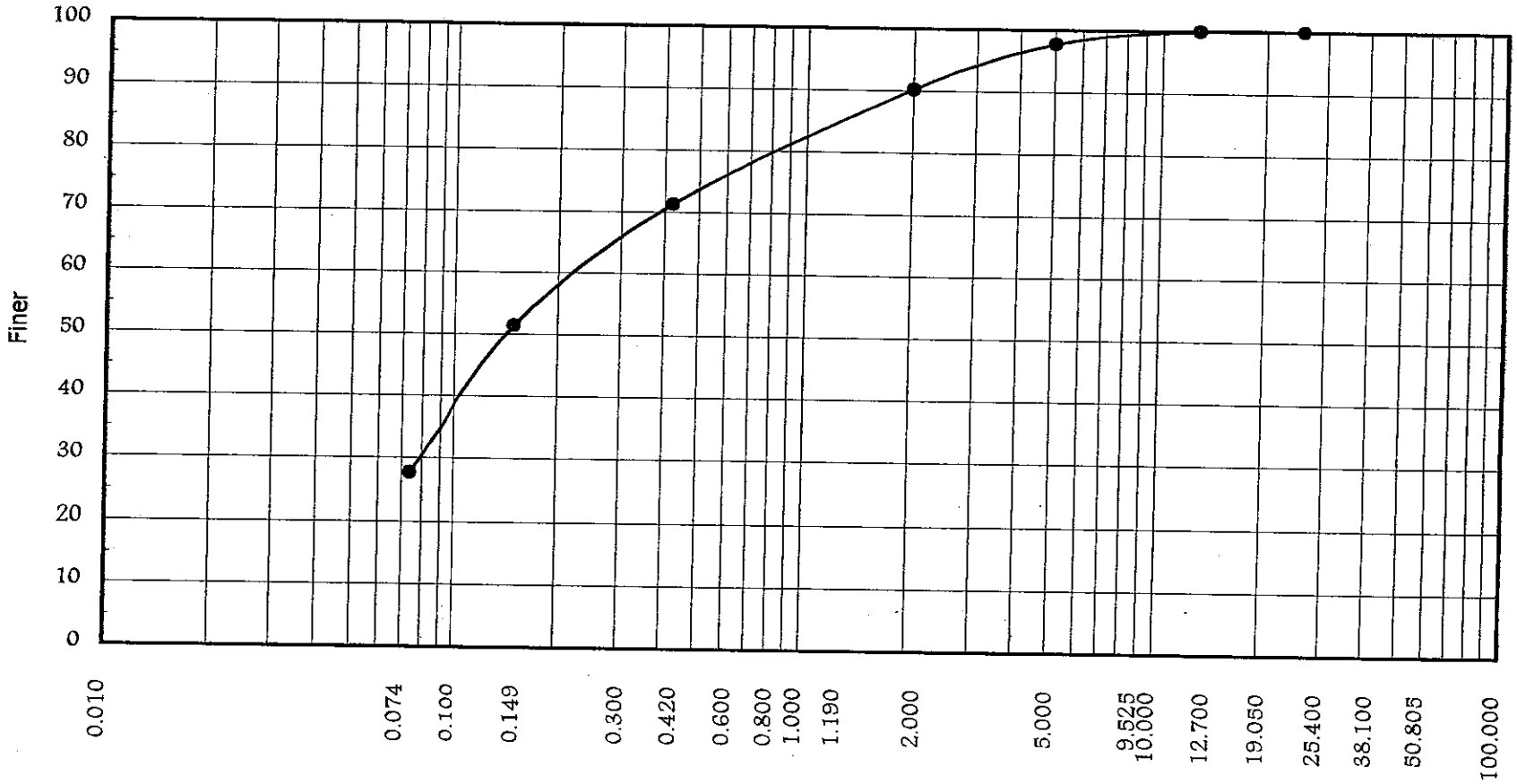
Total time = 600 Sec.
Total discharge (Q) = 526710 mm³
Q = 877.85 mm³/sec.
Temp. = 22c°
Rt. = 1
Difference in head (h) = 165 cm

i = h/i = 12.5
k = (q/i) × (Rt/A) = 9.7×10^{-3} mm/sec.

- **REMARKS**

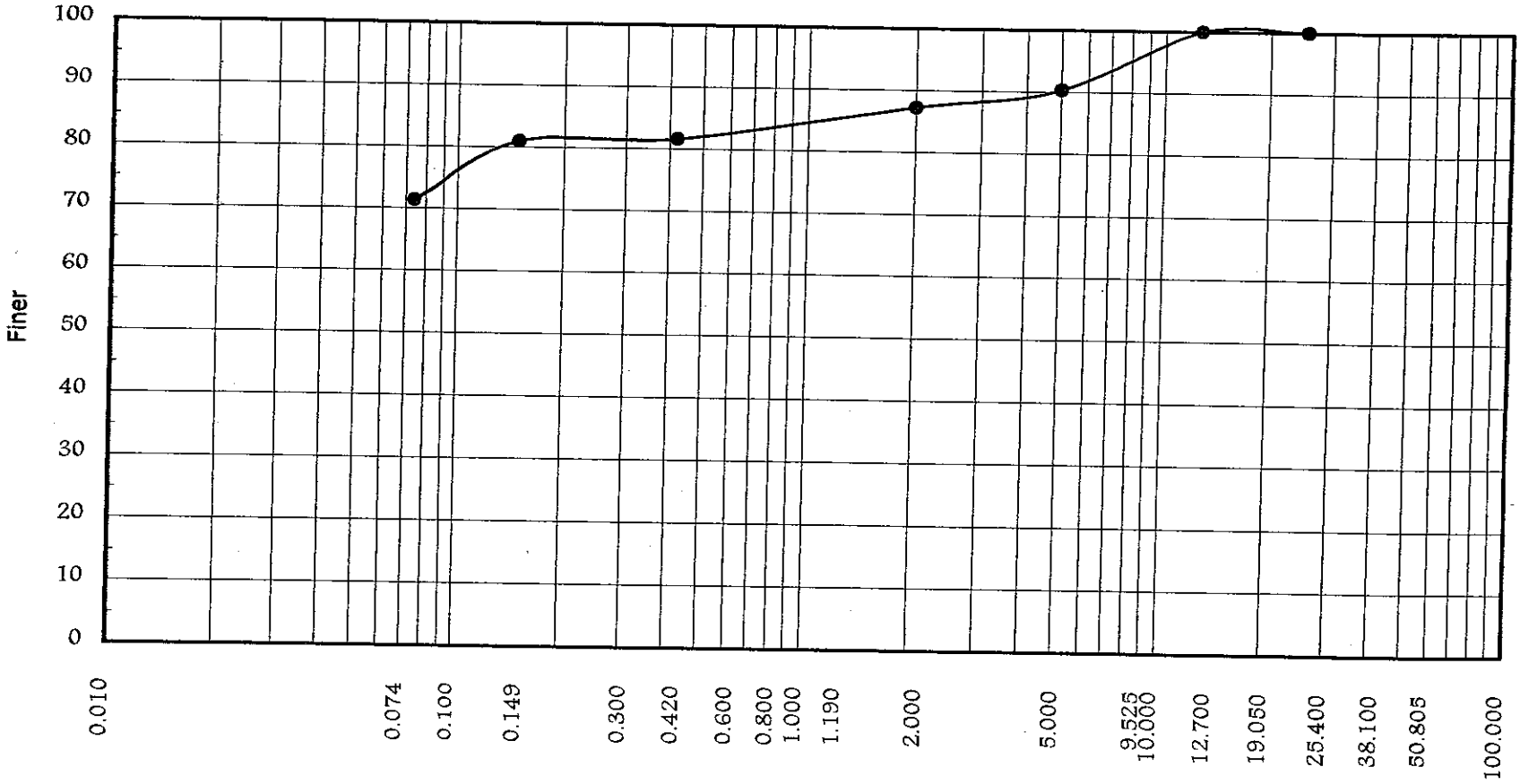
Material Eng. Q.N
C. E. C

Graphical Representation of Soil Gradation
Bore Hole no BH -1 (Depth 0.0 m to 0.5 m)
Location:Al-Mansora



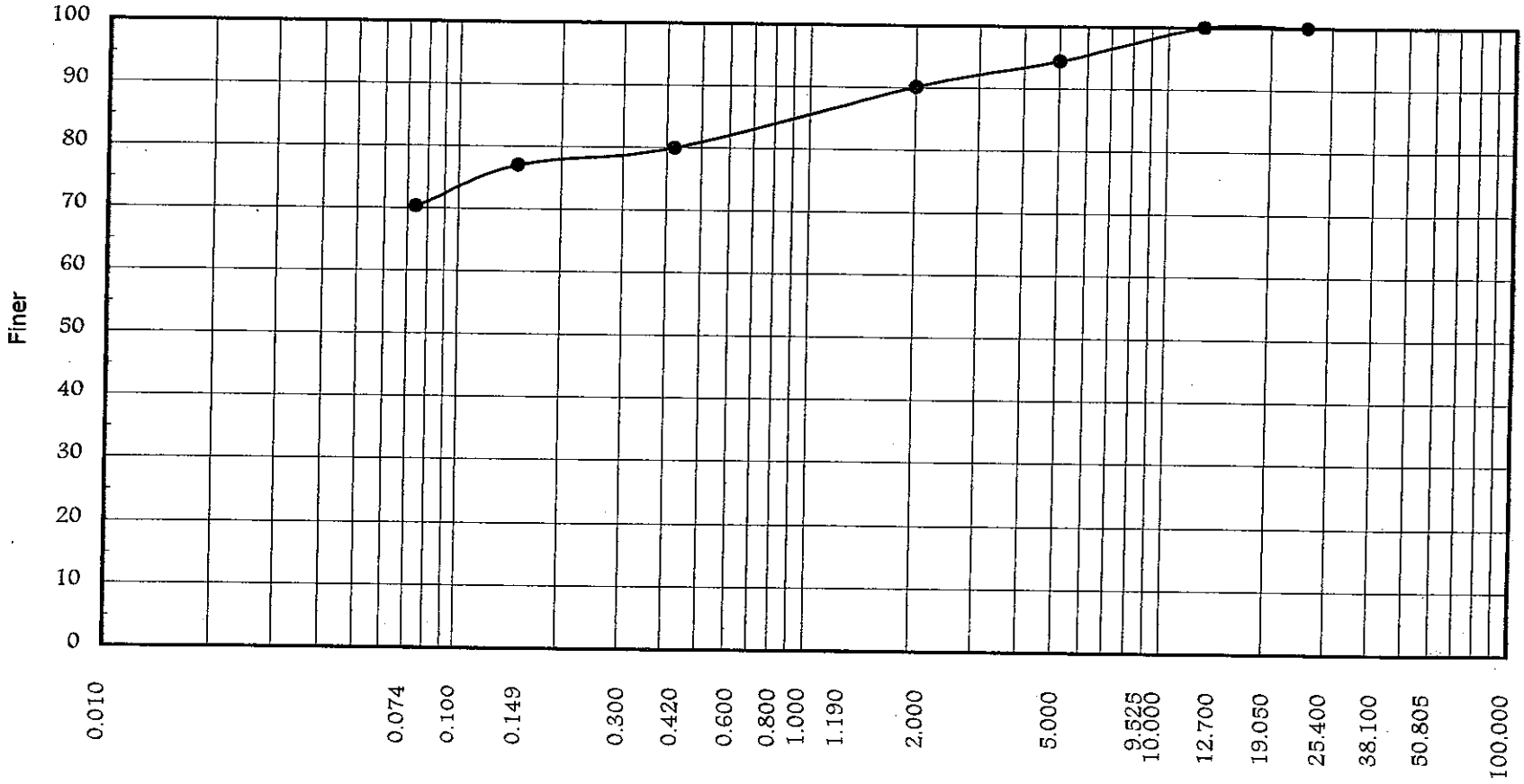
CLAY/SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE

Graphical Representation of Soil Gradation
Bore Hole no BH -1 (Depth 1.5 m to 2.8 m)
Location:Al-Mansora



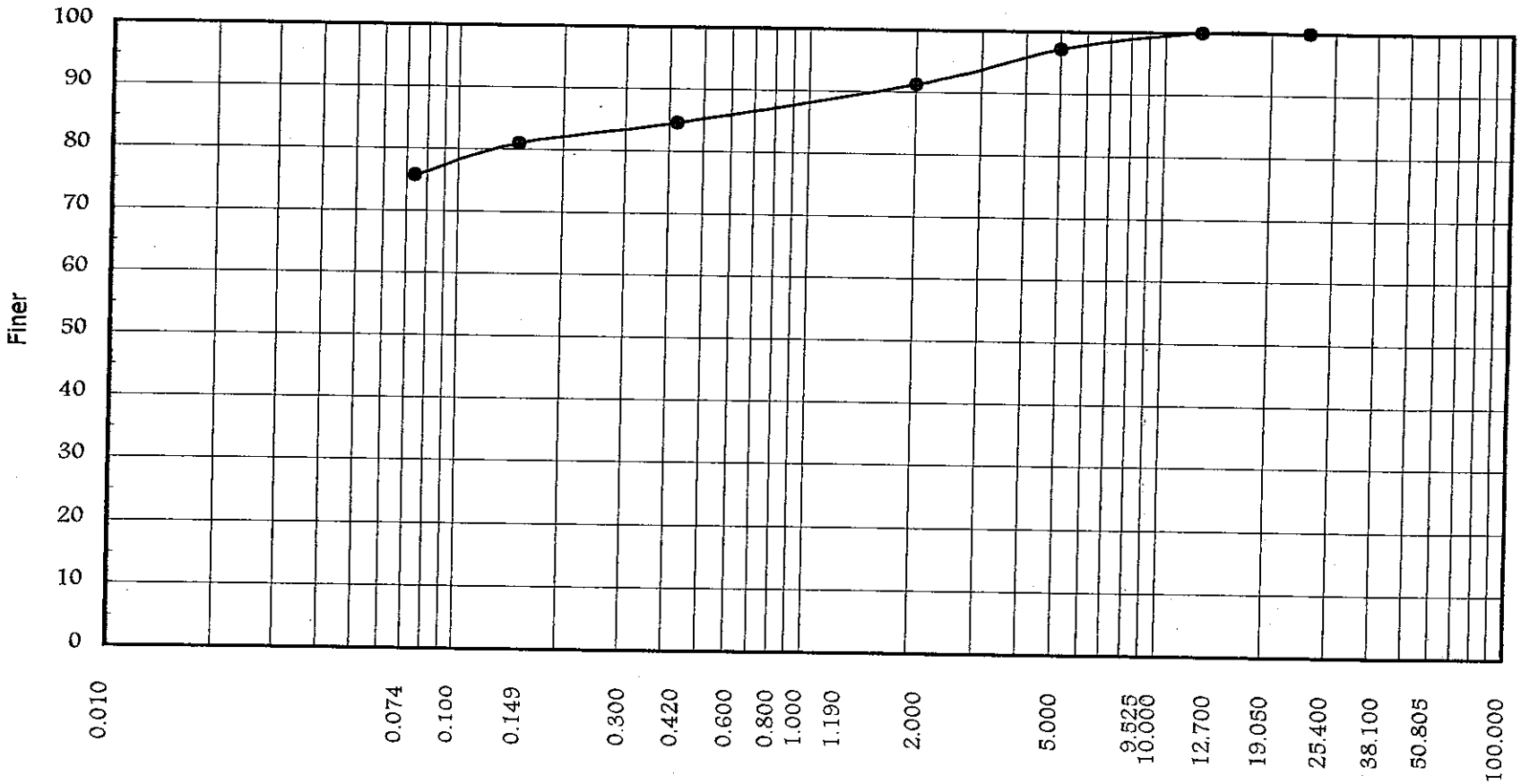
CLAY/SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE

Graphical Representation of Soil Gradation
Bore Hole no BH -1 (Depth 12.0 m to 12.5 m)
Location:Al-Mansora



CLAY/SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE

Graphical Representation of Soil Gradation
Bore Hole no BH -1 (Depth 5.0 m to 5.5 m)
Location:Al-Mansora



CLAY/SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE

Test Boring Log No.1

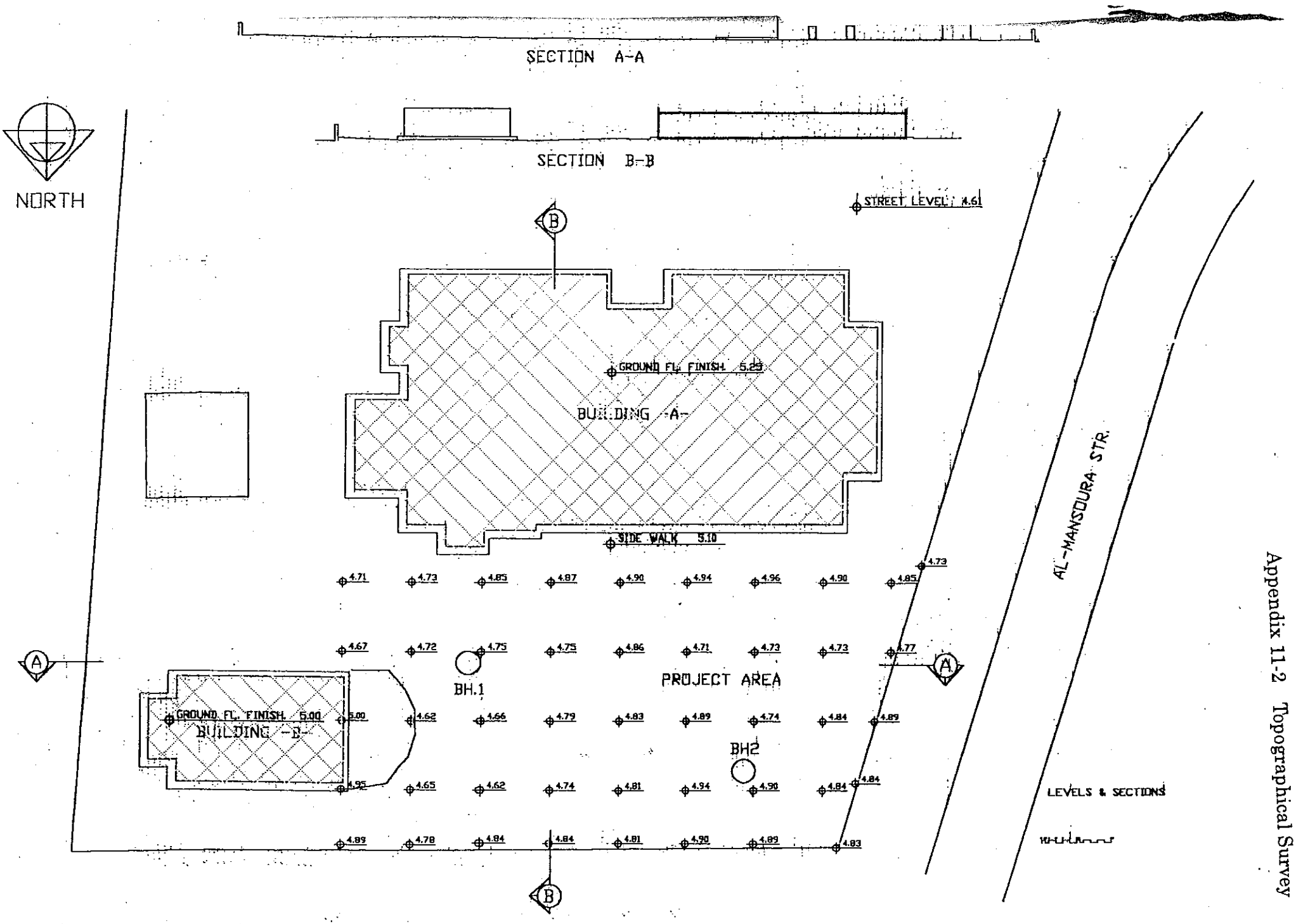
TEST BORING LOG						BORING NO. 1
PROJECT: T.C.Control Center						SHEET NO. 1/1
DRILLING METHOD: H. Stem Auger + Tricon Pit						DATE: April. 2000
LOCATION: Al Mansourah - Aden						TIME:
ELEV. (m)	THICK (m)	MOIST. COND.	COLOR	SYMBOL	IDENTIFICATION	REMARKS
	0.5	Dry	Grey		Silty Sand	loose
1						
2	-2.8 ▽					
3						
4						
5						
6						hard
7						
8						
9	15.8	Wet	Brown to Redish		Stratified clayey silt layers Each 1 - 3m	
10						
11						
12						
13						
14						
15						
16						
17						
18	3.7	Wet	Cray Light Brown		Stratified silty gravel Sand	Very dense
19						
20						

End of Excavation

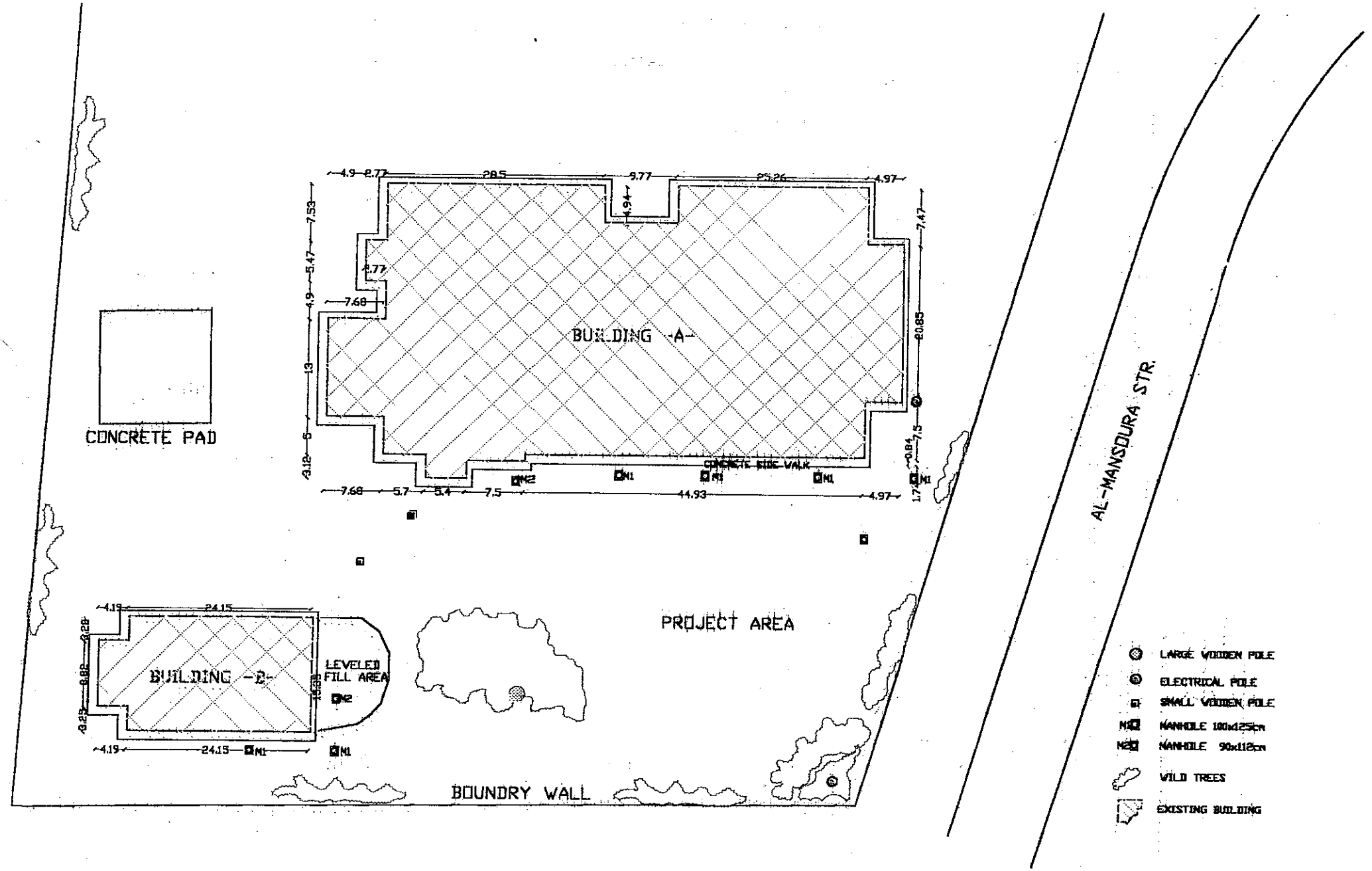
Test Boring Log No.2

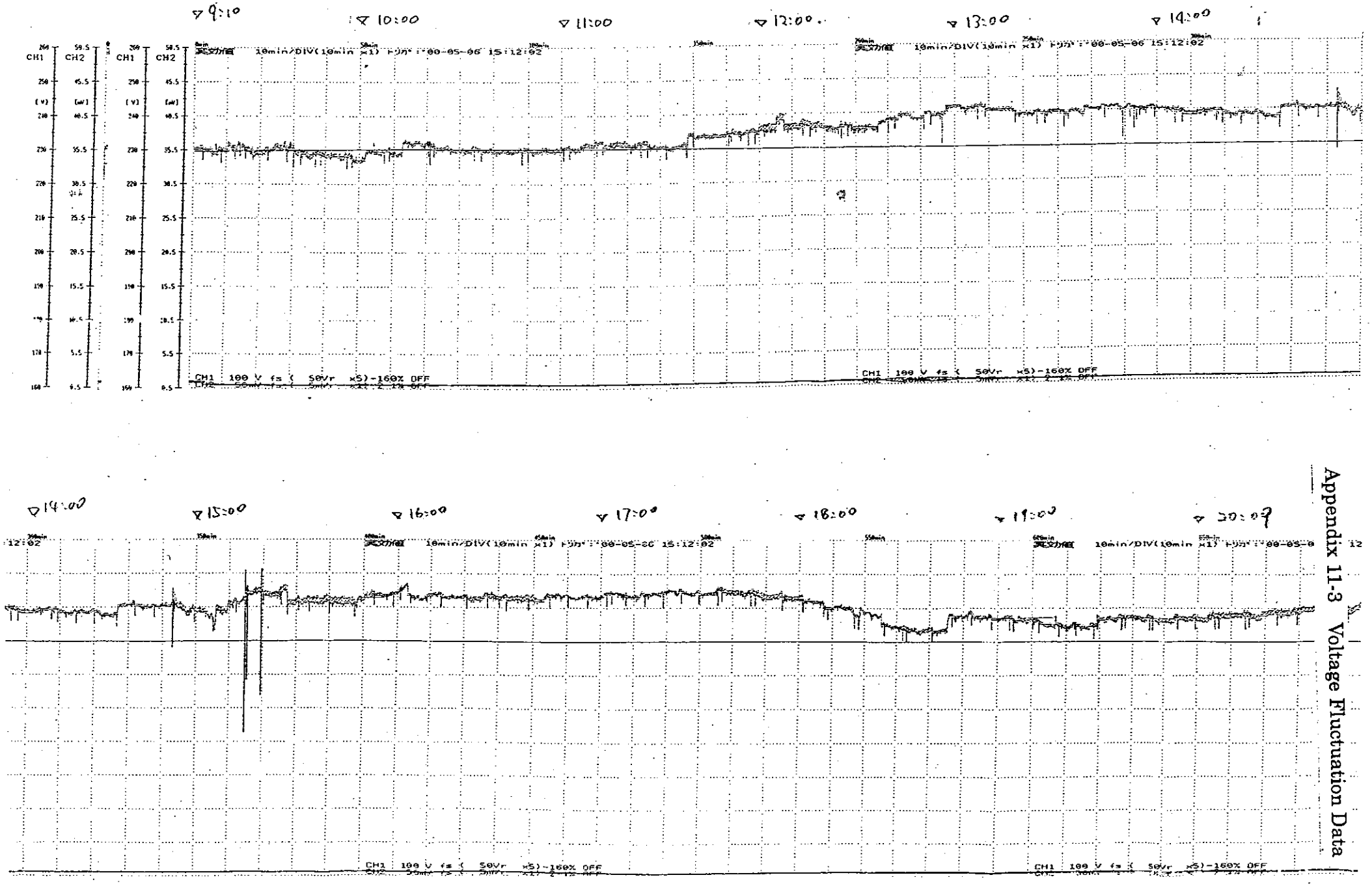
TEST BORING LOG						BORING NO. 2
PROJECT: T.C.Control Center						SHEET NO. 1/1
DRILLING METHOD: H. Stem Auger + Tricon Pit						DATE: April. 2000
LOCATION: Al Mansourah - Aden						TIME:
ELEV. (m)	THICK (m)	MOIST. COND.	COLOR	SYMBOL	IDENTIFICATION	REMARKS
	0.3	Dry	Grey		Silty Sand	loose
1						
2	-2.9 ▽					
3						
4						
5						
6						
7						hard
8						
9	15.7	Wet	Brown to Redish		Stratified clayey silt layers Each 1 - 3m	
10						
11						
12						
13						
14						
15						
16						
17						
18	4.0	Wet	Cray Light Brown		Stratified silty gravel Sand	Very dense
19						
20						

End of Excavation

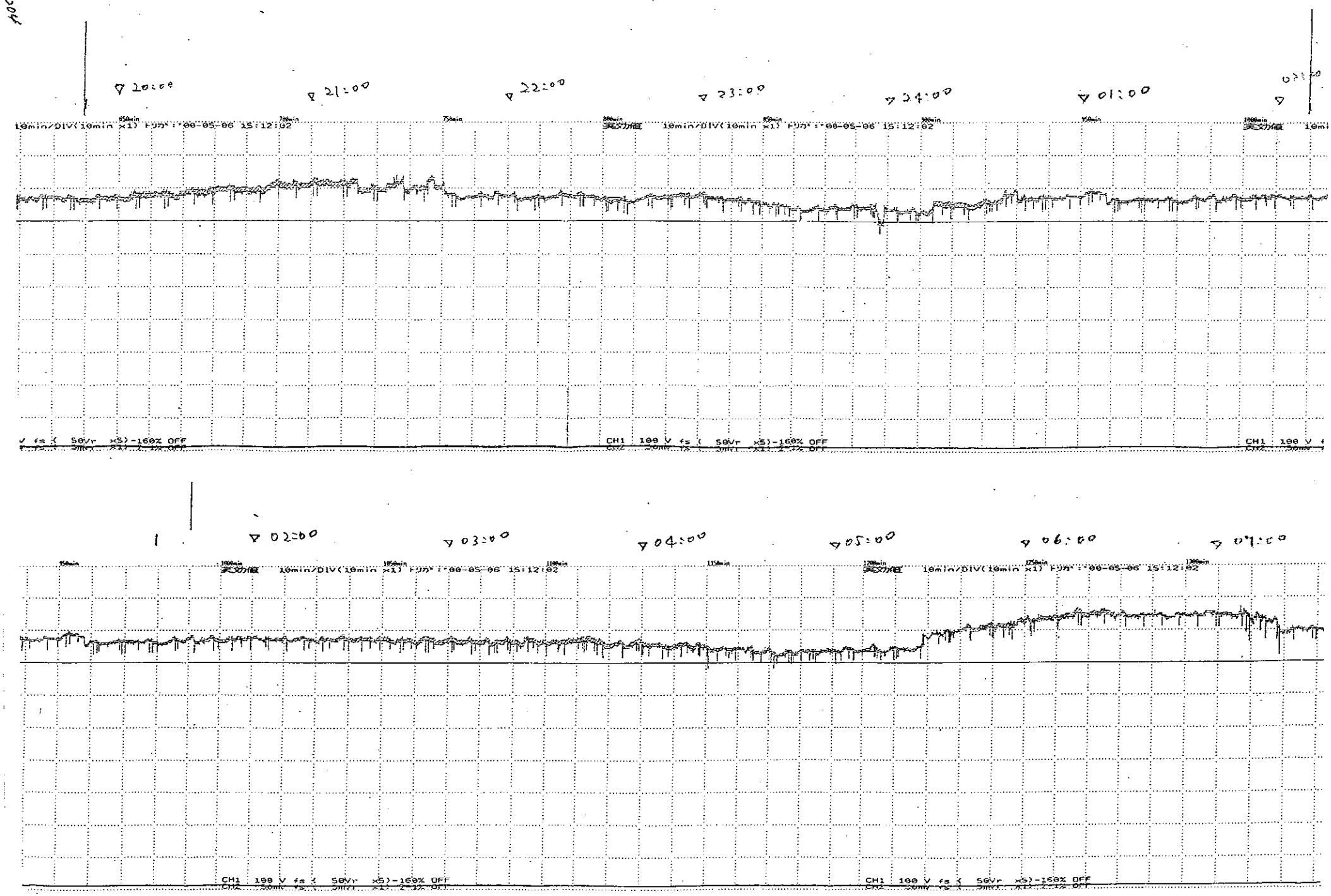


Appendix 11-2 Topographical Survey


CONCRETE PAD
BUILDING -A-
BUILDING -B-
LEVELED FILL AREA
PROJECT AREA
BOUNDRY WALL
AL-MANSOURA STR.
LARGE WOODEN POLE
ELECTRICAL POLE
SMALL WOODEN POLE
MANHOLE 100x125cm
MANHOLE 90x110cm
WILD TREES
EXISTING BUILDING



Appendix 11-3 Voltage Fluctuation Data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10min/DIV(10min x1) ﾌｧｲﾙ:-00-05-06 15:12:02
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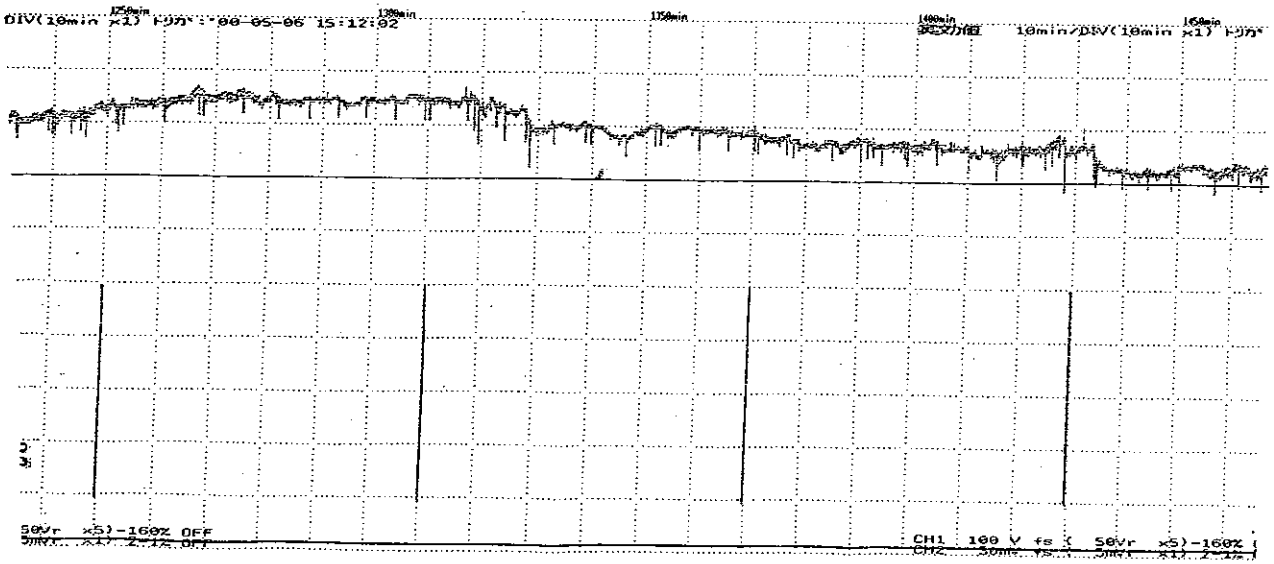

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12. Condition of the Relevant Facilities

Project Site

↑ (Photo-1) Site View from South East

↑ (Photo-2) South Side of PHC Building

↑ (Photo-3) Main Gate to PHC

↑ (Photo-4) Main Gate to Mansourah PC

↑ (Photo-5) Drainage Pit

↑ (Photo-6) Geological Survey

↑ (Photo-7) Electrical Sub-Station

Aden PHC

↑ (Photo-8) Reference Lab.

↑ (Photo-9) Reference Lab.

Aden Central Medical Storage

↑ (Photo-10) Storage Keeper Room

↑ (Photo-11) Medical Storage

Maintenance Office

↑ (Photo-12) Maintenance of Medical Equipment

↑ (Photo-13) Parts Store

↑ (Photo-14) Workshop for Wooden Goods

↑ (Photo-15) Workshop for Metal Goods

National Tuberculosis Institute (NTI)

↑ (Photo-16) Exterior

↑ (Photo-17) Corridor

↑ (Photo-18) Reference Lab.

↑ (Photo-19) Meeting Room

↑ (Photo-20) Lecture Room

↑ (Photo-21) Bed Room

↑ (Photo-22) Laboratory

↑ (Photo-23) Preparation Room

Taiz Sub Center

↑ (Photo-24) Main Entrance

↑ (Photo-25) Entrance Hall

↑ (Photo-26) Lecture Room

↑ (Photo-27) D O T S Room

↑ (Photo-28) Reference Lab.

↑ (Photo-29) Training Lab.

↑ (Photo-30) X-Ray Room

↑ (Photo-31) Dark Room

↑ (Photo-32) Corridor

Hodeidah Sub Center

↑ (Photo-33) Exterior

↑ (Photo-34) Entrance Hall

↑ (Photo-35) Reference Lab.

↑ (Photo-36) Lecture Room

↑ (Photo-37) X-Ray Room

↑ (Photo-38) Dark Room

↑ (Photo-39) Karte･Film Store

↑ (Photo-40) Consultation Roo

↑ (Photo-41) Library

↑ (Photo-42) Court Yard

↑ (Photo-43)Tuberculosis Ward

↑ (Photo-44)Tuberculosis Room

Aden Jumhuriyah Hospital

↑ (Photo-45) Male Ward

↑ (Photo-46) Exterior

↑ (Photo-47) Pantry

↑ (Photo-48) Preparatiuon Room

↑ (Photo-49) Consultation Room

↑ (Photo-50) Female Ward Pantry

↑ (Photo-51) Female Ward

↑ (Photo-52) Nurse Station

Mansourah Polyclinic

↑ (Photo-53) Main Entrance

↑ (Photo-54) Court Yard

↑ (Photo-55) Examination Room

↑ (Photo-56) DOTS Room

Boreiqa Polyclinic

↑ (Photo-57) Main Entrance

↑ (Photo-58) DOTS Room

↑ (Photo-59) DOTS Room

↑ (Photo-60) Medical Storage

Medan Polyclinic

↑ (Photo-61) Exterior

↑ (Photo-62) DOTS Room

↑ (Photo-63) Examination Room

↑ (Photo-64) Reference Lab.

Al Mu'lla Polyclinic

↑ (Photo-65) Exterior

↑ (Photo-66) DOTS Room

↑ (Photo-67) Sputum Examination Room

↑ (Photo-68) Consultation Room

Tawahi Health Unit

↑ (Photo-69) Court Yard & Treatment Room

↑ (Photo-70) Examination Room

↑ (Photo-71) Administration Office

↑ (Photo-72) Inoculation Room

Khormaksal Health Unit

↑ (Photo-73) Main Entrance

↑ (Photo-74) Waiting Hall

↑ (Photo-75) Reference Lab.

↑ (Photo-76) Pharmacy

Sheikh Othman Polyclinic

↑ (Photo-77) Entrance Hall

↑ (Photo-78) Waiting Hall

↑ (Photo-79) Reference Lab.

↑ (Photo-80) X-Ray Room

Sana Central Public Health Laboratory

↑ (Photo-81) Main Entrance

↑ (Photo-82) Laboratory

↑ (Photo-83) Laboratory

↑ (Photo-84) Laboratory

Aden Healh Institute

↑ (Photo-85) Court Yard

↑ (Photo-86) Drawing Room

↑ (Photo-87) Computer Room

↑ (Photo-88) Dormitory Bed Room

アデン保健学校

↑ (Photo-89) Exterior

↑ (Photo-90) Director Room

↑ (Photo-91) Lecture Room-1

↑ (Photo-92) Lecture Room-2

Survey of Infrastructure

↑ (Photo-93) Sewrage Treatment Plant

↑ (Photo-94) Sewrage Treatment Plant

↑ (Photo-95) Sewrage Treatment Plant

↑ (Photo-96) Sewrage Treatment Plant

↑ (Photo-97) Well near the Water Source

↑ (Photo-98) Same Left

↑ (Photo-99) Thermal Power Station

↑ (Photo-100) Garbage Dump

13. References

Appendix 13 References

Reference Materials List

1.MOPD

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
MPD-1	Statistical Year-Book, 1998	MOPD/CSO	Apr-99	2000/5/3	408pp.	Original	E/A
MPD-2	Statistical Year-Book, 1996	MOPD/CSO	Apr-97			Copy	E/A
MPD-3	The Yemen First Five Year Plan(1996-2000)	MOPD				Copy	E/A
MPD-4	Financial and Monetary Indicators	MOPD/CSO	1997	2000/5/17	7pp.	Copy	E/A
MPD-5	Yemen in Figures, 1997	MOPD/CSO	June,1998	2000/5/17	96pp.	Original	E/A
MPD-6	Population Estimates by Administrative and Geographical Subdivisions, 1994-2005	MOPD/CSO	Dec,1996	2000/5/17	124pp.	Original	E/A

2.MOPH

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
MPH-1	Health Sector Reform in the Republic of Yemen Volume 1: Strategy for Reform	MOPH	Dec-98	2000/4/30	60pp.	Copy	E
MPH-2	Annual Health Report, 1998	MOPH		2000/4/30		Original	A
MPH-3	National TB Control Programme: Annual Report,	MOPH/JICA				Copy	E
MPH-4	Health Science Newsletter, Dec/1997					Copy	E
MPH-5	Manual of the National TB Control Programme in the Republic of Yemen	MOPD/NTP	1996	2000/4/18	93pp.	Original	E

3.NTI

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
NTI-1	Budget Allocation, 2000	NTI	2000/4/10	2000/4/20	1pp.	Copy	A
NTI-2	Activities of NTI,1990-1995	NTI		2000/4/20	1pp.	Copy	A
NTI-3	Training of NTI,1996 and 1997	NTI		2000/4/20	1pp.	Copy	A
NTI-4	Training of NTI, July to November 1998	NTI		2000/4/20	1pp.	Copy	A
NTI-5	Budge and Income of NTI in 1998	NTI/JICA		2000/4/20	3pp.	Copy	E
NTI-6	Plan of Operations: Yemen TB Control Project III	NTI/JICA		2000/4/29	1pp.	Copy	E
NTI-7	Chart Organization of Aden TB Center	NTI		2000/4/29	1pp.	Copy	E
NTI-8	Population/1998	NTI		2000/4/29	1pp.	Copy	E
NTI-9	Health Monpower/1998-2	NTI		2000/4/29	1pp.	Copy	E
NTI-10	DOTS Population Coverage	NTI		2000/4/29	1pp.	Copy	E
NTI-11	Health Manpower in TB Control(Salaries)	NTI		2000/4/29	1pp.	Copy	E
NTI-12	The Organogram e of NTI	NTI		2000/4/29	3pp.	Copy	E
NTI-13	Training Activities/1999	NTI		2000/4/28	2pp.	Copy	E
NTI-14	Conversion Rate of Smear-Positive P.TB. Cases to Negative at 2,3 months of the	NTI		2000/4/28	2pp.	Copy	E

NTI-15	All Smear-Positive P.TB. Cases detected/1998/Dots Coverage related to all new Sm.	NTI		2000/4/28	4pp	Copy	E
NTI-16	Table shows new Sm.+,R.,T/l.,T/D. and O.+ recorded	NTI		2000/4/28	2pp.	Copy	E
NTI-17	Q1/1998/New P.Sm.+ TB. cases/Non-Dots Tx.	NTI		2000/4/28	4pp.	Copy	E
NTI-18	CF./1999/DOTS/Gvs./Ds./Hfs./Data is from Districts	NTI		2000/4/28	4pp.	Copy	E
NTI-19	イエメン結核対策プロジェクト(III)概要	NTI/JICA		2000/4/30	4pp.	Copy	J
NTI-20	Guideline of Supervision and Quality Control for TB Laboratories	NTI/JICA	Jun-98	2000/5/3	7pp.	Copy	E
NTI-21	NTP TB Laboratory, 1999	NTI/JICA	1999	2000/5/3	3pp.	Copy	E
NTI-22	Schedule of the GTC Meeting 2000	NTI/JICA		2000/5/3	1pp.	Copy	E
NTI-23	Curriculum oh the Training Courses	NTI		2000/5/12	3pp.	Copy	E/A
NTI-24	プロ技協供与機材リスト2000年(案)	NTI/JICA		2000/5/13	1p.	Copy	E
NTI-25	NTP Training Courses and Meetings at Aden, Plan 2002	NTI/JICA		2000/5/13	1p.	Copy	E/J

4.Aden PHC

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
APH-1	Health Statistics Aden, 1997	Aden Health				Copy	A
APH-2	Number of Graduates: Aden HIHS	HIHS	1999	2000/5/5	1p.	Copy	A
APH-3	School Brochure: Aden HIHS	HIHS	1996	2000/5/5	20pp	Original	E
APH-4	General Specifications for Building	MOC	1977	2000/5/2	???	Copy	E
APH-5	Aden PHC Office: Organization Charts	PHC	1999	2000/5/5	???	Copy	A
APH-6	DOTS Expansion Plan in the Southern and Eastern	NTP		2000/5/7	1p.	Copy	E
APH-7	Organization of Aden PHC Office	Aden PHC Office	2000	2000/5/7	30pp.	Copy	A
APH-8	Organizational Skeleton for PHC, Aden Governorate	Aden PHC Office		2000/5/7	3pp.	Copy	E/A
APH-9	Health Statistics in Aden 1990-1999	Aden Health	2000	2000/5/7	121pp.	Copy	A
APH-10	アデン州PHC事務所の研修内容	PHC		2000/5/9	14pp.	Copy	A
APH-11	水質検査結果(アデン州PHC事務所)	PHC		2000/5/9	2pp.	Copy	A
APH-12	アビヤン州保健職員･施設数	PHC		2000/5/9	2pp.	Copy	A
APH-13	アデン州PHC年次活動計画、1999年	PHC	1999	2000/5/9	38pp.	Copy	A
APH-14	アデン州財務資料	Aden Health		2000/5/9	14pp.	Copy	A

5. TB CENTER: TAIZ, HODAIDAH

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
TBC-01	Annual Report of NTP/TAIZ, 1999	Taiz TB Center		2000/5/10	23pp.	Copy	A/E
TBC-02	Taiz TB Center, Budget 1998	Taiz TB Center		2000/5/10	6pp.	Copy	A
TBC-03	Taiz TB Center, Plan for Implementation 2000	Taiz TB Center		2000/5/10	4pp.	Copy	E
TBC-04	TB Registration Cards	Taiz TB Center		2000/5/10	4 pcs	Original	A
TBC-05	Case Finding: Quarterly Report,1999	Hodaidah TBC		2000/5/13	1p.	Copy	E
TBC-06	WFP:食糧支給カード	Hodaidah TBC		2000/5/13	1p.	Original	A
TBC-07	Map of Hodaidah City	Hodaidah TBC		2000/5/13	1p.	Copy	E

6. Others

No.	Title	Issued by	Issued on	Received	Pages	Nature	Language
OTH-1	Cost Sharing for Health Services	MOPH	Dec-97	2000/5/2	13pp.	Copy	E
OTH-2	Transformation of the 5 Year Plan	MOPH/HSRC	Jan-98	2000/5/2	36pp.	Copy	E
OTH-3	Highlights on Planing of Human Resources	MOPH/CP	?	2000/5/2	10pp.	Copy	E
OTH-4	What about all these Teams, Councils, Committees?	HESAS	1999/8/17	2000/5/2	4pp.	Copy	E
OTH-5	Donors Health Sectorial Committee	MOPH/HSC	1999/4/24	2000/5/2	6pp.	Copy	E
OTH-6	Health Information of Yemen		1999/9/16	2000/5/2	12pp.	Copy	E
OTH-7	The Cabinet's Decree No.(15) of 1999 regarding the Community Participation in the Health & Curative Services & Regulating the Work of the Central Public autonomous Hospitals	MOF/MOPH	1999/1/26	2000/5/2	17pp.	Copy	E
OTH-8	Members of the Health Sector Coordination Meeting	~	~	2000/5/2	1pp.	Copy	E
OTH-9	UNICEF:1999-2001 Country Program of Cooperation: Volume 2 Program Plans of Operations	UNICEF	?	2000/5/2	54pp.	Copy	E
OTH-10	保健セクター・ドナー会合	MOPH/HSC	2000/2/21	2000/5/2	2pp.	Copy	J
OTH-11	MSF/Doctors without Borders: Activities in the Republic of Yemen	MSF/Yemen	Jul-97	2000/5/2	4pp.	Copy	E
OTH-12	USAID/Yemen: Activity management Office	USAID/Yemen	1997	2000/5/2	7pp.	Copy	E
OTH-13	Health Task Force Sub-Committee Meeting on Setting Standards	UNICEF	1998/8/16	2000/5/2	4pp.	Copy	E
OTH-14	Health Services in the Republic of Yemen, Handbook for Standards: Module 2 Health Unit	MOPH/CSS	1999/10/9	2000/5/2	7pp.	Copy	E
OTH-15	Yemen TB Control Project(III): PDM	MOPH/JICA	Nov-99	2000/5/2	8pp.	Copy	E/J
OTH-16	Health Sector Donors Co-ordination: Proposal on employment of trained health personnel	MSF/Yemen	Nov-99	2000/5/2	4pp.	Copy	E
OTH-17	Points of Clarification about Management Structure for the HSR	MOPH/HSRC	Nov-99	2000/5/2	12pp.	Copy	E
OTH-18	Summary Report of the In-depth review mission of the NTCP of Republic of Yemen (9-22 April 1999)	MOPH/WHO	Apr-99	2000/5/2	13pp.	Copy	E
OTH-19	Cost-sharing of Medical Expenses by Local Communities Act (First Draft, October 1997)	MOPH	Oct-97	2000/5/2	14pp.	Copy	E
OTH-20	MSF/Annual Report Yemen 1998	MSF/Yemen	1998	2000/5/3	39pp.	Copy	E
OTH-21	Yemen: Tourist Guide	MOCT	Jan-96	2000/5/3	115pp.	Copy	E
OTH-22	WHO: Joint Program Review Mission2000-2001	WHO	1999	2000/5/13	2pp.	Copy	E
OTH-23	総合報告書:結核対策プログラム管理(単発)/渡辺勝美	JICAプロ技協	1999/8/5	2000/5/13	47pp.	Copy	J
OTH-24	業務報告書:イエメン共和国結核対策/下内　昭	JICAプロ技協	Apr-98	2000/5/13	13pp.	Copy	J
OTH-25	Summary Report on TB Laboratory Activities to NTCP in the Republic of Yemen/Ms.Mika　Horie	JICAプロ技協	Jul-98	2000/5/13	18pp.	Copy	E
OTH-26	アデン共和国病院の結核病棟改修工事について/渡辺勝美	JICAプロ技協	Jul-98	2000/5/13	5pp.	Copy	E
OTH-27	短期派遣専門家報告書(Draft)/江上由里子	JICAプロ技協	Mar-99	2000/5/13	29pp.	Copy	J/E
OTH-28	イエメン在住難民に対する結核対策について	JICAプロ技協	Mar-99	2000/5/13	2pp.	Copy	J
OTH-29	業務報告書:イエメン共和国国家結核対策(III)/南川真理子	JICAプロ技協	2000/4/3	2000/5/13	33pp.	Copy	J/E