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The Proposed Construction of Anand Lake Front Residential Apartment Building at Sy No. 245 / 1b, Thally Road, Hosur – 635109 (TN).

REPORT SUBMITTED TO :

M/s RG ASSOCIATES,

HSR Layout, Bangalore.



SEPTEMBER- 2022

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MAIN GEOTECH REPORT

1. Introduction

The foundation is the part of an engineered system that transmits to, and into, the underlying soil or rock the loads supported by foundation and its self-weight. The resulting soil stresses-except at the ground surface-are in addition to those presently existing in the earth mass from its self-weight and geological history. Also, the successful performance of Foundation Structure depends as much as adopting standards of good load distribution successfully to the ground.

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.

The elements of Geotechnical Site Investigation depend heavily on the project but generally should provide the following.

- Information to determine the type of foundation required (shallow or deep)
- Information to allow the geotechnical engineer to make a recommendation on the allowable load capacity of the foundation.
- Sufficient data / laboratory tests to make settlement predictions.
- Location of Ground Water Table (or determination of whether, it is in the construction zone)
- Information so that the identification and solution of construction problems
- Identification potential problems (settlements, existing damage etc)

2. Location of Proposed Anand Lake Front Residential Apartment Building Site

The Proposed Construction of Anand Lake Front Residential Apartment Building at Sy No. 245/1b, Thally Road, Hosur, Tamilnadu

The Plan of proposed Construction of Anand Lake Front Residential Apartment Building Showing Location of Borehole Investigations were carried out is enclosed vide *Annexure 6.1, Figure No. 1*.

3. Objectives and Scope of Work

3.1 Objectives

The objectives of Geo-Technical Investigation are to evaluate the following:

- To ascertain the sub-soil strata of Site
- To study standing Ground Water Level
- To study the physical and engineering properties of soil strata
- To evaluate allowable safe bearing capacity of soils to design foundations
- To Recommend type and depth of foundation
- To recommend improvements to the weak soil strata if any

3.2. Scope of the Work

The Scope of Geo-technical Investigations includes the following Insitu and Laboratory Tests.

3.2.1. Field Investigations

- i) To study sub-soil strata, field investigations were carried out by Boring 6 Nos. 150-mm dia Boreholes in kinds of soils and Soft Disintegrated Weathered Rock up to 10.00m from excavated level or up to refusal strata (N>50 Blows for 15 cms penetrations) whichever encounter earlier using Rotary operated Boring Rig Equipment at the specified locations.
- ii) Determination of natural density as per IS: 2720 Part 29.
- iii) Conducting field-testing such as Standard Penetration Tests as per IS: 2131-1981.
- iv) Collecting Undisturbed Soil / Sand Samples as per IS: 8763 – 1978.
- v) Collecting disturbed and representative soil samples at Ground level in the Boreholes as per IS: 1892-1979.

3.2.2. Laboratory Testing

The scope of Laboratory Testing is as follows:

- i) Grain Size Analysis as per IS: 2720 (Part 4) – 1985.
- ii) Specific Gravity as per IS: 2720- (Part 3 / Section 1&2) - 1980.
- iii) Atterberg Limits as per IS: 2720 (Part 5) – 1985.
- iv) Determination of natural moisture content as per IS 2720 (Part 18) - 1978.
- v) Determination Differential Free Swelling Index as per IS: 2720 (Part 40) - 1977
- vi) Determination of Triaxial Strength tests by CU method as per IS: 2720 – (Part 10) - 1973 or
- vii) Determination of C and ϕ By Direct Shear Tests as per IS: 2720
- viii) Determination of Rock Core Density, Water Absorption, Unit Weight and UCC Strength as per IS 9143.

3.3. Report

This comprises preparing a detailed report including soil profiles, physical and engineering properties of soil/rock samples based on laboratory as well as field investigation/tests, recommendations regarding type and founding depth of foundations, allowable bearing pressure, allowable vertical load on piles, settlement of foundations and improvement to existing Foundation Soils etc and submission of Detailed Geotechnical Investigation Report with complete relevant recommendations in duplicate.

4.0. Schedule of Investigations

4.1. Field Investigations

To study sub-soil strata, field investigations were carried out by Boring 6 Nos. 150-mm dia Boreholes in kinds of soils and Soft Disintegrated Weathered Rock up to 12.50 m using Rotary operated Boring Rig Equipment at the specified locations.

Plan showing location of Borehole Investigations is enclosed vide *Annexure 6.1, Fig. No.1.*

Table 4.1 Details of Termination depth of Borehole

Sl No.	Location	BH No.	Termination Depth from EGL (m)	Remarks
1.	As per Plan	RBH 1	10.50	
2.	As per Plan	RBH 2	10.50	
3.	As per Plan	RBH 3	12.50	
4.	As per Plan	RBH 4	9.00	
5.	As per Plan	RBH 5	10.00	
6.	As per Plan	RBH 6	10.50	

ABH: Borehole through Hand Operated Auger

4.2 Standard Penetration Tests

Standard Penetration Tests (SPT) was conducted using split spoon sampler as per IS: 2131-1981 at various depths in Boreholes to determine 'N' values as well as relative density and stiffness of the soil.

Table 4.2 Details of SPT Tests conducted in Boreholes

Sl No	BH No.	SPT Depth / Level (m) & SPT Values (Blows)						
		1.0 / 5.0	1.5 / 6.0	2.00 / 7.0	2.50 / 8.0	3.00 / 9.0	3.50 / 10.0	4.0 / 11.0
1.	RBH 1	3+4+6 / 13+50 +Refusal	5+5+7 / 50 for 11cms	7+7+9 / 50 for 10cms	10+12+14 / 50 for 8cms	14+22+27 / 50B for 7cms	15+25+25 / 50B for 6cms	20+20+30
2.	RBH 2	4+4+6 / 9+16+25	4+5+8 / Refusal	5+7+8 / 50 B for 8cms	11+11+13 / 50B for 6cms	11+18+22 / 50B for 7cms	14+15+18 / 50B for 7cms	18+22+25
3.	RBH 3	3+4+4 / Refusal	4+4+5 / 50B for 8cms	5+5+6 / 50B for 10cms	6+7+8 / 50B for 13cms	7+11+14 / 50B for 14cms	10+17+22 / 50B for 4cms	15+20+25 / 50B for 5cms
4.	RBH 4	4+5+5 / 15+22+32	5+5+6 / 50B for 11cms	7+8+9 / Rebound	11+12+15 / Rebound	20+22+23 / Rebound	21+22+24 / Rebound	20+25+28 / Rebound

5.	RBH 5	3+4+6 / 15+20+25	5+6+6 / Rebound	6+7+9 / Rebound	7+11+13 / Rebound	14+22+28 / Rebound	21+25+25 / Rebound	11+19+30 / Rebound
6.	RBH 6	5+6+7 / Refusal	5+5+5 / Refusal	6+7+9 / 50B for 5cms	7+8+10 / 50B for 9cms	11+17+20 / 50B for 10cms	15+17+22 / 50B for 9cms	15+25+25 / --

ABH: Borehole through Hand Operated Auger penetrations)

R: Refusal (N>100 Blows for 30 cm

UDS: Undisturbed Soil Samples R: Rebound (No Penetrations)

4.3 Sampling

4.3.1 Disturbed / Representative Soil Samples (DS/RS) and UDS Soil Samples

Disturbed/Representative samples (DS/RS) were collected during drilling and also during SPT Tests. The Representative Samples from the split spoon sampler and UDS samples using 100 mm thin-walled Shelby tubes were also collected. The samples recovered were packed in polythene bags, labeled, and sent to the laboratory for carrying out relevant laboratory testing.

Table 4.3 Details of Soil Samples collected from Boreholes.

Sl. No	BH No.	Depth of Sampling from Excavated Level (m)	Type of Sampling
1.	RBH 1	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 0.50, 1.25, 2.25 0.0 to 1.0	SPT/DS UDS DS
2.	RBH 2	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 0.50, 1.25, 2.25 0.0 to 1.0	SPT/DS UDS DS
3.	RBH 3	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 0.50, 1.25, 2.25 0.0 to 1.0	SPT/DS UDS DS
4.	RBH 4	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 0.50, 1.25, 2.25 0.0 to 1.0	SPT/DS UDS DS
5.	RBH 5	1.0, 2.0, 3.0, 4.0, 5.0, 5.5, 6.0 1.50, 2.50, 3.50 0.0 to 1.0	SPT/DS UDS DS
6.	RBH 6	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 0.50, 1.25, 2.25 0.0 to 1.0	SPT/DS UDS DS

DS: Disturbed Soil Samples

UDS: Undisturbed Soil Samples

RQD: Rock Quality Designation

4.3.2 Rock Samples

Soft Weathered Rock Samples and Soft Rock Samples were collected during field boring investigations carried out from 30.08.2022 to 05.09.2022.

Table 4.4 Details of Rock Core Samples collected from Boreholes.

Sl. No	BH No.	Depth of Sampling from EGL (m)	Core Recovery, CR (%)	Rock Quality Designation RQD (%)	Type of Rock
1.	RBH 1	--	--	--	--
2.	RBH 2	--	--	--	--
3.	RBH 3	--	--	--	--
4.	RBH 4	7.50 to 8.00 8.00 to 9.00	70.00 42.00	46.00 37.00	Medium Hard Charnockite Rock Medium Hard Charnockite Rock
5.	RBH 5	6.00 to 7.00 7.00 to 8.00 8.00 to 9.00 9.00 to 10.25	53.00 0.00 0.00 14.00	34.00 0.00 0.00 0.00	Med Hard Rock Charnockite SDWR SDWR Soft Rock Charnockite
6.	RBH 6	--	--	--	--

4.4 Water Table Level

During field investigations the standing Water Table levels were studied and recorded in the Borehole log vide *Annexure 6.2.1 to 6.2.6*.

4.5 Ground Topography, Geology of the area and Sub-soil Details

The ground topography, geology at the Proposed Construction of Anand Lake Front Residential Apartment Building at Sy.No.245/1b, Thally Road, Tamilnadu Site location was studied and recorded in the Borehole logs.

4.6 Laboratory Tests

The following laboratory tests were conducted on the collected disturbed and undisturbed soil samples.

- Grain Size Analysis as per IS: 2720 (Part 4) – 1985.
- Specific Gravity as per IS: 2720- (Part 3)/Section 1 - 1980 and IS: 2720 – (Part 3)/Section 2 - 1980.

- iii) Atterberg Limits as per IS: 2720 (Part 5) – 1985
- iv) Determination of natural moisture content as per IS: 2720 (Part 18) - 1978.
- v) Determination of natural density as per IS: 2720 (Part 29)
- vi) Determination Differential Free Swelling Index as per IS: 2720 (Part 40) - 1977
- vii) Determination of Triaxial Strength tests by CU method as per IS: 2720 – (Part 10) – 1973
- viii) Determination of Shear Strength Tests by Direct Shear Method as per IS 2720

5.0 Results and Discussions

The results of field investigations and laboratory tests are presented in Borehole logs cum sub-soil profile and laboratory tests results.

5.1. Soil Profile and Classification

The ground topography at The Proposed Construction of Anand Lake Front Residential Apartment Building at Sy.No.245/1b, Thally Road, Hosur, Tamilnadu, is level and the soil strata is slightly varying from borehole-to-borehole locations. General Subsoil profile is interpreted from borehole. For this purpose, whenever necessary, field borehole logs have been corrected on the basis of laboratory tests results.

- Top Ground Soil 1: Reddish Brown Silt with Low Compressibility (ML / A-4)
- Underlain Strata 2: Reddish Brown Silt with Low Compressibility (ML / A-6)
- Underlain Strata 3: Reddish brown Silty Sand (SM / A-2-4)
- Deeper Strata 1: Brownish SDWR (Refusal) / Soft Rock (Charnockite)
- Deeper Strata 2: Brownish Medium Hard Rock (Charnockite)

5.2. Standard Penetration Number

The results of SPT test at all the **SIX** boreholes at various depths confirm that the Soil Strata are loose to medium dense and SDWR is very dense. The observed 'N' values at all the Boreholes locations are indicated in the borehole logs cum sub-soil profiles from *Annexure 6.2.1 to 6.2.6*.

5.3. Specific Gravity

The specific Gravity of Soil is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6*.

5.4. Liquid Limit and Plastic Limit

The Liquid Limit of sub soil is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6*.

5.5. Field Moisture Content

The Field Moisture Content of sub soil is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6.*

5.6. Field Bulk Density and Field Dry Density

The Field Bulk Density and Dry Density of sub soil is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6.*

5.7. Field Void Ratio

The Field Void Ratio of Sub soil is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6.*

5.8 Cohesive Strength and Friction Angle

The Cohesive strength of underlain of sub soil observed is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6.*

5.9 Differential Free Swelling Index

The Free Swelling Index of underlain of Soil observed is indicated in the Borehole Log cum Lab Test Results vide *Annexure 6.2.1 to 6.2.6.*

5.10. SDWR, Soft Rock and Hard Rock

The Refusal Strata SDWR, Soft Rock and Hard Rock is encountered at RBH1, RBH2, RBH3, RBH 6 and RB4 / RBH 5 bore hole locations and the details are indicated in the Bore hole Log cum Sub Soil Profile *Annexure 6.2.1 to 6.2.6.*

5.11. Water Table Level

The Sub Soil Water Table is encountered during field investigations was carried from *30.08.2022* to *05.09.2022* at all the six bore hole locations at a depth of 3.00 m to 3.50 m below existing ground level.

6.0. Recommendations

6.1 Allowable Safe Bearing Capacity

The safe bearing pressure of soil has been evaluated as per IS 6403-1982, IS 8009 part I-1993, as per Terzaghi / Tomlinson's Theory, based on 'N' values (Teng's) Theory considering the following criteria.

- i) Local / General Shear failure condition
- ii) Settlement criteria: Based on 'N' values

RCC Open Isolated Foundation may be adopted through and allowable Safe Bearing Capacity for minimum 2.00 m width of Footing for considering

No Basement Floor below Existing Ground Level.

Table 6-1: Recommended Safe Bearing Capacity – No Basement Floor is Considered

ABH No.	Recommended Founding Depth below EGL (m)	Type of strata	Recommended Bearing Capacity (T/Sq.m)		
			UBC	FS	SBC
RBH 1	2.50	Reddish Brown Silt (ML)	50.00	2.5	20.00
	3.00	Reddish Brown Silt (ML)	56.25	2.5	22.50
	3.50	Reddish Brown Silt (ML)	62.50	2.5	25.00
RBH 2	2.50	Reddish Brown Silt (ML)	50.00	2.5	20.00
	3.00	Reddish Brown Silt (ML)	56.25	2.5	22.50
	3.50	Reddish Brown Silt (ML)	62.50	2.5	25.00
RBH 3	2.50	Reddish Brown Silt (ML)	40.00	2.5	16.00
	3.00	Reddish Brown Silt (ML)	45.00	2.5	18.00
	3.50	Reddish Brown Silt (ML)	50.00	2.5	20.00
RBH 4	2.50	Reddish Brown Silt (ML)	47.50	2.5	19.00
	3.00	Reddish Brown Silt (ML)	55.00	2.5	22.00
	3.50	Reddish Brown Silt (ML)	62.50	2.5	25.00
RBH 5	2.50	Reddish Brown Silt (ML)	50.00	2.5	20.00
	3.00	Reddish Brown Silt (ML)	56.25	2.5	22.50
	3.50	Reddish Brown Silt (ML)	62.50	2.5	25.00
RBH 6	2.50	Reddish Brown Silt (ML)	50.00	2.5	20.00
	3.00	Reddish Brown Silt (ML)	56.25	2.5	22.50
	3.50	Reddish Brown Silt (ML)	62.50	2.5	25.00

Table 6-2: Recommended Soil Properties For Retaining Wall Design

Borehole Locations	Soil Details	MDD (gm/cc) / OMC (%)	Cohesive Strength 'C' (kg/Sq.cms)	Angle of Internal Friction 'φ' (Degrees)	Remarks / Soil Type
RBH 1 TO RBH 6	Excavated Soil 0.00 to 5.00	1.90 / 10.00	0.10	22.00	ML
RBH 1 TO RBH 6	Excavated Soil 5.00 to 10.00	2.00 / 6.50	0.00	32.00	SDWR

*FS in Soils / Sand = 2.5
Rock = 6.0*

FS in SDWR = 2.5

FS in Hard

The SBC and Settlement Calculations are shown in *Annexure 6.2.1 to 6.2.6*.

6.2 Type of Foundations & Recommendations

The Open Isolated Footing type of Foundations are recommended.

6.3 Additional Recommendations for Foundations

- The minimum confined depth of **RCC OPEN ISOLATED Foundation** shall be laid at minimum depth of 2.50 m below existing ground Level.
- The soil at the founding level shall be compacted to 95% MDD and OMC before laying foundation CC bed.
- The excavated clayey soil may be used for back filling to the foundations.
- If seepage water is encountered during the time of construction suitable dewatering has to be adopted, as water table was encountered 3.00m below EGL.

The SBC and Settlement Calculations is enclosed in *Annexure 6.3*.

Table 6-3: Recommended Minimum Depth of Foundations and Improvement to Foundation Soils

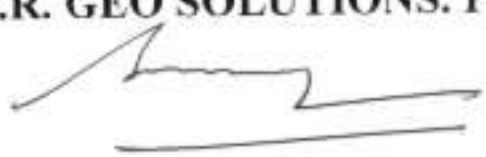
Borehole Locations	Type of Foundations	Min confined Depth of Foundations below EGL (m)	Improvement to Foundation Soil
RBH 1, RBH 2	RCC Open Isolated Footing	2.50	1. Compaction at founding Level Soil to achieve 95% MDD and OMC. 2. Backfilling to the foundation Soil in layers of 300 mm and compacted to 95% MDD with excavated soil 3. 230 mm Thick Soling with Rock Boulders and Stone Dust shall be provided at Founding Level
RBH 3, RBH 4	RCC Open Eccentric Footing	2.50	
RBH 5, RBH 6	RCC Open Combined Footing	2.50	

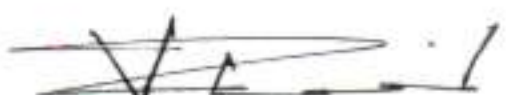
7.0. Conclusions

From the field investigations and laboratory testing, the following conclusions are drawn.

- The minimum confined depth of foundations required shall be as per **Table 6.3**.
- The photograph of field investigation is enclosed in **Annexure 6.4**

FOR S.R. GEO SOLUTIONS. PVT. LTD


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ANNEXUE - 6.1
BOREHOLE LOCATION PLAN

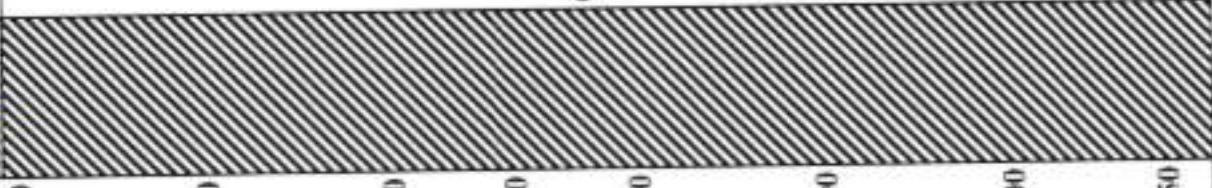


NO.OF CAR PARKS INSIDE BUILDING -86 NOS

NO.OF CAR PARKS OUTSIDE BUILDING -15 NOS

ANNEXURE - 6.2.1 to 6.2.6
BOREHOLE LOG, SUB-SOIL RPOFILE
AND LABORATORY TEST RESULTS

Annexure 6.2.1 Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 1																	
Date of Field Inv : 30.08.2022 Ground Water Level : 3.50 m Borehole Level : 0.00 m Borehole Termination Level : 10.50 m Page No / Sheet No : 1 of 1																	
Project : Construction of Anand Lake Front Residential Apartment Building Client: R.G. Associates, HSR Layout, Bengaluru Location : Sy No. 245/1b, Thally Road, Hosur, Tamilnadu, India Borehole No : RBH 1 Method : Rig Boring (Svenska Rotary Operated)																	
Excavated Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PI	FSI	IS / AASHTO Classification	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay										Cohesive Strength (Cu)	Angle of Internal Friction (φ cu)
0.000																	
1.000			UDS at 1.0 m SPT at 1.00 m N =3+4+6	0.40	47.74	51.86	39.30	11.30	17.40	ML A-4	8.70	1.86	1.71	2.65	0.55	0.15	15.00
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N =5+5+7	0.38	54.14	45.48	34.50	8.25	12.50	ML A-4	9.10	1.88	1.72	2.65	0.54	0.16	16.00
2.000			UDS at 2.00m SPT at 2.00 m N =7+7+9	0.45	53.50	46.05	33.20	8.10	13.00	ML A-4	8.90	1.88	1.73	2.65	0.54	0.17	20.00
2.500			SPT at 2.50 m N =10+12+14	2.24	36.18	61.58	34.61	6.68	10.25	ML A-4	8.31	1.87	1.73	2.63	0.52	0.16	21.00
3.000			SPT @ 3.00 m N = 14+22+27	0.02	37.06	62.92	36.58	17.45	12.36	ML A-4	8.58	1.86	1.75	2.64	0.51	0.16	21.00

 Reddish Brown Silt with Low Compressibility (ML)	SPT @ 3.50 m N = 15+25+25	0.52	50.54	48.94	37.55	18.45	15.00	ML A-4	9.00	1.88	1.72	2.63	0.52	0.16	21.00
		2.80	39.02	58.18	32.55	10.60	17.50	ML A-4	9.70	1.87	1.70	2.63	0.54	0.15	21.00
 Grayish Brown SDWR	SPT at 5.00 m N = 13+50+Refusal	2.75	48.00	49.25	33.50	8.60	12.50	SDWR A-1-a	8.90	2.00	1.84	2.65	0.44	0.05	28.00
	SPT at 6.00 m N = 50B for 11cms	5.00	56.54	38.46	33.50	5.60	6.00	SDWR A-4	8.90	2.00	1.84	2.65	0.44	0.05	26.00
	SPT at 7.00 m N = 50 for 10cms	3.00	63.00	34.00	33.50	5.60	6.30	SDWR A-1-a	8.90	2.02	1.85	2.65	0.43	0.05	28.00
	SPT at 8.00 m N = 50 for 8cms	5.20	65.00	29.80	33.50	5.60	6.00	SDWR A-1-a	8.90	2.03	1.86	2.65	0.42	0.05	28.00
	SPT at 9.00 m N = 50B for 7cms	5.50	66.00	28.50	33.50	5.60	5.90	SDWR A-1-a	8.90	1.98	1.82	2.65	0.46	0.05	30.00
	SPT at 10.00 m N = 50B for 6cms	6.10	61.00	32.90	32.00	4.00	6.00	SDWR A-1-a	8.90	2.00	1.84	2.65	0.44	0.04	32.00

B - Blows

Annexure 6.2. Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 2

Date of Field Inv : 31.08.2022

Ground Water Level : 3.50 m

Borehole Level : 0.00 m

Borehole Termination Level : 10.50 m

Page No / Sheet No : 1 of 1

Project : Construction of Anand Lake Front Residential Apartment Building

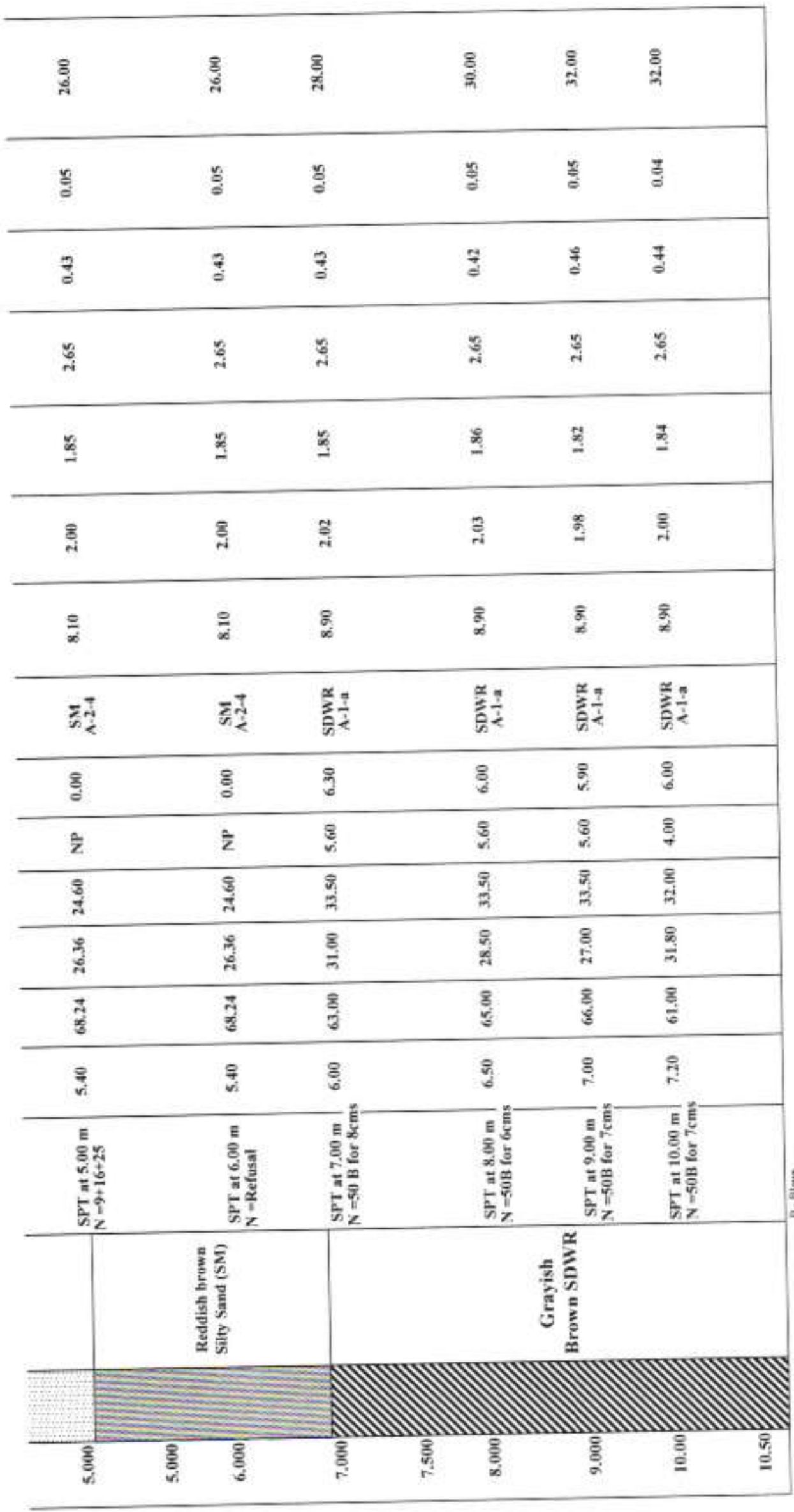
Client: R.G. Associates, HSR Layout, Bengaluru

Location : Sy No. 245/1b, Thali Road, Hosur, Tamilnadu, India

Borehole No : RBH 2

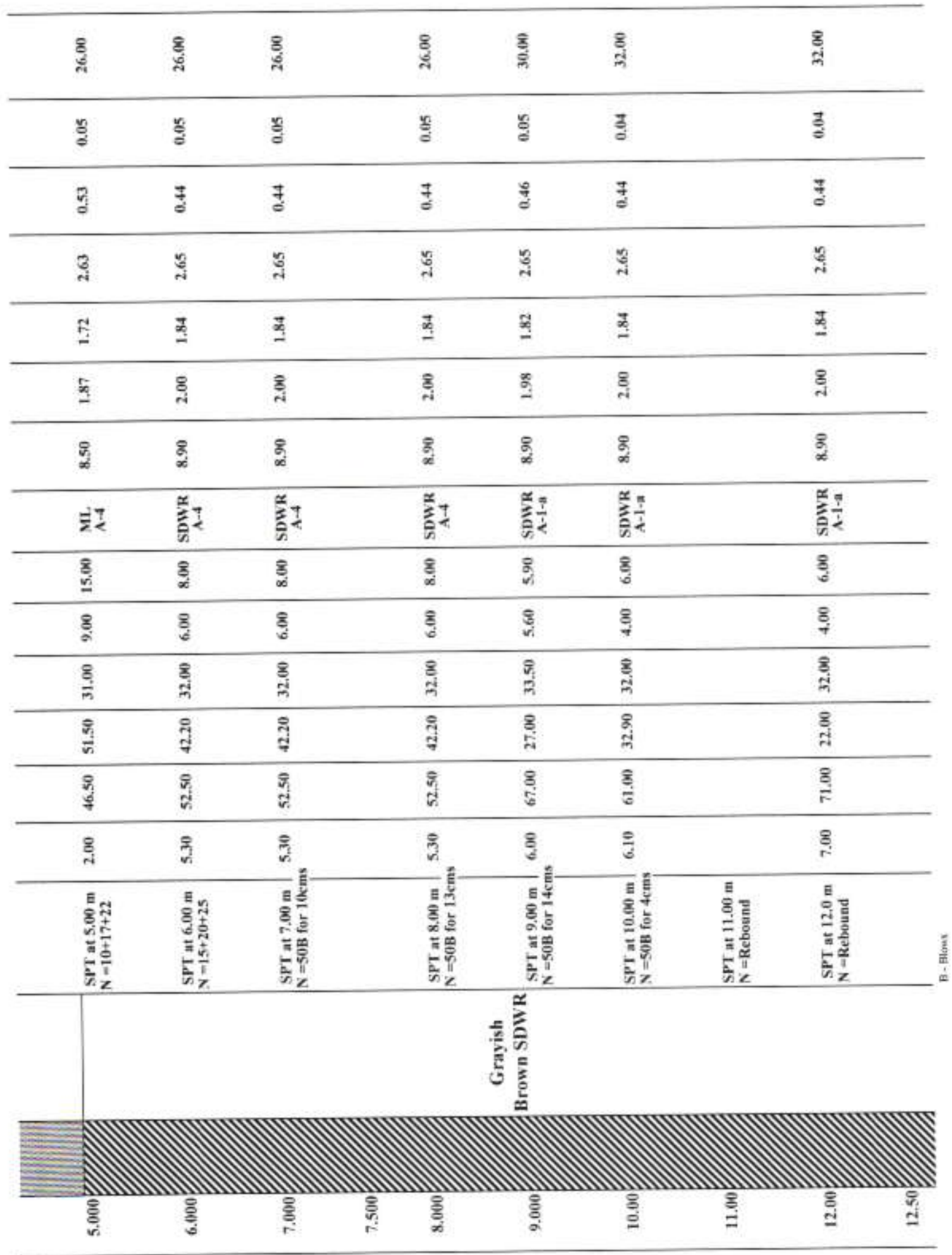
Method : Rig Boring (Svenska Rotary Operated)

Excavated Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			PI	FSI	IS / AASHTO Classification	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay									Cohesive Strength (C _u)	Angle of Internal Friction (φ _{cu})
				%	%	%									kg / cm ²	degrees
0.000			UDS at 1.0 m SPT at 1.00 m N = 4+4+6	0.24	35.96	63.80	10.90	16.25	ML A-4	7.35	1.86	1.73	2.65	0.53	0.15	19.00
1.000																
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N = 4+5+8	0.25	36.30	63.45	10.50	16.80	ML A-4	7.50	1.88	1.75	2.65	0.52	0.16	20.00
2.000			UDS at 2.00m SPT at 2.00 m N = 5+7+8	0.30	37.80	61.90	10.70	15.00	ML A-4	7.90	1.88	1.74	2.65	0.52	0.17	20.00
2.500			SPT at 2.50 m N = 11+11+13	2.16	36.42	61.42	11.26	15.53	ML A-4	8.26	1.89	1.76	2.66	0.53	0.16	21.00
3.000			SPT @ 3.00 m N = 11+18+22	0.62	41.30	50.08	11.00	16.00	ML A-4	8.10	1.88	1.74	2.63	0.51	0.16	22.00
		Reddish Brown Silt with Low Compressibility (ML)	SPT @ 3.50 m N = 14+15+18	0.62	41.30	50.08	11.00	16.00	ML A-4	8.10	1.88	1.74	2.63	0.51	0.16	22.00
4.000			SPT @ 4.00 m N = 18+22+25	0.58	43.30	56.12	10.30	15.80	ML A-4	7.50	1.87	1.74	2.63	0.51	0.20	23.00



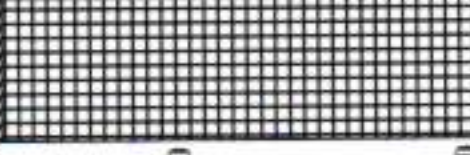
B - Blows

Annexure 6.2.3 Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 3																	
Date of Field Inv : 2.09.2022 Ground Water Level : 3.50 m Borehole Level : 0.00 m Borehole Termination Level : 12.50 m Page No / Sheet No : 1 of 1																	
Project : Construction of Anand Lake Front Residential Apartment Building Client: R.G. Associates, HSR Layout, Bengaluru Location : Sy No. 245/1b, Thally Road, Hosur, Tamilnadu, India Borehole No : RBH 3 Method : Rig Boring (Svenska Rotary Operated)																	
Excavat ed Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PI	FSI	IS / AASHTO Classific ation	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay										Cohesive Strength (C _u)	Angle of Internal Friction (φ cu)
0.000			UDS at 1.0 m	0.60	48.40	51.00	38.50	12.70	17.40	ML A-4	7.70	1.86	1.73	2.65	0.53	0.15	15.00
1.000			SPT at 1.00 m N = 3+4+4														
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N = 4+4+5	4.50	38.50	57.00	36.50	13.00	17.00	ML A-4	8.00	1.86	1.72	2.65	0.54	0.16	18.00
2.000			UDS at 2.00 m SPT at 2.00 m N = 5+5+6	4.50	38.50	57.00	36.50	13.00	17.00	ML A-4	8.00	1.88	1.74	2.65	0.52	0.16	18.00
2.500			SPT at 2.50 m N = 6+7+8	0.76	36.78	62.46	36.59	12.85	16.91	ML A-4	7.79	1.86	1.75	2.63	0.54	0.15	19.00
3.000			SPT @ 3.00 m N = 6+7+8	0.12	33.16	66.72	36.50	13.00	17.00	ML A-4	8.00	1.88	1.74	2.65	0.52	0.16	19.00
		Reddish Brown Silt with Low Compressibility (ML)	SPT @ 3.50 m N = 7+11+14	0.12	33.16	66.72	36.50	13.00	17.00	ML A-4	8.00	1.88	1.74	2.65	0.52	0.16	19.00
4.000			SPT @ 4.00 m N = 7+11+14	2.00	46.50	51.50	31.00	9.00	15.00	ML A-4	8.50	1.87	1.72	2.63	0.53	0.15	20.00



Annexure 6.2.4 Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 4**Project :** Construction of Anand Lake Front Residential Apartment Building**Client:** R.G. Associates, HSR Layout, Bengaluru, Karnataka, India**Location :** Sy No. 245/1b, Thally Road, Hosur, Tamilnadu, India**Date of Field Inv :** 01.09.2022**Ground Water Level :** 3.00 m**Borehole Level :** 0.00 m**Borehole Termination Level :** 9.00 m**Page No / Sheet No :** 1 of 1**Borehole No :** RBH 4**Method :** Rig Boring (Svenska Rotary Operated)

Excavated Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PI	FSI	IS / AASHTO Classification	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay										Cohesive Strength (C _u)	Angle of Internal Friction (φ _{cu})
0.000				%	%	%	%	%			%	gm / cc	gm / cc			kg / cm ²	degrees
1.000			UDS at 1.0 m SPT at 1.00 m N = 4+5+5	0.40	47.74	51.86	39.30	11.30	17.40	ML A-4	8.70	1.86	1.71	2.65	0.55	0.15	15.00
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N = 5+5+6	0.38	54.14	45.48	34.50	8.25	12.50	ML A-4	9.10	1.88	1.72	2.65	0.54	0.16	16.00
2.000			UDS at 2.25 m SPT at 2.00 m N = 7+8+9	0.45	53.50	46.05	33.20	8.10	13.00	ML A-4	8.90	1.88	1.73	2.65	0.54	0.17	20.00
2.500			SPT at 2.50 m N = 11+12+15	0.58	35.92	63.5	36.91	17.35	12.86	ML A-4	10.01	1.86	1.72	2.65	0.53	0.17	20.00
3.000			SPT @ 3.00 m N = 20+22+23	0.32	32.58	67.10	37.55	18.45	13.56	ML A-4	9.00	1.88	1.72	2.63	0.52	0.16	21.00

 Reddish Brown Silt with Low Compressibility (ML)	SPT @ 3.50 m N = 21+22+24	0.32	32.58	67.10	37.55	18.45	13.56	ML A-4	9.00	1.88	1.72	2.63	0.52	0.16	21.00
	SPT @ 4.00 m N = 20+25+28	2.80	39.02	58.18	32.55	10.60	17.50	ML A-4	9.70	1.87	1.70	2.63	0.54	0.20	21.00
	SPT at 5.00 m N = 15+22+32	2.75	48.00	49.25	33.50	8.60	12.50	SDWR A-1-a	8.90	2.00	1.84	2.65	0.44	0.05	28.00
	SPT at 6.00 m N = 50B for 11cms	5.00	56.54 ⁵⁹	38.46	33.50	5.60	6.00	SDWR A-4	8.90	2.00	1.84	2.65	0.44	0.05	26.00
 Grayish Brown SDWR	SPT at 7.00 m N = Rebound	3.00	63.00	34.00	33.50	5.60	6.30	SDWR A-1-a	8.90	2.02	1.85	2.65	0.43	0.05	30.00
	Type of Samples	Depth (m)	Length of Core	CR %	RQD %	G	γ gm/cc	WA %	UCC Strength Ton/Sq.m	Type of Rock					
	Rock Cores	7.5 to 8.0	23 4 7	70	46	2.66	2.35	1.35	2355	Carnockite					
 Pinkish Brown Medium Hard Rock	Rock Cores	8.0	10												
	Core Samples	to 9.0	2 27 3	42	37	2.67	2.35	1	2450						

B - Blows

Annexure 6.2.5 Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 5

Date of Field Inv : 03.09.2022
Ground Water Level : 3.00 m

Borehole Level : 0.00 m

Borehole Termination Level : 10.00 m
Page No / Sheet No : 1 of 1

Project : Construction of Anand Lake Front Residential Apartment Building

Client: R.G. Associates, HSR Layout, Bengaluru

Location : Sy No. 245/1b, Thally Road, Hosur, Tamilnadu, India

Borehole No : RBH 5

Method : Rig Boring (Svenska Rotary Operated)

Excavated Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PI	FSI	IS / AASHTO Classification	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay										Cohesive Strength (Cu)	Angle of Internal Friction (ϕ cu)
0.000				%	%	%	%	%			%	gm / cc	gm / cc			kg / cm ²	degrees
1.000			UDS at 1.0 m SPT at 1.00 m N = 3+4+6	2.50	37.00	60.50	36.80	12.00	16.50	ML A-4	7.00	1.86	1.74	2.65	0.52	0.15	16.00
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N = 5+6+6	2.50	37.00	60.50	36.80	12.00	16.50	ML A-4	7.00	1.86	1.74	2.65	0.52	0.15	16.00
2.000			UDS at 2.00 m SPT at 2.00 m N = 6+7+9	2.50	37.00	60.50	36.80	12.00	16.50	ML A-4	7.00	1.86	1.74	2.65	0.52	0.15	18.00
2.500			SPT at 2.50 m N = 7+11+13	0.78	38.26	60.96	35.91	12.89	15.56	ML A-4	7.56	1.87	1.73	2.66	0.54	0.17	21.00
3.000			SPT @ 3.00 m N = 14+22+28	0.16	45.88	53.96	34.30	12.55	15.00	ML A-4	7.20	1.88	1.75	2.66	0.52	0.16	22.00

	Reddish Brown Silt with Low Compressibility (ML)	SPT @ 3.50 m N = 21+25+25	0.16	45.88	53.96	34.30	12.55	15.00	ML A-4	7.20	1.88	1.75	2.66	0.52	0.16	22.00
		SPT @ 4.00 m N = 11+19+30	0.00	47.00	53.00	34.30	12.55	15.00	ML A-4	7.20	1.88	1.75	2.66	0.52	0.16	22.00
		SPT at 5.00 m N = 15+20+25	5.00	70.00	25.00	27.00	NP	5.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	30.00
	Grayish Brown SDWR	SPT at 6.00 m Rebound														
		Type of Samples	Depth (m)	Length of Core	CR %	RQD %	G	γ gm/cc	WA %	UCC Strength Ton/Sq.m	Type of Rock					
		Rock Cores	6.0 to 7.0	20 5 3 4 4 2 14	52 52	34	2.66	2.35	1.4	2200	Carnockite					
	Pinkish Brown Medium Hard Rock															
		NO ROCK CORE SAMPLES COLLECTED.														
	Pinkish Brown Soft Weathered Rock															
		NO ROCK CORE SAMPLES COLLECTED.														
	Pinkish Brown Soft Weathered Rock															
		NO ROCK CORE SAMPLES COLLECTED.														
	Pinkish Brown Soft Rock	Rock Cores	9.0	2	14	0	2.65	2.28	3.5	1550	Carnockite					
		Core		3												
		Samples	to	2												
			10.0	3												

B - Blows

Annexure 6.2.6 Borehole Log, Sub-Soil Profile & Laboratory Test Results - RBH 6

Date of Field Inv : 30.08.2022

Ground Water Level : 3.50 m

Borehole Level : 0.00 m

Project : Construction of Anand Lake Front Residential Apartment Building

Client: R.G. Associates, HSR Layout, Bengaluru

Location : Sy No. 245/1b, Thally Road, Hosur, Tamilnadu, India

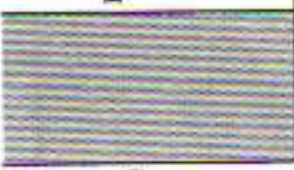
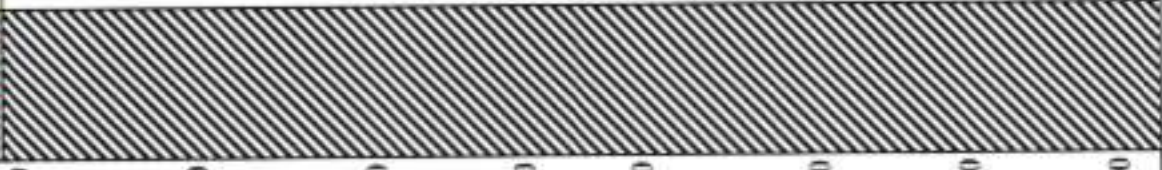
Borehole Termination Level : 10.50 m

Page No / Sheet No : 1 of 1

Borehole No : RBH 6

Method : Rig Boring (Svenska Rotary Operated)

Excavate d Level (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PI	FSI	IS / AASHTO Classific- ation	Insitu Moisture Content	Insitu Bulk Density	Insitu Dry Density	Specific Gravity 'G'	Void Ratio 'e'	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay										Cohesive Strength (Cu)	Angle of Internal Friction (φ cu)
0.000				%	%	%					%	gm / cc	gm / cc			kg / cm ²	degrees
1.000			UDS at 1.0 m SPT at 1.00 m N =5+6+7	0.10	41.82	58.08	39.30	11.30	18.26	ML A-4	11.20	1.87	1.68	2.65	0.58	0.15	18.00
1.500		Reddish Brown Silt with Low Compressibility (ML)	SPT at 1.50 m N =5+5+5	0.10	41.82	58.08	39.30	11.30	18.26	ML A-4	11.20	1.87	1.68	2.65	0.58	0.15	18.00
2.000			UDS at 2.25 m SPT at 2.00 m N =6+7+9	0.10	41.82	58.08	39.30	11.30	18.26	ML A-4	11.20	1.87	1.68	2.65	0.58	0.15	18.00
2.500			SPT at 2.50 m N =7+8+10	1.02	35.6	63.38	36.74	17.38	13.56	ML A-4	10.29	1.88	1.73	2.64	0.54	0.15	21.00
3.000			SPT @ 3.00 m N = 11+17+20	0.04	44.82	55.14	37.55	18.45	18.26	ML A-4	9.00	1.88	1.72	2.63	0.52	0.16	21.00
			SPT @ 3.50 m	0.04	44.82	55.14	37.55	18.45	18.26	ML	9.00	1.88	1.72	2.63	0.52	0.16	22.00

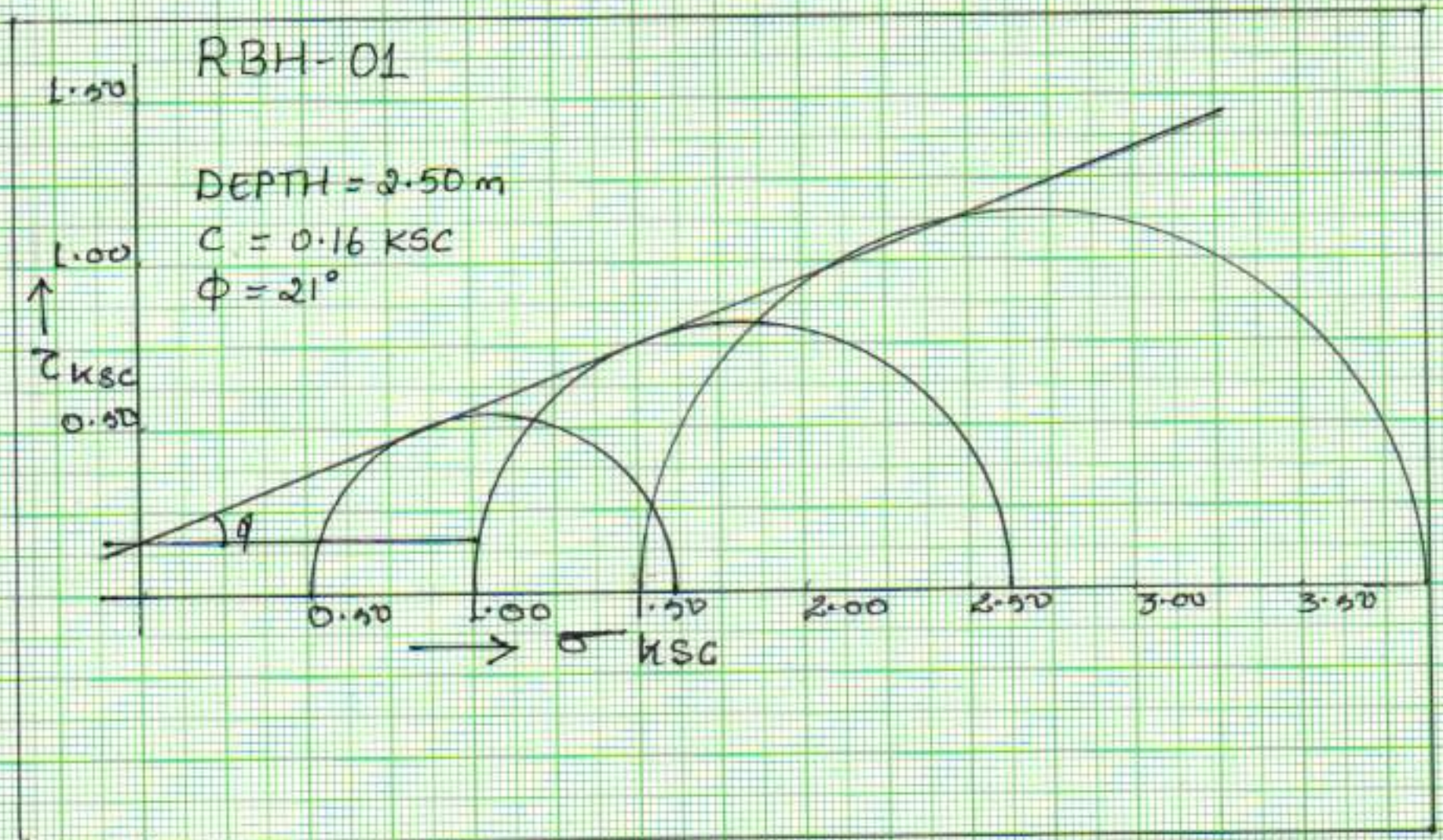
4.000	 Reddish Brown Silt with Low Compressibility (ML)	N = 15+17+22	2.80	39.02	58.18	32.55	10.60	17.50	A-4	9.70	1.87	1.70	2.63	0.54	0.16	22.00
5.000		SPT @ 4.00 m N = 15+25+25	2.60	54.00	43.40	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	30.00
6.000		SPT at 5.00 m N =Refusal	2.60	54.00	43.40	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	30.00
7.000		SPT at 6.00 m N =Refusal	2.60	54.00	43.40	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	30.00
7.500	 Grayish Brown SDWR	SPT at 7.00 m N =50 for 5cms	4.90	68.00	27.10	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	32.00
8.000		SPT at 8.00 m N =50 for 9cms	5.60	66.00	28.40	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	32.00
9.000		SPT at 9.00 m N =50B for 10cms	5.00	65.00	30.00	32.00	0.00	0.00	SDWR A-1-a	7.00	2.00	1.87	2.65	0.42	0.05	32.00
10.000		SPT at 10.00 m N =50B for 9cms														
10.500																

B - Blows

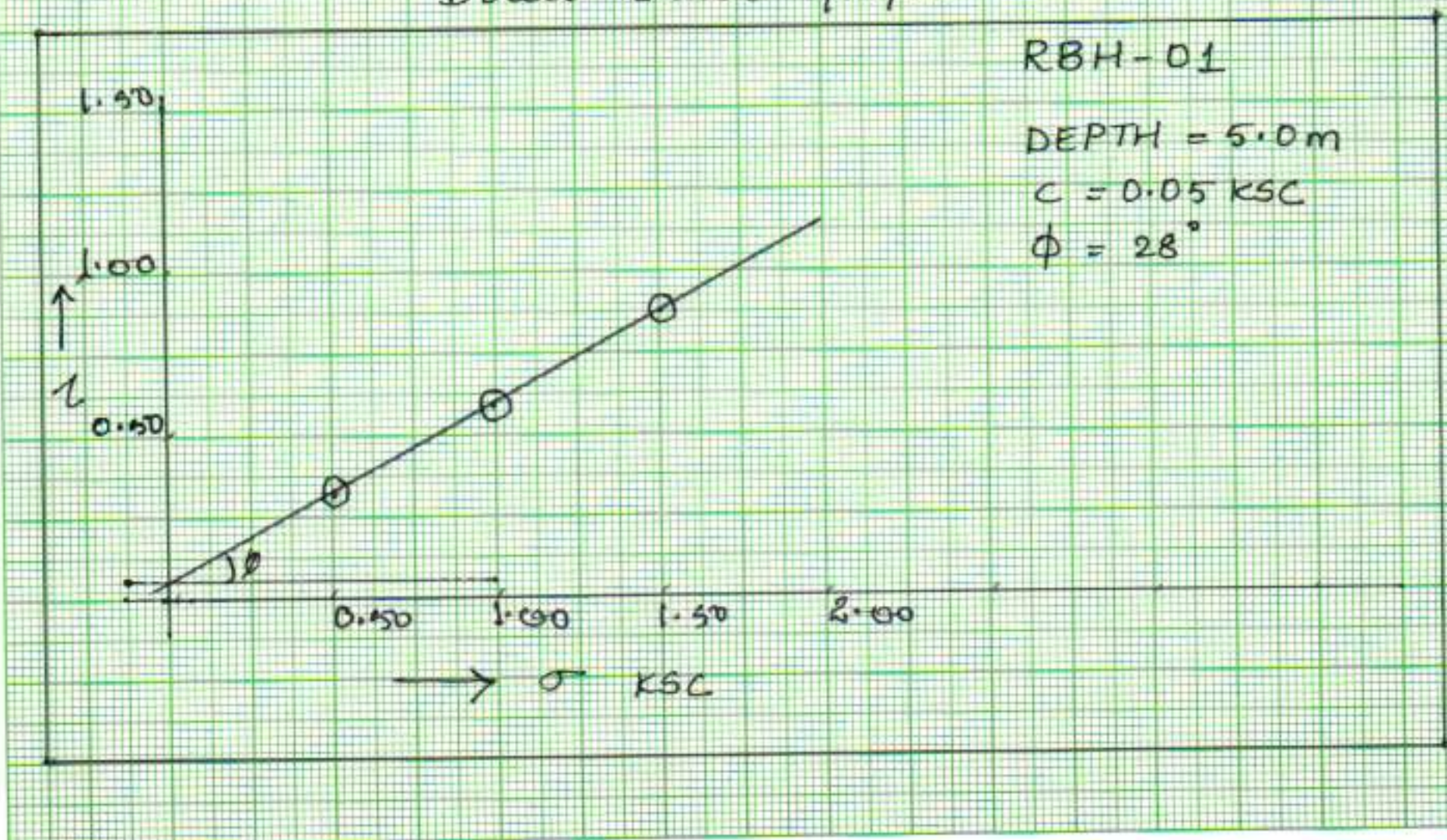
ANNEXURE - 6.3.1 TO 6.3.6
MOHR'S-COULOMB CIRCLES &
DIRECT SHEAR TEST GRAPH AND
FAILURE ENVELOPE

ANNEXURE 6.3.1 Mohr's - Coulomb Circles & Failure Envelope

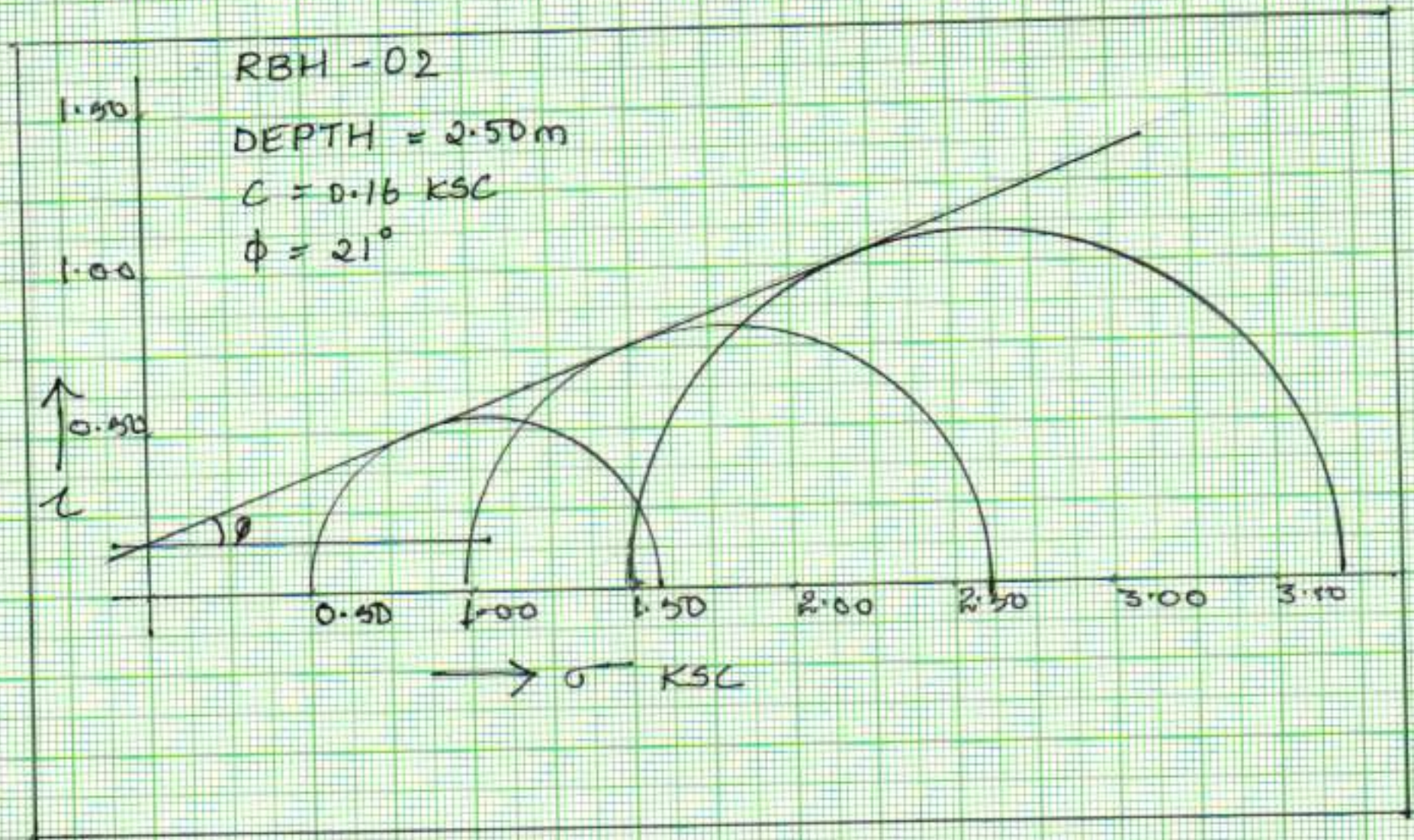
TRI-AXIAL TEST



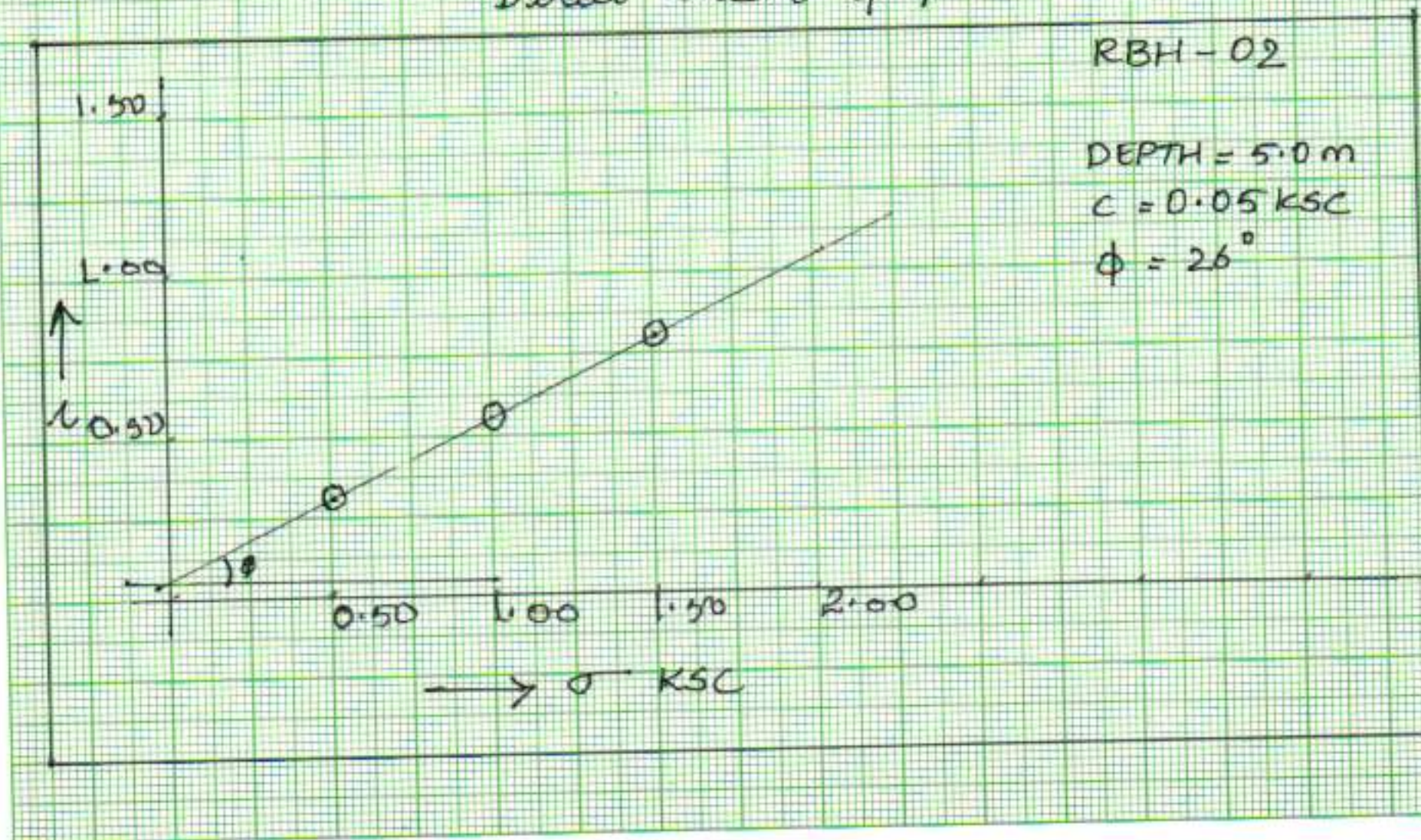
Direct Shear Graph



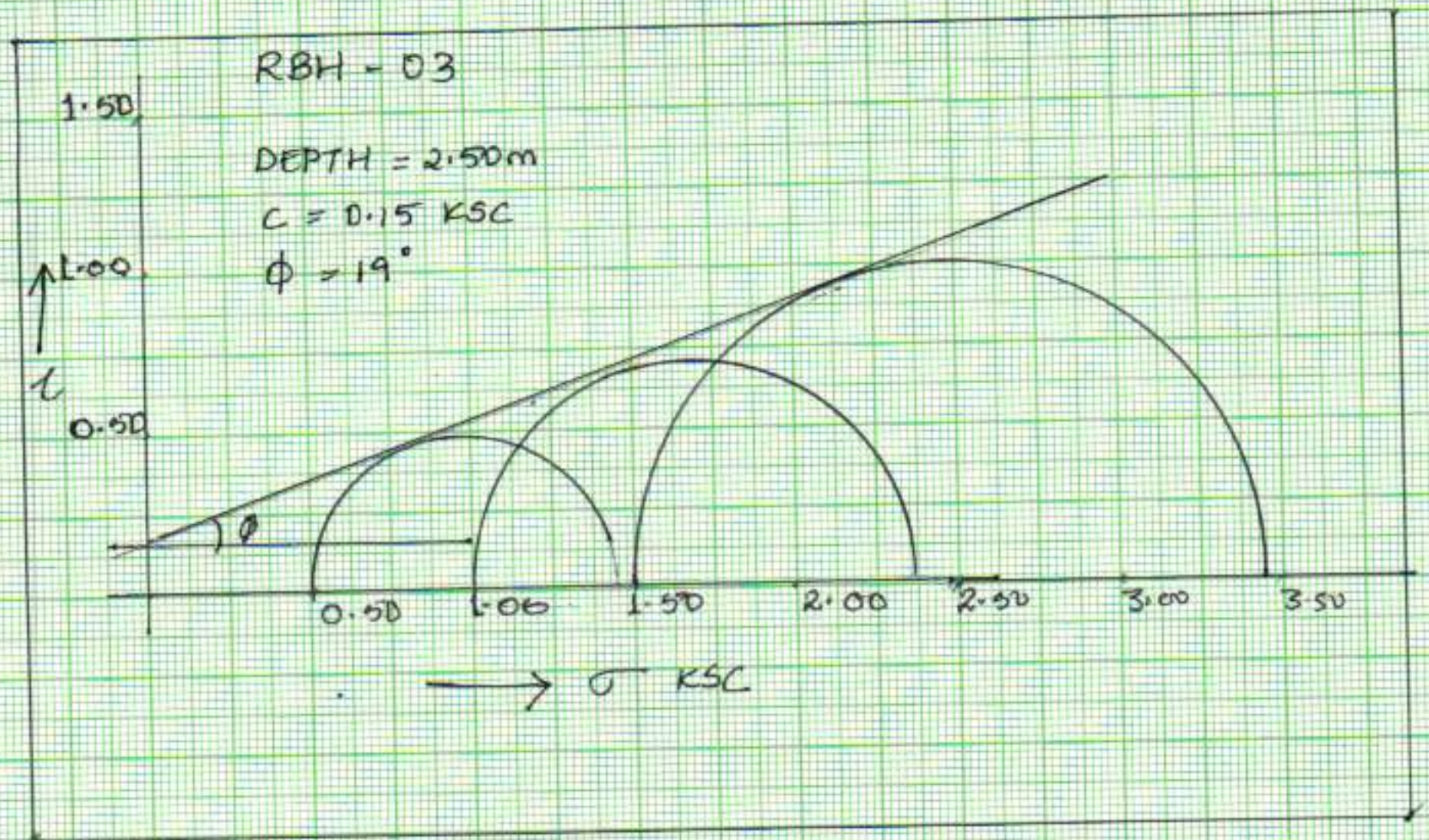
ANNEXURE 6.3.2 Mohr's - Coulomb Circles & Failure Envelope



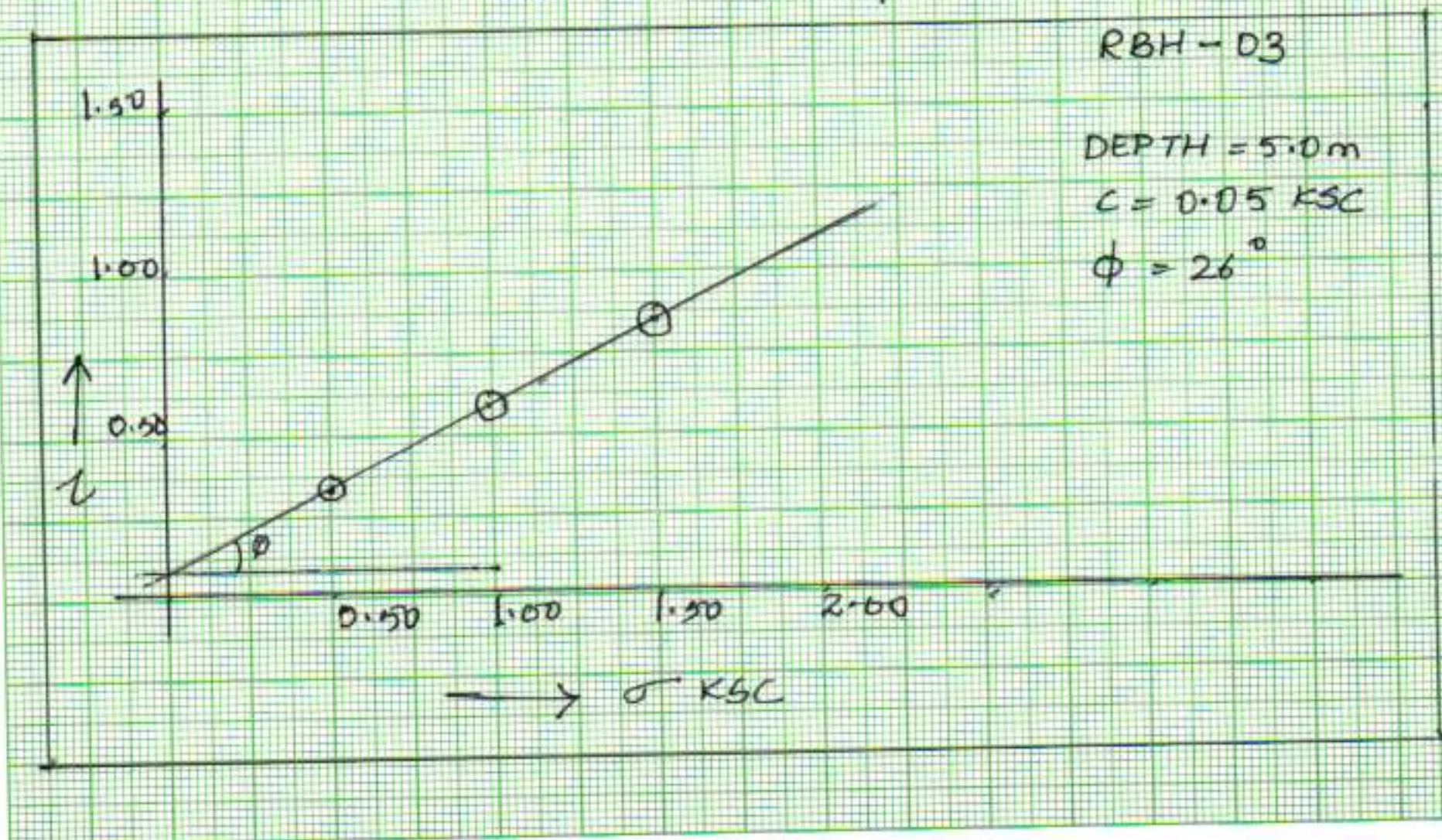
Direct Shear Graph



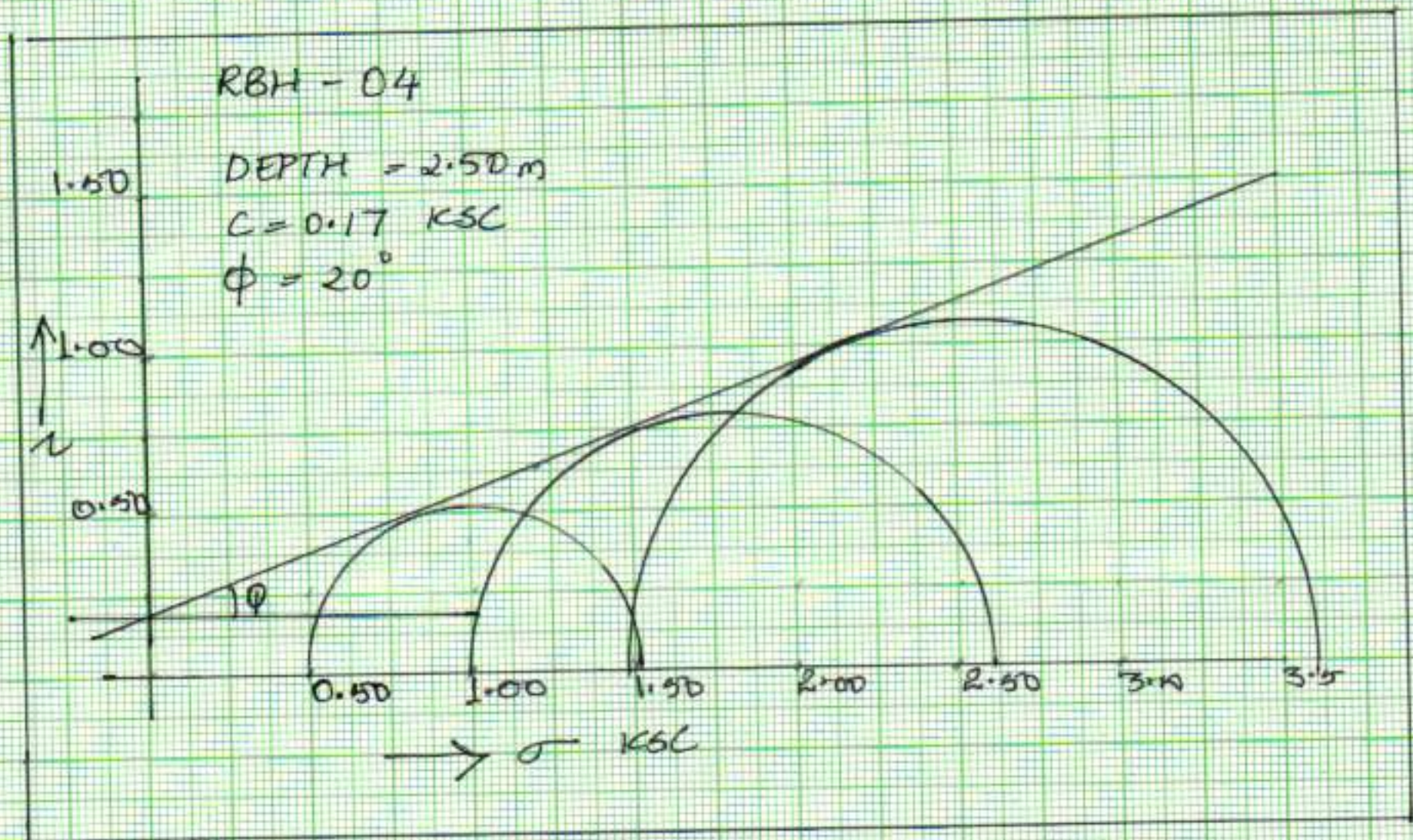
ANNEXURE 6.3.3 Mohr's - Coulomb Circles & Failure Envelope



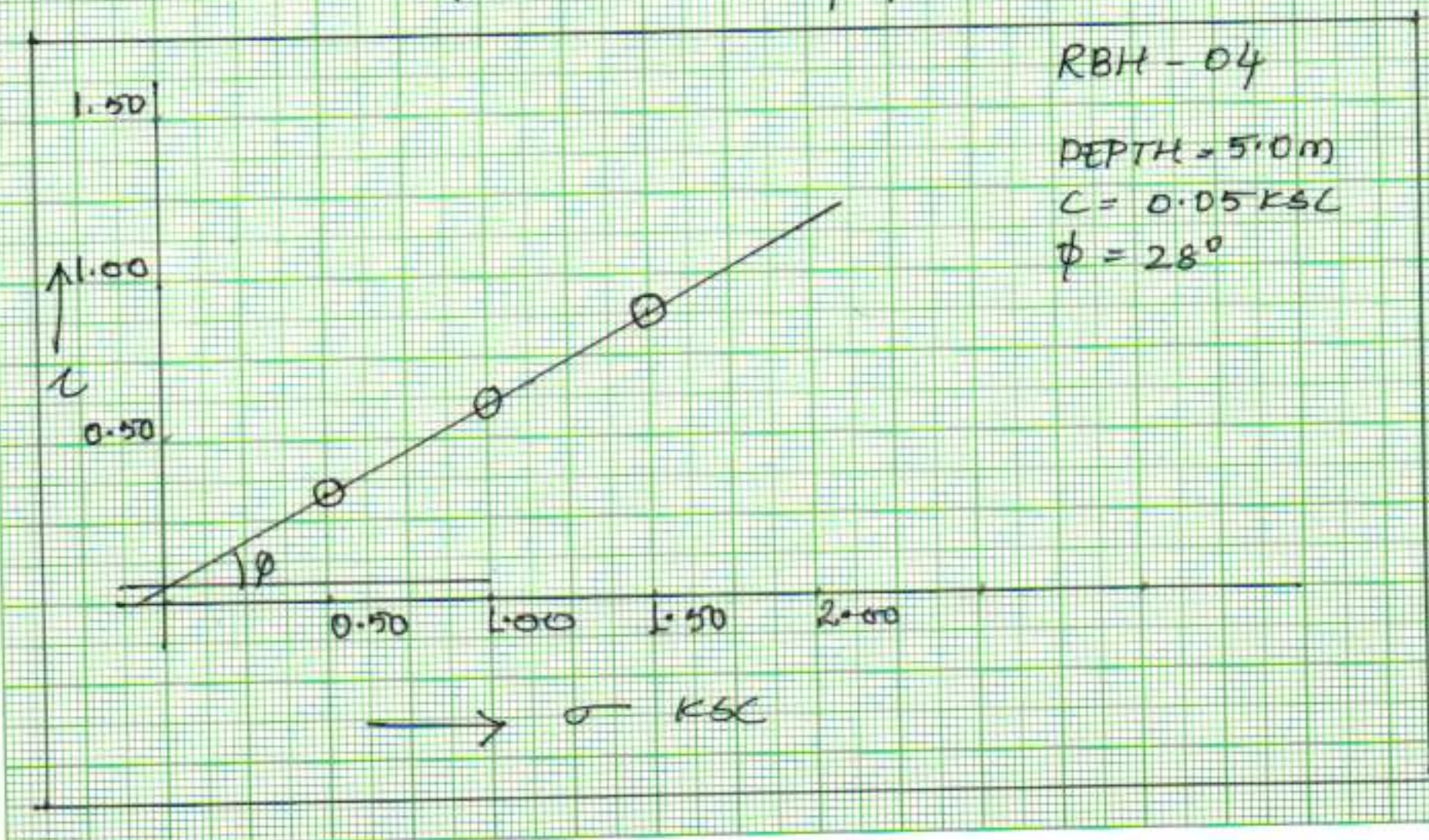
Direct Shear Graph



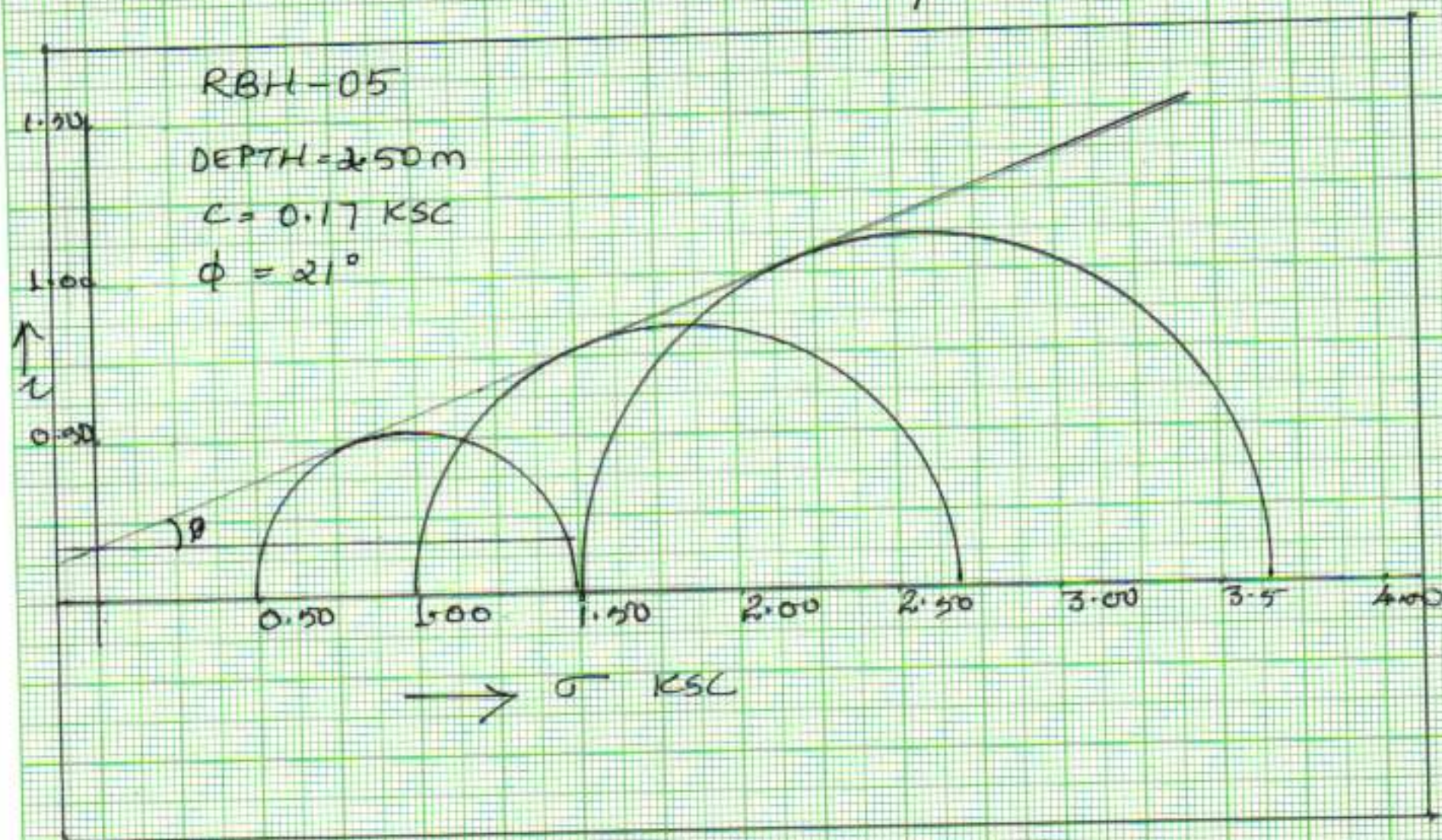
ANNEXURE 6.3.4 Mohr's Coulomb Circles & Failure Envelope



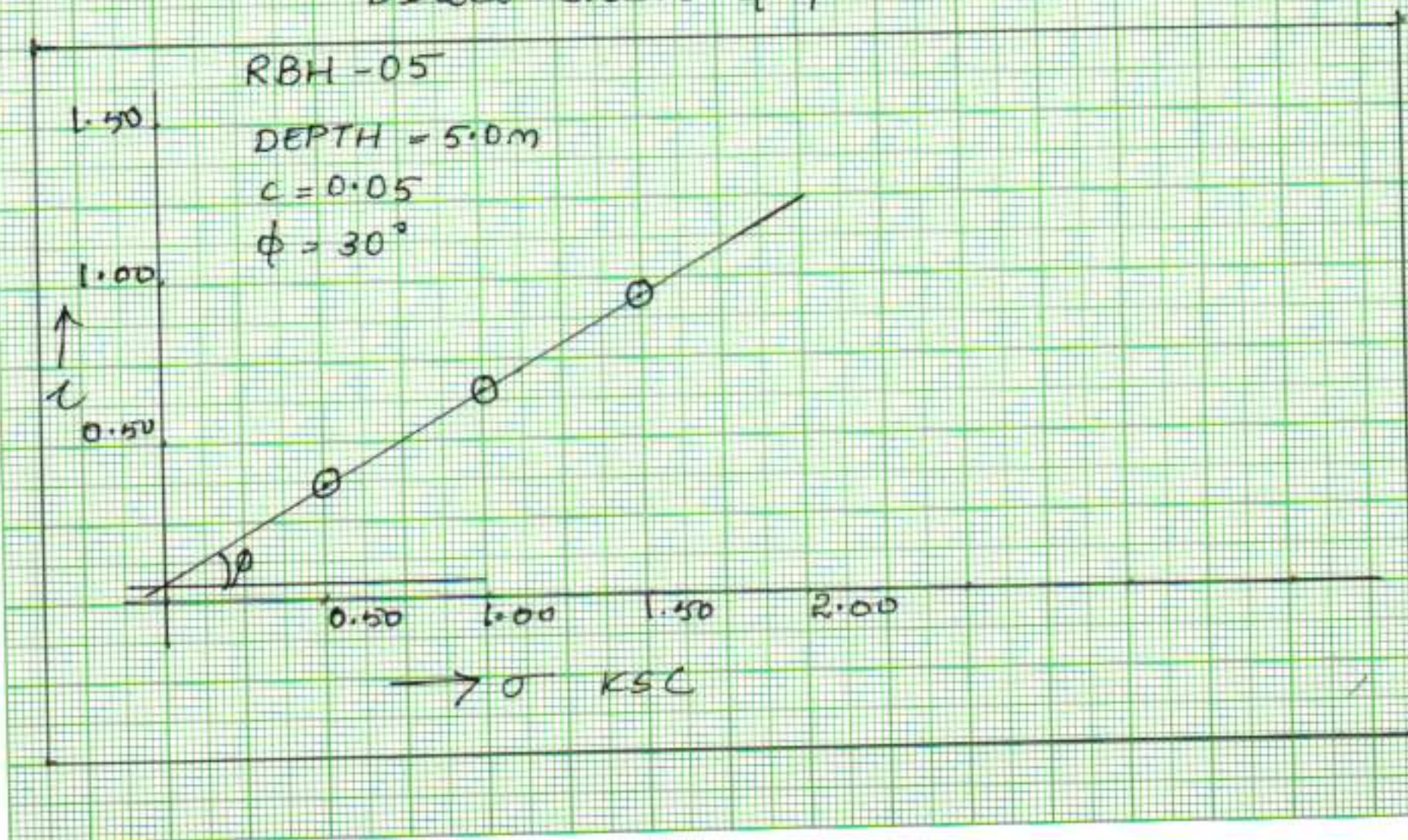
Direct Shear Graph



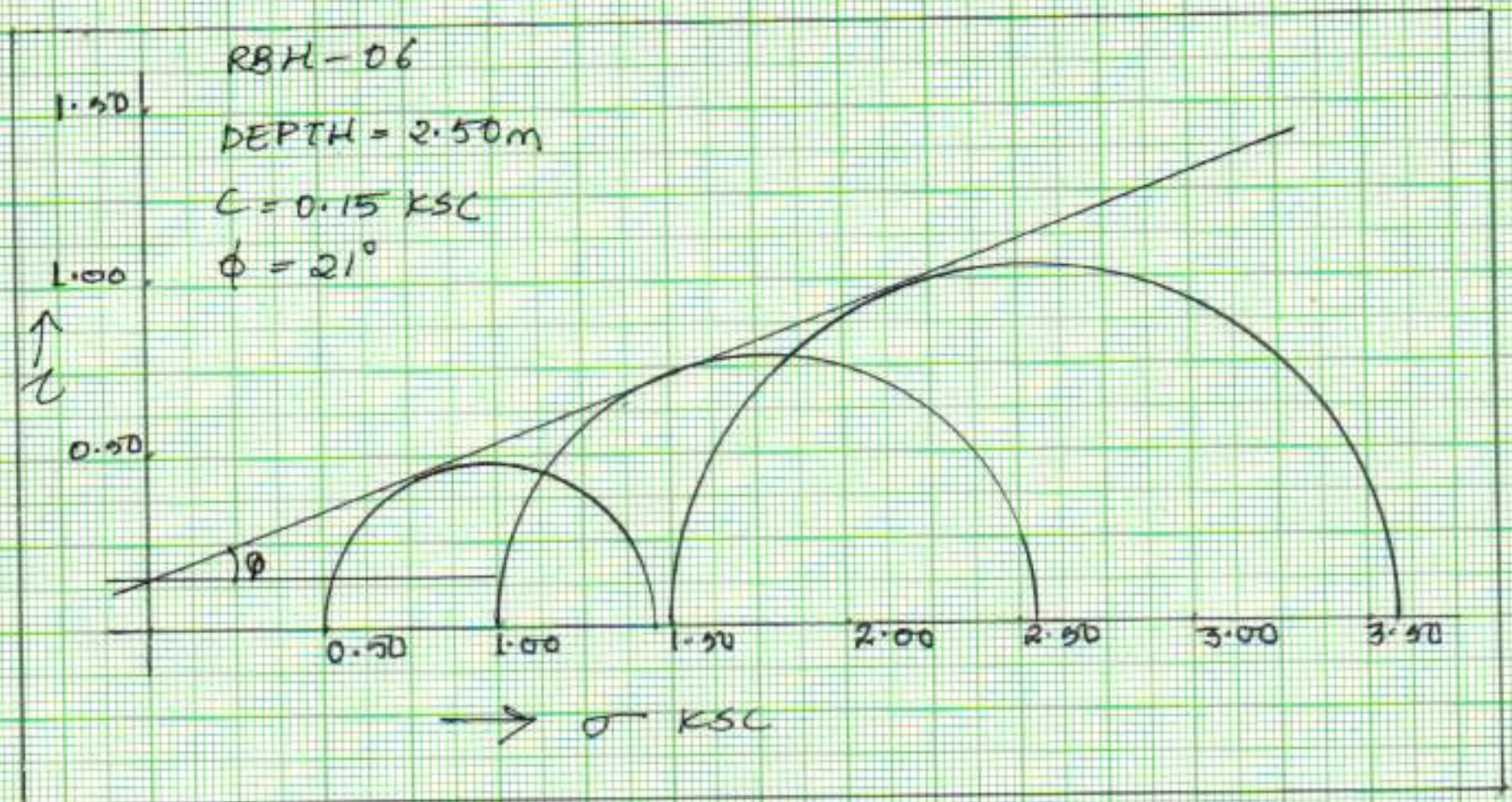
ANNEXURE 6.3.5 Mohr's Coulomb Circles & Failure Envelope



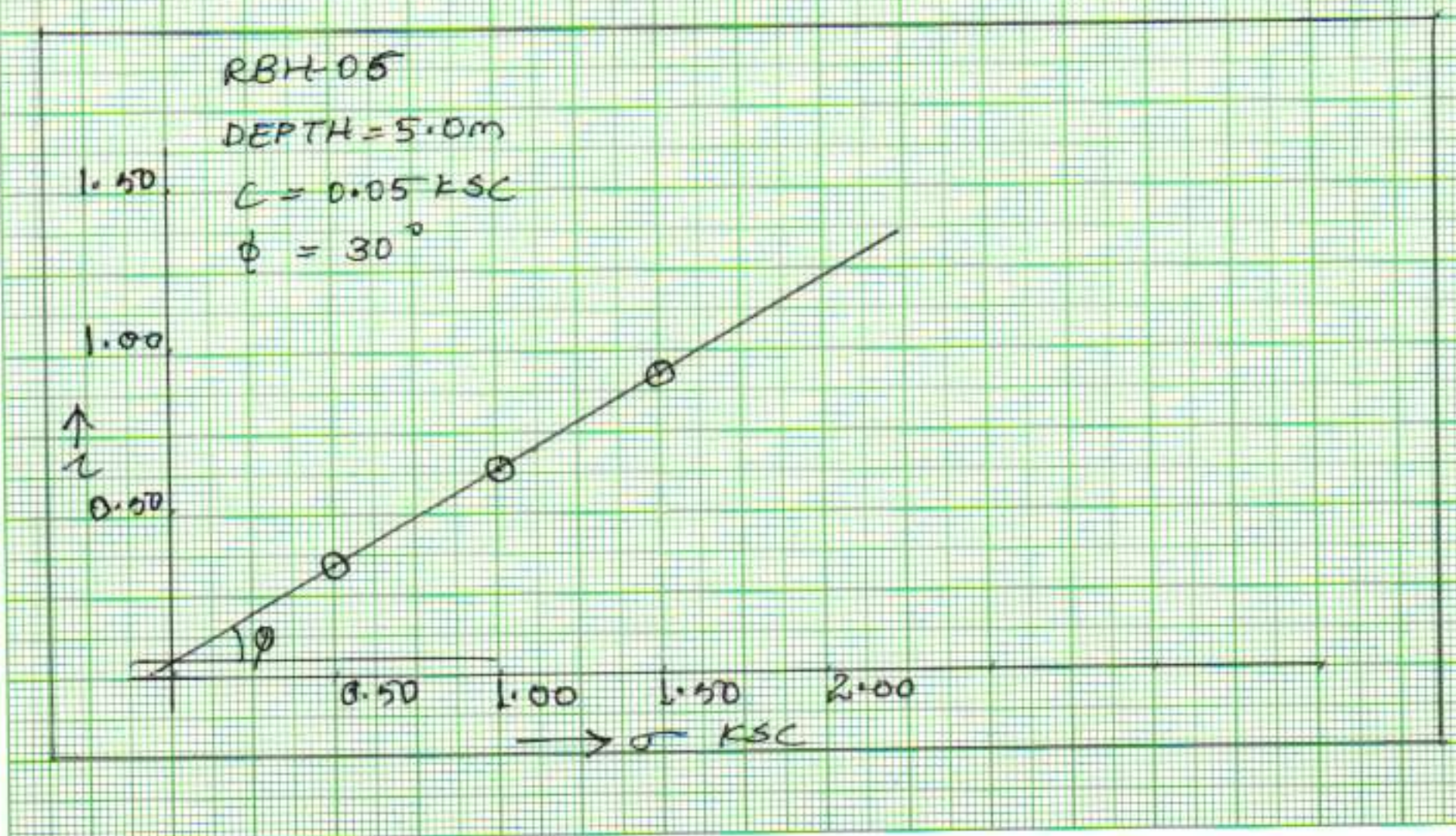
Direct Shear Graph



ANNEXURE 6.3.6 Mohr's Coulomb Circles & Failure Envelope



Direct Shear Graph



GRAINSIZE DISTRIBUTION CURVE

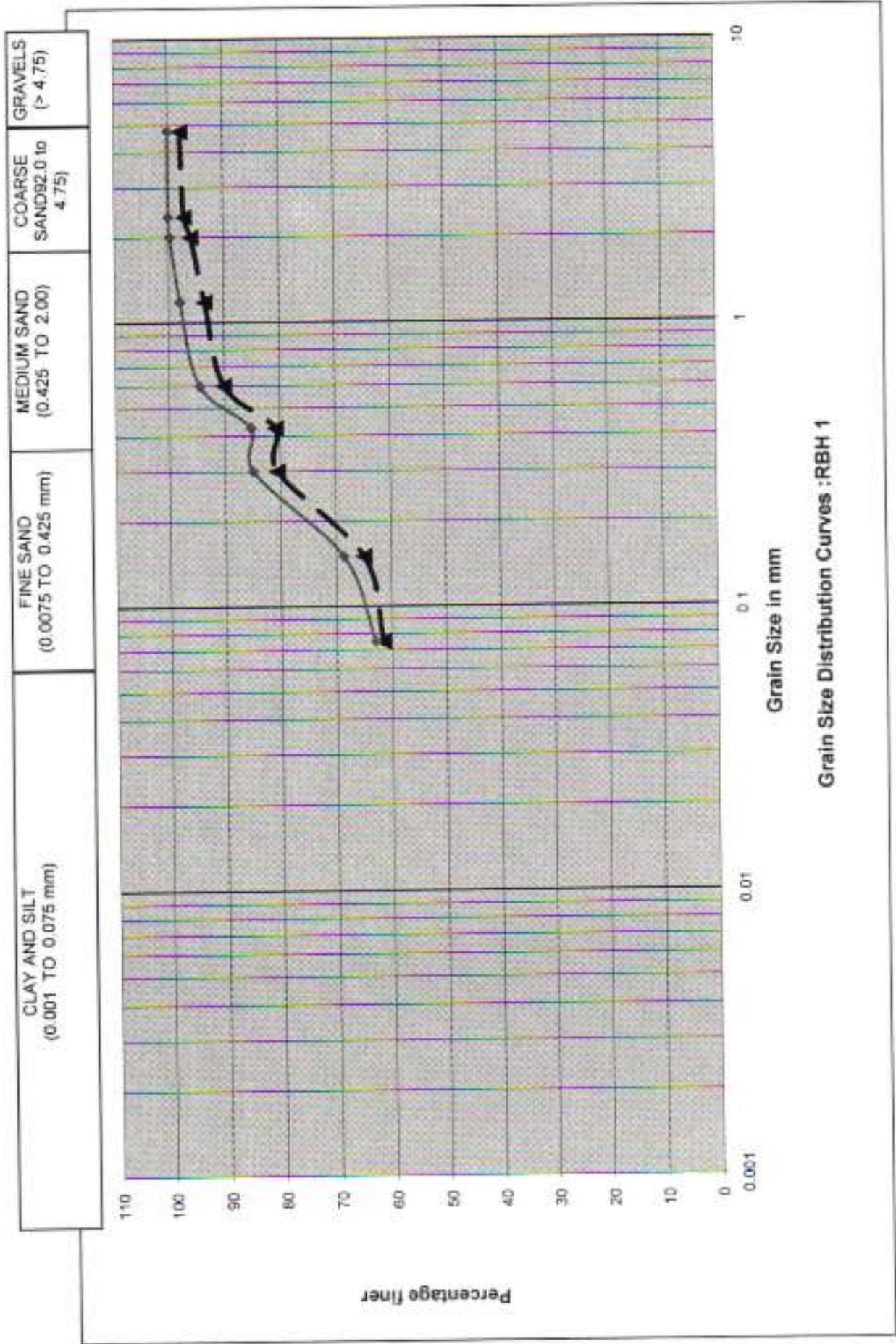
RBH-1

2.50m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	11.2	11.200	2.24	97.76
2.36	3.5	14.700	2.94	97.06
2	5.9	20.600	4.12	95.88
1.18	12.1	32.700	6.54	93.46
0.6	16.8	49.500	9.9	90.1
0.425	46.5	96.000	19.2	80.8
0.3	1.5	97.500	19.5	80.5
0.15	77.6	175.100	35.02	64.98
0.075	17	192.100	38.42	61.58

Gravels	Sand	Silt & Clay
2.24	36.18	61.58

3.00 m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	0.1	0.100	0.02	99.98
2.36	0.4	0.500	0.1	99.9
2	1.1	1.600	0.32	99.68
1.18	9	10.600	2.12	97.88
0.6	17.2	27.800	5.56	94.44
0.425	46.1	73.900	14.78	85.22
0.3	2	75.900	15.18	84.82
0.15	81	156.900	31.38	68.62
0.075	28.5	185.400	37.08	62.92

Gravels	Sand	Silt & Clay
0.02	37.06	62.92



RBH-2

2.50m

Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	10.8	10.800	2.16	97.84
2.36	4.6	15.400	3.08	96.92
2	5.2	20.600	4.12	95.88
1.18	13.3	33.900	6.78	93.22
0.6	18.4	52.300	10.46	89.54
0.425	44.5	96.800	19.36	80.64
0.3	1.7	98.500	19.7	80.3
0.15	79.8	178.300	35.66	64.34
0.075	14.6	192.900	38.58	61.42

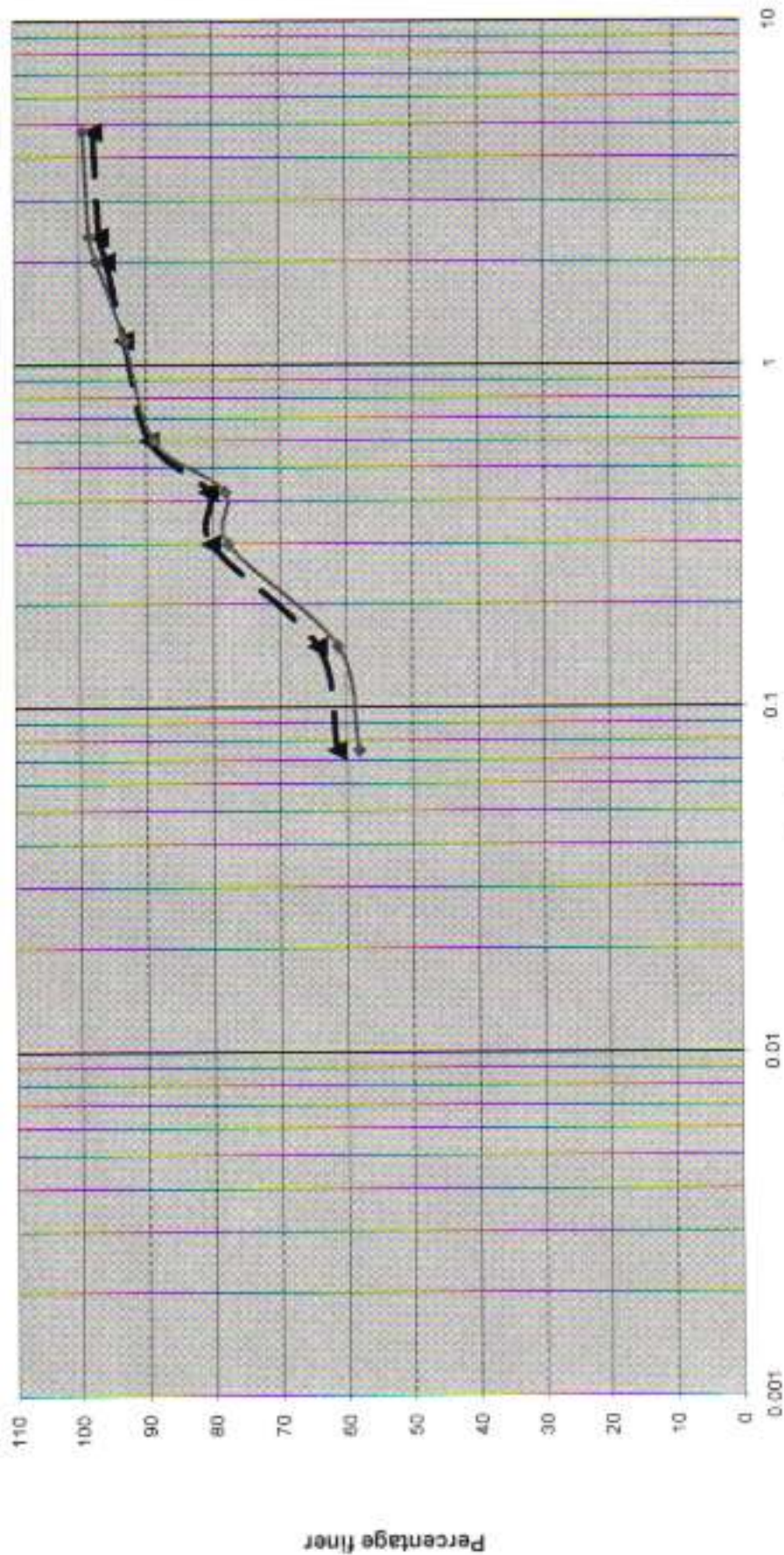
Gravels	Sand	Silt & Clay
2.16	36.42	61.42

3.00 m

Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	3.1	3.100	0.62	99.38
2.36	4.7	7.800	1.56	98.44
2	5.5	13.300	2.66	97.34
1.18	20.8	34.100	6.82	93.18
0.6	22	56.100	11.22	88.78
0.425	53.3	109.400	21.88	78.12
0.3	1.8	111.200	22.24	77.76
0.15	82.4	193.600	38.72	61.28
0.075	16	209.600	41.92	58.08

Gravels	Sand	Silt & Clay
0.62	41.3	58.08

CLAY AND SILT (0.001 TO 0.075 mm)	FINE SAND (0.0075 TO 0.425 mm)	MEDIUM SAND (0.425 TO 2.00)	COARSE SAND 92.0 to 4.75)	GRAVELS (> 4.75)
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Grain Size Distribution Curves : RBH 2

RBH-3

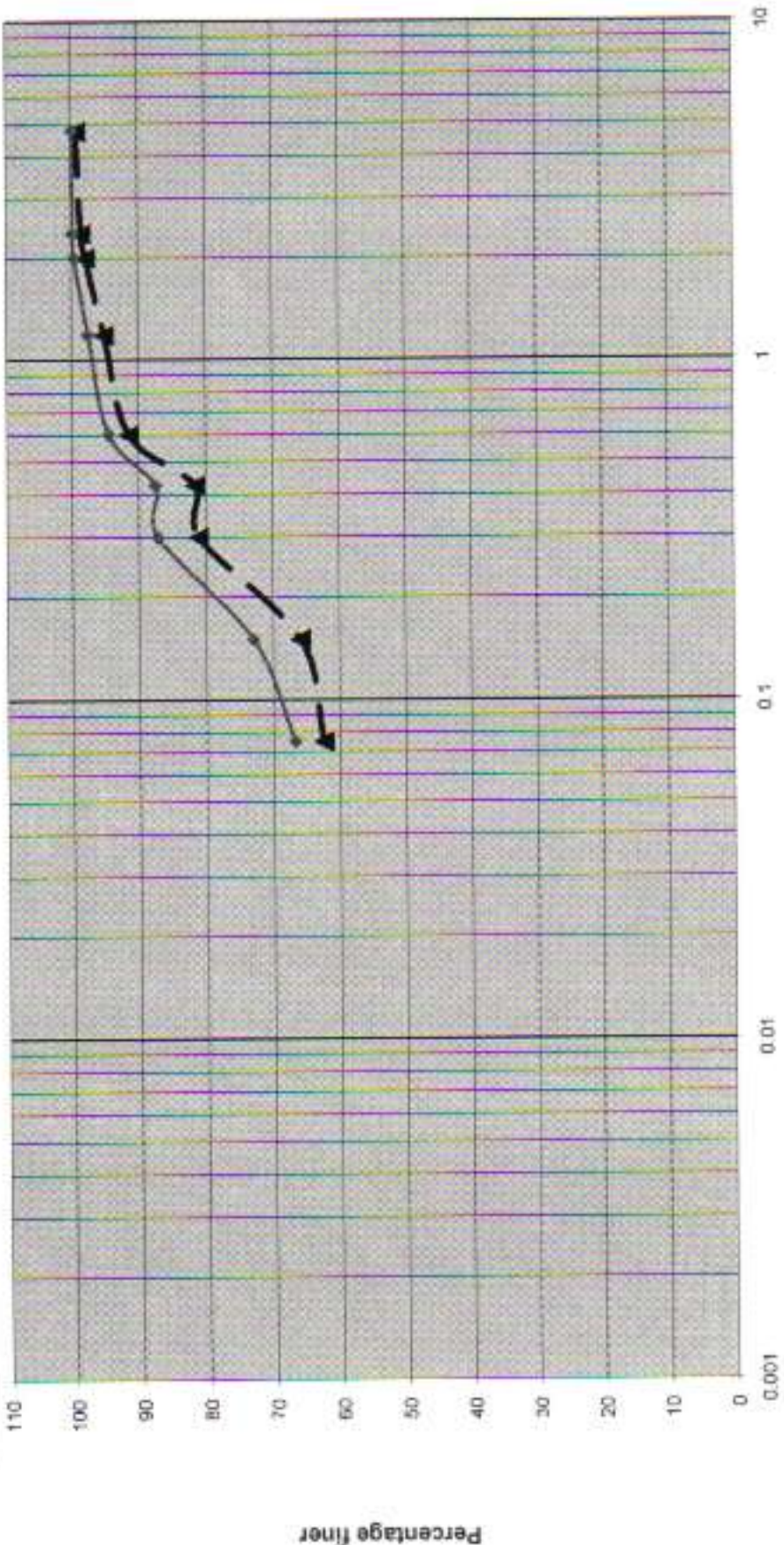
2.50m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	3.8	3.800	0.76	99.24
2.36	3.5	7.300	1.46	98.54
2	3.1	10.400	2.08	97.92
1.18	13.9	24.300	4.86	95.14
0.6	18.2	42.500	8.5	91.5
0.425	49.5	92.000	18.4	81.6
0.3	2.8	94.800	18.96	81.04
0.15	75.7	170.500	34.1	65.9
0.075	17.2	187.700	37.54	62.46

Gravels	Sand	Silt & Clay
0.76	36.78	62.46

3.00 m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	0.6	0.600	0.12	99.88
2.36	0.5	1.100	0.22	99.78
2	1.1	2.200	0.44	99.56
1.18	10.5	12.700	2.54	97.46
0.6	14.9	27.600	5.52	94.48
0.425	34.9	62.500	12.5	87.5
0.3	1.6	64.100	12.82	87.18
0.15	71.3	135.400	27.08	72.92
0.075	31	166.400	33.28	66.72

Gravels	Sand	Silt & Clay
0.12	33.16	66.72

CLAY AND SILT (0.001 TO 0.075 mm)		FINE SAND (0.0075 TO 0.425 mm)	MEDIUM SAND (0.425 TO 2.00)	COARSE SAND 92.0 to 4.75)	GRAVELS (> 4.75)
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Grain Size Distribution Curves : RBH 3

RBH-4

2.50m

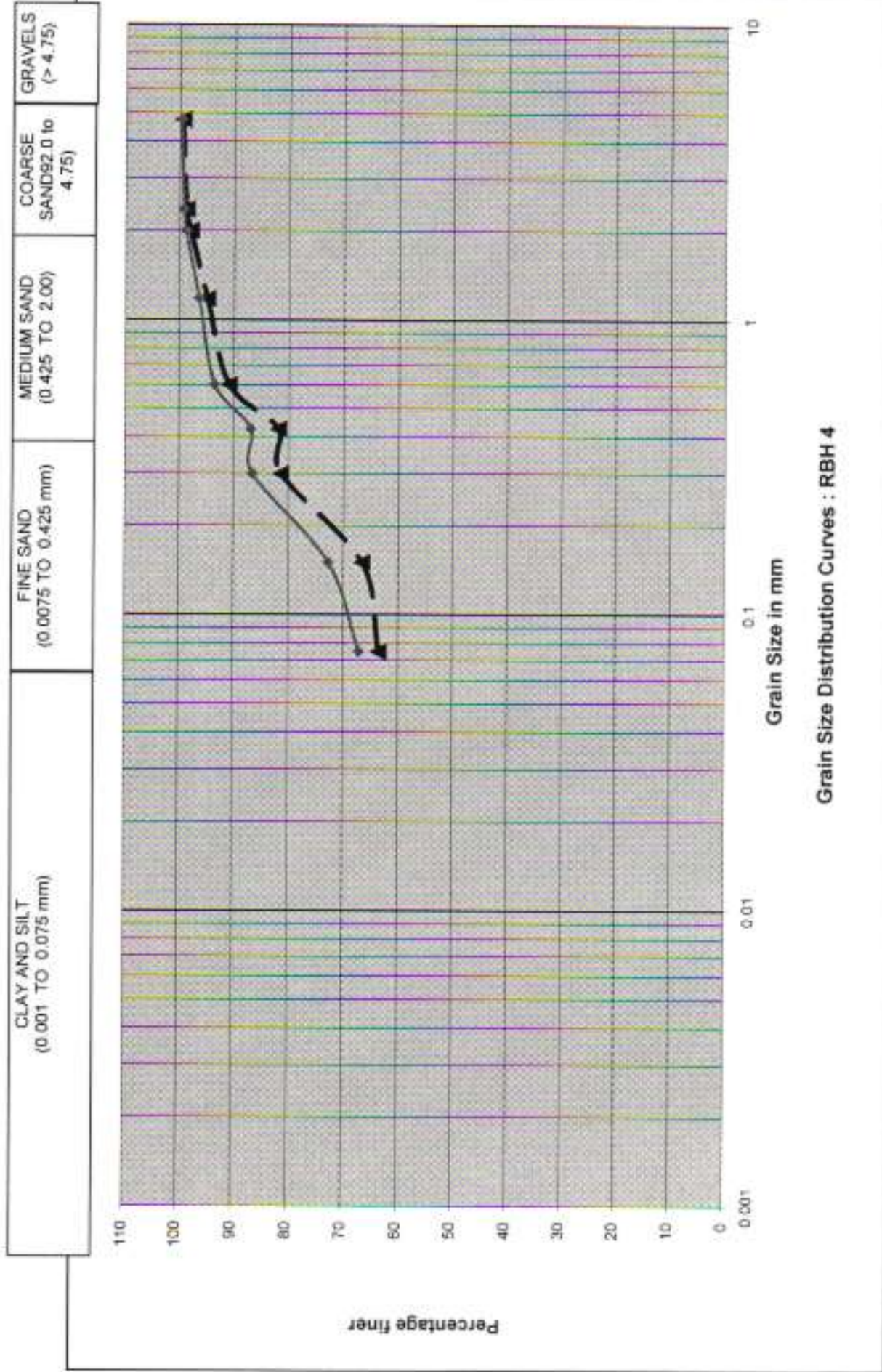
Sieve Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	2.9	2.900	0.58	99.42
2.36	3.6	6.500	1.3	98.7
2	3.8	10.300	2.06	97.94
1.18	15.3	25.600	5.12	94.88
0.6	20.1	45.700	9.14	90.86
0.425	44.8	90.500	18.1	81.9
0.3	2.1	92.600	18.52	81.48
0.15	74.3	166.900	33.38	66.62
0.075	15.6	182.500	36.5	63.5

Gravels	Sand	Silt & Clay
0.58	35.92	63.5

3.00m

Sieve Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	1.6	1.600	0.32	99.68
2.36	2.5	4.100	0.82	99.18
2	1.8	5.900	1.18	98.82
1.18	12.3	18.200	3.64	96.36
0.6	14.5	32.700	6.54	93.46
0.425	32.6	65.300	13.06	86.94
0.3	1.5	66.800	13.36	86.64
0.15	69.4	136.200	27.24	72.76
0.075	28.3	164.500	32.9	67.1

Gravels	Sand	Silt & Clay
0.32	32.58	67.1



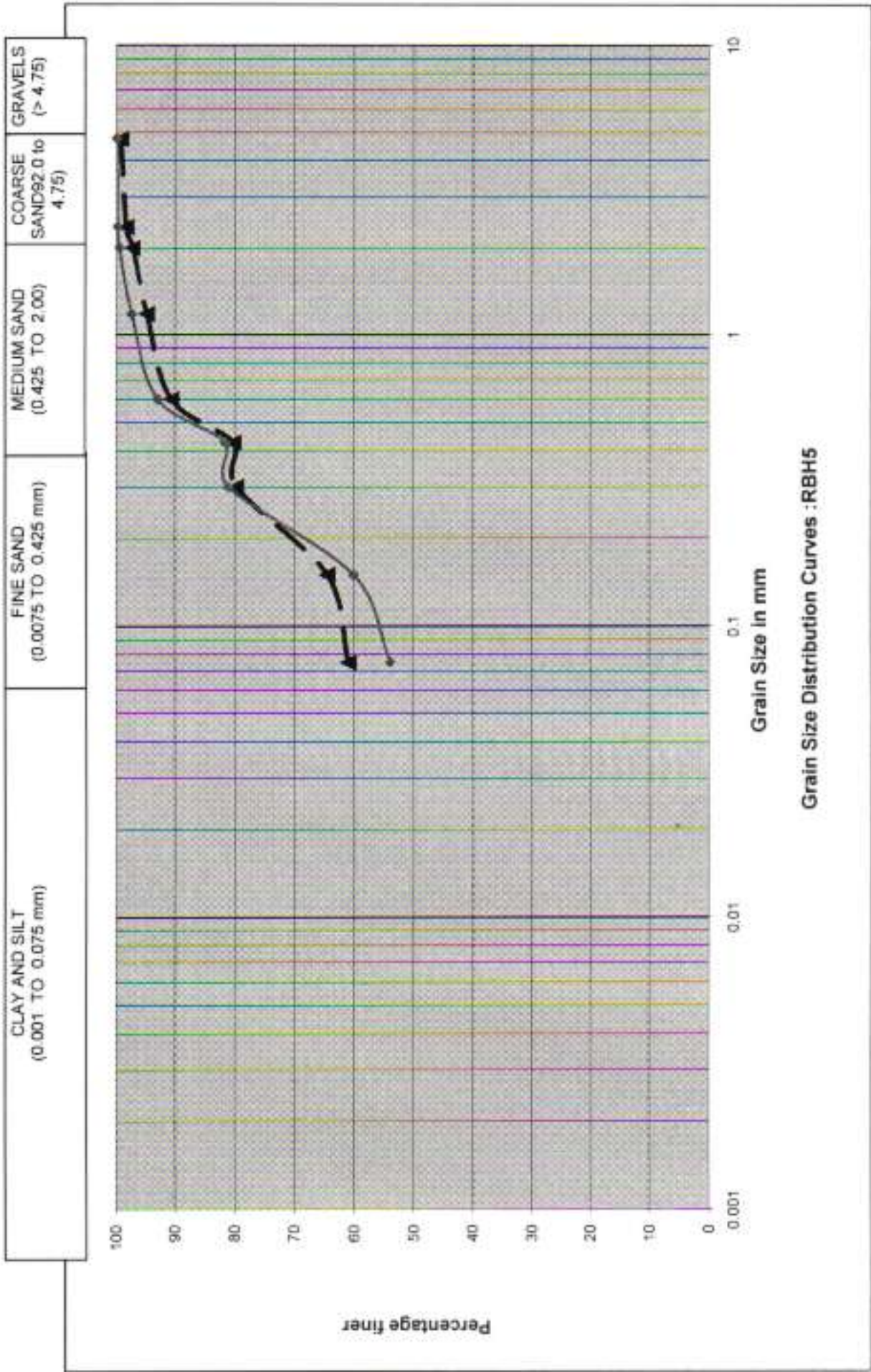
RBH-5

Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	3.9	3.900	0.78	99.22
2.36	4.2	8.100	1.62	98.38
2	5.8	13.900	2.78	97.22
1.18	12.6	26.500	5.3	94.7
0.6	20.5	47.000	9.4	90.6
0.425	51.8	98.800	19.76	80.24
0.3	2.3	101.100	20.22	79.78
0.15	76.3	177.400	35.48	64.52
0.075	17.8	195.200	39.04	60.96

Gravels	Sand	Silt & Clay
0.78	38.26	60.96

Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	0.8	0.800	0.16	99.84
2.36	0.4	1.200	0.24	99.76
2	1.3	2.500	0.5	99.5
1.18	10.5	13.000	2.6	97.4
0.6	22.8	35.800	7.16	92.84
0.425	56.3	92.100	18.42	81.58
0.3	2.8	94.900	18.98	81.02
0.15	104.6	199.500	39.9	60.1
0.075	30.7	230.200	46.04	53.96

Gravels	Sand	Silt & Clay
0.16	45.88	53.96



RBH-6

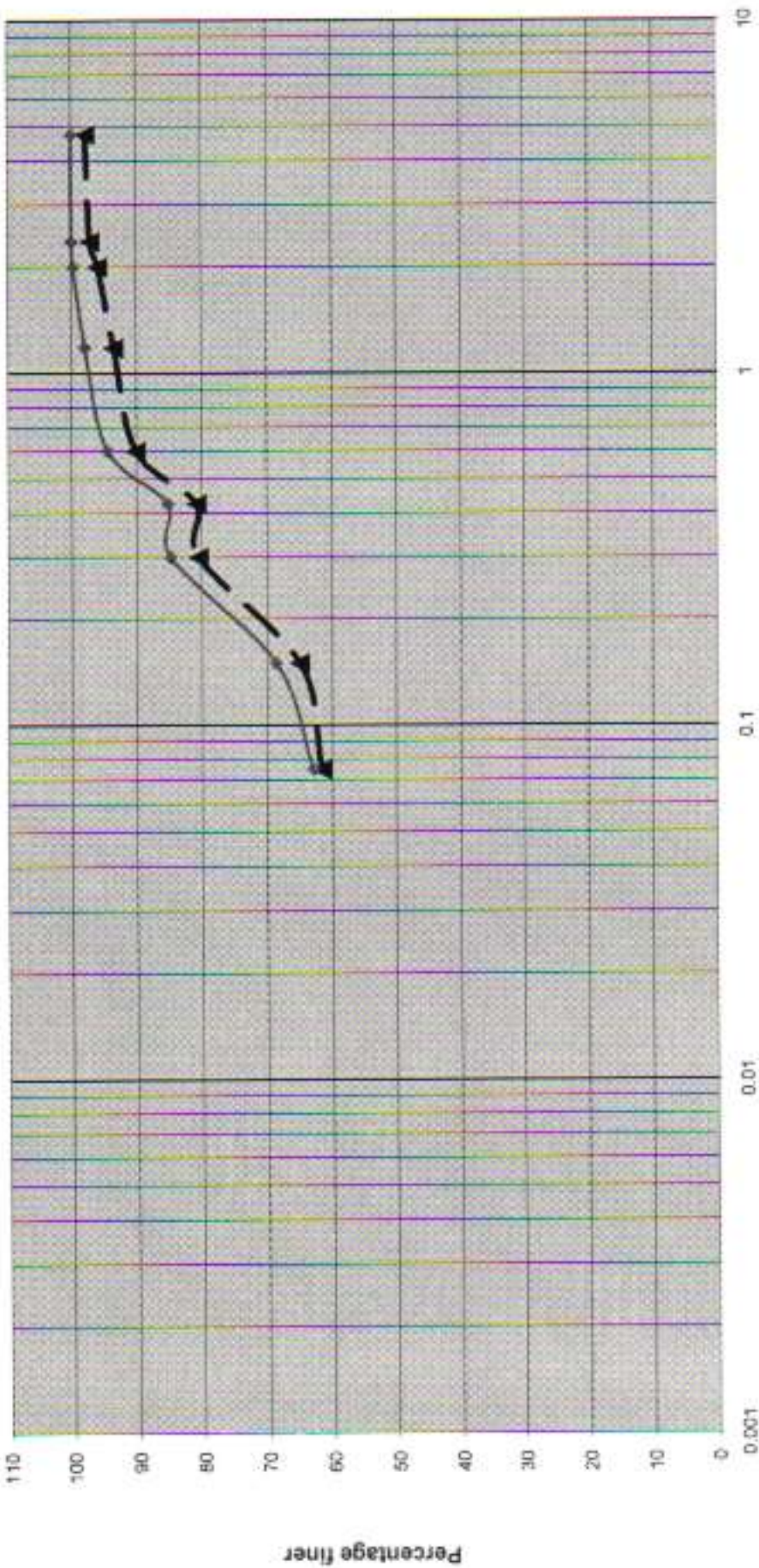
2.50m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	5.1	5.100	1.02	98.98
2.36	2.8	7.900	1.58	98.42
2	3.6	11.500	2.3	97.7
1.18	14.4	25.900	5.18	94.82
0.6	15.3	42.200	8.44	91.56
0.425	49.8	92.000	18.4	81.6
0.3	2.6	94.600	18.92	81.08
0.15	70.4	165.000	33	67
0.075	18.1	183.100	36.62	63.38

Gravels	Sand	Silt & Clay
1.02	35.6	63.38

3.00m				
Seive Size	Weight Retained	Cum Wt Retained	% Coarser	% Finer
4.75	0.2	0.200	0.04	99.96
2.36	0.6	0.800	0.16	99.84
2	1	1.800	0.36	99.64
1.18	9.5	11.300	2.26	97.74
0.6	20.3	31.600	6.32	93.68
0.425	57.6	89.200	17.84	82.16
0.3	2.4	91.600	18.32	81.68
0.15	105.3	196.900	39.38	60.62
0.075	27.4	224.300	44.86	55.14

Gravels	Sand	Silt & Clay
0.04	44.82	55.14

CLAY AND SILT (0.001 TO 0.075 mm)				FINE SAND (0.0075 TO 0.425 mm)		MEDIUM SAND (0.425 TO 2.00)		COARSE SAND 92.0 to 4.75)		GRAVELS (> 4.75)	
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ANNEXURE - 6.4.1 to 6.4.6
SBC AND SETTLEMENT
CALCULATIONS

Annexure 6.3.1

Specimen SBC and Settlement Calculations : RBH 1 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	N _y	Water Table Correction Factors:
0	5.70	1.00	0.00	
5	7.30	1.60	0.50	W _q W _r
10	9.60	2.70	1.20	1.00 1.00
15	12.90	4.40	2.50	(No Water Table is Encountered)
20	17.70	7.40	5.00	
25	25.10	12.70	9.70	0.50 0.50
30	37.20	22.50	19.70	(If Water Table touches the FL)
34	52.60	36.50	30.00	
35	57.80	41.40	42.40	
40	95.70	81.30	100.40	
45	172.30	173.30	297.50	
48	258.30	287.90	780.10	
50	347.50	415.10	1153.20	

Soil Strata at 2.50 m below EGL: Silt (ML / A-4)

6.3.1.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	N _y	Na= SPT =
21	19.18	8.46	5.94	26

b) Calculation of SBC :

Over Burden Pr. =

$$UBC (kg/Sq.cms) = 1.3 C Nc + 0.5 \gamma D + Wq \cdot Nq + 0.4 \cdot \gamma \cdot B \cdot W_y \cdot N_y$$

C	ϕ	γ	L	B	D	Nc
0.16	21	0.00188	250	250	250	26
(kg/Sq.cms)	(degrees)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

$$UBC(T/Sq.m) = 90.8236$$

$$SBC(T/Sq.m) = 36.32944$$

6.3.1.3.ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=26 Blows B = 2.50 m Sett Factor = 0.0090
 Recommended SBC = 20.00T/Sq.m = 2.000 kg/Sq.cms 2.000
 Allowable Settlement (mm) = 18.00 < 50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 20.00 T/sq.m SBC

6.3.1.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

ϕ	Nc	Nq	N _y	a) Bearing Capacity Factors (IS 6403):
0	5.14	1.00	0.00	
5	6.50	1.60	0.40	ϕ Nc Nq N _y
10	8.30	2.50	1.20	21 15.98 7.26 6.5
15	11.00	3.90	2.60	
20	14.80	6.40	5.40	b) Water Table Correction Factors:
25	20.70	10.70	10.90	
30	30.10	18.40	22.40	
32	35.50	23.20	30.20	Water Table is Found
34	42.20	29.40	41.00	in future
36	50.60	37.80	56.50	W _q
38	61.40	48.90	78.00	0.50
40	75.30	64.20	109.40	
45	133.90	134.90	270.00	
50	319.100	319.10	763.00	

c) Depth Factors:
 $D_c = 1.29100181$ $D_q = D_\gamma = 1.145500903$

d) Shape Factors:

$$S_c = 1.09 \text{ for Square \& circle}$$

$$S_q = 1.05 \text{ for Square \& circle}$$

$$S_\gamma = 0.60 \text{ for Square}$$

0.6 for circle

e) Load Inclination Factors:

$$i_c = 1.00$$

$$i_q = 1.00$$

$$i_\gamma = 1.00$$

$$Q_{ult} (T/Sq.m) = 2/3 C N_c S_c D_c i_c + q (N_q - 1) S_q D_q i_q W_q + 0.5 \gamma B N_\gamma S_\gamma i_\gamma W_\gamma$$

$$Q_{ult} (T/Sq.m) = 52.12$$

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

$$\text{Factor of Safety} = 2.5 \quad Q_{safe} = \frac{Q_{ult}}{FS} = 20.848$$

$$\text{Minimum of the Above Three UBC} \quad 52.12 \quad 52.10$$

$$\text{Minimum of the Above Three SBC} \quad 20.85 \quad 20.90$$

$$\text{Actual Recommended} = 20.00 \quad 20.00 \text{ T/Sq.m}$$

(Minimum of Above four methods)

Annexure 6.3.2

Specimen SBC and Settlement Calculations : RBH 2 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	N _γ	Water Table Correction Factors:
0	5.70	1.00	0.00	Wq
5	7.30	1.60	0.50	Wr
10	9.60	2.70	1.20	1.00
15	12.90	4.40	2.50	(No Water Table is Encountered)
20	17.70	7.40	5.00	0.50
25	25.10	12.70	9.70	0.50
30	37.20	22.50	19.70	(If Water Table touches the FL)
34	52.60	36.50	30.00	
35	57.80	41.40	42.40	
40	95.70	81.30	100.40	
45	172.30	173.30	297.50	
48	258.30	287.90	780.10	
50	347.50	415.10	1153.20	

Soil Strata at 2.50 m below EGL: Silt (ML / A-4)

6.3.2.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	N _γ
21	19.18	8.45	5.94

Na = SPT = 15

b) Calculation of SBC :

Over Burden Pr. =

$$UBC (kg/Sq.cms) = 1.3 C Nc + 0.5 \gamma D + Wq Nq + 0.4 \gamma B W \gamma N \gamma$$

C	ϕ	γ	L	B	D	Nc
0.16	21	0.00188	200	200	250	15
(Kg/Sq.cms)	21	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

$$UBC(T/Sq.m) = 88.59016$$

$$SBC(T/Sq.m) = 35.436064$$

6.3.2.3 ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=15 Blows B = 2.0 m
Sett Factor = 0.0180
Recommended SBC = 20.00 T/Sq.m = 2.0 kg/Sq.cms

Allowable Settlement (mm) = 36.00 < 50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 20.00 T/sq.m SBC

6.3.2.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

a) Bearing Capacity Factors (IS 6403):

ϕ	Nc	Nq	N _γ
0	5.14	1.00	0.00
5	6.50	1.60	0.40
10	8.30	2.50	1.20
15	11.00	3.90	2.60
20	14.80	6.40	5.40
25	20.70	10.70	10.90
30	30.10	18.40	22.40
32	35.50	23.20	30.20
34	42.20	29.40	41.00
36	50.60	37.80	56.50
38	61.40	48.90	78.00
40	75.30	64.20	109.40
45	133.90	134.90	270.00
50	319.100	319.10	763.00

b) Water Table Correction Factors:

Water Table is Found

in future

Wq

0.50

c) Depth Factors:

$$Dc = 1.36375226 \quad Dq = D \gamma = 1.181876129$$

d) Shape Factors:

$$Sc = 1.09 \quad \text{for Square \& circle}$$

$$Sq = 1.05 \quad \text{for Square \& circle}$$

$$Sy = 0.60 \quad \text{for Square}$$

0.6 for circle

e) Load Inclination Factors:

$$Ic = 1.00$$

$$Iq = 1.00$$

$$I\gamma = 1.00$$

$$Quilt (T/Sq.m) = 2/3 C Nc Sc Dc Ic + q (Nq-1) Sq Dq Iq Wq + 0.5 \gamma B N\gamma Sy I\gamma W\gamma$$

$$Quilt (T/Sq.m) = 52.2$$

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

$$\text{Factor of Safety} = 2.5 \quad Q_{safe} = 20.88$$

$$Q_{ult}/FS = 20.88$$

$$(T/Sq.m)$$

$$\text{Minimum of the Above Three UBC} = 52.2$$

$$\text{Minimum of the Above Three SBC} = 20.88$$

$$\text{Actual Recommended} = 20.00$$

$$\text{(Minimum of Above four methods)} = 20.00 \text{ T/Sq.m}$$

Annexure 6.3.3

Specimen SBC and Settlement Calculations : RBH 3 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	N _γ	Water Table Correction Factors:
0	5.70	1.00	0.00	
5	7.30	1.60	0.50	W _q W _r
10	9.60	2.70	1.20	1.00 1.00
15	12.90	4.40	2.50	(No Water Table is Encountered)
20	17.70	7.40	5.00	
25	25.10	12.70	9.70	0.50 0.50
30	37.20	22.50	19.70	(If Water Table touches the FL)
34	52.60	36.50	30.00	
35	57.80	41.40	42.40	
40	95.70	81.30	100.40	Soil Strata at 2.50 m below EGL: Silt (ML / A-4)
45	172.30	173.30	297.50	
48	259.30	287.90	780.10	
50	347.50	415.10	1153.20	

6.3.3.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	N _γ	Na= SPT =
19	16.74	6.8	4.5	11

b) Calculation of SBC :

Over Burden Pr =

$$UBC (kg/Sq.cms) = 1.3 C Nc + 0.5 \gamma D + Wq Nq + 0.4 \gamma B W \gamma N \gamma$$

C	ϕ	γ	L	B	D	Nc
0.15	19	0.00186	200	200	250	11
(kg/Sq.cms)	(degree)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

UBC(T/Sq.m) SBC(T/Sq.m)

70.959 28.3836

(T/Sq.mts) (T/Sq.mts)

6.3.3.3.ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=11Blows B = 2.0 m Sett Factor = 0.025
Recommended SBC = 16.00T/Sq.m = 1.60 kg/Sq.cms

Allowable Settlement (mm) = 40.00 < 50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 16.00 T/sq.m SBC

6.3.3.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

a) Bearing Capacity Factors (IS 6403):

ϕ	Nc	Nq	N _γ
0	5.14	1.00	0.00
5	6.50	1.60	0.40
10	8.30	2.50	1.20
15	11.00	3.90	2.60
20	14.80	6.40	5.40
25	20.70	10.70	10.90
30	30.10	18.40	22.40
32	35.50	23.20	30.20
34	42.20	29.40	41.00
36	50.60	37.80	56.50
38	61.40	48.90	78.00
40	75.30	64.20	109.40
45	133.90	134.90	270.00
50	319.100	319.10	763.00

b) Water Table Correction Factors:

Water Table is Found

in future

W_q

0.50

c) Depth Factors:

Dc = 1.35048707 Dq=D_γ= 1.175243537

d) Shape Factors:

Sc = 1.08 for Square & circle

Sq = 1.04 for Square & circle

S_γ = 0.60 for Square

0.6 for circle

e) Load Inclination Factors:

Ic = 1.00

Iq = 1.00

I_γ = 1.00

Qult (T/Sq.m) = 2/3 C Nc Sc Dc Ic + q (Nq-1) Sq Dq Iq Wq + 0.5 γ B N_γ S_γ I_γ W_γ

Qult (T/Sq.m) = 40.85

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

Factor of Safety = 2.5 Qsafe = Qult/FS = 16.34

(T/Sq.m)

Minimum of the Above Three UBC 40.85 40.90

Minimum of the Above Three SBC 16.34 16.30

Actual Recommended = 16.00 T/Sq.m

(Minimum of Above four methods)

Annexure 6.3.4

Specimen SBC and Settlement Calculations : RBH 4 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	N _y	Water Table Correction Factors:
0	5.70	1.00	0.00	
5	7.30	1.60	0.50	
10	9.60	2.70	1.20	Wq Wr
15	12.90	4.40	2.50	1.00 1.00
20	17.70	7.40	5.00	(No Water Table is Encountered)
25	25.10	12.70	9.70	0.50 0.50
30	37.20	22.50	19.70	(If Water Table touches the FL)
34	52.60	36.50	30.00	
35	57.80	41.40	42.40	
40	95.70	81.30	100.40	
45	172.30	173.30	297.50	
48	258.30	287.90	780.10	
50	347.50	415.10	1153.20	

Soil Strata at 2.50 m below EGL: Silt (ML / A-4)

6.3.4.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors

ϕ	Nc	Nq	N _y	Na= SPT =
20	17.7	7.4	5	27

b) Calculation of SBC :

Over Burden Pr =

$$UBC (kg/Sq.cms) = 1.3 C N_c + 0.5 \gamma L + 0.5 \gamma D + W_q \cdot N_q + 0.4 \cdot \gamma \cdot B \cdot W_y \cdot N_y$$

C	ϕ	γ	L	B	D	Nc
0.17	20	0.00188	200	200	250	27
(kg/Sq.cms)	(degree)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

UBC(T/Sq.m)	SBC(T/Sq.m)
81.417	32.5668
(T/Sq.mts)	(T/Sq.mts)

6.3.4.3.ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=27 Blows	B = 2.0 m	Sett Factor =	0.008
Recommended SBC =	19 00T/Sq m =	1.90 kg/Sq.cms	1.900
Allowable Settlement (mm) =	15.20	< 50 mm as per IS 1904, Hence Safe	

Hence the Foundation is safe against allowable settlement of 50 mm with 19.00 T/sq m SBC

6.3.4.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

ϕ	Nc	Nq	N _y	a) Bearing Capacity Factors (IS 6403):
0	5.14	1.00	0.00	
5	6.50	1.60	0.40	
10	8.30	2.50	1.20	
15	11.00	3.90	2.60	
20	14.80	6.40	5.40	b) Water Table Correction Factors:
25	20.70	10.70	10.90	
30	30.10	18.40	22.40	
32	35.50	23.20	30.20	Water Table is Found
34	42.20	29.40	41.00	in future
36	50.60	37.80	56.50	Wq
38	61.40	48.90	78.00	0.50
40	75.30	64.20	109.40	
45	133.90	134.90	270.00	
50	319.100	319.10	763.00	

c) Depth Factors:
Dc = 1.357037 Dq=D_y= 1.178518501

d) Shape Factors:

Sc =	1.09	for Square & circle
Sq =	1.04	for Square & circle
Sy =	0.60	for Square

0.6 for circle

e) Load Inclination Factors:

lc =	1.00
lq =	1.00
ly =	1.00

$$Q_{ult} (T/Sq.m) = 2/3 C N_c S_c D_c l_c + q (N_q - 1) S_q D_q l_q W_q + 0.5 \gamma B N_y S_y l_y W_y$$

$$Q_{ult} (T/Sq.m) = 47.51$$

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

$$\text{Factor of Safety} = \frac{Q_{ult}}{Q_{safe}} = \frac{47.51}{19.004} = 2.5$$

Minimum of the Above Three UBC 47.51 47.50

Minimum of the Above Three SBC 19 19.00

Actual Recommended = 19.00 19.00 T/Sq.m
(Minimum of Above four methods)

Annexure 6.3.5

Specimen SBC and Settlement Calculations : RBH 5 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	N _y	Water Table Correction Factors:
0	5.70	1.00	0.00	
5	7.30	1.60	0.50	W _q W _r
10	9.60	2.70	1.20	1.00 1.00
15	12.90	4.40	2.50	(No Water Table is Encountered)
20	17.70	7.40	5.00	0.50 0.50
25	25.10	12.70	9.70	(If Water Table touches the FL)
30	37.20	22.50	19.70	
34	52.60	36.50	30.00	
35	57.80	41.40	42.40	
40	95.70	81.30	100.40	
45	172.30	173.30	297.50	
48	258.30	287.90	780.10	
50	347.50	415.10	1153.20	

Soil Strata at 2.50 m below EGL: Silt (ML / A-4)

6.3.5.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	N _y	Na= SPT =
21	19.18	8.46	5.94	16

b) Calculation of SBC :

Over Burden Pr. =

$$UBC (kg/Sq.cms) = 1.3 C N_c + 0.5 \gamma D + W_q \cdot N_q + 0.4 \cdot \gamma \cdot B \cdot W_y \cdot N_y$$

C	ϕ	γ	L	B	D	Nc
0.17	21	0.00186	200	200	250	16
(Kg/Sq.cms)	(degree)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

UBC (T/Sq.m) SBC (T/sq.m)
90.56552 36.226208
(T/Sq.mts) (T/Sq.mts)

6.3.5.3.ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=16 Blows B = 2.0 m Sett Factor = 0.016
Recommended SBC = 20.00T/Sq.m = 2.000 kg/Sq.cms 2.000

Allowable Settlement (mm) = 32.00 < 50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 20.00 T/sq m SBC

6.3.5.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982.:

ϕ	Nc	Nq	N _y	a) Bearing Capacity Factors (IS 6403):
0	5.14	1.00	0.00	
5	6.50	1.60	0.40	ϕ Nc Nq N _y
10	8.30	2.50	1.20	21 15.98 7.26 6.5
15	11.00	3.90	2.60	
20	14.80	6.40	5.40	b) Water Table Correction Factors.
25	20.70	10.70	10.90	
30	30.10	18.40	22.40	
32	35.50	23.20	30.20	Water Table is Found
34	42.20	29.40	41.00	in future
36	50.60	37.80	56.50	W _q
38	61.40	48.90	78.00	0.50
40	75.30	64.20	109.40	
45	133.90	134.90	270.00	
50	319.100	319.10	763.00	

c) Depth Factors:

$$D_c = 1.36375226 \quad D_q = D_{\gamma} = 1.181876129$$

d) Shape Factors:

$$\begin{aligned} S_c &= 1.09 \text{ for Square \& circle} \\ S_q &= 1.05 \text{ for Square \& circle} \\ S_{\gamma} &= 0.60 \text{ for Square} \end{aligned}$$

$$0.6 \text{ for circle}$$

e) Load Inclination Factors:

$$\begin{aligned} i_c &= 1.00 \\ i_q &= 1.00 \\ i_{\gamma} &= 1.00 \end{aligned}$$

$$Q_{ult} (T/Sq.m) = 2/3 C N_c S_c D_c i_c + q (N_q - 1) S_q D_q i_q W_q + 0.5 \gamma B N_{\gamma} S_{\gamma} i_{\gamma} W_{\gamma}$$

$$Q_{ult} (T/Sq.m) = 53.5$$

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

$$\text{Factor of Safety} = 2.5 \quad Q_{safe} = Q_{ult}/FS = 21.4$$

$$(T/Sq.m)$$

$$\text{Minimum of the Above Three UBC} = 53.5$$

$$\text{Minimum of the Above Three SBC} = 21.4$$

$$\text{Actual Recommended} = 20.00$$

$$\text{(Minimum of Above four methods)} = 20.00 \text{ T/Sq.m}$$

Annexure 6.3.6

Specimen SBC and Settlement Calculations : RBH 6 at 2.50m Depth below EGL

Terzaghi's Bearing Capacity Factors :					Water Table Correction Factors:		
ϕ	Nc	Nq	N _γ		Wq	W _r	
0	5.70	1.00	0.00		1.00	1.00	
5	7.30	1.60	0.50				
10	9.60	2.70	1.20				
15	12.90	4.40	2.50				
20	17.70	7.40	5.00				
25	25.10	12.70	9.70		0.50	0.50	
30	37.20	22.50	19.70				
34	52.60	36.50	30.00				
35	57.80	41.40	42.40				
40	95.70	81.30	100.40				
45	172.30	173.30	297.50				
48	258.30	287.90	780.10				
50	347.50	415.10	1153.20				

Soil Strata at 2.50 m below EGL: Silt (ML / A-4)

6.3.5.1. SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	N _γ	Na= SPT =
21	19.18	8.46	5.94	16

b) Calculation of SBC :

Over Burden Pr =

$$UBC (kg/Sq.cms) = 1.3 C N_c + 0.5 \gamma^* D + W q + N q + 0.4 \gamma^* B + W \gamma^* N \gamma$$

C	ϕ	γ	L	B	D	Nc
0.15	21	0.00187	200	200	250	16
(kg/Sq.cms)	(degree)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

UBC(T/Sq.m) SBC(T/Sq.m)

85.83774	34.335096
(T/Sq.mts)	(T/Sq.mts)

6.3.6.3.ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES :

For N=16 Blows	B = 2.0 m	Sett Factor =	0.016
Recommended SBC =	20.00T/Sq.m	=	2.000 kg/Sq.cms
Allowable Settlement (mm) =	32.00	<	50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 20.00 T/sq.m SBC

6.3.6.2. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

a) Bearing Capacity Factors (IS 6403):

ϕ	Nc	Nq	N _γ
0	5.14	1.00	0.00

b) Water Table Correction Factors:

ϕ	Nc	Nq	N _γ
5	6.50	1.60	0.40
10	8.30	2.50	1.20
15	11.00	3.90	2.60
20	14.80	6.40	5.40
25	20.70	10.70	10.90
30	30.10	18.40	22.40
32	35.50	23.20	30.20
34	42.20	29.40	41.00
36	50.60	37.80	56.50
38	61.40	48.90	78.00
40	75.30	64.20	109.40
45	133.90	134.90	270.00
50	319.100	319.10	763.00

Water Table is Found in future

Wq

0.50

c) Depth Factors:

$$D_c = 1.36375226 \quad D_q = D_\gamma = 1.181876129$$

d) Shape Factors:

$$S_c = 1.09 \text{ for Square \& circle}$$

$$S_q = 1.05 \text{ for Square \& circle}$$

$$S_\gamma = 0.60 \text{ for Square}$$

0.6 for circle

e) Load Inclination Factors:

$$i_c = 1.00$$

$$i_q = 1.00$$

$$i_\gamma = 1.00$$

$$Q_{ult} (T/Sq.m) = \frac{2}{3} C N_c S_c D_c i_c + q (N_q - 1) S_q D_q i_q W_q + 0.5 \gamma B N_\gamma S_\gamma i_\gamma W_\gamma$$

$$Q_{ult} (T/Sq.m) = 50.47$$

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and water Table correction factor and it will vary from 2 to 3)

$$\text{Factor of Safety} = \frac{Q_{ult}}{Q_{safe}} = \frac{2.5}{20.188} = 20.188$$

$$\text{Minimum of the Above Three UBC} = 50.47$$

$$\text{Minimum of the Above Three SBC} = 20.19$$

$$\text{Actual Recommended} = 20.00$$

$$\text{(Minimum of Above four methods)} = 20.00 \text{ T/Sq.m}$$

ANNEXURE - 6.5
PHOTOGRAPH OF FIELD GEOTECH
INVESTIGATIONS

S.R.GEO-SOLUTIONS PVT LTD.



RBH-01

RBH-02



RBH-03

View Showing Geotechnical Field Investigations for The Proposed Construction of Anand Lake Front Residential Apartment Building at Sy No. 245 / 1b, Thally Road, Hosur – 635109 (TN).

S.R.GEO-SOLUTIONS PVT LTD.



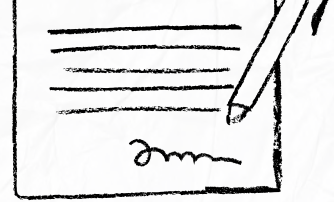
RBH-04

RBH-05



RBH-06

View Showing Geotechnical Field Investigations for The Proposed Construction of Anand Lake Front Residential Apartment Building at Sy No. 245 / 1b, Thally Road, Hosur – 635109 (TN).



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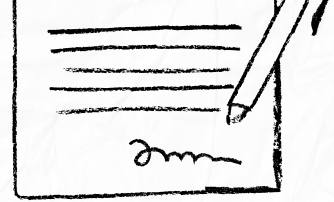
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