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PROJECT

GEOTECHNICAL INVESTIGATION FOR THE PROPOSED RESIDENTIAL BUILDING CONSISTING OF ONE BASEMENT + GROUND + 4 UPPER FLOORS AT OLD NO. 4, NEW NO. 5, SATHYA NARAYANA AVENUE, BOAT CLUB

CLIENT

M/s CEEBROS HOTELS (P) LTD.,
19/1, 3rd CROSS STREET,
RA PURAM, CHENNAI,
TAMILNADU – 600 028.

TITLE

GEOTECHNICAL INVESTIGATION REPORT

REPORT NO.: GT- 2541

DATE	REVISON	DESCRIPTION		AUTHORISED SIGNATORY
23/05/2023	FIRST SUBMISSION	SUBMISSION OF GEOTECHNICAL REPORT	SIGN	
			Date	23/05/2023
			DESIGNATION	**MANAGING DIRECTOR**
			NAME	**DR. C.V.PRASAD**

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CHAPTER-1

INTRODUCTION

1.0 PROJECT INFORMATION MATRIX:

NATURE OF PROJECT	: **RESIDENTIAL BUILDING**
STRUCTURE	: **ONE BASEMENT + GROUND + 4 UPPER FLOORS**
PROJECT OWNER	: **M/s CEEBROS HOTELS (P) LTD**
PROJECT LOCATION	: **SATHYANARAYANA AVENUE, R.A. PURAM**
JOB CODE	: **GT-2541**

1.1 SCOPE OF WORK:

1.1.1 FIELD WORK:

- Conducting three soil investigation bore holes of 150 mm diameter in Soil
- Conducting Standard Penetration Test (SPT) within the borehole at:
  - Every 1.0m depth interval up to 6.0m depth
  - Every 1.5m depth interval up to 12.0m
  - At every 2.0m depth interval up to the termination depth of 20.0m below the existing ground level
  - In case of rock formation, rock coring is carried out at every 1.5m depth interval
- The depth of investigation is 23.0m to 25.0m below the existing ground level.
- Collection of disturbed soil samples at SPT location and undisturbed samples from the clayey strata with SPT-value greater than 2 to less than 15 if met within the investigation depth
- Collection of water samples if groundwater table met within the investigation depth

1.1.2 LABORATORY WORK:

- Natural Moisture Content
- Atterberg's limits
- Grain Size Analysis
- Consolidation test on undisturbed samples if applicable
- Chemical Analysis test on soil and water samples to give pH, Chlorides and Sulphates

1.2 STRUCTURE OF THE REPORT:

- Contents
- Introduction
- Investigation Methodology & Test Results
- Sub-Surface Stratification
- Foundation System
- Recommendation
- Annexure

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REPORT TEXT

CHAPTER-2

INVESTIGATION METHODOLOGY & TEST RESULTS

2.0 PREAMBLE:

Three soil investigation boreholes were put as per the planning of the engineer in-charge and these locations are shown in Fig.2.0. The equipment used and the methodology adopted to carry out the fieldwork is described below.

2.1 METHODOLOGY OF FIELD WORK:

2.1.1 EQUIPMENT USED AND METHOD OF DRILLING:

All the boreholes were sunk by conventional rotary drilling rigs. For borehole Methodology followed for boring conformed to IS: 1892 -2000. Boring was progressed by the cutting action of rotating bit with water circulation and stabilizing the side of the boreholes by using casing pipes/bentonite slurry up to required depth to prevent collapse of sidewall. Boring was continued by normal boring process using MS soil cutter in soil. However, Tungsten Carbide (TC) bit drilling was resorted to drill in highly weathered rock stratum where the normal boring process became slow. Diamond Core (DC) bit drilling was adopted in moderately weathered rock formations where penetration using TC bit was became slow.

2.1.2 STANDARD PENETRATION TESTS:

This is a field test to determine "Penetration Resistance of Stratum at the Test Depth". This has been conducted in the boreholes generally up to refusal depth using procedures described in IS: 2131- 2002. In this test, split spoon sampler (50.8 mm OD and 35 mm ID) has replaced driving bit. Sampler is then driven by dropping 63.5 kg hammer on top of driving collar with free fall of 75 cm. The length of sampler is 60 cm.

The tests were conducted at the depth intervals indicated in Chapter-1 (Sec.1.1.1).

2.1.3 COLLECTION OF SOIL SAMPLES:

2.1.3.1 DISTURBED SAMPLES:

The SPT-samples collected were used as disturbed soil samples. These samples were used for visual and physical identification and for conducting laboratory classification tests as per I.S.1498-1970.

2.1.3.2 UNDISTURBED SAMPLES:

From the soft to stiff clay layer, representative undisturbed samples were collected. These samples were used primarily to establish the compressibility parameters to estimate the settlements of shallow foundation system wherever applicable.

2.1.4 COLLECTION OF GROUND WATER SAMPLES:

One representative water sample from each borehole was collected after 24 hours of completing the borehole if water table met within the investigated depth.

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NOTE ON GROUNDWATER TABLE RECORD:

- Groundwater table observation in geotechnical report is predominantly to arrive at foundation design criteria and shall not be construed as design guidelines for the design of dewatering systems
- The groundwater level indicated in the bore logs is specific to the duration of investigation and intensity of the monsoon rains during the time of investigation. Hence, the level shall be taken as guidelines only to plan the investigation for the dewatering system
- No foundation excavation or basement excavations if anticipated within the groundwater table zone shall be carried out without implementing groundwater lowering schemes

2.2 LABORATORY TESTING:

2.2.1 ON COARSE GRAINED SOIL:

On the representative samples, sieve analysis tests were conducted to arrive at grain size distribution. These tests were conducted as per I.S.2720 (part 4)-1985 and the results are presented in Tables-2.1 to 2.3. The graphical representation of grainsize distribution curve for the representative samples in each bore is presented in Fig 2.5 to 2.7.

2.2.2 ON FINE GRAINED SOIL:

On the SPT sample index property tests were conducted to estimate consistency. These test results are presented in Tables-2.1 to 2.3. The graphical representation of hydrometer analyses curve for the representative samples in each bore is presented in Fig.2.8 to 2.15.

2.2.3 CHEMICAL ANALYSIS TESTS:

On representative soil and water samples chemical analysis tests were conducted to estimate pH, Chloride and Sulphates and these results are presented in Table – 2.5 & 2.6

2.3 SUMMARY:

The locations of the field investigation boreholes are shown in site plan given in Fig.2.0. The average sub soil profiles encountered at each location along with their classification and engineering properties are presented in Figs.2.1 & 2.2.

Further, the rock test results are presented in Fig. 2.6 and the cross-section of the soil profile is presented in Fig 2.4

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SITE PLAN

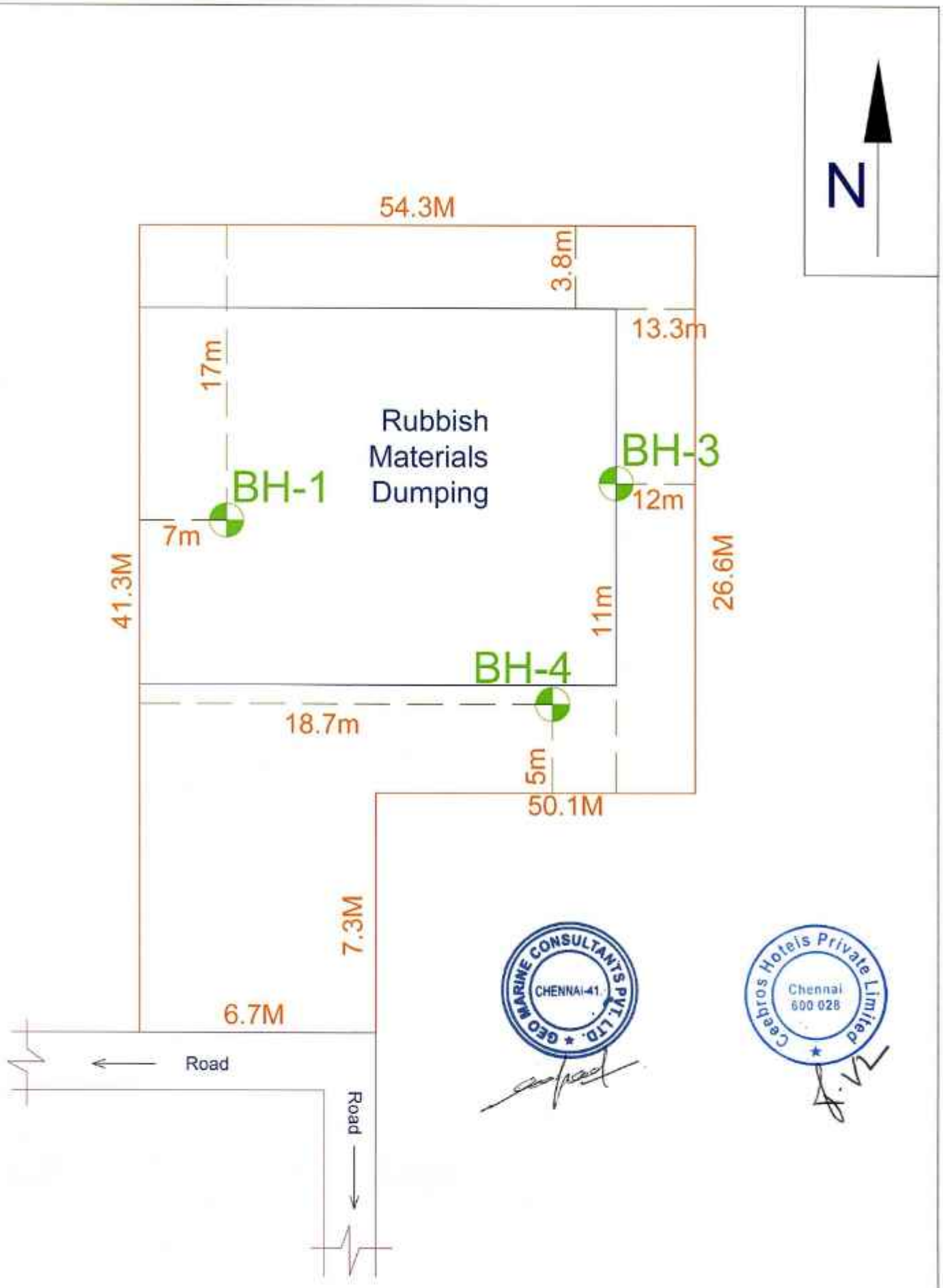


FIG. 2.0 SITE PLAN SHOWING THE FIELD INVESTIGATION BOREHOLE LOCATION

SOIL PROFILES

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SITE INVESTIGATION RECORD

BORE HOLE No.	BH-01		
SHEET	1	OF	3
DIA OF BORE HOLE	150mm ✓ / NX		
BORE START DATE	09/05/2023		
BORE END DATE	10/05/2023		
TOTAL DRILL DAYS	2		

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING						
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-		
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N	-	
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E	-	

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	RL (m)	Layer Data: Legend	No	Depth	Geotechnical Description
0	09/05/2023	10	30	SC	-	-												
		To																
		10	31				1	1	3	4	0.50	1	SS	-0.5				Brown, Very Loose, **Filled Up Soil/ Silty SAND (SM) With Brick Pats**
		10	40								0.95							
1		To		SC	-	-										L1	1.3	
		10	41				8	8	8	16	1.25	2	SS	-1.25				Brown, Moist, Very Stiff, Fine Grains Sands Mixture, **Sandy Silty CLAY (CI)** Lean Clay of Medium Plasticity
		10	46								1.70							
		To		SC	-	-										L2	2.0	
2		10	47				7	10	12	22	2.00	3	SS	-2.0				Brown, Moist, Poorly Graded, Fine Grains Sands, Medium Dense, **Silty Fine SAND (SM)**
		11	00								2.45							
		To		SC	-	-										L3	3.0	
		11	01															
3		11	08				6	3	3	6	3.00	4	SS	-3.0				
		To		SC	-	-					3.45							
		11	10															Brown, Moist, Medium Stiff, **Silty CLAY (CI) & Sitly CLAY (CH)** Clays of Medium & High Plasticity
4		11	31				2	3	3	6	4.00	5	SS	-4.0				
		To		SC	-	-					4.45							
		11	32													L4	5.0	
5		11	50				1	2	2	4	5.00	6	SS	-5.0				
		To		SC	-	-					5.45							
		11	51															
6		12	05				0	1	2	3	6.00	7	SS	-6.0				Black, Moist, Soft, **Silty CLAY (CH)** Clays of High Plasticity
		To		SC	-	-					6.45							
		12	06															
7																L5	7.5	
							0	0	1	1	7.50	8	SS	-7.5				
											7.95							
8		12	18															Brown, Moist, Poorly Graded, Fine Grains Sands, Very Loose, **Silty Fine SAND (SM) With Binder**
		To		SC	-	-												
		12	19															
9							3	2	3	5	9.00	9	SS	-9.0		L6	9.0	
											9.45							
		12	40															Brown, Moist, Poorly Graded, Fine Grains Sands, Loose, **Silty Fine SAND (SM)**
		To		SC	-	-												
10		12	40															

CS - Core Sample	DS - Disturbed Sample	LOGGED	D.Venugopal	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	09/05/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	G.Sharmila	WATER TABLE (m) 1.80	
WS - Wash Sample	DB - Diamond Bit	DATE	11/05/2023	CASING DEPTH (m) 0.00	

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SITE INVESTIGATION RECORD

BORE HOLE No. **BH-01**
SHEET 2 OF 3

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm ✓ / NX
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-	BORE START DATE	09/05/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N -	BORE END DATE	10/05/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E -	TOTAL DRILL DAYS	2

Depth below E.G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	RL (m)	Layer Data: Legend	No	Depth	Geotechnical Description
11	09/05/2023	14	05	SC	-	-	6	5	4	9	10.50	10	WS	-10.5				Brown, Moist, Poorly Graded, Fine Grains Sands, Loose. **Silty Fine SAND (SM)**
		To									10.95							
		14	07															
12							1	2	4	6	12.00	11	SS	-12.0		L7	12.0	
											12.45							
		14	28															Brown, Moist, Medium Stiff, **Silty CLAY (CI) With Sand Lenses** Clay of Medium Plasticity
13		To		SC	-	-												
		14	30															
14							1	1	2	3	14.00	12	SS	-14.0		L8	14.0	
											14.45							
		14	50															Black to Grey, Moist, Soft, **Silty CLAY (CI)** Lean Clay of Medium Plasticity
15		To		SC	-	-												
		14	52															
16							2	3	3	6	16.00	13	SS	-16.0		L9	16.0	
											16.45							
		15	28															
17		To		SC	-	-												
		15	30															
18							2	3	4	7	18.00	14	SS	-18.0				Black to Grey, Moist, Medium Stiff, **Silty CLAY (CH)** Clays of High Plasticity
											18.45							
		16	01															
19		To		SC	-	-												
		16	10															
20							10Cm Penet for 50Blows			>100	20.00	15	SS	-20.0		L10	20.0	
											20.10							Hard, Soft **SHALE**

CS - Core Sample	DS - Disturbed Sample	LOGGED	D.Venugopal	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	09/05/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	G.Sharmila	WATER TABLE (m) S Pipe	
WS - Wash Sample	DB - [illegible] Bit	DATE	11/05/2023	CASING DEPTH (m) 0.00	

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SITE INVESTIGATION RECORD

BORE HOLE No.	BH-01		
SHEET	3	OF	3

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm / NX ✓
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-	BORE START DATE	09/05/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N -	BORE END DATE	10/05/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E -	TOTAL DRILL DAYS	2

Depth below E.G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R Q D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Sample Details: RL (m)	Layer Data: Legend	Layer Data: No	Layer Data: Depth	Geotechnical Description
21	10/05/2023			DB	44	6	-	-	-	-	21.50	16	CS	-21.5				Brown Grey,Fine Grains Structure, Argillaceous & Lithified,Hard,Sub Fissile/Horizontal Joints,**Lithified SHALE** Gondwana Shale Formation
22		Total Drilling time 1hr 35mins																
23		14 To 15	39 To 34	DB	10	0	-	-	-	-	23.00	17	CS	-23.0		L11	23.0	
24																		
25																		
26																		
27																		
28																		
29																		
30																		

CS - Core Sample	DS - Disturbed Sample	LOGGED	D.Venugopal	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	10/05/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	G.Sharmila	WATER TABLE (m) 1.80	
WS - Wash Sample	DB - Diamond Bit	DATE	11/05/2023	CASING DEPTH (m) 0.00	

Borehole terminated at 23 m depth below E.G.L

FIG.2.1 Sub Soil Profile at BH-01 Location

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SITE INVESTIGATION RECORD

BORE HOLE No.	BH-03		
SHEET	1	OF	3

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING	DIA OF BORE HOLE	150mm ✓ / NX
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-05
CHAINAGE (m)	-	BORE START DATE	24/04/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary
CO-ORDINATES	N -	BORE END DATE	26/04/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite
CO-ORDINATES	E -	TOTAL DRILL DAYS	3

Depth below E.G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	RL (m)	Layer Data: Legend	No.	Depth	Geotechnical Description
1	24/04/2023	12	11	SC	-	-												
		To																
		12	15				2	3	4	7	0.50	1	SS	-0.5				
		12	17								0.95							Brown, Moist, Medium Stiff, **Sandy Silty CLAY (CL) & Silty CLAY (CI)** Clay of Low & Medium Plastic Clay
		To		SC	-	-												
		12	21				2	3	4	7	1.25	2	SS	-1.3				
		12	40								1.70							
		To		SC	-	-												
		12	43				3	5	8	13	2.00	3	SS	-2.0		L1	2.0	
		12	55								2.45							
		To		SC	-	-												
		12	58															
		14	41				3	5	9	14	3.00	4	SS	-3.0				
		To		SC	-	-					3.45							Grey, Moist, Stiff, **Silty CLAY (CI) & Silty CLAY (CH)** Clays of Medium & High Plasticity
		14	45															
		15	17				3	4	6	10	4.00	5	SS	-4.0				
		To		SC	-	-					4.45							
		15	23															
		15	47				-	-	-	-	5.00	6	UDS	-5.0		L2	5.0	
		To		SC	-	-												
		15	51															Grey, Moist, **Silty CLAY (CH) with Sand Lenses** Clays of High Plasticity
		16	06				2	3	4	7	6.00	7	SS	-6.0		L3	6.0	
		To		SC	-	-					6.45							
		16	10															Black to Grey, Moist, Medium Stiff, **Silty CLAY (CH)** Clays of High Plasticity
							2	3	3	6	7.50	-	*SS	-7.5		L4	7.5	
		16	40								7.95							
		To		SC	-	-												Sample Failed (Wash Sample Observation/ Sandy Formation)
		16	48															
							6	7	16	23	9.00	8	SS	-9.0		L5	9.0	
		10	11								9.45							
		To		SC	-	-												Brown, Moist, Poorly Graded, Fine Grains Sands, Medium Dense, **Sitly SAND (SM)** With Binder
10		10	20															

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Elavazhagan	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	24/04/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m) 2.90	
WS - Wash Sample	DB - Diamond Bit	DATE	28/04/2023	CASING DEPTH (m) 0.00	

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SITE INVESTIGATION RECORD

BORE HOLE No.	BH-03		
SHEET	2	OF	3
DIA OF BORE HOLE	150mm ✓ / NX		
BORE START DATE	24/04/2023		
BORE END DATE	26/04/2023		
TOTAL DRILL DAYS	3		

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING						
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-05	CHAINAGE (m)	-		
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N	-	
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E	-	

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	RL (m)	Layer Data: Legend	No.	Depth	Geotechnical Description
							8	5	5	**10**	10.50 / 10.95	10	SS	-10.5		L6	10.5	Brown,Moist,Poorly Graded,Fine Grains Sands,Medium Dense,**Sitly SAND (SM) With Binder**
11		10 To 10	52 57	SC	-	-												Black,Grey,Moist,Poorly Garded,Fine Grains Sands,Loose,**Silty SAND (SM)**
12							4	4	6	**10**	12.00 / 12.45	11	SS	-12.0		L7	12.0	
13		11 To 11	22 28	SC	-	-												
14							3	3	5	**8**	14.00 / 14.45	12	SS	-14.0				
15	25/04/2023	12 To 12	33 39	SC	-	-												
16							7	7	8	**15**	16.00 / 16.45	13	SS	-16.0				Grey to Black,Moist,Stiff,**Silty CLAY (CH)** Clays of High Plasticity
17		14 To 14	51 57	SC	-	-												
18							3	5	6	**11**	18.00 / 18.45	14	SS	-18.0				
19		16 To 16	15 21	SC	-	-												
20							4	6	7	**13**	20.00 / 20.45	-	*SS	-20.0				

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Elavazhagan	PROJECT SITE DETAILS		REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	25/04/2023	GROUND LEVEL (m)	0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m)	2.90	*(SS) - Sample Failed
WS - Wash Sample	DB - Diamond Bit	DATE	28/04/2023	CASING DEPTH (m)	0.00	

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Geobros Home Private Limited Chennai 600 028

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-03		
SHEET	3	OF	3

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm ✓ / NX ✓
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-05	CHAINAGE (m)	-	BORE START DATE	24/04/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N -	BORE END DATE	26/04/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E -	TOTAL DRILL DAYS	3

Depth below E.G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm 0-15	SPT Details: Blows/cm 15-30	SPT Details: Blows/cm 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Sample Details: RL (m)	Layer Data: Legend	Layer Data: No	Layer Data: Depth	Geotechnical Description
21	26/04/2023	10	10	SC	-	-												Grey to Black,Moist,Stiff,**Silty CLAY (CH)** Clays of High Plasticity
		To																
22		10	17															
							4cm Penete for 60 Blows			>100	22.50 ↓ 22.54 ↓	15	SS	-22.5		L8	22.5	
23		11	00	DB	60	21												Brown Grey,Fine Grains Structure, Argillaceous & Lithified,Hard,Sub Fissile/Horizontal Joints,**Lithified SHALE** Gondwana Shale Formation
		To																
24		14	30				-	-	-	-	24.00	16	CS	-24.0				
		14	50															
25		To		DB	100	56										L9	25.5	
		17	10				-	-	-	-	25.50	17	CS	-25.5				
26																		
27																		
28																		
29																		
30																		

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Elavazhagan	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	26/04/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m) 2.90	
WS - Wash Sample	DB - Diamond Bit	DATE	28/04/2023	CASING DEPTH (m) 0.00	

Borehole terminated at 25.5 m depth below E.G.L

FIG.2.2 Sub Soil Profile at BH-03 Location

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Seabros Hotels Private Limited Chennai 600 028

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-04		
SHEET	1	OF	3
DIA OF BORE HOLE	150mm ✓ / NX		
BORE START DATE	11/05/2023		
BORE END DATE	12/05/2023		
TOTAL DRILL DAYS	2		

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING						
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-		
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N	-	
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E	-	

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm 0-15	SPT Details: Blows/cm 15-30	SPT Details: Blows/cm 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Sample Details: RL (m)	Layer Data: Legend	Layer Data: No	Layer Data: Depth	Geotechnical Description
0	11/05/2023	11	42															
		To		SC	-	-												
		11	43				1	3	5	8	0.50	1	SS	-0.5				Brown, Moist, Poorly Graded, Fine & Medium Grains Sands, Loose, **Silty SAND (SM)**
		11	51								0.95							
1		To		SC	-	-										L1	1.3	
		11	52				4	4	4	8	1.25	2	SS	-1.3				
		12	01								1.70							Brown, Moist, Medium Stiff, Fine Grains Sands Mixture, Stiff, **Sandy Silty CLAY (CI)**
2		To		SC	-	-										L2	2.0	
		12	02				5	6	11	19	2.00	3	SS	-2.0				
		12	09								2.45							Brown, Moist, Poorly Graded, Fine & Medium Grains Sands, Medium Dense. **Silty SAND (SM)**
		To		SC	-	-										L3	3.0	
3		12	10				3	7	9	16	3.00	4	SS	-3.0				
		12	18								3.45							
		To		SC	-	-												
		12	19															
4		12	42				4	6	8	14	4.00	5	SS	-4.0				Grey, Grey Brown, Moist, Very Stiff, **Silty CLAY (CI) With Sand Mix & Silty CLAY (CH)** Clays of Medium & High Plasticity
		To		SC	-	-					4.45							
		12	43															
5							-	-	-	-	5.00	6	UDS	-5.0		L4	5.0	
		14	08															
		To		SC	-	-												
		14	09															
6							1	1	1	2	6.00	7	SS	-6.0				Grey, Moist, Very Soft, **Silty CLAY (CH)** Clays of High Plasticity
		14	23								6.45							
		To		SC	-	-												
7		14	24															
							1	1	1	2	7.50	8	SS	-7.5		L5	7.5	
											7.95							
8		14	39															
		To		SC	-	-												
		14	40															
9							2	2	1	3	9.00	-	*SS	-9.0				Grey, Moist, Poorly Graded, Pred. Fine Grains Sands, Medium Grains Sands Mix, Very Loose & Loose, **Silty Fine SAND (SM)**
											9.45							
		14	53															
		To		SC	-	-												
10		14	54															

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Kamalakannan	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	11/05/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m) 1.70	*(SS) - Sample Failed
WS - Wash Sample	DB - Diamond Bit	DATE	15/05/2023	CASING DEPTH (m) 0.00	

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Cebros Hotels Private Limited Chennai 600 028

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-04		
SHEET	2	OF	3

PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm ✓ / NX ✓
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-	BORE START DATE	11/05/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N -	BORE END DATE	12/05/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E -	TOTAL DRILL DAYS	2

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	RL (m)	Layer Data: Legend	No	Depth	Geotechnical Description
11	11/05/2023	15	09 To 15 10	SC	-	-	2	3	2	5	10.50 / 10.95	9	SS	-10.5				Grey,Moist,Poorly Graded,Pred. Fine Grains Sands,Medium Grains Sands Mix,Very Loose & Loose,**Silty Fine SAND (SM)**
12							1	2	3	5	12.00 / 12.45	10	SS	-12.0		L6	12.0	
13		15	23 To 15 25	SC	-	-												
14							2	3	3	6	14.00 / 14.45	11	SS	-14.0				Grey,Moist,Medium Stiff,**Silty CLAY (CI)** Lean Clay of Medium Plasticity
15		15	59 To 16 01	SC	-	-												
16							1	1	3	4	16.00 / 16.45	12	SS	-16.0		L7	16.0	
17		16	29 To 16 31	SC	-	-												Grey,Moist,Soft,**Silty CLAY (CH)** Clays of High Plasticity
18							1	2	20	22	18.00 / 18.45	13	SS	-18.0		L8	18.0	
19	12/05/2023	09	34 To 09 42	SC	-	-	SPT Hammer Rebounded			>100	19.00	-	*SS	-19.0		L9	19.0	Green Grey,Moist,Very Stiff,**Silty CLAY (CI)** Lean Clay of Medium Plasticity
20		10	08 To 10 29	TCB	53	0	-	-	-	-	20.00	14	CS	-20.0				Brown Grey,Fine Grains Structure, Argillaceous & Lithified,Hard,Sub Fissile/Horizontal Joints,**Lithified SHALE** Gondwana Shale Formation

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Kamalakannan	PROJECT SITE DETAILS		REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	12/05/2023	GROUND LEVEL (m)	0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m)	1.70	*(SS) - Sample Failed
WS - Wash Sample	DB - Diamond Bit	DATE	15/05/2023	CASING DEPTH (m)	0.00	

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Cedros Hotels Private Limited Chennai 600 028

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	BH-04						
SHEET	3	OF	3				
PROJECT NAME	PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING					DIA OF BORE HOLE	150mm / NX ✓
LOCATION	Sathya Narayana Avenue, R. A. Puram	MACHINE No.	CR-03	CHAINAGE (m)	-	BORE START DATE	11/05/2023
STRUCTURE	1 Basement + Ground + 4 Upper Floors	DRILLING METHOD	Rotary	CO-ORDINATES	N -	BORE END DATE	12/05/2023
JOB CODE	GT-2541	FLUSHING MEDIUM	Bentonite		E -	TOTAL DRILL DAYS	2

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min.	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm 0-15	SPT Details: Blows/cm 15-30	SPT Details: Blows/cm 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No	Sample Details: Type	Sample Details: RL (m)	Layer Data: Legend	Layer Data: No	Layer Data: Depth	Geotechnical Description
21	12/05/2023	10	50	TCB	74	15	-	-	-	-	21.50	15	CS	-21.5				Brown Grey, Fine Grains Structure, Argillaceous & Lithified, Hard, Sub Fissile/Horizontal Joints, **Lithified SHALE** Gondwana Shale Formation
		To																
		11	36															
22																		
		13	44	TCB	74	0												
		To																
23		14	33				-	-	-	-	23.00	16	CS	-23.0		L10	23.0	
24																		
25																		
26																		
27																		
28																		
29																		
30																		

CS - Core Sample	DS - Disturbed Sample	LOGGED	R.Kamalakannan	PROJECT SITE DETAILS	REMARKS
SS - Split Spoon Sample	SC - Soil Cutter	DATE	12/05/2023	GROUND LEVEL (m) 0.00	
UDS- Undisturbed Sample	TCB - Tungsten Carbide Bit	CHECKED	S.Tysonraj	WATER TABLE (m) 1.70	
WS - Wash Sample	DB - Diamond Bit	DATE	15/05/2023	CASING DEPTH (m) 0.00	

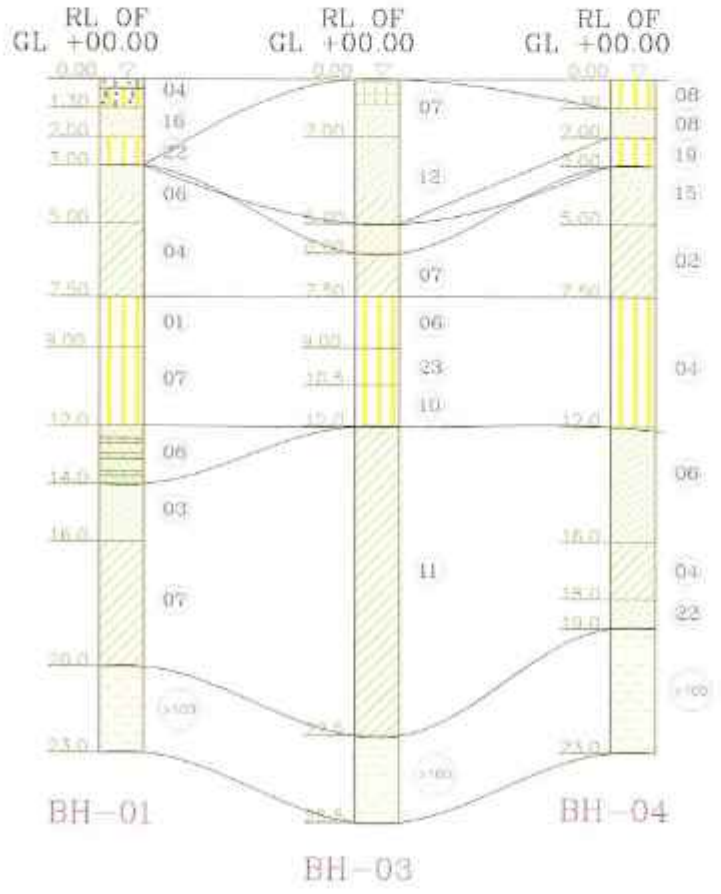
Borehole terminated at 23 m depth below E.G.L

FIG.2.3 Sub Soil Profile at BH-04 Location

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CROSS SECTION PROFILE



LEGEND

- SILTY SAND (SM)
- CLAYEY SILTY SAND (SC)
- Shale
- SILTY CLAY (CI)
- Silty CLAY (CL)
- SILTY CLAY (CH)

FIG.No.2.4 CROSS SECTIONAL VARIATION OF SUB SOIL PROFILE THROUGH BH-01,03 & 04

GEO MARINE CONSULTANTS PVT. LTD. ★ CHENNAI-41.

Cebros Hotels Private Limited Chennai 600 028 ★

GRAIN SIZE DISTRIBUTION CURVE

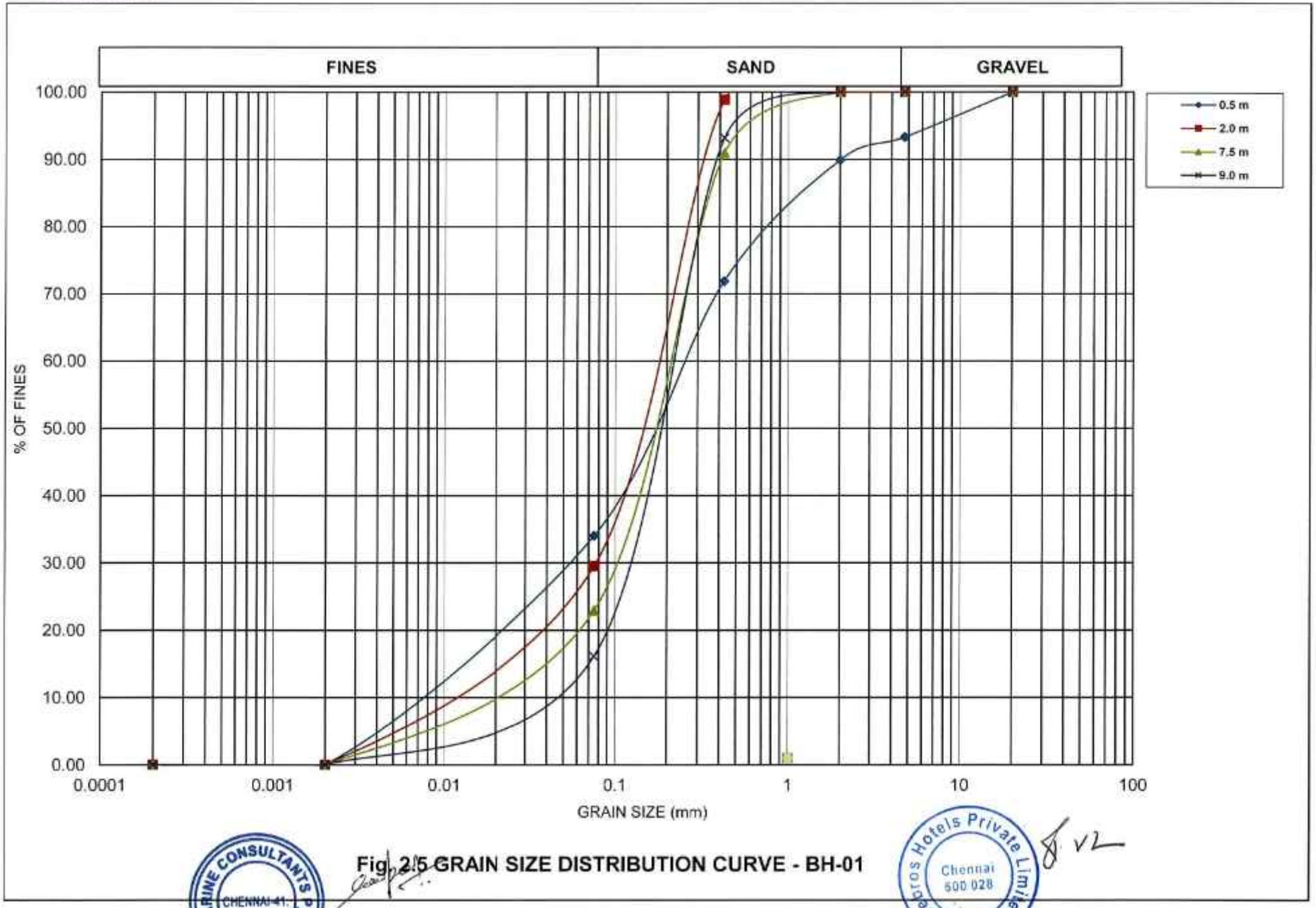


Fig 2.5 GRAIN SIZE DISTRIBUTION CURVE - BH-01

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Ceebros Hotels Private Limited Chennai 600 028

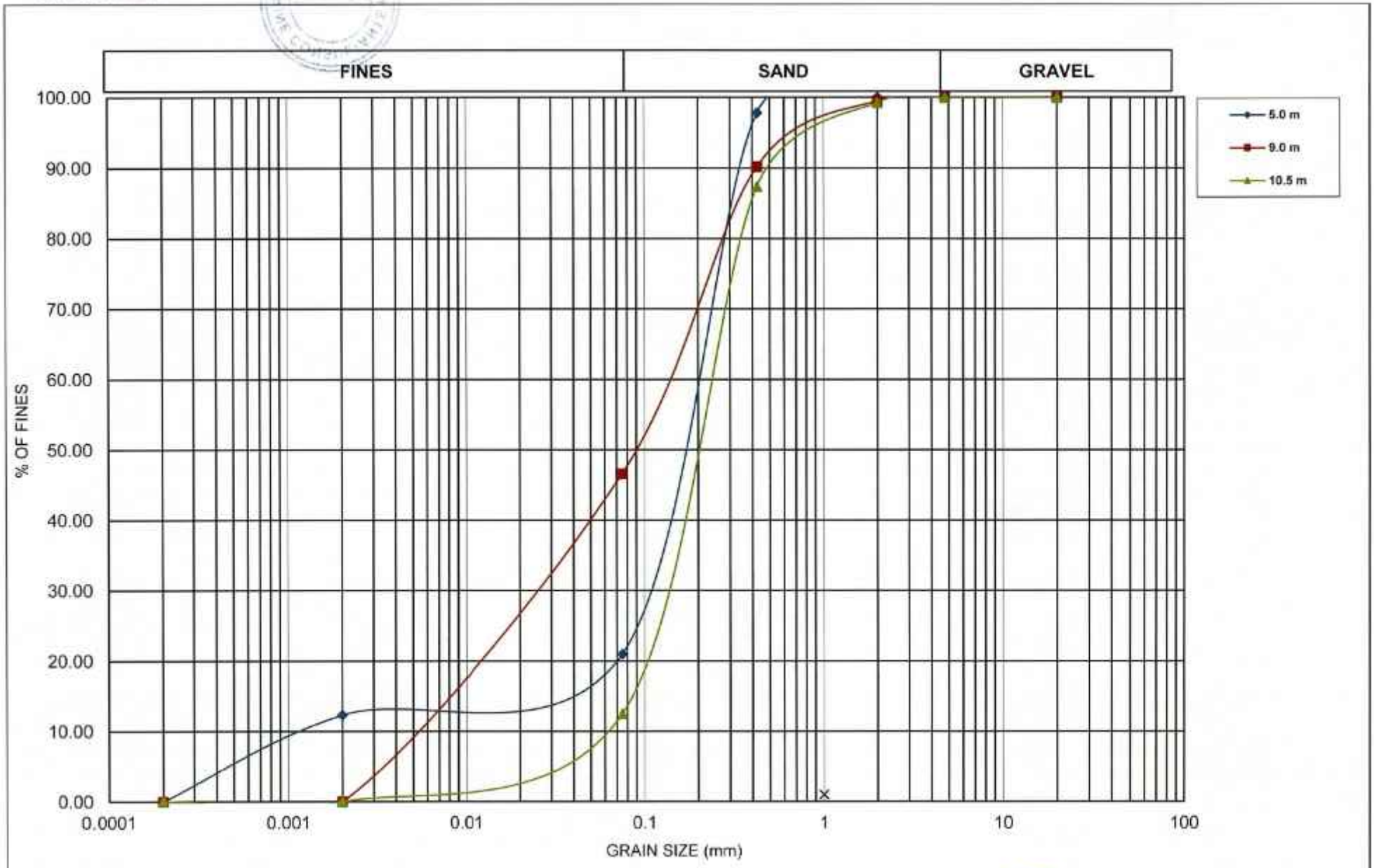


Fig. 2.6 GRAIN SIZE DISTRIBUTION CURVE - BH-03

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.
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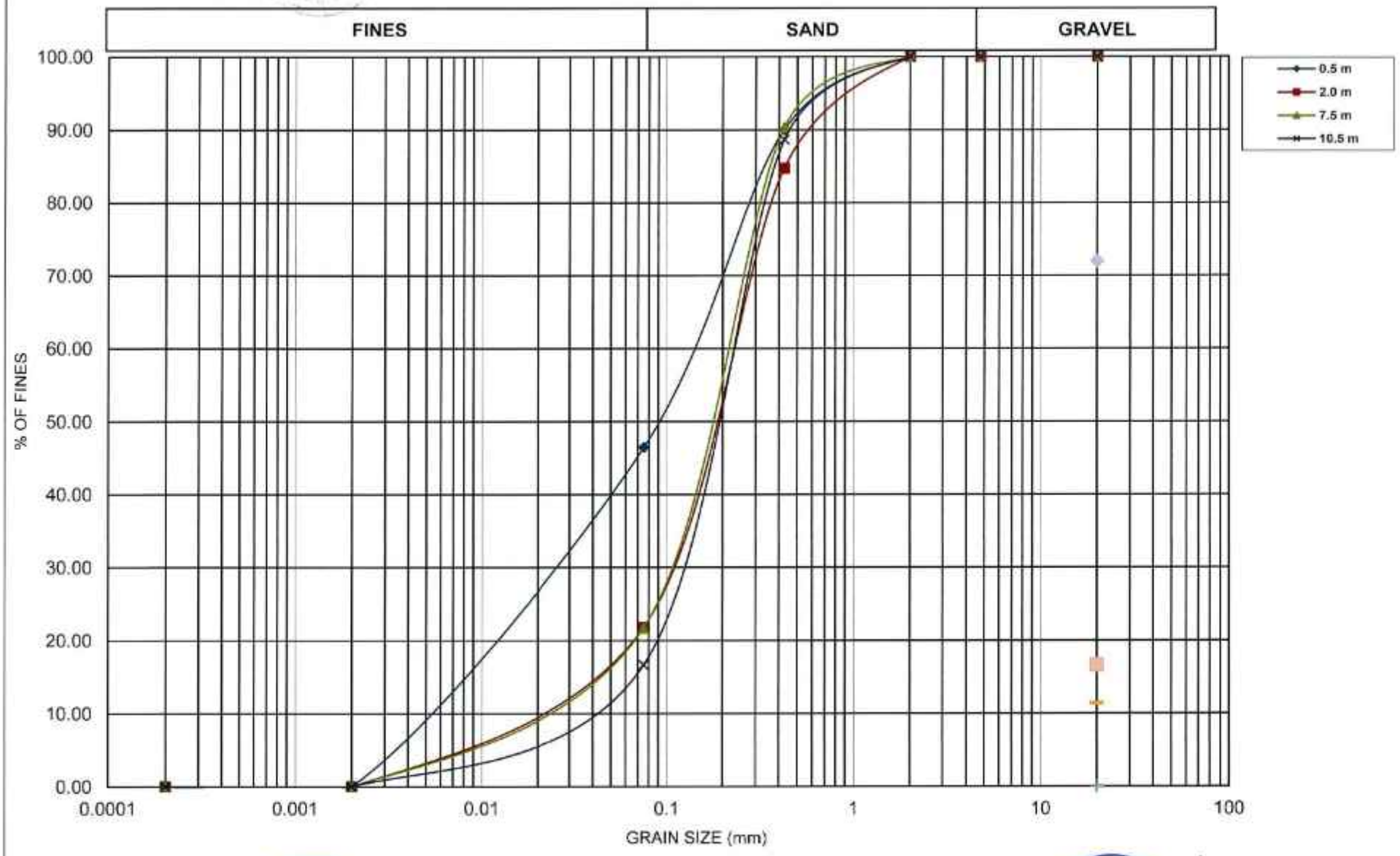


Fig. 2.7 GRAIN SIZE DISTRIBUTION CURVE - BH-04

GEO MARINE CONSULTANTS PVT. LTD. ★ CHENNAI 41.

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HYDROMETER ANALYSIS CURVE

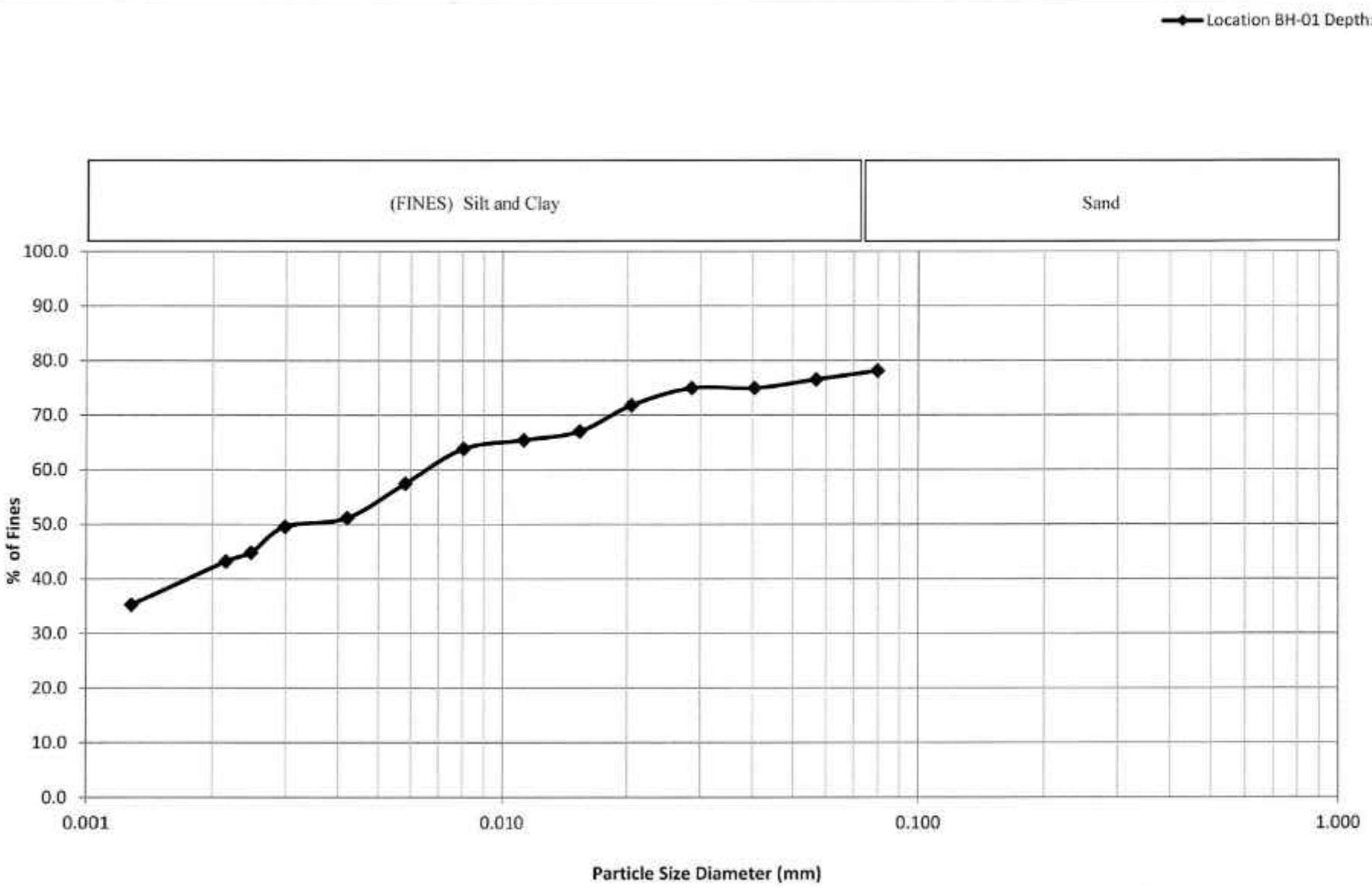


Fig 2.8 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

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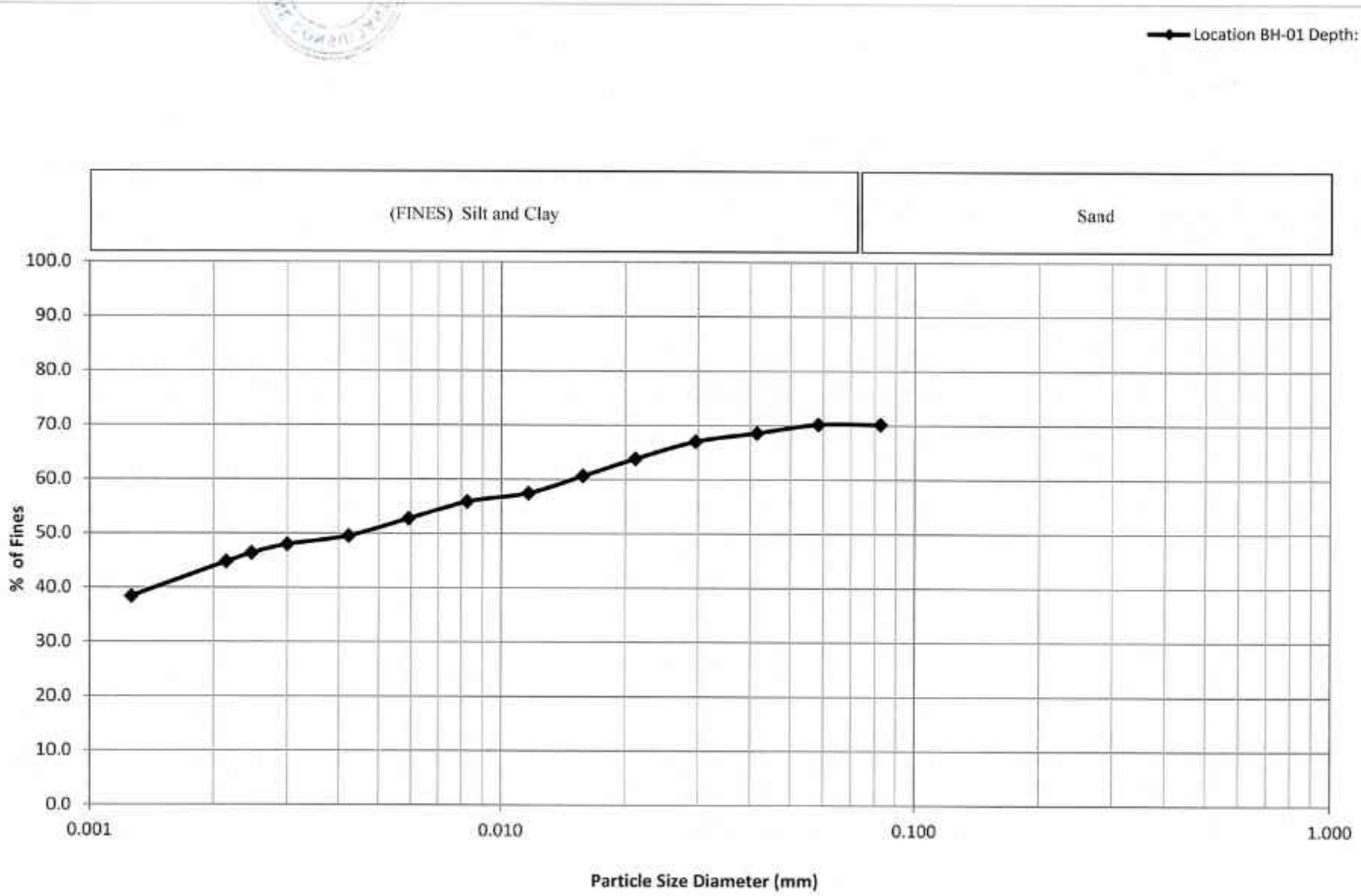


Fig 2.9 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Cebros Hotels Private Limited Chennai 600 028

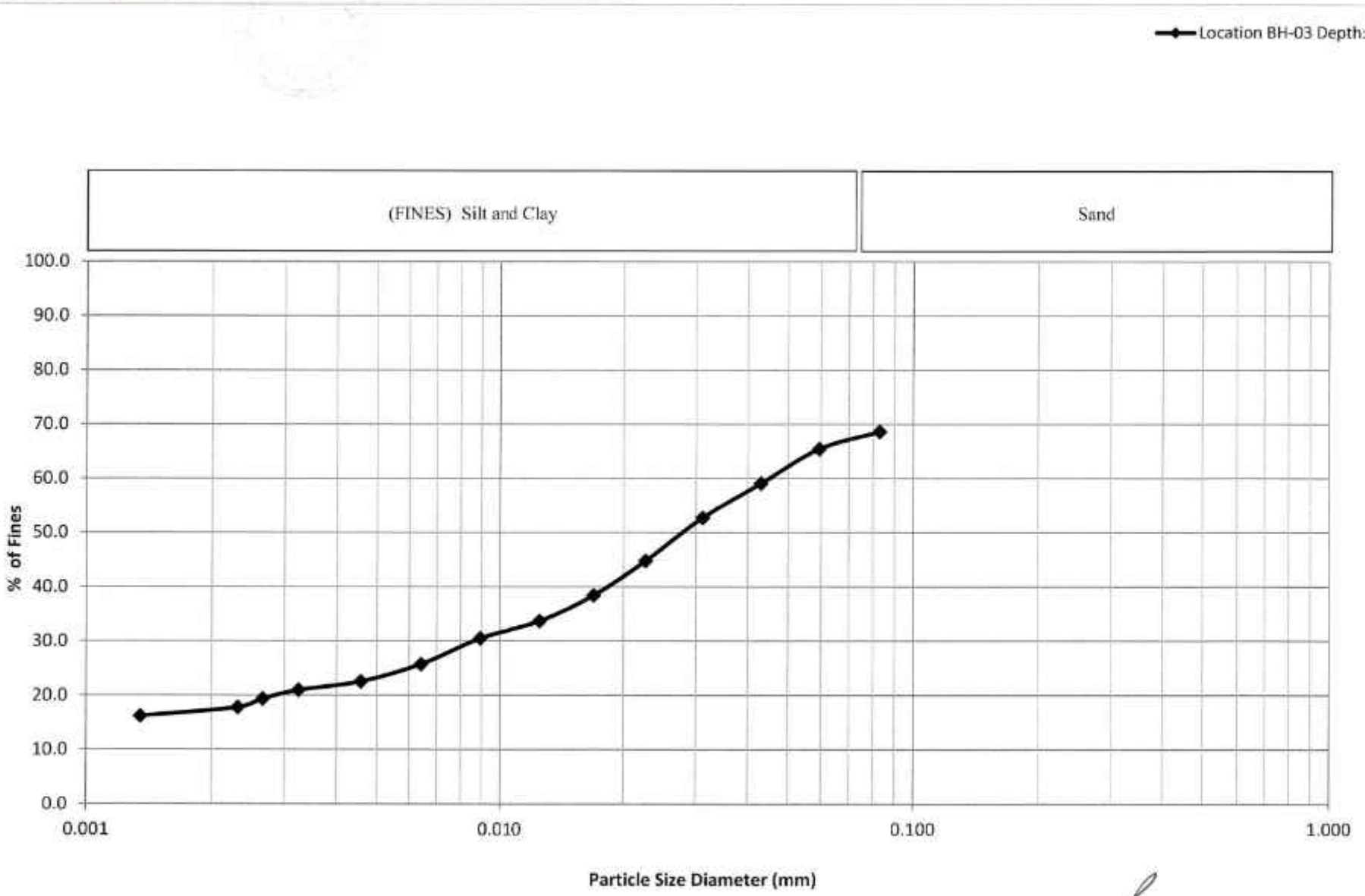


Fig 2.10 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Ceebros Hotels Private Limited Chennai 600 028

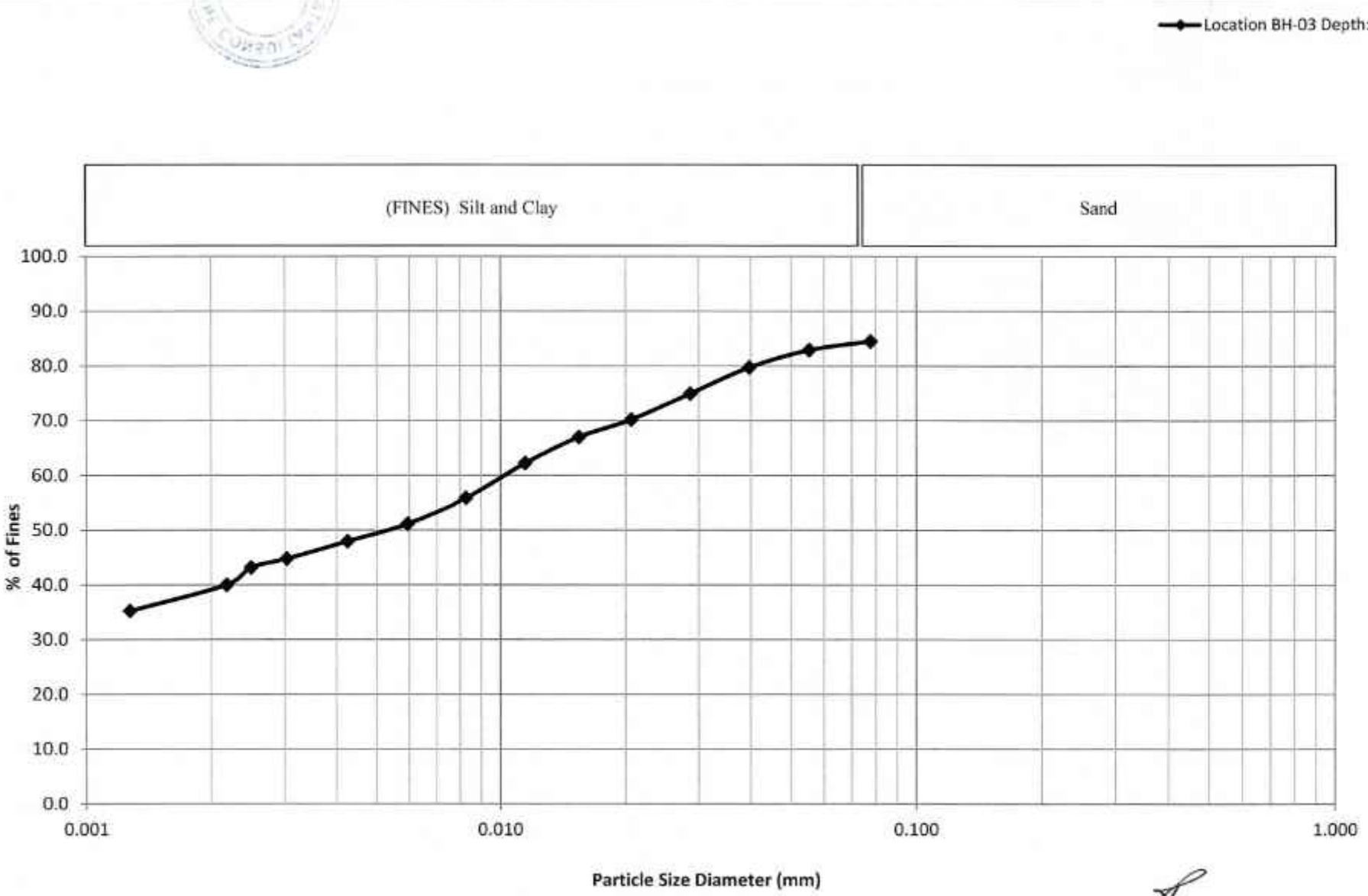


Fig 2.11 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Cebros Hotels Private Limited Chennai 600 028

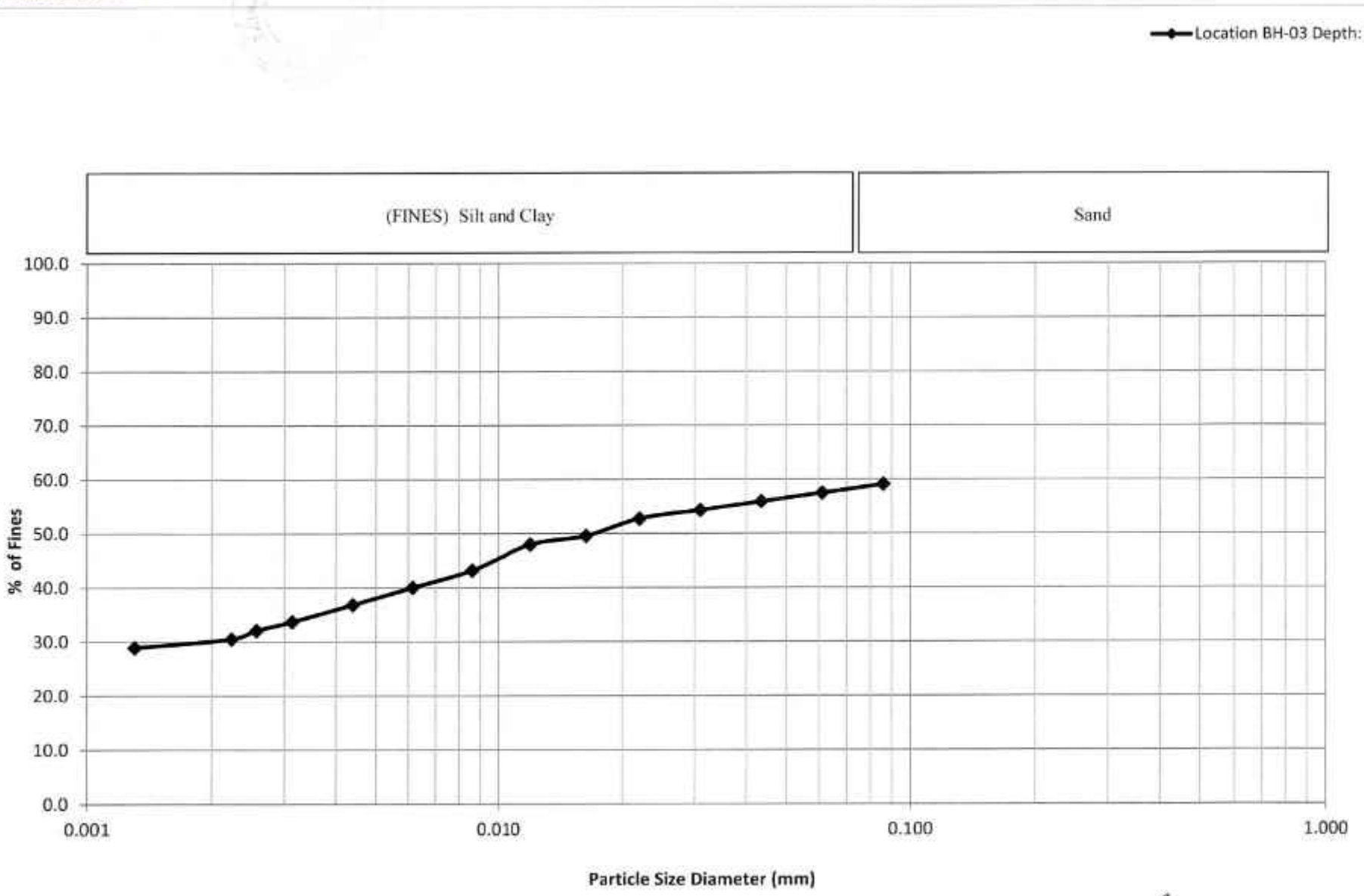


Fig 2.12 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Ceebros Hotels Private Limited Chennai 600 028

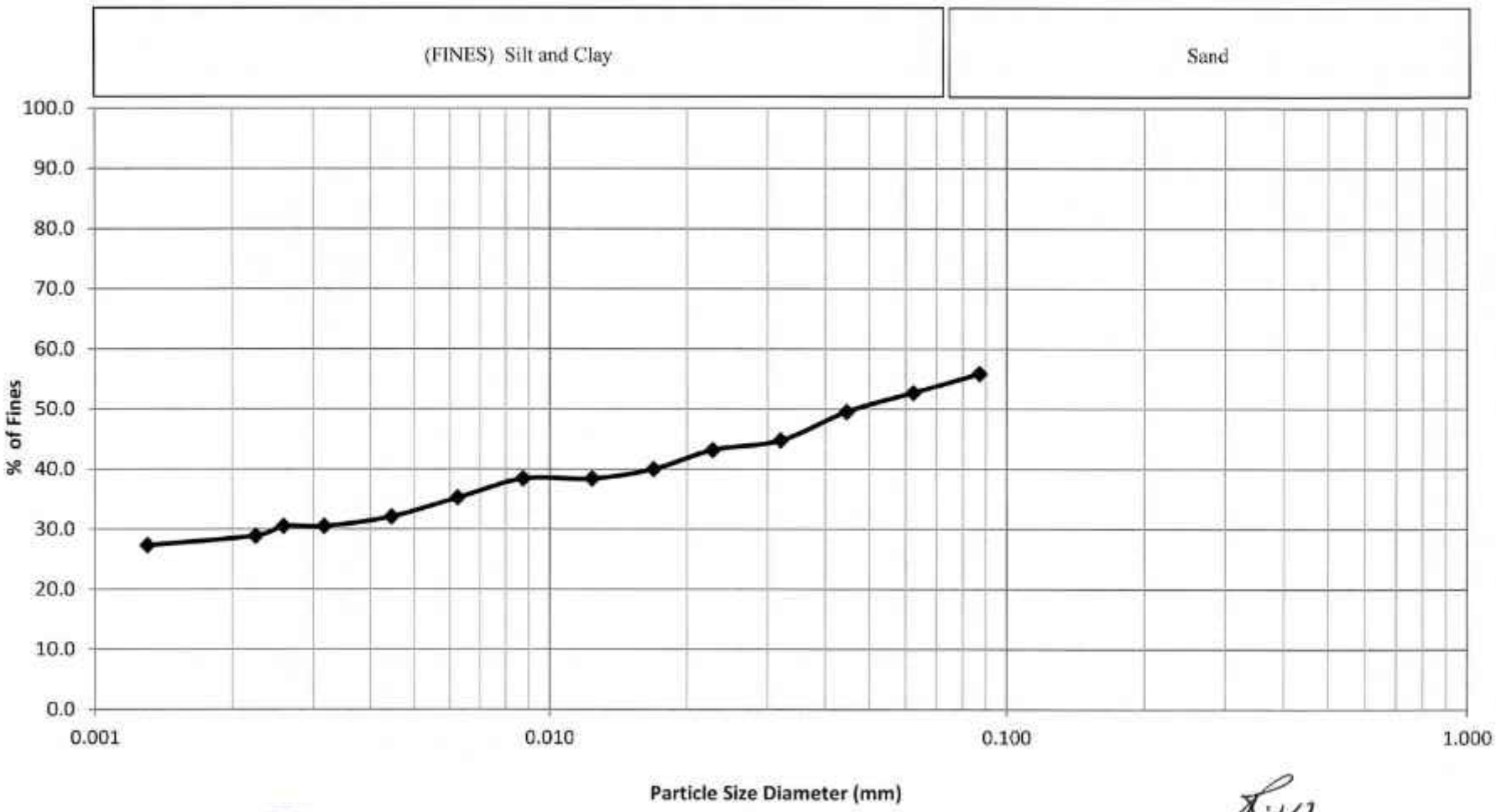


Fig 2.13 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Cebros Hotels Private Limited Chennai 600 028

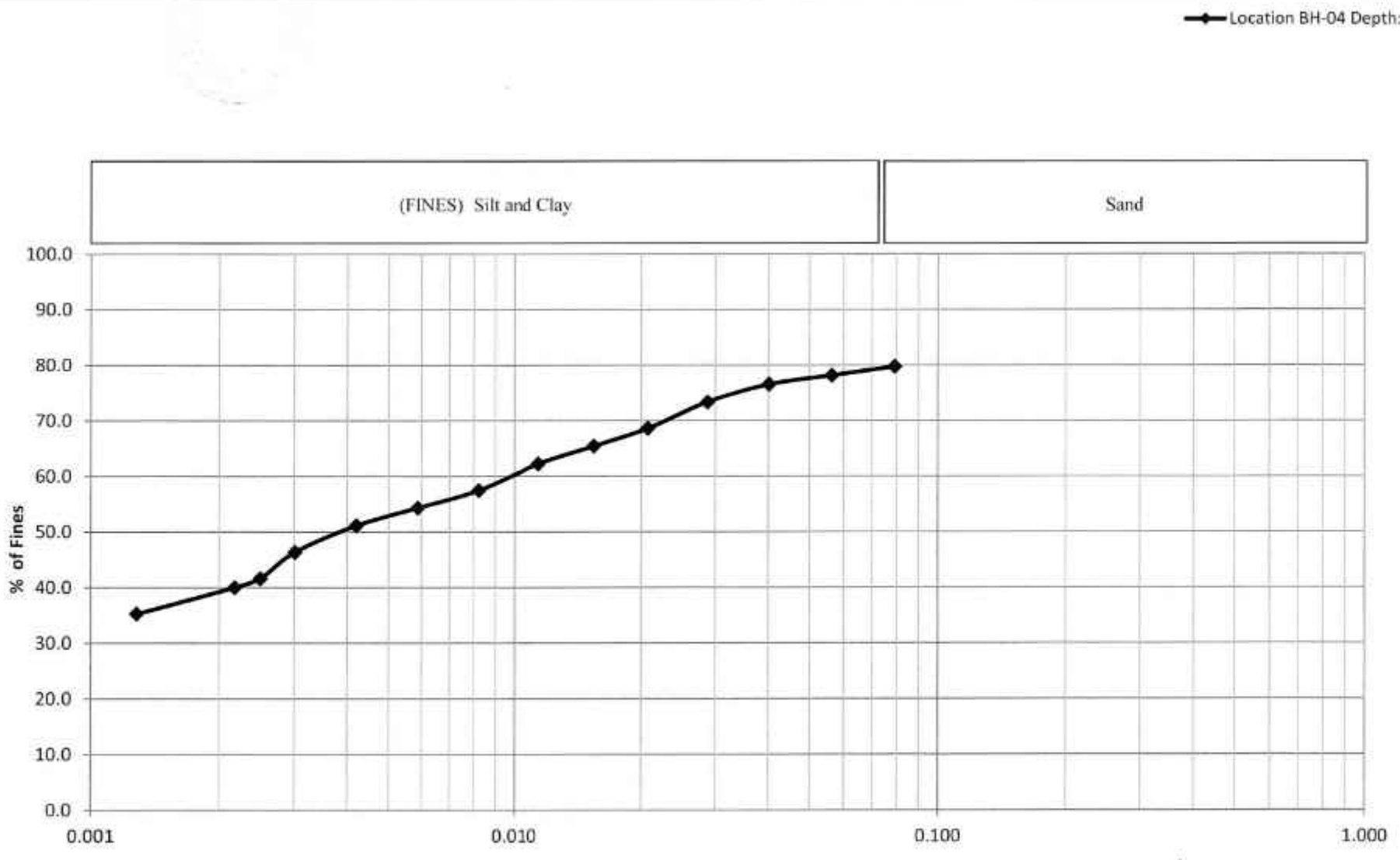


Fig 2.14 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Cebros Hotels Private Limited Chennai 600 028

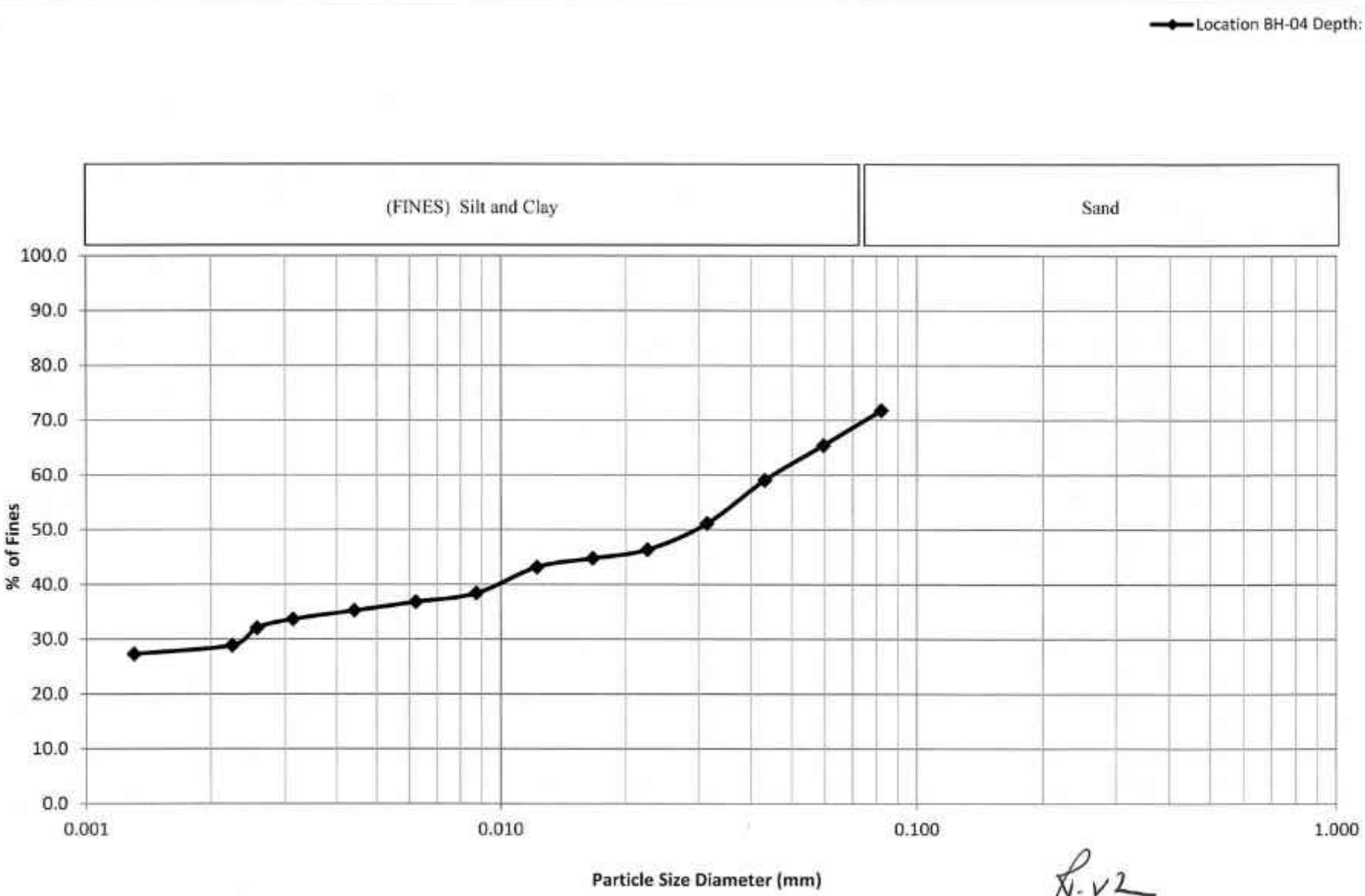


Fig 2.15 Hydrometer Analysis Master Curve

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41

Cebros Hotels Private Limited Chennai 600 028

LABORATORY TEST RESULTS

GEOMARINE
Phone No.: 044-24481485, 044-24480305
ULR No: TC114102300000034F

LABORATORY TEST REPORT

GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

TC-11410

Name & Address of the Customer	:	**M/s CEEBROS HOTELS (P) LTD**	**Customer Reference**	:	By Email
Sample Description	:	Soil Sample	**Period of Testing**	:	12/05/2023 to 17/05/2023
Source of Sample	:	Customer Supplied- Borehole No. BH-01	**Sample Identification Number**	:	GMC/0423/653
Sample Condition	:	Satisfactory	**Test Report No.**	:	GT-2541
Test Method	:	As per Bureau of Indian Standards	**Report Date**	:	22/05/2023
Sample Receipt Date	:	10/05/2023	**Test Report Pages**	:	One Page

Table-2.1 Laboratory Classification of Soil Samples from BH-01

Sample Depth (m)	SPT- "N" Value	Type of Sample	Fine Grained (FG)										Specific Gravity AS PER IS 2720 (P-III, SEC-1) - 1980, RA-2010	Coarse Grained (CG)													
			Moisture Content (%) AS PER IS 2720 (P-II) - 1973, RA-2015	LIQUID LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	PLASTIC LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	Plasticity Index (I_p= LL-PL)	Consistency Index (I_c=LL-NMC/I_p)	SHRINKAGE LIMIT (%) AS PER IS 2720 (P-VI) - 1972, RA-2011	FREE SWELL INDEX (%) AS PER IS 2720 (P-XL) - 1977, RA-2011	Consistancy	Position With Respect to A-Aline	IS:Notation		GRAIN SIZE ANALYSIS AS PER IS 2720 (P-IV) - 1985, RA-2015						D_{10} (mm)	D_{30}(mm)	D_{60} (mm)	Uniformity Co-Efficient $C_U=D_{60}/D_{10}$	Co-Efficient of Curvature $C_c=D_{30}^2/(D_{10}xD_{60})$	Relative Density	IS-Notation	
														Gravel (%)	Coarse (%)	Medium (%)	Fine (%)	Silt (%)	Clay (%)							Gravel	Sand
0.5	4	SS	25.9	-	-	-	-	-	-	CG>50%	-	-	-	6.7	3.4	18.1	37.9	34.0		-	-	-	-	-	V.Loose	<50%	SM
1.25	16	SS	16.4	38.5	16.8	21.7	1.0	14.7	15.4	V.Stiff	Above	CI	-	0.0	0.0	4.1	41.7	54.2		-	-	-	-	-	FG>50%	FG>50%	FG>50%
2.0	22	SS	34.2	-	-	-	-	-	-	CG>50%	-	-	2.60	0.0	0.0	1.1	69.4	29.5		-	-	-	-	-	M.Dense	<50%	SM
3.0	6	SS	29.7	42.4	19.6	22.7	0.6	-	7.7	M.Stiff	Above	CI	-	0.0	0.0	0.9	3.4	95.7		-	-	-	-	-	FG>50%	FG>50%	FG>50%
4.0	6	SS	41.1	61.0	24.3	36.7	0.5	11.7	21.4	M.Stiff	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
5.0	4	SS	50.3	62.6	22.3	40.3	0.3	10.9	0.0	Soft	Above	CH	-	-	-	-	-	56.8	43.2	-	-	-	-	-	FG>50%	FG>50%	FG>50%
6.0	3	SS	43.3	55.4	21.0	34.5	0.4	10.0	28.6	Soft	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
7.5	1	SS	34.7	Clay Binder/ Low Quantity for Atterberg's Limit					75.0	CG>50%	-	-	-	0.0	0.0	9.1	68.0	22.9		-	-	-	-	-	V.Loose	<50%	SM
9.0	5	SS	29.8	-	-	-	-	-	-	CG>50%	-	-	2.61	0.0	0.0	6.8	77.1	16.1		-	-	-	-	-	Loose	<50%	SM
12.0	6	SS	31.7	46.1	18.1	27.9	0.5	-	107.7	M.Stiff	Above	CI	-	0.0	0.0	2.8	25.9	71.3		-	-	-	-	-	FG>50%	FG>50%	FG>50%
14.0	3	SS	35.6	43.5	19.5	24.0	0.3	12.4	83.3	Soft	Above	CI	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
16.0	6	SS	56.7	85.2	29.3	55.9	0.5	-	-	M.Stiff	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
18.0	7	SS	59.3	90.2	30.4	59.7	0.5	-	76.9	M.Stiff	Above	CH	-	-	-	-	-	55.2	44.8	-	-	-	-	-	FG>50%	FG>50%	FG>50%
20.0	>100	SS	28.6	Low Sample. Shale Pieces Observed. Atterberg Limits Test and Grain Size Distribution is not Carried Out																							

** END OF REPORT**

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GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Ceebros Hotels Private Limited Chennai 600 028

Authorised Signatory
A. VINOTH
(Technical Manager)

GEOMARINE
Phone No.: 044-24481485, 044-24480305
ULR No: TC114102300000034F

LABORATORY TEST REPORT

GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

TC-11410

Name & Address of the Customer	:	**M/s CEEBROS HOTELS (P) LTD**	**Customer Reference**	:	By Email
Sample Description	:	Soil Sample	**Period of Testing**	:	05/05/2023 to 12/05/2023
Source of Sample	:	Customer Supplied- Borehole No. BH-03	**Sample Identification Number**	:	GMC/0423/653
Sample Condition	:	Satisfactory	**Test Report No.**	:	GT-2541
Test Method	:	As per Bureau of Indian Standards	**Report Date**	:	22/05/2023
Sample Receipt Date	:	04/05/2023	**Test Report Pages**	:	One Page

Table-2.2 Laboratory Classification of Soil Samples from BH-03

Sample Depth (m)	SPT- "N" Value	Type of Sample	Fine Grained (FG)											Coarse Grained (CG)															
			Moisture Content (%) AS PER IS 2720 (P-II) - 1973, RA-2015	LIQUID LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	PLASTIC LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	Plasticity Index (I_p= LL-PL)	Consistency Index (Ic=LL-NMC/I_p)	SHRINKAGE LIMIT (%) AS PER IS 2720 (P-VI) - 1972, RA-2011	FREE SWELL INDEX (%) AS PER IS 2720 (P-XL) - 1977, RA-2011	Consistancy	Position With Respect to A-Aline	IS:Notation	SPECIFIC GRAVITY AS PER IS 2720 (P-III, SEC-1) - 1980, RA-2010	GRAIN SIZE ANALYSIS AS PER IS 2720 (P-IV) - 1985, RA-2015						D_{10} (mm)	D_{30}(mm)	D_{60} (mm)	Uniformity Co-Efficient $C_u=D_{60}/D_{10}$	Co-Efficient of Curvature $C_c=D_{30}^2/(D_{10}xD_{60})$	Relative Density	IS-Notation	
														Gravel (%)	Coarse (%)	Medium (%)	Fine (%)	Silt (%)	Clay (%)							Gravel	Sand
0.5	7	SS	19.6	25.7	15.1	10.5	0.6	13.6	0.0	M.Stiff	Above	CL	-	0.0	0.0	6.7	40.7	52.6		-	-	-	-	-	FG>50%	FG>50%	FG>50%
1.25	7	SS	23.7	38.0	17.1	20.9	0.7	14.1	8.3	M.Stiff	Above	CI	-	0.0	0.0	1.7	10.9	87.4		-	-	-	-	-	FG>50%	FG>50%	FG>50%
2.0	13	SS	21.8	Sample Not Sufficient for Carrying Out Atterberg Limits Test. Based on Grain Size Distribution and Visual Identification Sample is Identified as Sandy Clay										0.0	0.0	1.3	30.1	68.6		-	-	-	-	-	FG>50%	FG>50%	FG>50%
3.0	14	SS	26.3	41.9	22.5	18.5	0.8	13.7	0.0	Stiff	Above	CI	-	-	-	-	-	62.2	17.8	-	-	-	-	-	FG>50%	FG>50%	FG>50%
4.0	10	SS	31.9	51.2	27.9	23.3	0.8	-	0.0	Stiff	Above	CH	2.56	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
5.0	-	UDS	43.3	61.0	23.0	38.0	0.5	-	30.8	False	Above	CH	-	-	-	-	-	60.0	40.0	-	-	-	-	-	FG>50%	FG>50%	FG>50%
6.0	7	SS	46.5	70.1	29.2	40.9	0.6	11.7	21.4	M.Stiff	Above	CH	-	-	-	-	-	69.5	30.5	-	-	-	-	-	FG>50%	FG>50%	FG>50%
9.0	23	SS	22.0	Clay Binder/ Low Quantity for Atterberg's Limit						CG>50%	-	-	2.61	0.0	0.5	9.3	43.6	46.6		-	-	-	-	-	M.Dense	<50%	SM
10.5	10	SS	20.4	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.8	11.9	74.9	12.5		-	-	-	-	-	Loose	<50%	SM
12.0	10	SS	33.9	62.1	25.7	36.4	0.8	16.6	233.3	Stiff	Above	CH	-	-	-	-	-	71.1	28.9	-	-	-	-	-	FG>50%	FG>50%	FG>50%
14.0	6	SS	39.7	74.6	29.0	45.7	0.8	-	333.3	Stiff	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
16.0	15	SS	37.5	70.1	28.6	41.5	0.8	-	200.0	Stiff	Above	CH	-	0.0	2.2	1.5	17.8	78.5		-	-	-	-	-	FG>50%	FG>50%	FG>50%
18.0	11	SS	51.1	104.3	37.8	66.5	0.8	-	-	Stiff	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
22.5	>100	SS	12.0	Low Sample. Shale Pieces Observed. Atterberg Limits Test and Grain Size Distribution is not Carried Out																									

** END OF REPORT**

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GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Ceebros Hotels Private Limited Chennai 600 028

Authorised Signatory

A. VINOTH
(Technical Manager)

GEOMARINE
Phone No.: 044-24481485, 044-24480305
ULR No: TC1141023000000034F

LABORATORY TEST REPORT

GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

TC-11410

Name & Address of the Customer	:	**M/s CEEBROS HOTELS (P) LTD**	**Customer Reference**	:	By Email
Sample Description	:	Soil Sample	**Period of Testing**	:	15/05/2023 to 19/05/2023
Source of Sample	:	Customer Supplied- Borehole No. BH-04	**Sample Identification Number**	:	GMC/0423/653
Sample Condition	:	Satisfactory	**Test Report No.**	:	GT-2541
Test Method	:	As per Bureau of Indian Standards	**Report Date**	:	22/05/2023
Sample Receipt Date	:	13/05/2023	**Test Report Pages**	:	One Page

Table-2.3 Laboratory Classification of Soil Samples from BH-04

Sample Depth (m)	SPT- "N" Value	Type of Sample	Fine Grained (FG)										Coarse Grained (CG)													
			Moisture Content (%) AS PER IS 2720 (P-II) - 1973, RA-2015	LIQUID LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	PLASTIC LIMIT (%) AS PER IS 2720 (P-V) - 1985, RA-2015	Plasticity Index (I_p= LL-PL)	Consistency Index (I_c=LL-NMC/I_p)	SHRINKAGE LIMIT (%) AS PER IS 2720 (P-VI) - 1972, RA-2011	FREE SWELL INDEX (%) AS PER IS 2720 (P-XL) - 1977, RA-2011	Consistancy	Position With Respect to A-Aline	IS:Notation	SPECIFIC GRAVITY AS PER IS 2720 (P-III, SEC-1) - 1980, RA-2010	GRAIN SIZE ANALYSIS AS PER IS 2720 (P-IV) - 1985, RA-2015						D_{10} (mm)	D_{30}(mm)	D_{60} (mm)	Uniformity Co-Efficient $C_U=D_{60}/D_{10}$	Co-Efficient of Curvature $C_c=D_{30}^2/(D_{10}xD_{60})$	Relative Density	IS-Notation	
													Gravel (%)	Coarse (%)	Medium (%)	Fine (%)	Silt (%)	Clay (%)							Gravel	Sand
0.5	8	SS	7.9	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	10.0	43.6	46.4		-	-	-	-	-	Loose	<50%	SM
1.25	8	SS	19.4	35.4	17.6	17.7	0.9	16.0	7.7	Stiff	Above	CI	-	0.0	0.0	6.6	31.9	61.5		-	-	-	-	-	FG>50%	FG>50%	FG>50%
2.0	19	SS	17.0	Clay Binder/ Low Quantity for Atterberg's Limit					0.0	CG>50%	-	-	2.62	0.0	0.0	15.3	63.0	21.8		-	-	-	-	-	M.Dense	<50%	SM
3.0	16	SS	16.7	35.8	17.2	18.7	1.0	-	0.0	V.Stiff	Above	CI	-	0.0	1.3	11.3	11.2	76.3		-	-	-	-	-	FG>50%	FG>50%	FG>50%
4.0	14	SS	27.9	56.9	27.2	29.7	1.0	13.3	0.0	Stiff	Above	CH	-	-	-	-	-	60.0	40.0	-	-	-	-	-	FG>50%	FG>50%	FG>50%
6.0	2	SS	48.3	54.6	26.9	27.7	0.2	13.1	20.0	Very Soft	Above	CH	2.54	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
7.5	2	SS	26.7	Clay Binder/ Low Quantity for Atterberg's Limit					9.1	CG>50%	-	-	-	0.0	0.0	9.7	68.6	21.7		-	-	-	-	-	V.Loose	<50%	SM
10.5	5	SS	22.4	-	-	-	-	-	-	CG>50%	-	-	-	0.0	0.0	11.4	72.0	16.6		-	-	-	-	-	Loose	<50%	SM
12.0	5	SS	31.7	44.5	20.2	24.3	0.5	16.7	61.5	M.Stiff	Above	CI	-	0.0	0.0	0.4	43.3	56.3		-	-	-	-	-	FG>50%	FG>50%	FG>50%
14.0	6	SS	29.5	41.4	21.1	20.4	0.6	-	50.0	M.Stiff	Above	CI	-	-	-	-	-	71.7	28.3	-	-	-	-	-	FG>50%	FG>50%	FG>50%
16.0	4	SS	48.8	68.1	25.8	42.3	0.5	10.7	52.9	Soft	Above	CH	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%
18.0	22	SS	20.1	39.4	21.8	17.7	1.1	-	-7.1	V.Stiff	Above	CI	-	-	-	-	-	100.0		-	-	-	-	-	FG>50%	FG>50%	FG>50%

** END OF REPORT**

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GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

Ceebros Hotels Private Limited Chennai 600 028

Authorised Signatory

A. VINOTH
(Technical Manager)

CHEMICAL LABORATORY TEST RESULTS

GEOMARINE
Phone No.: 044-24480305
ULR No : TC114102300000034F

LABORATORY TEST REPORT
GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

TC-11410

Table 2.4 Result of Chemical Test

Name & Address of the Customer:	**M/s CEEBROS HOTELS (P) LTD**		
Sample Description:	Water and Soil	**Sample Identification Number:**	GMC/0423/653
Source of Sample:	Customer Supplied	**Period of Testing:**	15/05/2023
Sample Condition:	Satisfactory	**Report Date:**	23/05/2023
Test Method	As per Bureau of Indian Standards	**Test Report No.:**	GT-2541
Sample Receipt Date:	13/05/2023	**Test Report Pages:**	One Page

S No.	Bore Hole Number	Water				SOIL (2:1)	
		DEPTH OF SAMPLE (m)	pH AS PER IS 3025 (P-XI) - 2022	SULPHATES (mg/l) AS PER APHA 23rd Edn.2017-4500	CHLORIDES (mg/l) AS PER IS 3025(P-XXXII) - 1988, RA-2019	DEPTH OF SAMPLE (m)	pH AS PER IS 2720 (P-XXVI) - 1987, RA-2021
1.0	BH-01	1.80	7.40	452.2	299.2	2.00	8.27
2.0	BH-03	2.90	6.92	111.5	199.9	1.25	8.14
3.0	BH-04	1.70	7.23	202.6	377.9	2.00	8.30

** END OF REPORT**

Authorised Signatory
A. VINOTH
(Technical Manager)

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Ceebros Hotels Private Limited Chennai 600 028

Table-2.5 Results of Chemical Test for Soil Sample				
SL No.	Bore HoleNo.	Soil (2:1)		
		Depth of Sample (m)	SULPHATES (mg/kg)	CHLORIDES (mg/kg)
1.0	BH-01	2.00	13.7	42.8
2.0	BH-03	1.25	40.2	33.3
3.0	BH-04	2.00	28.4	19.0

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GEOMARINE
Phone No.: 044-24480305
TC114102300000034F

LABORATORY TEST REPORT
GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN.
KOTTIVAKKAM, CHENNAI

TC-11410

Table 2.6 Result of Rock Test

Name & Address of the Customer:	**M/s CEEBROS HOTELS (P) LTD**		
Sample Description:	Rock	**Sample Identification Number:**	GMC/0423/653
Source of Sample:	Customer Supplied	**Period of Testing:**	22/05/2023
Sample Condition:	Satisfactory	**Report Date:**	23/05/2023
Test Method	As per Bureau of Indian Standards	**Test Report No.:**	GT-2541
Sample Receipt Date:	13/05/2023	**Test Report Pages:**	One Page

S.No	Bore Hole Number	DEPTH (m)	UNCONFINED COMPRESSIVE STRENGTH,mPa AS PER IS 9143 - 1979, RA-2021	POINT LOAD STRENGTH INDEX, mPa AS PER IS 8764 - 1998, RA-2019	WATER CONTENT, % AS PER IS 13030 - 1991, RA-2021	SLAKE DURABILITY, % AS PER IS 10050 - 1981, RA-2021
1	BH - 03	22.50 to 24.00	9.16	0.53	7.24	-
2	BH - 04	20.00 to 21.50	9.42	0.36	7.89	-

** END OF REPORT**

Authorised Signatory

A. VINOTH
(Technical Manager)

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CHAPTER-3

GEOLOGY & SUB-SURFACE STRATIFICATION

3.0 PREAMBLE:

Geotechnical investigation carried out at a specific site provides location specific sub surface engineering characteristics. However, in major project sites where the construction activities spread over a very large area location specific sub surface strata characteristics are studied together with the geological mapping data.

This is required to incorporate the impact of any documented macro-level geological characteristics of the region on the foundation design, irrespective of the location specific sub surface strata characteristics.

In view on the above, though it is beyond the scope of the present study to carry out macro-level geological investigation the regional geology based on the published data is presented and discussed.

3.1 CLIMATE AND RAINFALL:

The study area receives the rain under the influence of both southeast and northeast monsoons. Predominantly northeast monsoon contributes rainfall and most of the precipitation occurs in the form of cyclonic storm caused due to the depressions in Bay of Bengal. The north east monsoon occurs between October & December. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

The normal annual rainfall over the study area varies from 1100 mm to 1200mm.

3.2 GEOMORPHOLOGY:

Chennai district forms part of coastal plains of northern Tamil Nadu. Major part of the district is having flat topography with very gentle slope towards east. The altitudes of land surface vary from 10 m above MSL in the west to sea level in the east.

Fluvial, marine and erosional landforms are noticed in the district. Marine transgression and regressions and neo-tectonic activity during the recent past have influenced the morphology and resulted in various present landforms.

Meandering streams with small sand bars are present along the course of Adyar River. The pediment and buried pediment in Guindy area in and around the reserved forest, is the only area where the ecological system is less disturbed, while the other areas are completely disturbed by built up area with large-scale human interference and pollution.

3.3 GEOLOGY OF CHENNAI DISTRICT:

Chennai district is underlain by various geological formations from ancient Archaean to the Recent Alluvium. The geological formations of the district can be grouped into three units, namely

i) Archaean crystalline rocks

ii) Gondwana (Consolidated Clay/Clayey Silt) and Tertiary sediments and

iii) Recent Alluvium.

The Archaean crystalline rocks of the district comprise chiefly of Charnockite, gneisses and the associated basic and ultra-basic intrusive dykes.

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3.4 GEOLOGICAL ORDER OF THE STUDY AREA:

Geologically, the present site is located in a coastal region with sub surface consisting of sedimentary deposits. The top sedimentary deposit is under laid by upper Gondwana system, particularly lower stage of Sriperumpudur. The formation mechanism of the sediments is chiefly due to transportation of surface water and marine deposition.

The above geological characteristics are also observed in the direct borehole investigation, which confirms that the present site does not depict any surprising geological features that are different from that of the region.

3.5 DESIGN SUB SOIL PROFILE: (WRT Foundation Engineering Application)

The sub soil characteristics obtained at the test location are further processed to arrive at the design soil parameters required for the design of sub structure using the following shear strength correlations with respect to the Standard Penetration Test Values of different layers.

- For Coarse Grained Material, Ref. IS: 6403 to estimate Angle of Shearing Resistance (Reproduced and shown in Fig.A1)
- For Fine Grained Material, Ref. Terzaghi & Peck, 1948, to estimate Unconfined Compressive Strength (Reproduced and shown in Fig.A2)

Based on the above, the average design soil characteristics are given below:

REFERENCE BORE HOLE				BH-01	Ref R.L. of G.L. (m):			0.00		
Layer No.	Layer Thk. (m)			Type of Strata	Colour	Ave. Design SPT	Relative Density	Consistency	(γ) kN/m³	Shear Parameters	
	Top BGL	Bottom BGL	Thickness							(C_u) kPa	(ϕ) Deg.
1.0	0.00	1.30	1.30	Filled Up	Brown	-	-	-	-	-	-
2.0	1.30	2.00	0.70	Sandy Silty Clay	Brown	16	-	Very Stiff	20	107	-
3.0	2.00	3.00	1.00	Silty Fine Sand	Brown	22	Medium Dense	-	18.5	-	33.6
4.0	3.00	5.00	2.00	Silty Clay	Brown	6	-	Medium Stiff	15.5	40	-
5.0	5.00	7.50	2.50	Silty Clay	Black	4	-	Soft	14.5	27	-
6.0	7.50	9.00	1.50	Silty Fine Sand	Brown	1	Very Loose	-	12	-	19.761
7.0	9.00	12.00	3.00	Silty Fine Sand	Brown	7	Loose	-	14.5	-	29.4
8.0	12.00	14.00	2.00	Silty Clay	Brown	6	-	Medium Stiff	15.5	40	-
9.0	14.00	16.00	2.00	Silty Clay	Black	3	-	Soft	14	20	-
10.0	16.00	20.00	4.00	Silty Clay	Black	7	-	Medium Stiff	16	47	-
11.0	20.00	23.00	3.00	Shale	Brown Grey	CRR: 10% to 44%; RQD: 0% to 6%					

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REFERENCE BORE HOLE					BH-03	Ref R.L. of G.L. (m):			0.00		
Layer No.	Layer Thk. (m)			Type of Strata	Colour	Ave. Design SPT	Relative Density	Consistency	(γ) kN/m³	Shear Parameters	
	Top BGL	Bottom BGL	Thickness							(Cu) kPa	(ϕ) Deg.
1.0	0.00	2.00	2.00	Silty Clay	Brown	7	-	Medium Stiff	16	47	-
2.0	2.00	5.00	3.00	Silty Clay	Grey	12	-	Stiff	18.5	80	-
3.0	5.00	6.00	1.00	Silty Clay	Grey	-	-	-	-	-	-
4.0	6.00	7.50	1.50	Silty Clay	Black	7	-	Medium Stiff	16	47	-
5.0	7.50	9.00	1.50	Silty Sand	-	6	Loose	-	14.5	-	29.2
6.0	9.00	10.50	1.50	Silty Sand	Brown	23	Medium Dense	-	18.5	-	33.9
7.0	10.50	12.00	1.50	Silty Sand	Black	10	Loose	-	15	-	30
8.0	12.00	22.50	10.50	Silty Clay	Grey	11	-	Stiff	18	73	-
9.0	22.50	25.50	3.00	Shale	Brown Grey	CRR: 60% to 100%; RQD: 21% to 56%					

REFERENCE BORE HOLE					BH-04	Ref R.L. of G.L. (m):			0.00		
Layer No.	Layer Thk. (m)			Type of Strata	Colour	Ave. Design SPT	Relative Density	Consistency	(γ) kN/m³	Shear Parameters	
	Top BGL	Bottom BGL	Thickness							(Cu) kPa	(ϕ) Deg.
1.0	0.00	1.30	1.30	Silty Sand	Brown	8	Loose	-	14.5	-	29.6
2.0	1.30	2.00	0.70	Sandy Silty Clay	Brown	8	-	Medium Stiff	16.5	53	-
3.0	2.00	3.00	1.00	Silty Sand	Brown	19	Medium Dense	-	18	-	32.7
4.0	3.00	5.00	2.00	Silty Clay	Grey	15	-	Stiff	20	100	-
5.0	5.00	7.50	2.50	Silty Clay	Grey	2	-	Very Soft	14	13	-
6.0	7.50	12.00	4.50	Silty Sand	Brown	3	Very Loose	-	13	-	20.067
7.0	12.00	16.00	4.00	Silty Clay	Grey	6	-	Medium Stiff	15.5	40	-
8.0	16.00	18.00	2.00	Silty Clay	Grey	4	-	Soft	14.5	27	-
9.0	18.00	19.00	1.00	Silty Clay	Green Grey	22	-	Very Stiff	20.5	147	-
10.0	19.00	23.00	4.00	Shale	Brown Grey	CRR: 53% to 74%; RQD: 0% to 15%					

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FOUNDATION SYSTEM

CHAPTER-4

FOUNDATION SYSTEM

4.0 PREAMBLE:

In the design of foundation system, the stress-strain compatibility of the super structure, sub structure and the bearing strata should be satisfied both individually and as a combined system. In view of this, the following data are needed for the design of foundation system, defined in terms of the type of sub structure and the bearing strata characteristics.

- The super structure characteristics along with the loading pattern on the sub structure
- The sub soil characteristics that define the required substructure configuration for a safe transfer of super-structural loads to the bearing strata

Considering the above aspects of the foundation design, the suitable type of foundation system is presented below.

4.1 PROPOSED STRUCTURES:

An understanding of the proposed construction and the order of loads on the foundations is needed for choosing the appropriate foundation system. In the present case, the proposed structure is configured with one basement, ground and four upper floors which is meant for residential building. For this kind of structure, the column loads could vary between 2000 kN to 5000 kN.

The above-mentioned loads have no bearing on the design of either sub or super structures and are mentioned just to provide an insight to choose an appropriate foundation system with respect to subsoil conditions.

4.2 SUB SOIL STRATIGRAPHY:

The sub soil stratification of the present project site is as follows:

Layer-I	0.0m to 3.0m	Very Stiff, Silty Clay & Medium Dense, Sand Lenses
Layer-II	3.0m to 7.5m	Medium Stiff & Stiff, Silty Clay
Layer-III	7.5m to 12.0m	Very Loose & Loose, Silty Sand
Layer-IV	12.0m to 19.0m/20.0m/22.5m	Medium Stiff & Stiff, Silty Clay
Layer-V	Beyond 19.0m/20.0m/22.5m	Hard, Shale Formation (Lithified Formation)

4.3 FOUNDATION SYSTEM:

In the present project location, the strata up to underlying rock formation is weak from both shear and compressibility considerations. Hence, no shallow foundation system is feasible and it is advisable to adopt pile foundation system.

The piles can be installed by drilling with direct mud circulation technique (Bored Cast Insitu Piles) and the recommended safe load carrying capacity of bored cast insitu piles in compression, tension and lateral for different diameters is worked out as per IS 14593-1998 and are presented in Table:4.1.

In the present case, the pile shall be socketed to a minimum depth of 1.5m from top of the Hard, Shale formation.

Typical computations are presented in Annexure-I

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NOTE:

- *The tractor mounted rig cannot penetrate into the Hard, Shale formation beyond 1.0m. Hence, appropriate drilling technique is required to achieve 1.5m socketing.*
- *It is mandatory to confirm the theoretical capacity of pile with initial pile load test. The piling shall not progress without conducting initial pile load test.*

TABLE: - 4.1 RECOMMENDED SAFE LOAD CARRYING CAPACITIES OF BORED CAST-IN SITU PILES

Sl.No	BOREHOLE NO	LENGTH OF SOCKET INTO SHALE ROCK (m)	TOP OF ROCK FORMATION BELOW E.G.L (m)	TOTAL LENGTH OF PILE BELOW EGL (m)	ASSUMED CUT-OFF BELOW EGL (m)	LENGTH OF PILE BELOW CUT-OFF FROM EGL (m)	DIAMETER OF PILE (mm)	SAFE LOAD CARRYING CAPACITY (kN)		
								VERTICAL LOAD CARRYING CAPACITY	PULL OUT CAPACITY	LATERAL LOAD CARRYING CAPACITY
1.0	BH-01	1.5	21.0	22.5	5.0	17.50	500	1300	900	20
2.0							550	1400	950	22
3.0	BH-03		22.5	24.0		19.00	600	1600	1000	25
4.0							650	1700	1050	27
5.0	BH-04		19.0	20.5		15.50	750	2000	1100	31
6.0							800	2200	1200	33

4.4 BASEMENT EXCAVATION:

For basement excavation, the soft clay formation experience base shear failure upon release of overburden. Hence, shoring system is a prerequisite. Adopt Contiguous pile as the shoring system.

Since the scope of work does not cover the design of shoring system the same is not presented in this report.

4.5 DEWATERING:

In the present project location, since the formation is highly heterogeneous, a combination of shallow borewell and open pit dewatering system meets the requirement for lowering the ground water table.

4.6 UPLIFT DESIGN:

The lower basement floor design shall include uplift pressure corresponding to water table at existing ground level (because of chances of flooding).

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RECOMMENDATIONS

CHAPTER-5

RECOMMENDATIONS

5.1 RECOMMENDATION FOR PILE FOUNDATION SYSTEM:

- For the kind of proposed structure Bored Cast in situ piles are recommended as the suitable foundation system.
- The allowable safe load carrying capacities of different diameters of piles as given in Table-4.1 can be adopted as provisional design loads, as the load carrying capacity of piles is not only depends upon the sub soil properties, but also depends on the care and experience of installation piles.
- The theoretical load carrying estimates of piles shall be confirmed by conducting pile loads tests as per the guide lines laid down in IS: 2911-Part-IV.
- The boring shall be carried out using direct mud circulation prepared out of sodium bentonite.
- After reaching the borehole termination depth, the borehole shall be cleaned using mud circulation for a minimum period of 30min or till the return mud is relatively clear of soil particles.
- After ensuring the borehole is clean, the tremie pipe shall be lowered and concreting can be done.
- The pile shall be socketed to a minimum depth of 1.5m into the Hard Shale formation.

5.1.1 CONSTRUCTION METHOD STATEMENT OF PILE FOUNDATION:

- For the bored cast in situ piles, a guide casing of suitable length can be adopted
- The mud used shall be made out of sodium bentonite with minimum free swell index of more than 300% and liquid limit more than 100%. The silt content in bentonite shall not more than 5%.
- The mud was prepared using sodium bentonite with a density of 1.10 to 1.15 g/cc.

5.2 RECOMMENDATION FOR EXCAVATION AND DEWATERING:

- For excavation and dewatering, follow the guidelines as provided in the clause 4.4 & 4.5 in the foundation design chapter.

5.3 GENERAL RECOMMENDATIONS:

- The chlorides content in ground water & soil-water extract is less than the permissible limit of 500 mg/l as per IS 456 Table 1.0. Hence no special steel is required.
- Corresponding to the sulphate content in 2:1 Water-Soil extract and ground water use Table 4.0 of IS 456 for minimum cement content and maximum water cement ratio. Hence ordinary Portland cement shall be adopted.
- The present project site falls in seismic zone-III as per IS 1893-P-1.

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- *Before excavation is started a workshop shall be conducted including the Owner, Architect, Structural Engineer, Geotechnical Engineer and Execution agency to ensure the proposal given by the contractor is workable and safe.*
- *Before construction activities are initiated, a scientific due-diligence of the condition of the neighbouring structures shall be carried out and authenticated. This is required to ensure that no undue claims or interpretations are made by the neighbourhood that the construction activities cause damages to their structures.*

AUTHORISED SIGNATORY

DR. C. V. PRASAD,
GEO MARINE CONSULTANTS PVT LTD.,

GEO MARINE CONSULTANTS PVT. LTD. CHENNAI-41.

ANNEXURE-I

GEOMARINE

ESTIMATION OF SAFE LOAD CARRYING CAPACITY OF BORED CAST-INSITU PILES

Type of Pile	Bored	Diameter of Pile			Length of Pile below G.L. (m)	24.0	IS:2911-(P-I,S-2)-2010 & IS 14593	
Reference Bore Hole	BH-03	500	mm	Surcharge Pressure	0	kPa		

Layer No.	Layer Thk. (m) Top. R.L.	Bot. R.L.	Thickness	Type of Strata	Ave. SPT	(γ) kN/m³ of Layer	Ave. upto Layer	Shear Parameters (C_u) kPa	(φ) Deg.	Effective Overburden Pressure (kPa) At top of Layer	At Bot. of Layer	At Mid. of Layer	Adhesion Factor (α)	Earth Pressure Coefficient (k)	Skin Friction (Q_f) kN		
1.0	0.0	5.0	5.0	Cut-Off Level													
2.0	5.0	6.0	1.0	Silty Clay	7	16.0	16.0	47	-	0.0	6.0	3.0	0.9	-	qf	2	66.4
3.0	6.0	7.5	1.5	Silty Clay	7	16.0	16.0	47	-	6.0	15.0	10.5	0.9	-	qf	3	99.7
4.0	7.5	9.0	1.5	Silty Sand	6	14.5	15.3	-	29	15.0	21.8	18.4	-	1.0	qf	4	24.2
5.0	9.0	10.5	1.5	Silty Sand	23	18.5	16.5	-	34	21.8	34.5	28.1	-	1.2	qf	5	53.3
6.0	10.5	12.0	1.5	Silty Sand	10	15.0	16.8	-	30	34.5	42.0	38.3	-	1.0	qf	6	52.0
7.0	12.0	22.5	10.5	Silty Clay	11	18.0	16.5	73	-	42.0	126.0	84.0	0.6	-	qf	7	746.5

Summation of Positive Skin Resitance (kN) Q_f= 1042.17

Summation of Negative Skin Resistance (kN) -Qf= 0.00

COMPUTATION OF ROCK SOCKET CAPACITY

Type of Strata:	Lithified Shale
Unconfined Confined Compressive Strength (U.C.C.) (q_c):	9141.00 kPa
Diameter of the Pile (D):	0.50 m
Socket Length into the rock (ls):	1.50 m
Rock Socket slide resistance reduction factor (Ref. Fig.1, IS:14593-1998) (α):	0.05
Rock Socket correction factor (IS:14593-1998) (β):	1.00
Safe Load Capacity in Tension ($Q_{ss}=q_c\pi Dl_s\alpha\beta$):	1076.90 kN

COMPUTATION OF END BEARING RESISTANCE

Type of Strata:	Lithified Shale
Unconfined Confined Compressive Strength (U.C.C.) (q_c):	9141.00 kPa
N_j, as per Table-4.0 of IS:12070-1987-reaffirmed in 1995) for sapcing of discontinuties 30cm-100cm (N_j):	0.10
Depth Factor (0.8+0.2*l_e/D) (N_d):	1.40
Cross Sectional Area of Pile Toe (A_p):	0.20 m^2
Safe Load Capacity @ Toe ($Q_b=q_cN_jN_dA_p$):	251.28 kN
Self Weight of Pile (P_{SW}):	71.58 kN
Recommended Allowable Vertical Load Carying Capcity (Q_{AV}):	**1328.18 kN**
Recommended Allowable Pull Out Capacity (Q_{AP}):	**1148.48 kN**

Skin Resistance in Clay Layer is π*d*T*C_u*α
Skin Resistance in Sand Layer is π*d*T*q_i*K*Tan(φ)
Where
Cu=Undrained Shear Strength of Clay
φ=Angle of Shearing Resistance
N_c=Bearing Capacity Factor = 9
K=Coef. Earth Pressure at Rest
q_i=Effective Overburden Pressure at middle of Layer
N_q=Bearing Capacity Factor, Ref. Fig.1 of IS: Code Referred above
d=Dia. Of Pile
α=Adhession Factor
T_i=Thickness of Layer
Q_b = el Effective Overburden Pressure at pile tip=Effective height of overburden X (γ=10)

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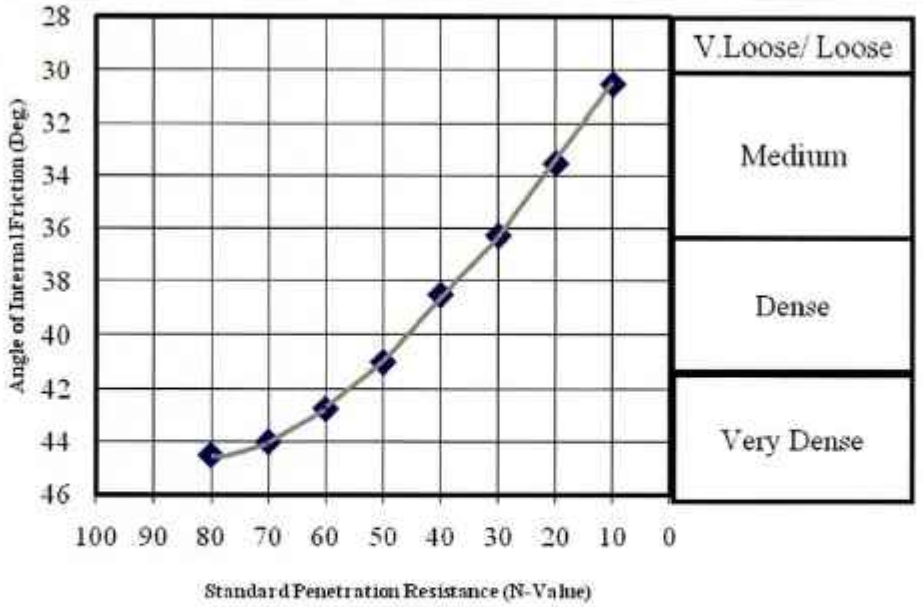


FIG. A1 Relation Ship between Angle of Internal Friction & N-value (Reproduced from IS:6403-1981)

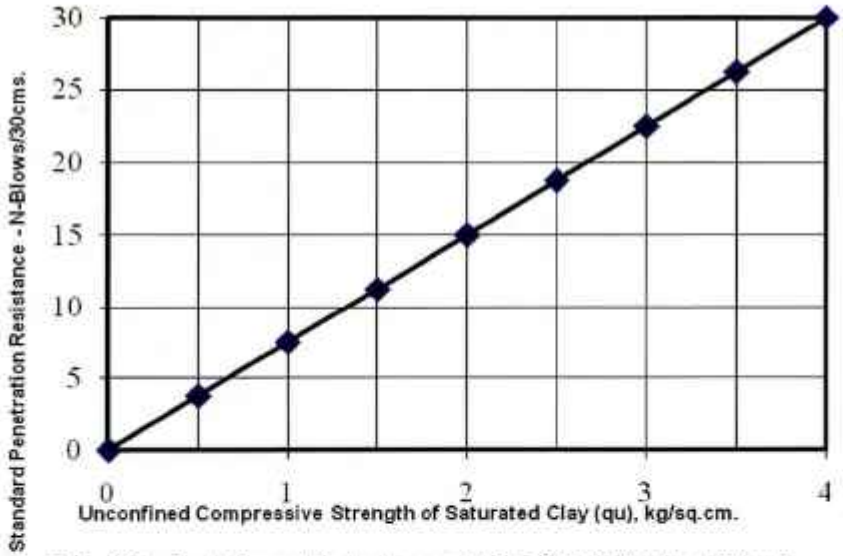


FIG. A2 : Relationship between UCC & SPT-Value (N) of Saturated Clay (AfterTerzhagi & Peck, 1948)

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GEOMARINE
THE SPIRIT OF ENGINEERING

LATERAL LOAD CARRYING CAPACITY OF BORED CAST- SITU PILES

1.0 Geometrical Data

Type of Pile Head Considered		Fixed	
Diameter of Pile (d)	:	0.50	m
Free standing Length of Pile (e)	:	0	m
Length of Pile below E.G.L (Le)	:	24.0	m
Cut-Off Level From E.G.L	:	5.0	
Length of Pile below Cut-Off Level (Le)	:	19.0	m
Grade of Concrete (M)	:	25	MN/m^2
Young's Modulus of Concrete (E)	:	25000000	kN/m^2
Momemnt of Inertia (I)	:	0.003068	m^4

2.0 Determination of Depth of Fixity

Type of Soil Strata	:	Clay	
Ground Water Condition	:	Submerged	
Design SPT "N" Value	:	3	
K=((k1/1.5)*(0.3/B))			
(n can be read as h in the above and below equation in case of Sand)			
K1=	:	6750	kN/m^3
K=	:	2700	kN/m^4
R=	:	2.75	m
L1/R	:	0.00	
Lf/R	:	2.20	
Depth of Fixity below Cut off (z_f)	:	6.04	m

3.0 Determincation of Lateral Load and Moment Carrying Capacity for 0.005 m Lateral Deflection:

Allowable Lateral Deflection (Y)	:	0.005	m
Lateral Load Carrying Capacity (H)= Y*12EI/(e+zf)^3	:	20.88	kN
Recommended Design Lateral Load carrying Capacity	:	**20**	**kN**
Fixed End Moment,M_F=H(e+z_f)/2		63	
Reduction Factor (L_1/T)	:	0.67	m
Actual Moment (Fixed End Moment/Reduction Factor),M_F		**42**	kN-m

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ANNEXURE-II

CONSOLIDATION TEST GRAPH

GEOMARINE
Phone No.: 044-24480305
ULR No : TC114102300000034F

LABORATORY TEST REPORT
GEOMARINE CONSULTANTS PVT LTD- GEOTECHNICAL LABORATORY
NO.11 2nd MAIN ROAD, KANNAPA NAGAR EXTN,
KOTTIVAKKAM, CHENNAI

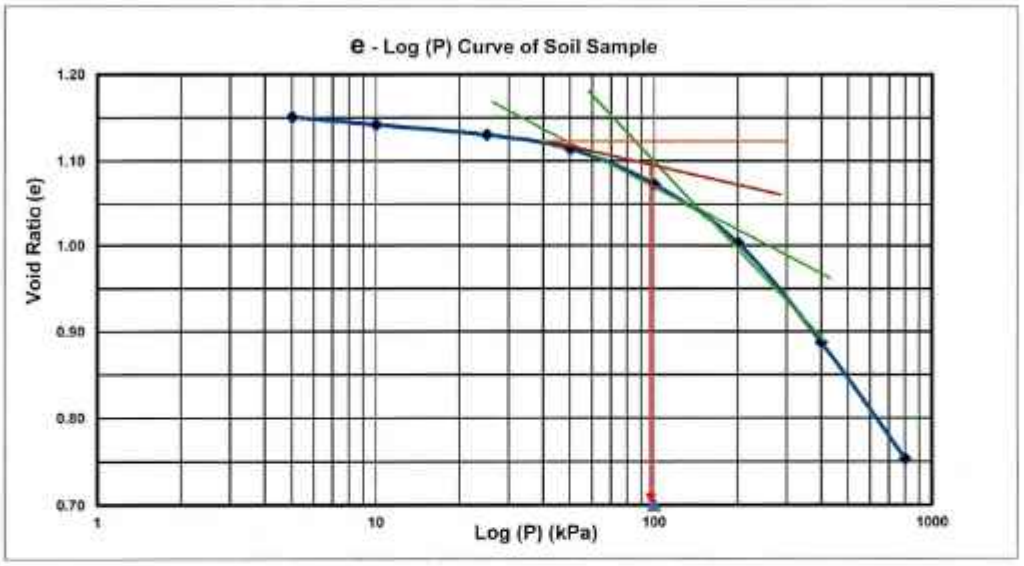
TC-11410

CONSOLIDATION TEST AS PER IS 2720-Part-15 : 1965 (RA 2021)

Name & Address of the Customer:	**M/s CEEBROS HOTELS (P) LTD**		
Sample Description:	Soil	**Sample Identification Number:**	GMC/0423/653
Source of Sample:	Customer Supplied	**Period of Testing:**	05/05/2023 to 12/05/2023
Sample Condition:	Satisfactory	**Report Date:**	23/05/2023
Test Method	As per Bureau of Indian Standards	**Test Report No.:**	GT-2541
Sample Receipt Date:	03/05/2023	**Test Report Pages:**	One Page
Bore Hole Number:	BH-03	**Depth of Sample,m**	5.00

Before Test:			**After Test:**		
Diameter of consolidation ring	60	mm	Mass of the consolidation ring + Sample	278.78	g
Height of consolidation ring	20	mm	Mass of sample	88.4	g
Mass of consolidation ring	190.38	g	Dry Mass	67.01	g
Mass of consolidation ring + sample	285.87	g	Specific Gravity	2.55	g
Mass of sample	95.49	g	Height of Solids	9.30	mm
Bulk Unit weight	16.57	kN/m^3	Dry Unit Weight	12.6	kN/m^3

Initial Moisture Content of sample			**Final Moisture Content of sample**			
Can No	A1		Can No	A1		
Mass of can	7.07	g	Mass of can	44.84	g	
Can + Wet mass	23.29	g	Can + Wet mass	133.24	g	
Can + Dry mass	18.39	g	Can + Dry mass	111.85	g	
Initial Moisture Content	43.3	%	Final Moisture Content	31.92	%	



Results :

Natural Moisture Content	43.3 %
Initial Void Ratio	1.151
Pre Consolidation Pressure	100 kPa
Compression Index	0.232

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ANNEXURE-III

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No.	01
PAGE No.	01
DIA OF BORE HOLE	150mm ✓ / 100mm
BORE START DATE	09/05/2023
BORE END DATE	09/05/2023
TOTAL DRILLING DAYS	

PROJECT NAME	Cedros Hotels (P) LTD. Boat club, Sathya Narayana avenue, R.A. Puram						
LOCATION	R.A. PURAM	MACHINE No.		CHAINAGE (m)			
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES	N		
JOB CODE		FLUSHING MEDIUM	Bentonite		E		

Depth below G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
		10	30 TO 31				1	1	3	4	0.50	1	SS	0.50	TOP Soil:- filled up soil upto 0.5m Brownish v. Loose Sand with brick bats
1		10	40 TO (2.41)				8	8	8	16	1.25	2	SS	1.25	Brownish M. Dense silty sandy silty clay
2		10	46 TO 12.47				7	10	12	22	2.00	3	SS	2.00	Brownish M. Dense silty fine Sand
3		11	00 TO 11 01				6	3	3	6	3.00	4	SS	3.00	Brownish silty Sandy, stiff clay
4		11	09 TO 4.10				2	3	3	6	4.00	5	SS	4.00	Brownish M. stiff clay
5	09/05/2023	11	31 TO 10 32				1	2	2	4	5.00	6	SS	5.00	Blackish soft clay with sand patchs
6		10	50 TO 10 51				0	1	2	3	6.00	7	SS	6.00	Blackish v. soft clay with silty fine sand
7		12	05 TO 13 06				0	0	1	1	7.50	8	SS	7.50	Brownish v. Loose clayey sand
8		12	18 TO 12 19				3	2	3	5	9.00	9	SS	9.00	Brownish very loose fine to M. Sand
9															Sample Slipped —
10		12	40 TO 12 42				6	5	4	9	10.50	10	SS	10.50	Brownish v. Loose fine sand.

CS - Core Sample	DS - Disturbed Sample	SUPERVISOR NAME	D. VENUGOPAL	PROJECT SITE DETAILS
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE	09/05/2023	WATER TABLE (m)
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)

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Cedros Hotels Limited ★ 600 028

GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No. 01
PAGE No. 02

PROJECT NAME: Ceebros Hotels (P) Ltd, Sathya Narayana Avenue Boat Club, R.A. puram
DIA OF BORE HOLE: 150mm ✓ / 100mm
LOCATION: R.A. puram | MACHINE No. | CHAINAGE (m) | BORE START DATE: 09/05/2023
STRUCTURE | DRILLING METHOD: Rotary | CO-ORDINATES N | BORE END DATE: 09/05/2023
JOB CODE | FLUSHING MEDIUM: Bentonite | E | TOTAL DRILLING DAYS

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (DC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	09/05/2023	2	05 to 07												
2							1	2	4	6	12.00	11	SS	12.00	Brownish Very Soft clay with silty fine sand
3		2	28 to 30												
4							1	1	2	3	14.00	12	SS	14.00	Blackish Very Soft clay with silty sand
5		2	50 to 52												
6							2	3	3	6	16.00	13	SS	16.00	Blackish Medium Stiff clay with sand patches
7		3	28 to 30												
8							2	3	4	7	18.00	14	SS	18.00	Blackish M.Stiff clay with sand patches and shells
9		4	01 to 10												
0							100/5cm		N	100	20.00	15	SS	20.00	Dark Greenish Hard Shale.

CS - Core Sample | DS - Disturbed Sample | SUPERVISOR NAME: D. Venugopal
SS - Split Spoon Sample | SC - Soil Cutter | SIGNATURE
UDS-Undisturbed Sample | TCB - Tungsten Carbide Bit | DATE: 09/05/2023
WS - Wash Sample | DB - Diamond Bit | CLIENT IN-CHARGE

PROJECT SITE DETAILS
GROUND LEVEL (m)
WATER TABLE (m)
CASING DEPTH (m)

GEO MARINE ENGINEERS PVT. LTD. CHENNAI-41.

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GEOMARINE
THE SPIRIT OF ENGINEERING

SITE INVESTIGATION RECORD

BORE HOLE No. 01
PAGE No. 2

PROJECT NAME: CEEBROS HOTEL (P) LTD, SATHYANARAYANA AVENUE
DIA OF BORE HOLE: 150mm / 100mm
LOCATION: R.A-PURAM | MACHINE No.: CR-03 | CHAINAGE (m): | BORE START DATE: 09/05/2023
STRUCTURE: | DRILLING METHOD: Rotary | CO-ORDINATES: N, E | BORE END DATE: 10/05/2023
JOB CODE: | FLUSHING MEDIUM: Bentonite | TOTAL DRILLING DAYS: 2

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	10/05/2023	10	25												
		11	06	DB	44%	6%					21.50		CS		Brownish Grayish Green SHALE
		11	49												
2		12	43												
		2	39												
3		3	34	DB	10%	0%					23.00		CS		Brownish Grayish Green, SHALE.
4															
							Bore Terminated at 23.00m depth								
5															
6															
7															
8															
9															
0															

CS - Core Sample
SS - Split Spoon Sample
UDS - Undisturbed Sample
WS - Wash Sample
DS - Disturbed Sample
SC - Sand Cutter
TCB - Tungsten Carbide Bit
DB - Diamond Bit

SUPERVISOR NAME: R. Kanagakannan
SIGNATURE: R. Kan
DATE: 10/05/23
CLIENT IN-CHARGE:

PROJECT SITE DETAILS
GROUND LEVEL (m):
WATER TABLE (m):
CASING DEPTH (m):

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SITE INVESTIGATION RECORD

BORE HOLE No. 03
PAGE No. 1

PROJECT NAME: CEEBROS HOTEL PRIVATE LIMITED
DIA OF BORE HOLE: 150mm / 300mm
LOCATION: SATHYA NARAYANA AVENUE
MACHINE No.: CR.05
CHAINAGE (m):
BORE START DATE: 24-04-23
STRUCTURE:
DRILLING METHOD: Rotary
CO-ORDINATES: N, E
BORE END DATE: 26-04-23
JOB CODE:
FLUSHING MEDIUM: Bentonite
TOTAL DRILLING DAYS:

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
0	24-04-2023	11	11	SC	-	-	2	3	4	7	0.50	1	SS		very soft Brownish Sandy clay.
		12	15												
1		12	17	SC	-	-	2	3	4	7	1.25	2	SS		Medium dense Brownish Sandy clay
		12	21												
2		12	40	SC	-	-	3	5	8	13	2.00	3	SS		→ "DO" →
		12	43												
3		12	55	SC	-	-	3	5	9	14	3.00	4	SS		very Stiff Grayish Clay
		12	58												
4		2	41	SC	-	-	3	4	6	10	4.00	5	SS		→ "DO" →
		2	45												
5		3	17	SC	-	-	-	-	17		5.00	6	UDS		Soft Grayish Clay.
		3	23												
6		3	47	SC	-	-	2	3	4	7	6.00	7	SS		Soft Grayish to Blackish Clay.
		3	51												
7		4	06	SC	-	-	2	3	3	6	7.50	8	SS		very loose "Sample Slipped"
		4	10												
8															
9		4	40	SC	-	-	6	7	16	23	9.00	9	SS		Medium dense Brownish Clay & Sand.
		4	48												
10															

CS - Core Sample
SS - Split Spoon Sample
UDS-Undisturbed Sample
WS - Wash Sample

DS - Disturbed Sample.
SC - Soil Cutter
TCB - Tungsten Carbide Bit
DB - Diamond Bit

SUPERVISOR NAME: R. Ekambaragan
SIGNATURE:
DATE:
CLIENT IN-CHARGE:

PROJECT SITE DETAILS
GROUND LEVEL (m):
WATER TABLE (m): 2.90M
CASING DEPTH (m):

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SITE INVESTIGATION RECORD

BORE HOLE No.	03
PAGE No.	2
DIA OF BORE HOLE	150mm / 100mm
BORE START DATE	24-04-23
BORE END DATE	26-04-2023
TOTAL DRILLING DAYS	

PROJECT NAME	CEEBORS HOTEL PRIVATE LIMITED						
LOCATION	SATHYA NARAYANA AVENUE	MACHINE No.	CR: 05	CHAINAGE (m)			
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES	N		
JOB CODE		FLUSHING MEDIUM	Bentonite		E		

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCD / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Layer Data: Geotechnical Description
1	25-04-23	10	11	SC	-	-	8	5	5	10	10.50	10	SS		Soft Blackish sandy clay
		10	20												
2		10	52	SC	-	-	4	4	6	10	12.00	11	SS		Stiff, brayish to Blackish clay.
		10	57												
3															
4		11	22	SC	-	-	3	3	5	8	14.00	12	SS		Stiff, Blackish clay
		11	28												
5															
6		12	33	SC	-	-	7	7	8	15	16.00	13	SS		—— "DO" ——
		12	39												
7															
8		2	51	SC	-	-	3	5	6	11	18.00	14	SS		—— " " DO ——
		2	57												
9		4													
10		4	15	SC	-	-	4	6	7	13	20.00	15	SS		"Sample slipped"
		4	21												

CS - Core Sample	DS - Disturbed Sample	SUPERVISOR NAME	R. Elavazhagan	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS - Undisturbed Sample	TCD - Tungsten Carbide Bit	DATE		WATER TABLE (m)	2.90m
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

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SITE INVESTIGATION RECORD

BORE HOLE No.	03
PAGE No.	03
DIA OF BORE HOLE	150mm / 100mm
BORE START DATE	24-04-2023
BORE END DATE	26-04-2023
TOTAL DRILLING DAYS	

PROJECT NAME	CEEBROS HOTEL PRIVATE LIMITED				
LOCATION	SOTHERN RAILWAY MAIN AVENUE	MACHINE No.	CR-05	CHAINAGE (m)	
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES	N
JOB CODE		FLUSHING MEDIUM	Bentonite		E

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: 15-30	SPT Details: 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
1	26-04-23														
2		10	10	SC	–	–	4KM/60B	HR	HR	N>100	21.50	16	SS		Weak, Grayish Clay and Completly Weathered Rock fragments
3		10	17												
4		11	00	DB	60	21	–	–	–	–	24.00	17	CS		Medium Strong, Grayish to Brownish Moderatly Weathered Rock.
5		12	30												
6		2	50	DB	100	56	–	–	–	–	28.50	18	CS		Strong, Grayish to Brownish Moderatly Weathered Rock.
7		5	10												
8															
9															
0															

CS - Core Sample	DS - Disturbed Sample	SUPERVISOR NAME	R. Elavazhagan	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB - Tungsten Carbide Bit	DATE		WATER TABLE (m)	2.90m
WS - Wash Sample	DB - Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

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SITE INVESTIGATION RECORD

BORE HOLE No. 04
PAGE No. 1

PROJECT NAME	CEEBROS HOTEL (P) LTD, SATHYANARAYANA AVENUE					DIA OF BORE HOLE	150mm / 100mm
LOCATION	R.A. PURAM	MACHINE No.	CR-03	CHAINAGE (m)		BORE START DATE	11/05/2023
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES	N	BORE END DATE	12/05/2023
JOB CODE		FLUSHING MEDIUM	Bentonite		E	TOTAL DRILLING DAYS	2

Depth below E.G.L (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	11/05/2023	11	42	SC			1	3	5	8	0.50	1	SS		Loose, Brownish, sandy clayey SILT
		11	43												
		11	51	SC			4	4	4	8	1.25	2	SS		Loose, Brownish, clayey SILT
		11	52												
2		12	01	SC			5	8	11	19	2.00	3	SS		Medium Dense, Brownish, Silty SAND.
		12	02												
3		12	09	Sc			3	7	9	16	3.00	4	SS		Medium Dense, Greyish Brown, clayey SILT
		12	10												
4		12	18	Sc			4	6	8	14	4.00	5	SS		Stiff, Greyish Brown, Silty CLAY.
		12	19												
5		12	42	SC				45cm			5.00	6	UDS		UNDISTURBED SAMPLE
		12	43					39	blx						
6		2	08	SC			1	1	1	2	6.00	7	SS		very soft, Greyish, Silty CLAY
		2	09												
7		2	23	SC			1	1	1	2	7.50	8	SS		very Loose, Greyish, clayey sandy SILT.
		2	24												
8															
9		2	39	Sc			2	2	1	3	9.00	9	Nil		Sample slipped
		2	40												
10		2	53	SC			2	3	2	5	10.50	10	SS		very Loose, Greyish, clayey Sandy SILT
		2	54												

CS - Core Sample
SS - Split Spoon Sample
UDS - Undisturbed Sample
WS - Wash Sample

DS - Disturbed Sample
SC - Soil Cutter
TCB - Tungsten Carbide Bit
DB - Diamond Bit AI-41

SUPERVISOR NAME: R. Kanakalakannan
SIGNATURE: R.Kanakalakannan
DATE: 11/05/2023
CLIENT IN-CHARGE:

PROJECT SITE DETAILS
GROUND LEVEL (m):
WATER TABLE (m):
CASING DEPTH (m):

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SITE INVESTIGATION RECORD

BORE HOLE No. 04
PAGE No. 2

PROJECT NAME	CEEBROS HOTEL (P) LTD, SATHYA NARAYANA AVENUE					DIA OF BORE HOLE	150mm / 100mm
LOCATION	R-A-PURAM	MACHINE No.	CR-03	CHAINAGE (m)		BORE START DATE	11/05/2023
STRUCTURE		DRILLING METHOD	Rotary	CO-ORDINATES	N	BORE END DATE	12/05/2023
JOB CODE		FLUSHING MEDIUM	Bentonite		E	TOTAL DRILLING DAYS	

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drilling (SC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	15-30	30-45	SPT 'N' Value	Sample Details: Depth	No.	Type	Layer Data: Depth (m)	Geotechnical Description
1	11/05/2023														
2		3	18	SC			1	2	3	5	12.00	11	SS		Medium stiff, Greyish, Silty CLAY.
		3	10												
3															
4		3	23	SC			2	3	3	6	14.00	12	SS		Medium stiff, Greyish, clay
		3	25												
5															
6		3	59	SC			1	1	3	4	16.00	13	SS		Soft, Greyish, CLAY
		4	01												
7															
8		4	29	SC			1	2	20	22	18.00	14	SS		very stiff to hard, Greenish Hard clay.
		4	31												
9	12/05/2023	9	34	SC			Hammer Rebound			N>100	19.00	15	NV		Sample Nil
		9	42												
10		10	08	TCB	53	0					20.00	16	CS		Brownish Greyish Green SHALE
		10	29												

CS - Core Sample	DS - Disturbed Sample.	SUPERVISOR NAME	R. Kanagalakannan	PROJECT SITE DETAILS	
SS - Split Spoon Sample	SC - Soil Cutter	SIGNATURE		GROUND LEVEL (m)	
UDS-Undisturbed Sample	TCB-Tungsten Carbide Bit	DATE	11/05/2023	WATER TABLE (m)	
WS - Wash Sample	DB-Diamond Bit	CLIENT IN-CHARGE		CASING DEPTH (m)	

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SITE INVESTIGATION RECORD

BORE HOLE No.	04		
PAGE No.	3		
PROJECT NAME	CEEBROS HOTEL (P) LTD, SATHYA NARAYANA AVENUE	DIA OF BORE HOLE	150mm / 100mm
LOCATION	R.A. PURAM	MACHINE No.	CR-03
CHAINAGE (m)		BORE START DATE	11/05/2023
STRUCTURE		DRILLING METHOD	Rotary
CO-ORDINATES	N / E	BORE END DATE	12/05/2023
JOB CODE		FLUSHING MEDIUM	Bentonite
		TOTAL DRILLING DAYS	2

Depth below E.G.L. (m)	Drilling progress per metre: Date	Time: Hr.	Time: Min	Type of Drill Bit (DC / TCB / DB)	Core Details: Total Core Recovery %	Core Details: R.Q.D %	SPT Details: Blows/cm. 0-15	SPT Details: Blows/cm. 15-30	SPT Details: Blows/cm. 30-45	SPT 'N' Value	Sample Details: Depth	Sample Details: No.	Sample Details: Type	Layer Data: Depth (m)	Geotechnical Description
1	12/05/2023	10	50												
2		11	36	TCB	74	15					21.50	17	CS		Pale yellow mix Brownish Greyish Green, SHALE
3		1	44												
		2	33	TCB	74	0					23.00	18	CS		Pale yellow mix Greyish Pale Pinkish Green, SHALE
4															Bore Terminated at 23.00m depth
5															
6															
7															
8															
9															
0															

CS - Core Sample
SS - Split Spoon Sample
UDS-Undisturbed Sample
WS - Wash Sample
US - Undisturbed Sample
SC - Soil Cutter
TCB - Tungsten Carbide Bit
DB - Diamond Bit

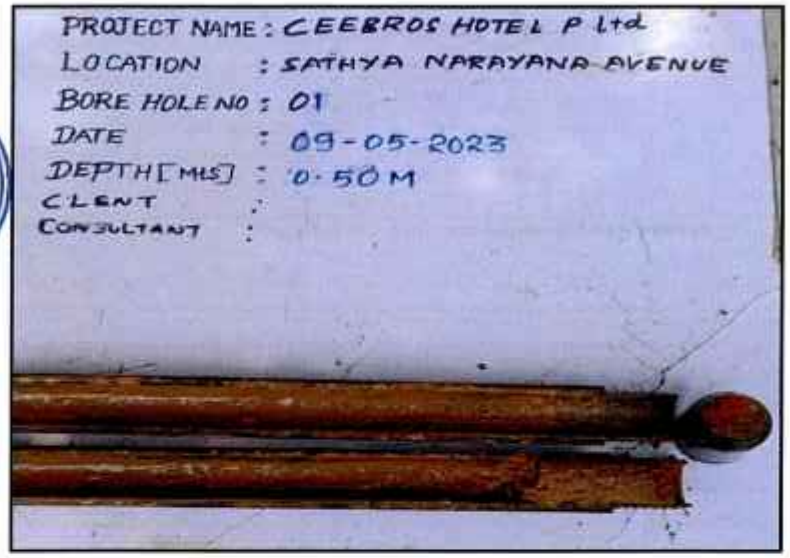
SUPERVISOR NAME: R. Kamalakannan
SIGNATURE: R. Kam
DATE: 12/05/2023
CLIENT IN-CHARGE:

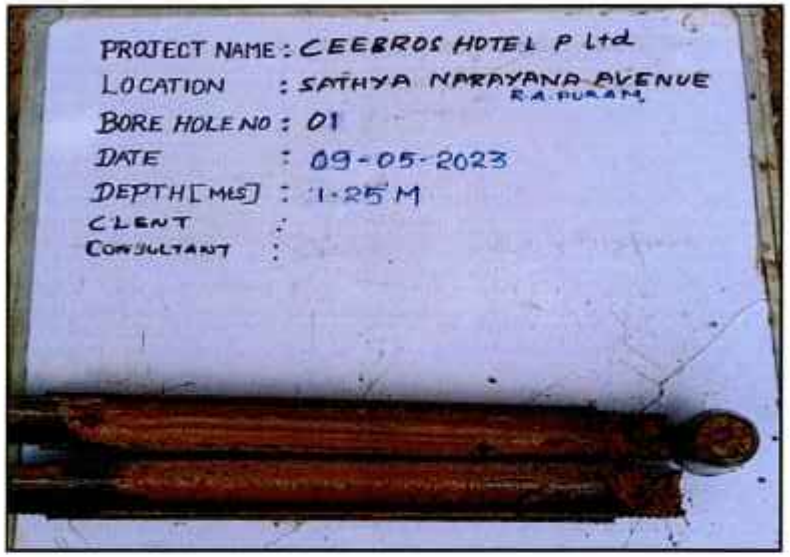
PROJECT SITE DETAILS
GROUND LEVEL (m):
WATER TABLE (m):
CASING DEPTH (m):

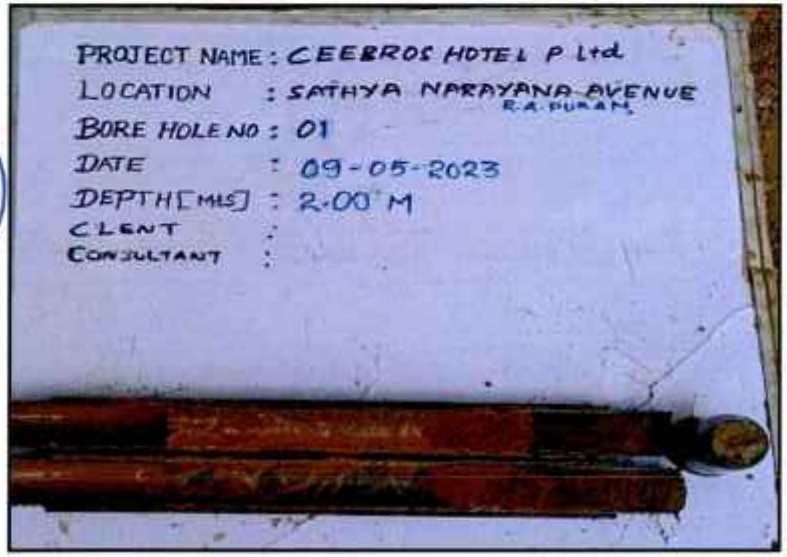
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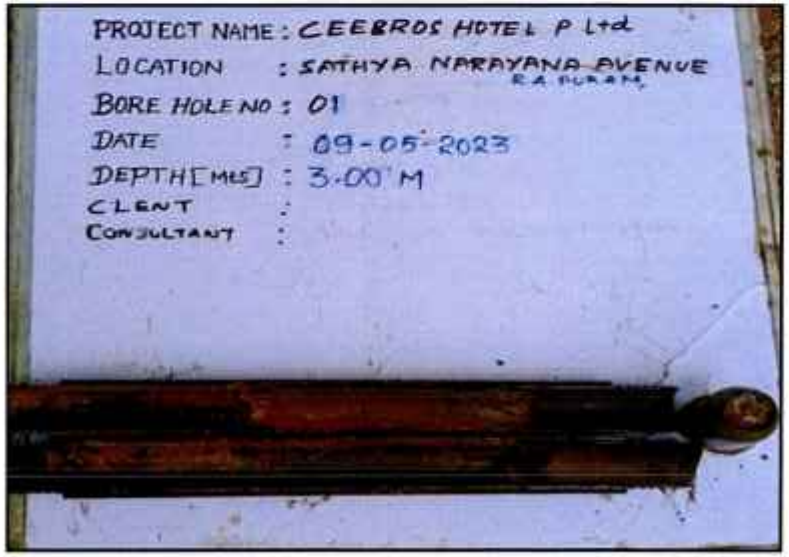
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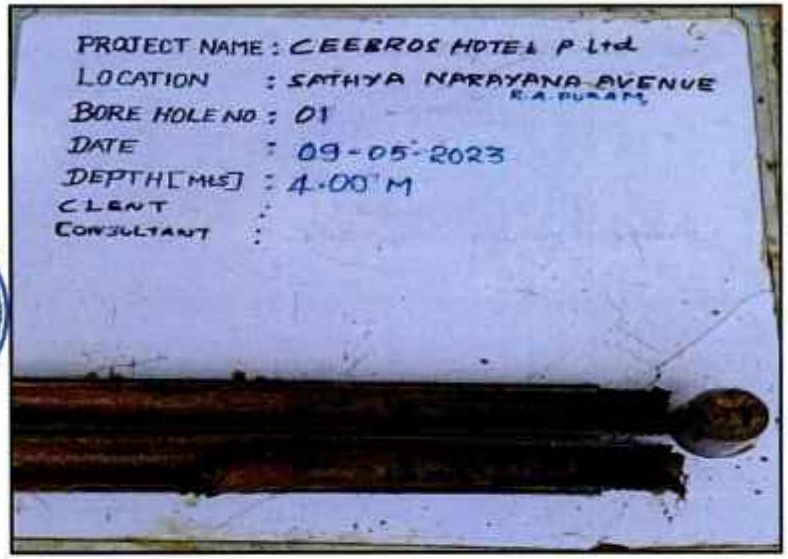








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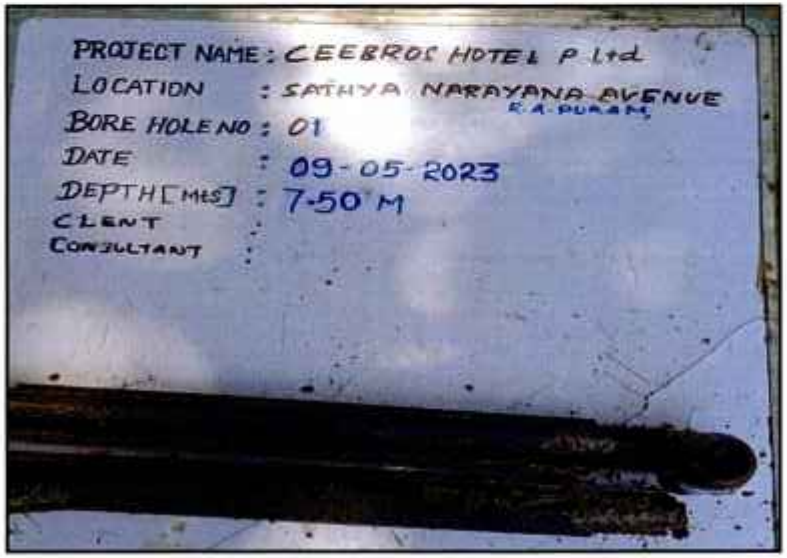




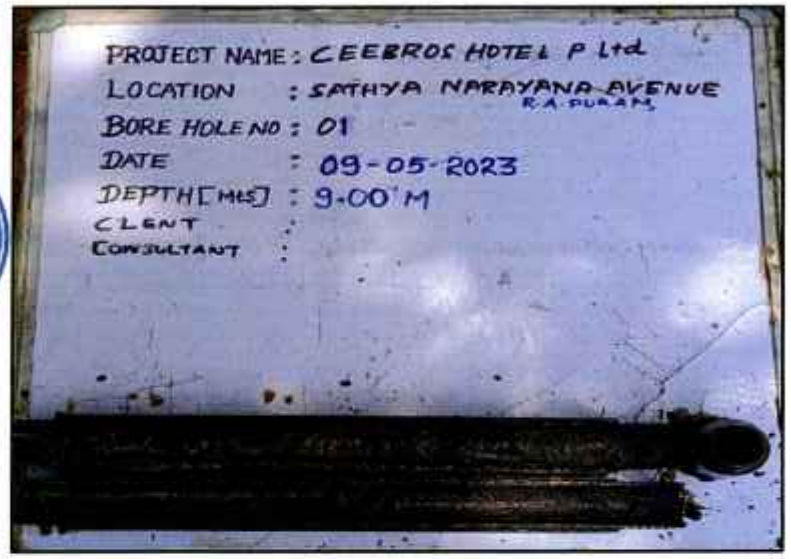
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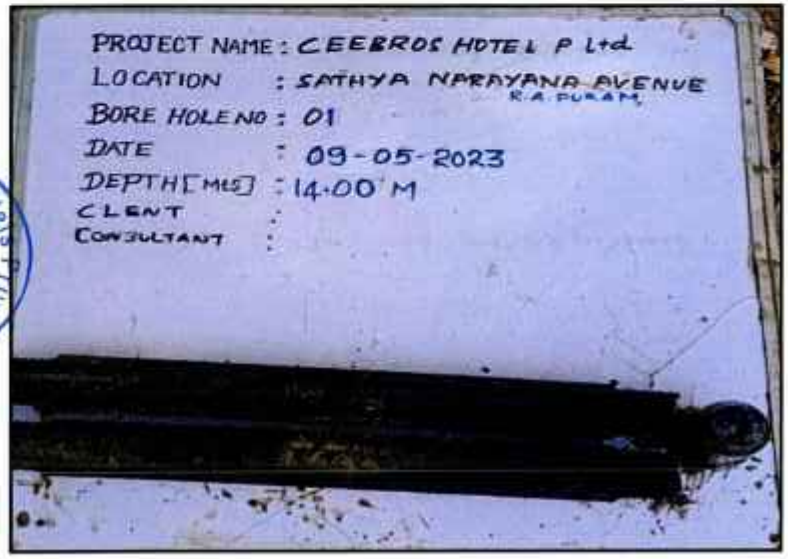
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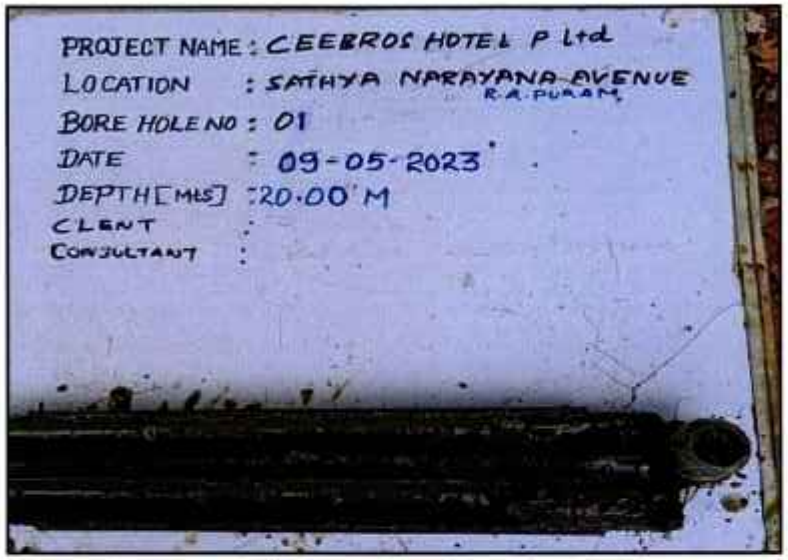


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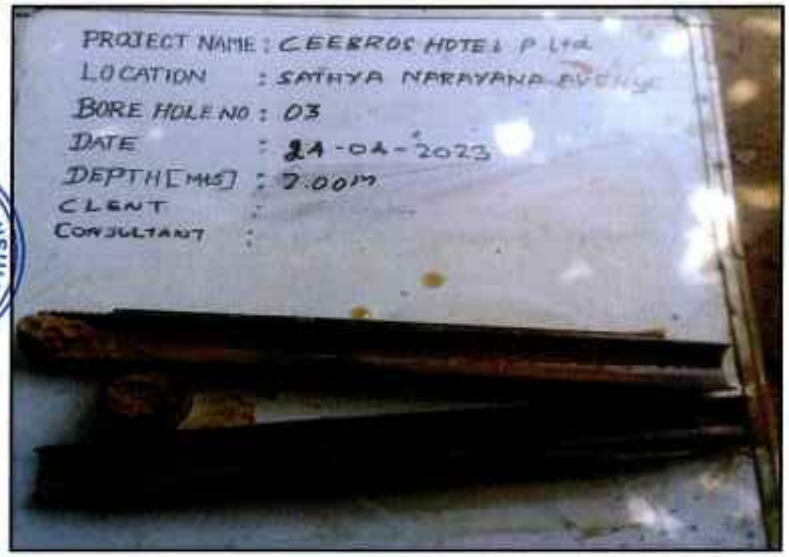
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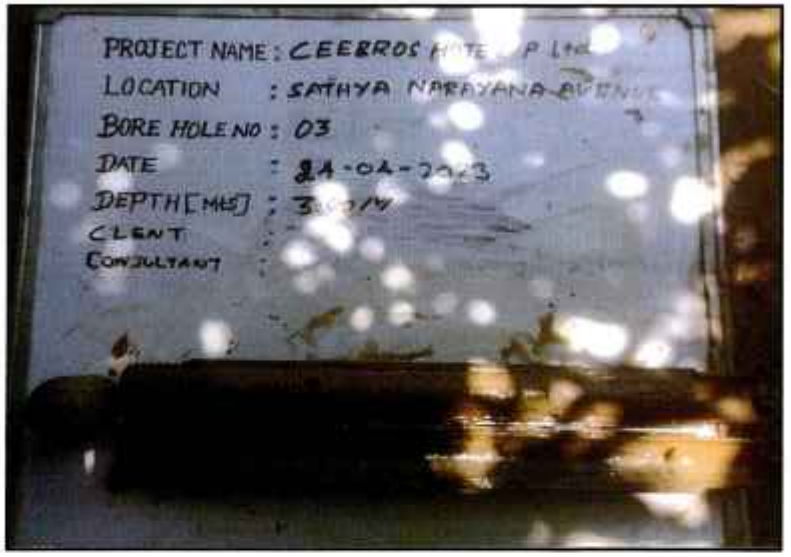


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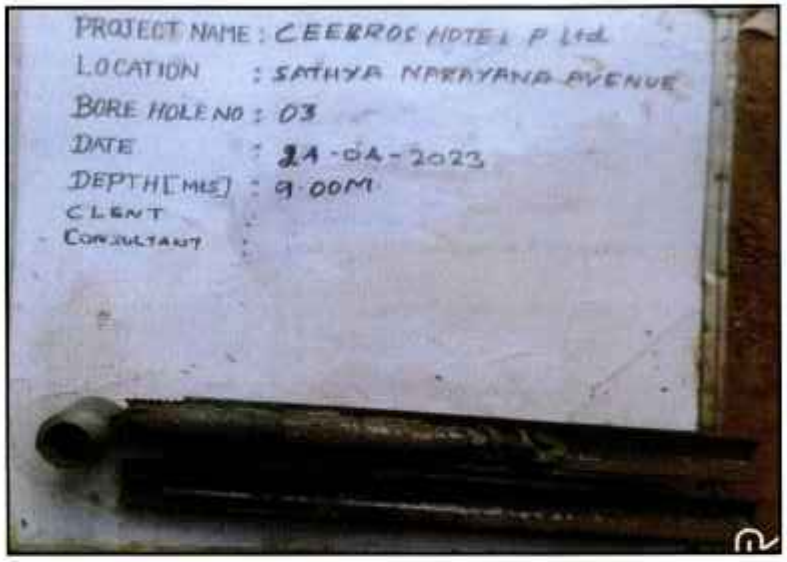


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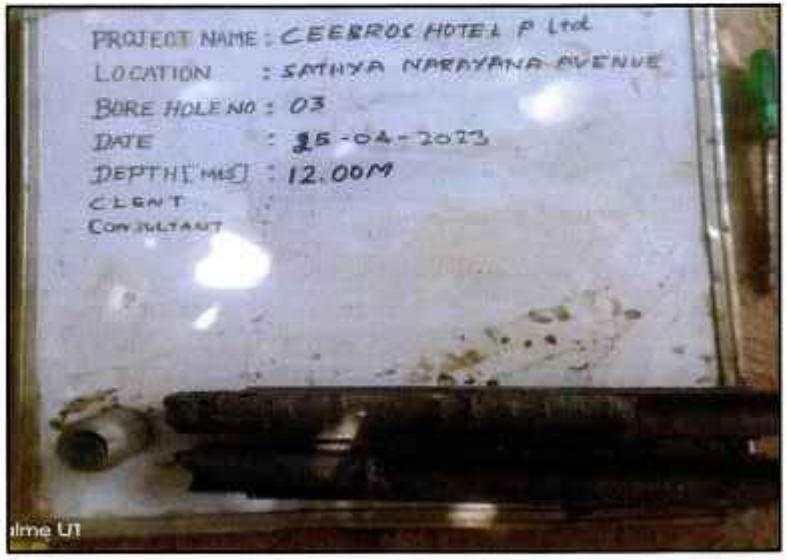


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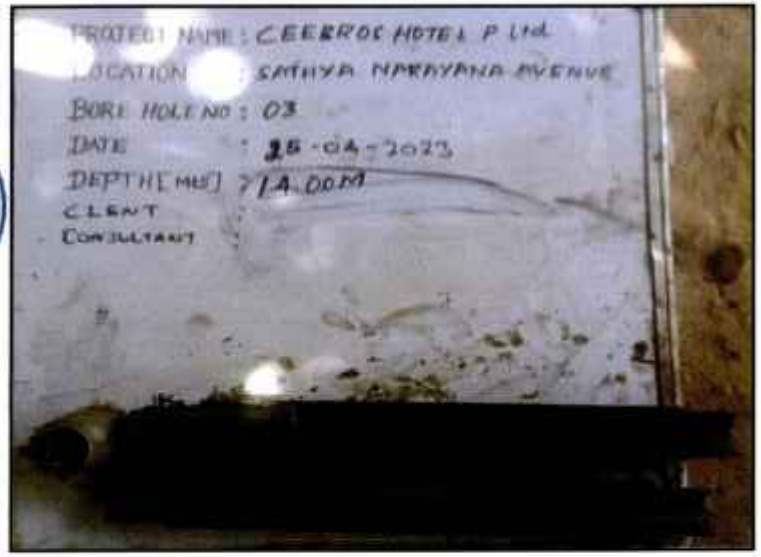








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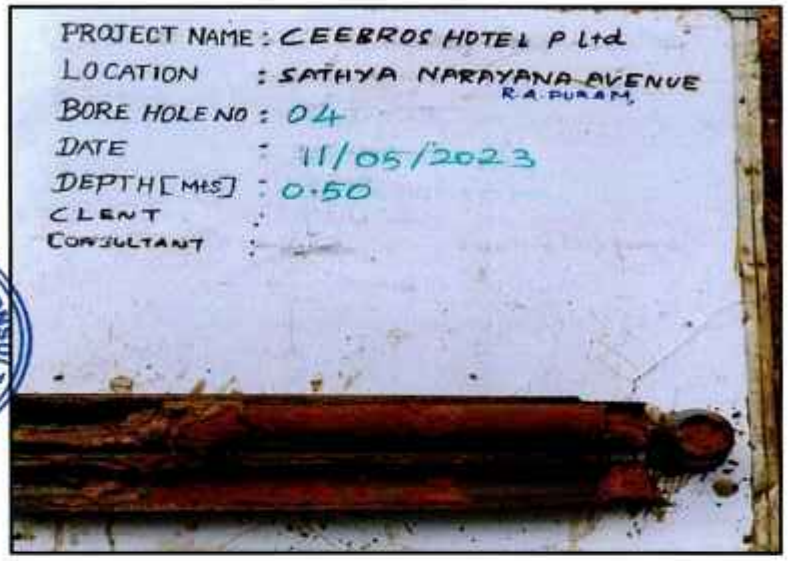






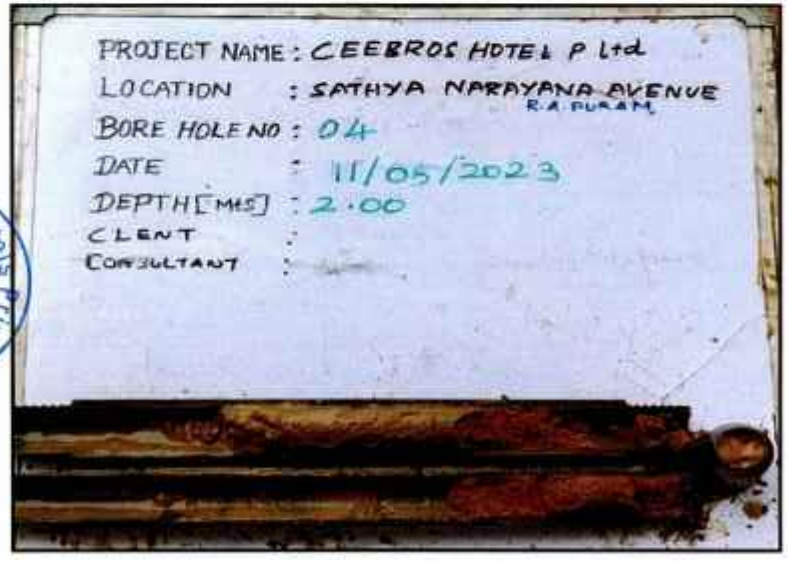


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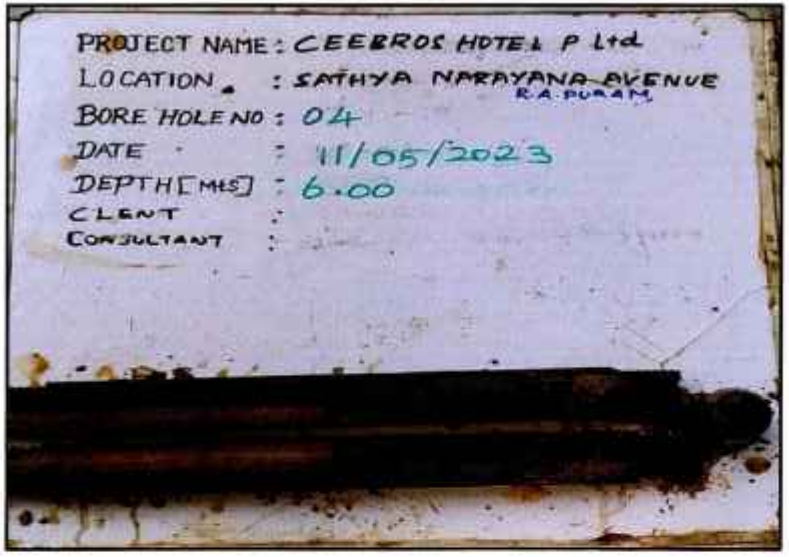


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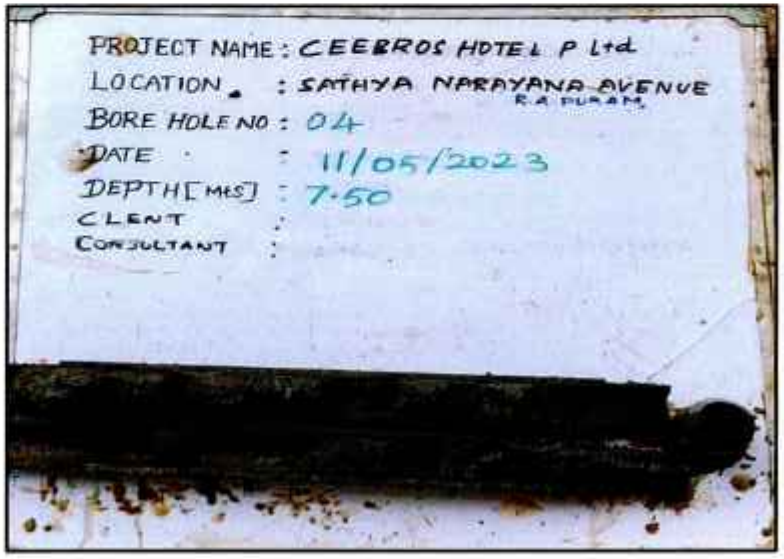


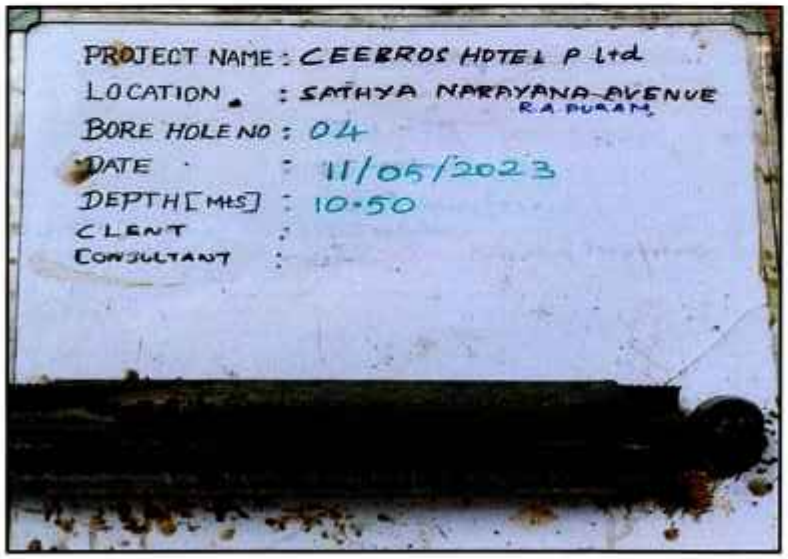
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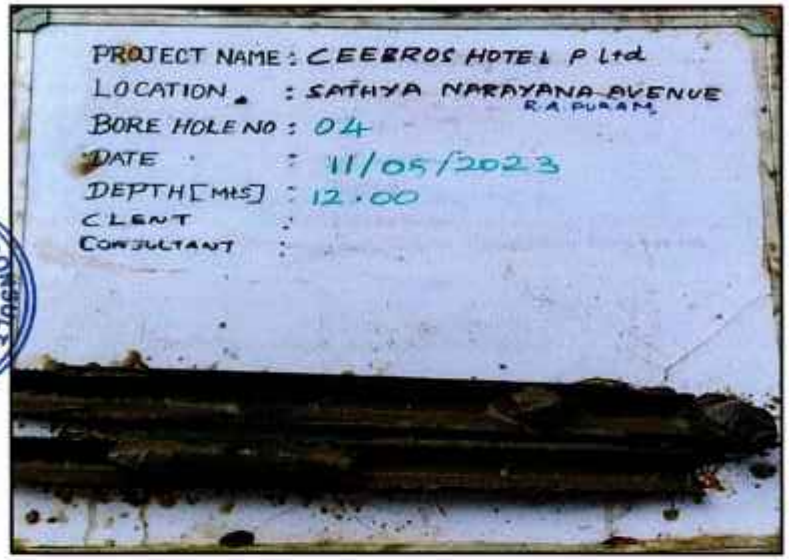
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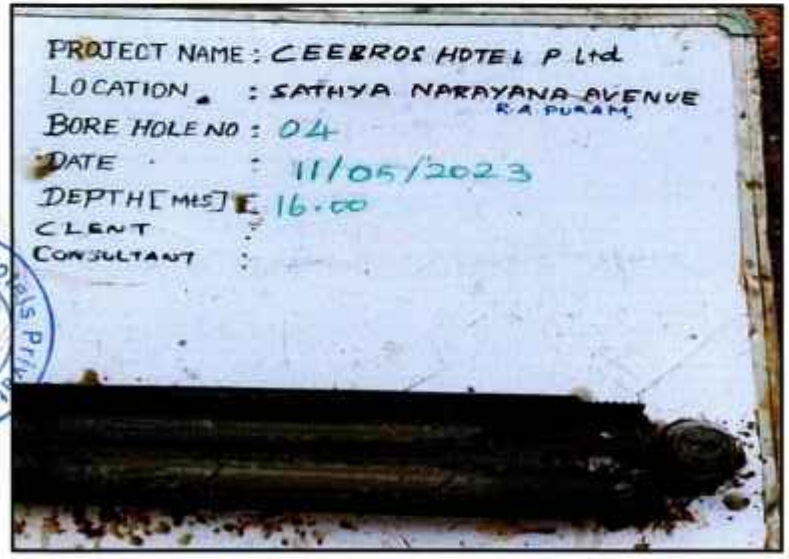


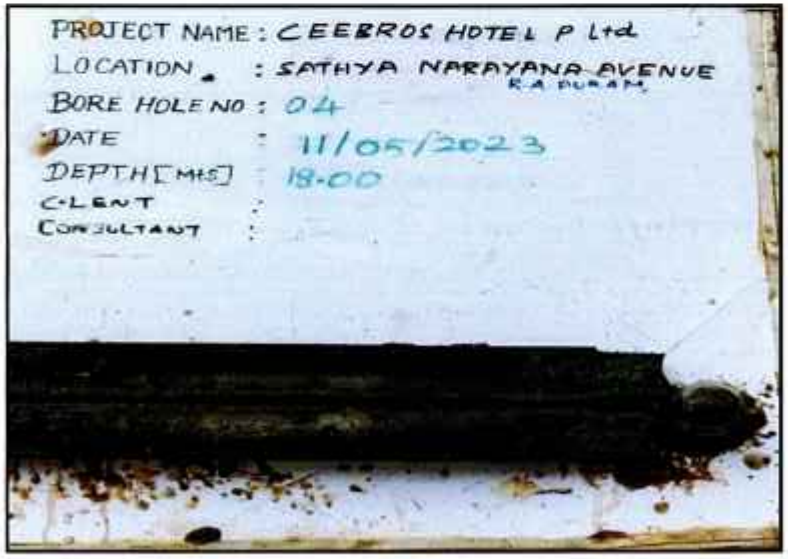
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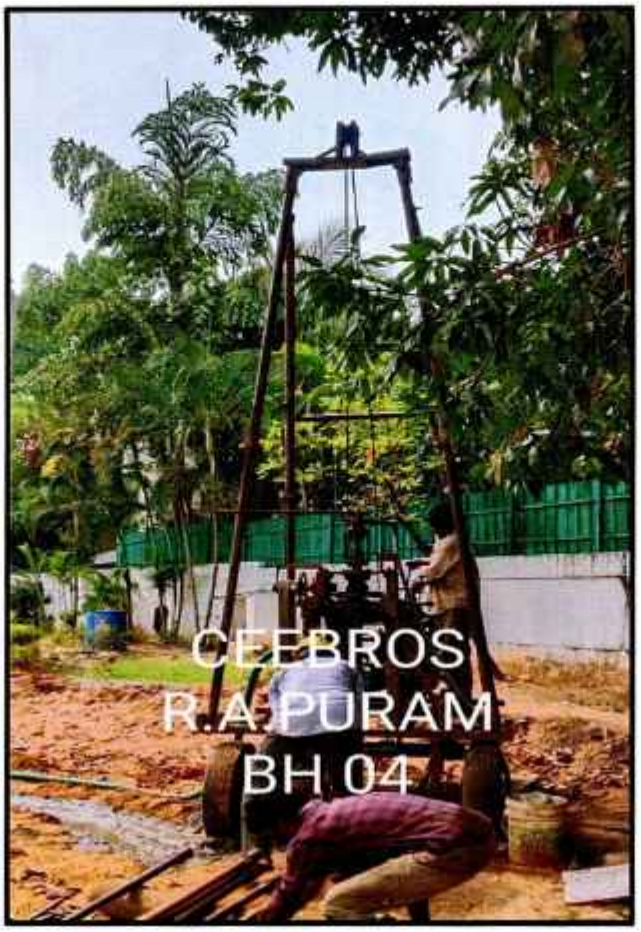




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Property Development & Approvals

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NRI & Investment Services

Escrow Services, Rentals, Litigation Solutions, Property Valuation and Property Management

Compliance & Special Services

Demolition, Vaasthu checks, regularization of unauthorized buildings, and office space solutions.



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Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter

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Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer

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Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator

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