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PROPOSED CONSTRUCTION OF COMMERCIAL BUILDING (PARTLY BASEMENT+G+4) AT ANNA NAGAR

Report on Geotechnical Investigation

Client:

Mr. P.S.Ravindran,
Chennai.



®

MARS SYNERGY GEOTECH Pvt Ltd

An ISO 9001: 2015 Certificate Company

Plot #:206, 3rd Link Street, Nehru Nagar,
Kottivakkam, OMR, (Kandanchavadi), Chennai-600 041.

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11th Nov 2019.

To

Mr. P.S. Ravindran,

Chennai.

Reg: Proposed Construction of commercial building (Partly Basement+G+4) at Plot No. 4617, Door No. Y-217, Second Avenue, Anna Nagar, Chennai – 600 040, Tamil Nadu.

The **Mars Synergy Geotech Pvt Ltd**, Chennai has completed the geotechnical engineering services for the above referenced project.

This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations design recommendations for your structure foundation are presented here in final form together with a summary of field and laboratory data.

We appreciate the opportunity to be of service to you on this project. If you have any comments concerning this report, or if we may be of further services, please contact us/mail.

Note:

1. The test results enclosed are only related to the sample tested by us.
2. The Report shall not be reproduced in full or part without written permission from Mars Synergy Geotech Laboratory.
3. All the lab related tested values are as per the standard conditions followed by the lab.
4. *Not under NABL scope and NABL is applicable only to tested results enclosed.
5. Samples are retained for 30 days from sample received date at lab.

Sincerely,

Mars Synergy Geotech Pvt Ltd.

Report No: **MSGTPL/SI-4513/19-20**

Copies Submitted: (2)

Total no of Pages: (46)

MARS SYNEGRY GEOTECH PVT LTD

an ISO 9001:2015 certificate company

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**REPORT ON SOIL INVESTIGATION AND RECOMMENDATIONS FOR THE
PROPOSED CONSTRUCTION OF COMMERCIAL BUILDING (PARTLY
BASEMENT+G+4) AT ANNA NAGAR, CHENNAI.**

1.0 INTRODUCTION

Mr. P.S.Ravindran, Chennai are planning to construct commercial building (Partly Basement+G+4) at Plot No. 4617, Door No. Y-217, Second Avenue, Anna Nagar, Chennai – 600 040, Tamil Nadu, INDIA. **M/s. Mars Synergy Geotech Pvt Ltd**, Chennai, carried out this investigation and completed on 02nd Nov 2019 as per the instructions from owner of the project.

The scope of work includes the following:

- Making two numbers of Standard Soil Investigation bore-holes
- Collecting soil samples at regular depth intervals
- Conducting SPTs at every 1.0m/1.50m depth intervals
- Conducting laboratory tests on samples collected
- Submitting report with laboratory test results and recommendations for foundations.

1.1 DESCRIPTION OF STRUCTURE

The proposed structure is a commercial building (Partly Basement+G+4). The exact details of columns are not available at the time of preparation of this report. Assuming an approximate column spacing of 4 to 5 m c/c considering this the central column load works about 120 to 150 tones for proposed building. These loads are assumed for the purpose of foundation only and for the structural design, exact loads are to be estimated based on a suitable structural analysis.

1.2 SOIL INVESTIGATION

The field investigation works were carried out using 1 sets of Rotary mechanical drilling Rig. The following activities, carried out in chronological sequence, comprised the fieldwork for the project

- Mobilization of rotary drill rig, water pump, testing tools and accessories.
- Collection of disturbed samples of non-cohesive soils.
- Sampling and logging of the boreholes. Packing, labeling and dispatching the samples to laboratory.
- Field investigation and laboratory tests conducted as per IS-1892 and IS -2720

1.3 FIELD SAMPLING

Two numbers of standard soil investigation boreholes of 100mm diameter was made at the locations shown in the figure, **MSGTPL/SI-4513** enclosed. Investigations were conducted up to 20.50m from existing ground level where SPT is more than 50blows. SPTs were conducted at every 1.0/1.5m depth intervals and samples were collected for identification and testing.

1.4 LABORATORY TESTS

The laboratory-testing scheme is so designed to obtain the design parameters for the foundations. The following parameters are evaluated:

- Type of soil and it's gradation properties
- Atterberg Limits
- Specific Gravity
- Natural Moisture Content (NMC)
- Sieve analysis on the coarse-grained soil fraction

All the test results are presented in the tabular forms. Comprehensive field information along with SPT values is presented on separate sheet.

1.5 SOIL PROFILE

Based on visual identification of soil samples and test results (of both field and laboratory tests), the soil profile arrived. Subsoil is made-up of six/seven distinctive layers there are

- (i) Soft to medium Stiff CLAY up to -7.0m with **SPT's N= 2-7**
- (ii) Loose SAND -7.0m to - 12.0m with **SPT's N=4-8**
- (iii) Medium Dense Silty Clayey SAND -12.0m to -13.50m with **SPT's N=10-18**
- (iv) **Hard CLAY -13.50m to -16.50m with SPT N=>50**
- (v) Very Stiff CLAY -16.50m to -18.0m with **SPT's N=24-26**
- (vi) Very Stiff to Hard Sandy CLAY-18.0m to -20.50m with **SPT's N=25-31**

The soil profile details are presented in the bore-chart.

1.6 GROUND WATER TABLE

At the time of soil investigation (01/11/2019 to 02/11/2019), the ground water table was - 2.0m encountered within the drilled depth.

1.7 DISCUSSION ON FOUNDATION

From the sub soil profile and laboratory test data, it can be seen that the top soil is soft to medium stiff CLAY average **SPT N Value is 5** up to 7.0m depth, below this layer 5.0m thick loose SAND Average **SPT N=6**, . Below 12.0m to 20.0m depth medium dense SAND. Hard CLAY and very stiff CLAY Soil layers are encountered up to 20.50m depth. Based on soil strata shallow foundation is not satisfactory for the proposed building, hence bored cast in-situ pile foundation is suggested.

1.8 RECOMMENDATIONS

- Considering that this structure is a commercial Building (1 Basement+Ground+4 Upper Floors) storied residential building, pile foundation is recommended up to **15.0m depth** from existing Ground level.
- The pile bore may be terminated at a depth of minimum three times diameter of the pile in to hard strata (where three consecutive SPT 'N' values of more than 50 are obtained in each test at depth intervals of one pile diameter).
- To satisfy the above criterion the pile length may be about **15.0 m** from the existing ground level.
- The capacities of piles of varying diameters are provided below for the proposed structure.

Pile Termination Depth From EGL (m)	Pile Embedded Depth (m)	Pile Dia (mm)	Safe Vertical Capacity (Tones)	Safe Uplift Capacity (Tones)	Safe Lateral Capacity w.r.t 5mm Deflection	
					Free Head (Tones)	Fixed Head (Tones)
15.0	12.50	450	40	24	1.16	3.0
		500	49	27	1.29	3.34
		600	64	33	1.55	4.0

- **The above safe loads suggested are only tentative and these must be confirmed by conducting through pile load tests conducted as per I.S-2911part –IV.**
- Site for the proposed project is situated in Anna Nagar, Chennai which falls under Seismic Zone III as per IS 1893 (Part 1) - 2002. Structure should be design against Earthquake resistance

ESTIMATION OF VERTICAL CAPACITY OF PILE

Project:	4513
Location:	Anna Nagar
Reference BH's	BH-1 to BH-2

Dia of Pile	600	mm
Elevation	0	m
Pile Cut off Level	2.5	m
Pile termination level below G.L	15	m
Total Length of Pile	12.5	m
Factor of safety	2.5	

$$Q_u = A_p \left(\frac{1}{2} D \gamma N_\gamma + P_D N_q \right) + \sum_{i=1}^n K_i P_{Di} \tan \delta_i A_{si}$$

$$Q_u = A_p N_c c_p + \sum_{i=1}^n \alpha_i c_i A_{si}$$

Soil Design Parameters

Sl.No	From (m)	To (m)	Thickness (m)	Soil Type	Avg 'N'	γ' (kN/m ³)	C (kPa)	α	ϕ	K	Pdi (kN/m ²)
1	0	7	7	Medium Stiff CLAY	5	7	25	1	-	-	24.5
2	7	12	5	Loose SAND	6	7	-	-	18	1	66.5
3	12	13.5	1.5	Medium Dense Calyey SAND	14	8	-	-	31	1.05	90
4	13.5	16.5	3	Hard CLAY	>50	10	300	0.3	-	-	111
5	16.5	18	1.5	Very Stiff CLAY	26	9	130	0.4	-	-	132.75
6	18	20.5	2.5	Very Stiff To Hard CLAY	30	9	150	0.3	-	-	150.75

Pile Calculations As per IS-2911 part-1/Sec-2-2010

Sl.No	From (m)	To (m)	Thickness (m)	Avg 'N'	γ' (kN/m ³)	C (kPa)	α	ϕ	K	Asi	Sf (kN)	Sfi (kN)
1	2.5	7	4.5	5	7	25	1	-	-	8.48	212.06	212.06
2	7	12	5	6	7	-	-	18	1	9.42	203.64	415.70
3	12	13.5	1.5	14	8	-	-	31	1.05	2.83	160.55	576.25
4	13.5	15	1.5	>50	10	300	0.3	-	-	2.83	254.47	830.71

End Bearing

Bearing Strata	Dia (m)	Ap (m ²)	γ' (kN/m ³)	Cu(kN/m ²)	Nq	Ng	Nc	Qp (kN)	Qult (kN)	Qallow (kN)
Hard CLAY	0.6	0.2827433	10	300	-	-	9	763.4	1594.1	637.65

Safe vertical Capacity of Single Pile

64

Tones

The ultimate Compressive Strength (considering this as column),

$$P_u = [0.4f_{ck} \cdot A_{sc} + (0.67f_y - 0.4f_{ck}) \cdot A_{sc}]$$

% of steel	0.4
Grade of Concrete	25
f_y	415
Ap	282743.3 mm ²
Asc	1130.973 mm ²
Pu=	3130591 N
70% of concrete strength	2191414 N

Safe Compressive Strength of Pile 219 Tones

Which is more than the safe capacity of 64 tones from soil considerations, Hence it is Safe.

ESTIMATION OF UPLIFT CAPACITY OF PILE (TENSION)

Qult up= Ultimate Skin friction

Qsafe up= Qult/FOS

Density of Concrete	24	kN/m ³
Qult=	831	kN
Qsafe Up	277	kN
Volume of Pile	3.5	m ³
Weight of Pile	85	kN
Pile weight under Buoyant Condition	49	kN

Safe up capacity = Qsafe+Pile weight in buoyant condition

= 326 kN

Safe Uplift Capacity from soil 28 Tones

Safe uplift capacity from soil + Pile weight 33 Tones

Lateral Pile Capacity Calculation

Project Title : Proposed Commercial Building (1 Basement+G+4 Upper Floors)
Site : Ann Nagar
BH: BH-1 to BH-2

Date: Nov /08/2019
Prep By: Peram

As Per IS-2911(Part-1/Sec-2):2010

$$\text{Deflection, } y = \frac{H(e + Z_f)^3}{3EI} \times 10^3 \quad \dots \text{for free head pile}$$

$$\text{Deflection, } y = \frac{H(e + Z_f)^3}{12EI} \times 10^3 \quad \dots \text{for fixed head pile}$$

Input

Soil		Medium sand (Submerged)	For CLAY	Stiffness factor R , in $m = \sqrt[4]{\frac{EI}{KB}}$
Diameter of Pile	=	600 mm	$k_1 = 12.6 \text{ MN/m}^2$	$L_1/R = 0$
Length of Pile Below FGL, (L)	=	12.5 m	$K = 4.2 \text{ MN/m}^3$	$L_f/R \text{ (Free Head)} = 1.9$
Length of Pile Above FGL, ($L_1=e$)	=	0 m	$R = 2.82 \text{ m}$	$L_f/R \text{ (Fixed Head)} = 2.2$
Grade of Concrete	=	25	For SAND	Stiffness factor T , in $m = \sqrt[3]{\frac{EI}{\eta_h}}$
Allowable Deflection, (y)	=	5 mm	$\eta_h = \text{MN/m}^3$	$L_f/T \text{ (Free Head)} = 1.9$
Young's modulus of pile material, (E)	=	25000.00 MN/m^2	$T = \text{\#DIV/0! m}$	$L_f/T \text{ (Fixed Head)} = 2.2$
Moment Inertia of the Pile Cross section (I)	=	0.0064 m^4	$L_1/T = \text{\#DIV/0!}$	

Output for CLAY Soil

Z_f (Free Head) / Depth of Fixity = 5.36 m
 Z_f (Fixed Head) / Depth of Fixity = 6.20 m

Result

Lateral Load Free Head = 1.55 Tones
Lateral Load Fixed Head = 4.00 Tones

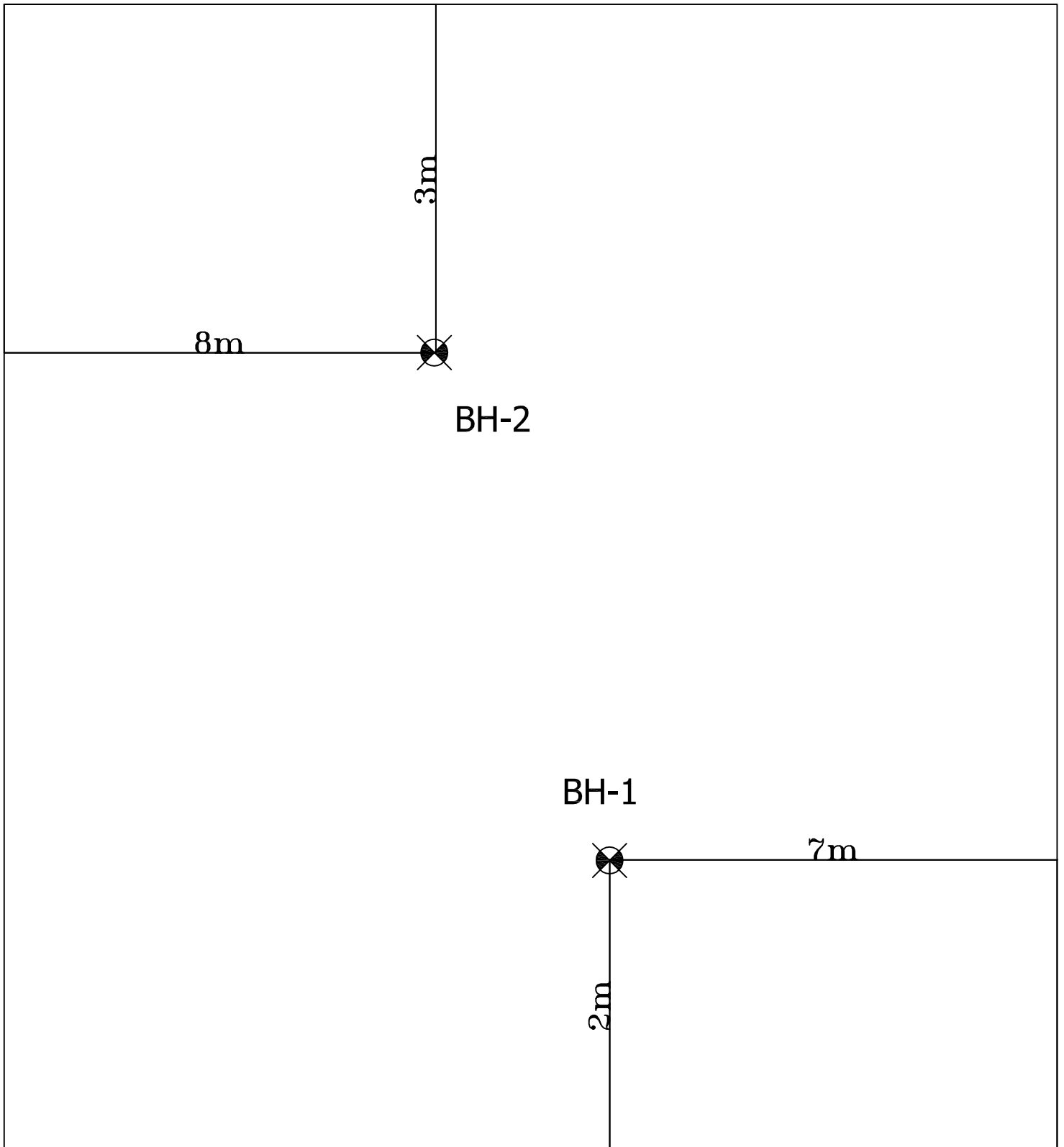
Output for SANDY Soil

Z_f (Free Head) / Depth of Fixity = #DIV/0! m
 Z_f (Fixed Head) / Depth of Fixity = #DIV/0! m

Result

Lateral Load Free Head = ##### Tones
Lateral Load Fixed Head = ##### Tones

ANNA NAGAR ROUNDANA TO THIRUMANGALAM



TITLE: DRAWING SHOWING THE SOIL INVESTIGATION BORE HOLE LOCATIONS

PROJECT: PROPOSED CONSTRUCTION OF COMMERCIAL BUILDING (PARTLY BASEMENT+G+4)
AT ANNA NAGAR.

LEGEND:

BH: BORE HOLE	SOIL TEST LOCATION	SCALE: N T S
ACTIVITY	EXECUTED BY	DATE STARTED
FOREMEN	SURESH	01-11-2019
DRAFTING	G JEGAN	01-11-2019



MARS SYNERGY GEOTECH Pvt Ltd
(An ISO 9001: 2015 Certified Company)
Engineering Survey & Soil Investigation
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DRAWING NO: MSGTPL/SI-4513/19-20

Page No.6

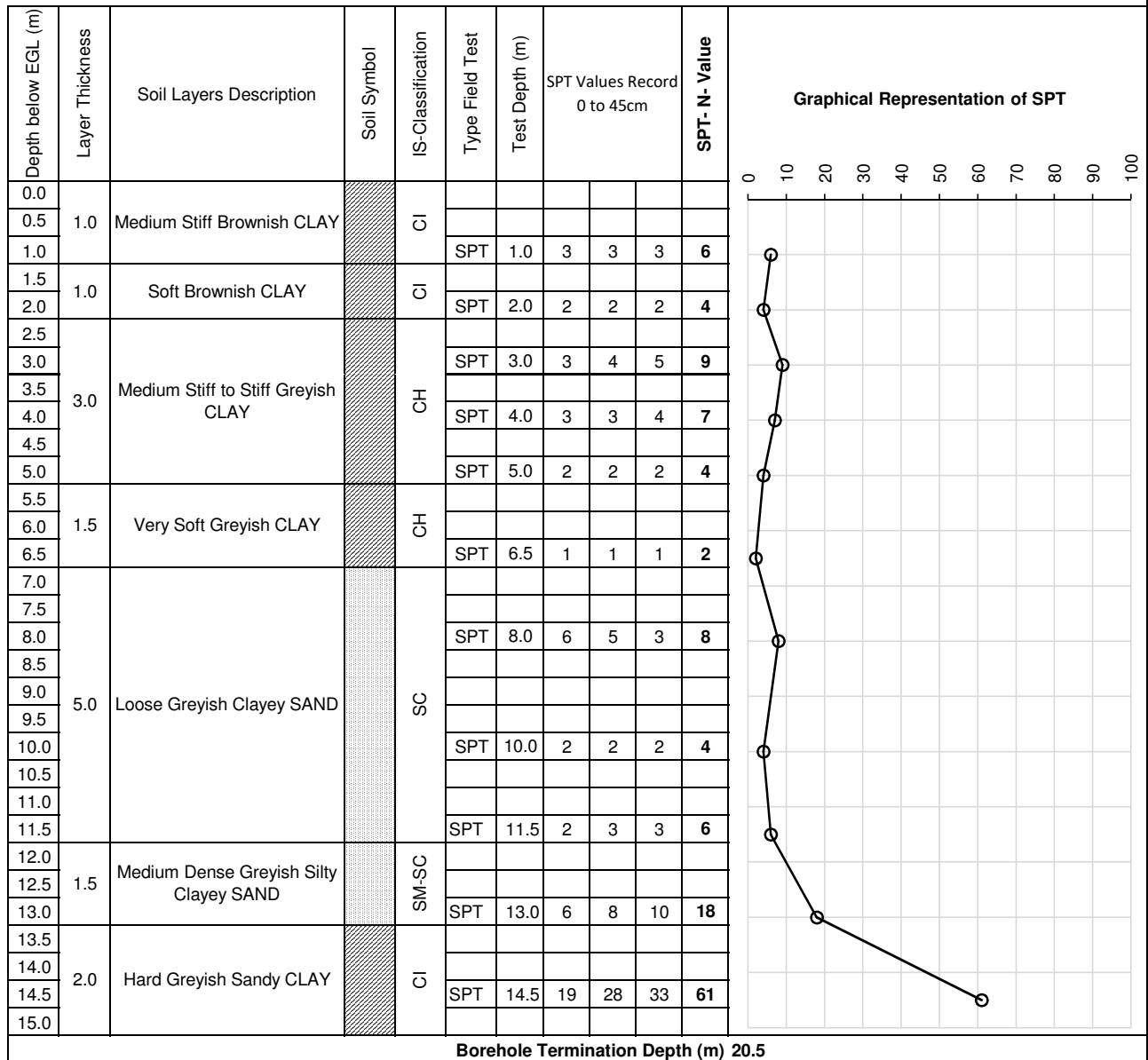
BOREHOLE LOG

Project No: MSGTPL/SI-4513/19-20

Project: Proposed Construction of (Partly Basement+G+4) Commercial Building

Location	Anna Nagar
Ground R.L	Nil
Drilling	Rotary

Borehole No	BH-1	
G.W.T (m)	(-) 2.0m	
Date of Start	1-Nov-2019	
Date of Complete	2-Nov-2019	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	20.50	1 of 2



EGL- Existing Ground Level
 R.L- Reduced Level
 GWT- Ground Water Table

SPT- Standard Penetration Test
 UDS- Undisturbed Sample
 VST- Vane Shear Test

DS- Disturbed Sample
 CR- Core Recovery
 RQD- Rock Quality Designation

BOREHOLE LOG

Project No: MSGTPL/SI-4513/19-20

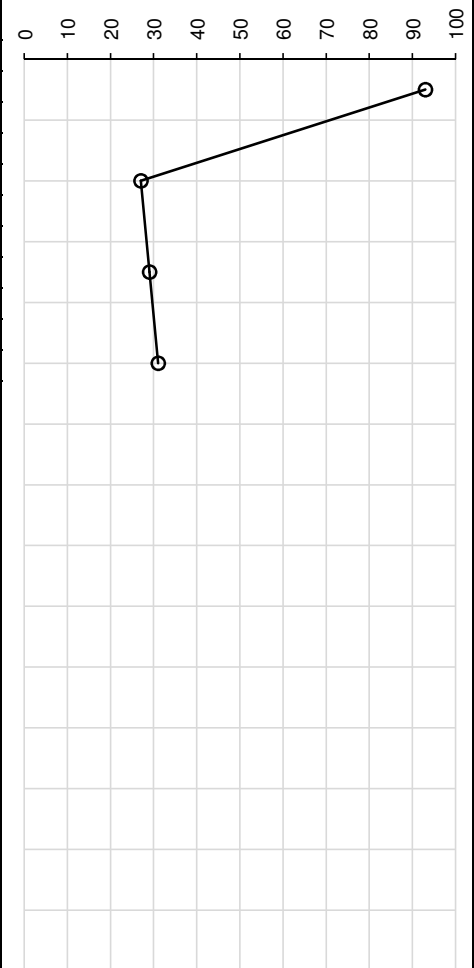
Project: Proposed Construction of (Partly Basement+G+4) Commercial Building

Location	Anna Nagar
Ground R.L	Nil
Drilling	Rotary

Borehole No	BH-1	
G.W.T (m)	(-) 2.0m	
Date of Start	1-Nov-2019	
Date of Complete	2-Nov-2019	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	20.50	2 of 2

Depth below EGL (m)	Layer Thickness	Soil Layers Description	Soil Symbol	IS-Classification	Type Field Test	Test Depth (m)	SPT Values Record 0 to 45cm				SPT- N- Value
15.5	1.0	Hard Greyish Sandy CLAY		CI							
16.0					SPT	16.0	25	41	52	93	
16.5	1.5	Very Stiff Brownish & Light Greyish CLAY		CH							
17.0											
17.5					SPT	17.5	10	12	15	27	
18.0	3.0	Very Stiff to Hard Light Greyish Sandy CLAY		CI							
18.5											
19.0					SPT	19.0	8	12	17	29	
19.5											
20.0											
20.5					SPT	20.5	10	15	16	31	
21.0											
21.5											
22.0											
22.5											
23.0											
23.5											
24.0											
24.5											
25.0											
25.5											
26.0											
26.5											
27.0											
27.5											
28.0											
28.5											
29.0											
29.5											
30.0											

Graphical Representation of SPT



Borehole Termination Depth (m) 20.5

EGL- Existing Ground Level
 R.L- Reduced Level
 GWT- Ground Water Table

SPT- Standard Penetration Test
 UDS- Undisturbed Sample
 VST- Vane Shear Test

DS- Disturbed Sample
 CR- Core Recovery
 RQD- Rock Quality Designation

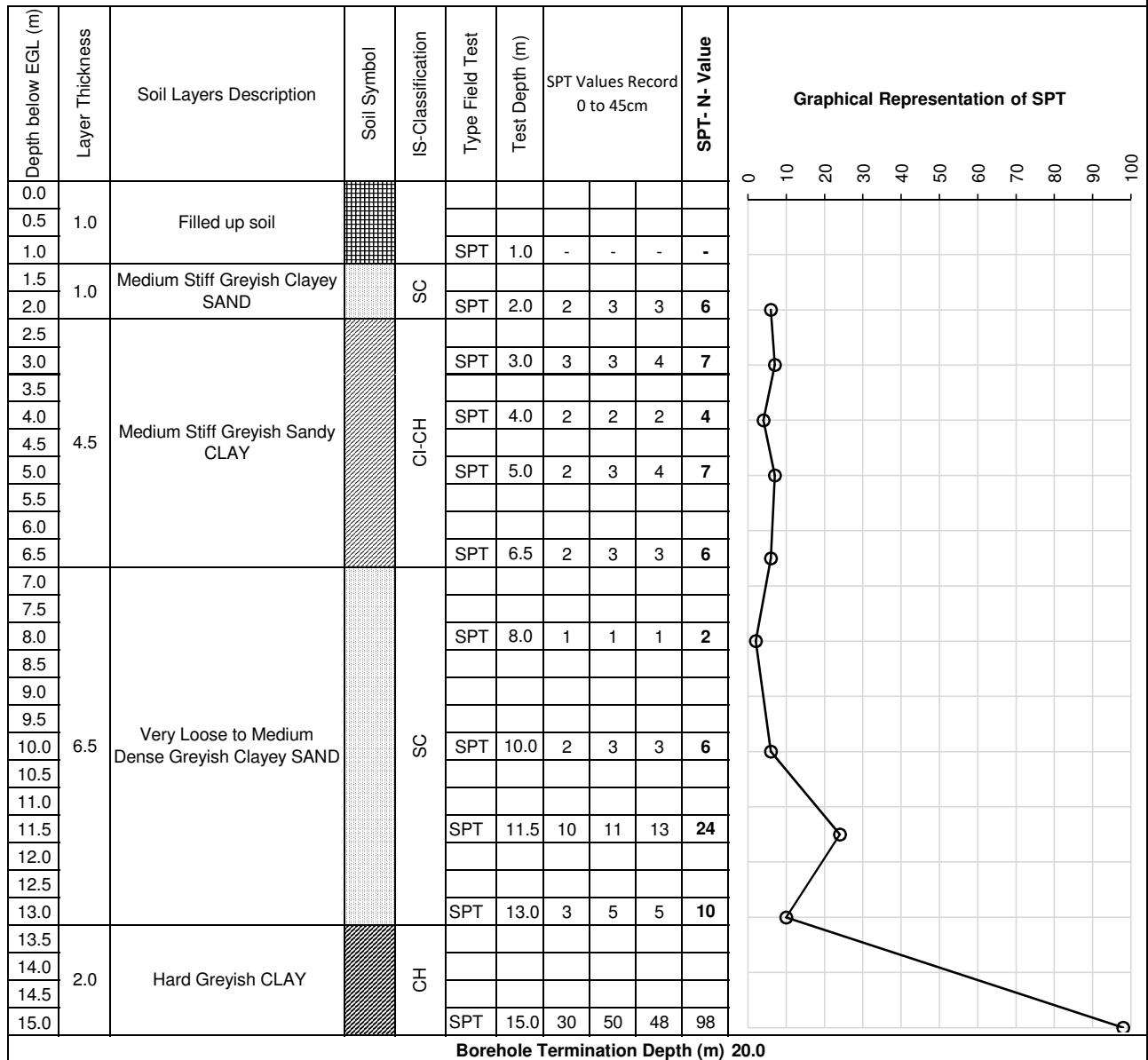
BOREHOLE LOG

Project No: MSGTPL/SI-4513/19-20

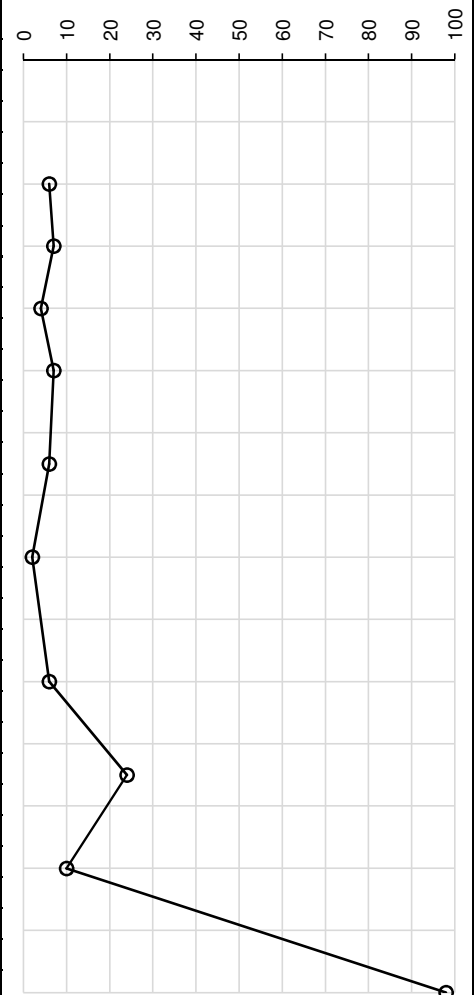
Project: Proposed Construction of (Partly Basement+G+4) Commercial Building

Location	Anna Nagar
Ground R.L	Nil
Drilling	Rotary

Borehole No	BH-2
G.W.T (m)	(-) 2.0m
Date of Start	2-Nov-2019
Date of Complete	2-Nov-2019
Dia of Bore (mm)	100
Termination Depth (m)	20.00
	Sheet 1 of 2



Graphical Representation of SPT



EGL- Existing Ground Level
 R.L- Reduced Level
 GWT- Ground Water Table

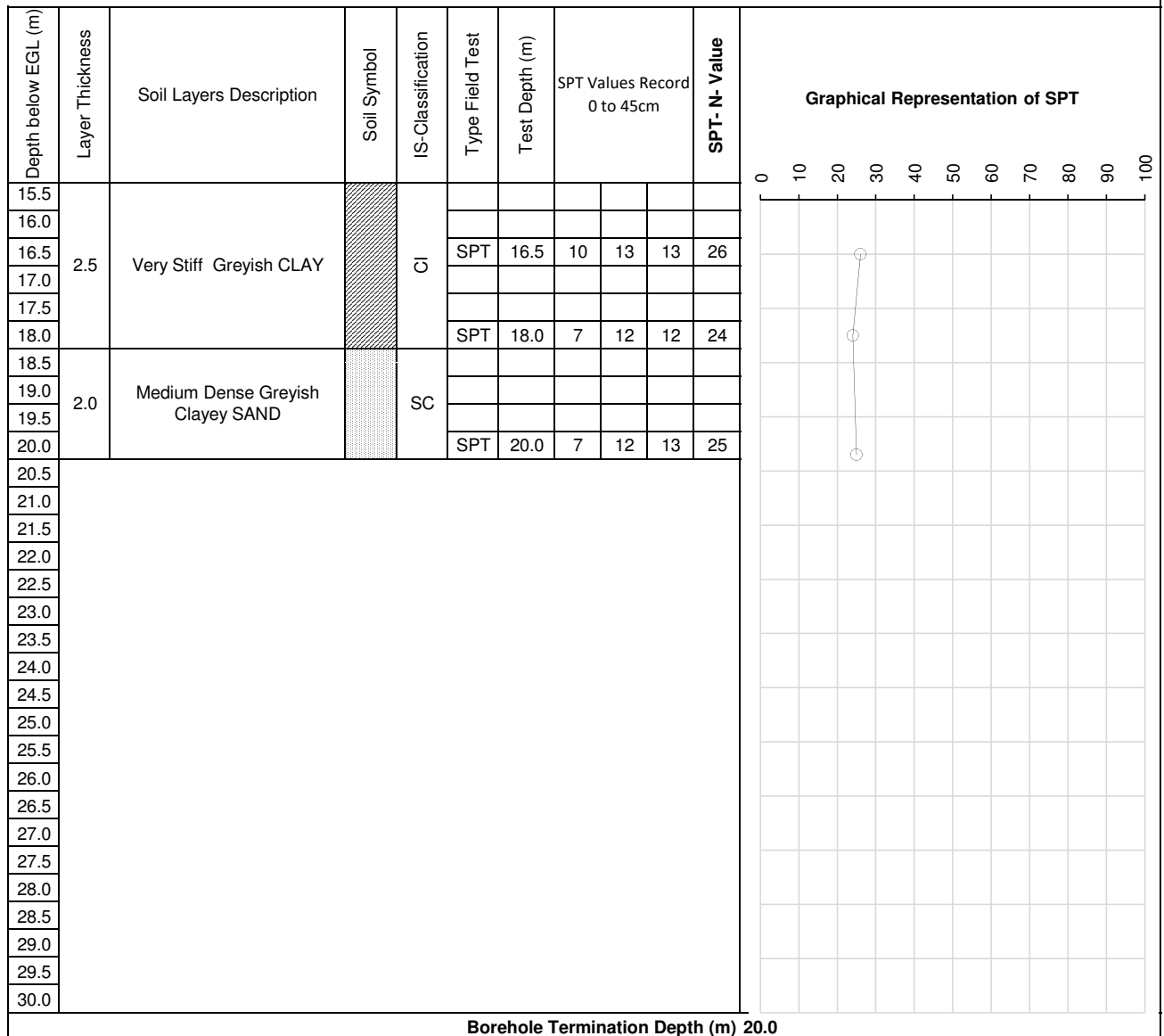
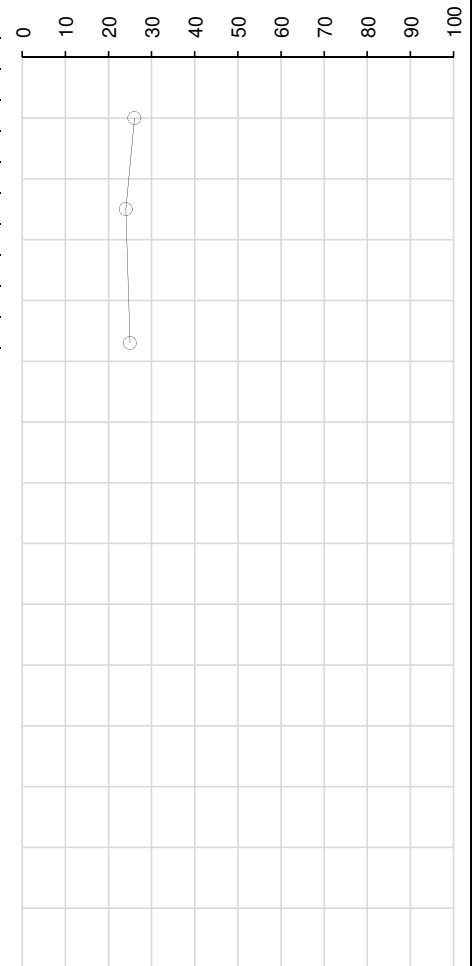
SPT- Standard Penetration Test
 UDS- Undisturbed Sample
 VST- Vane Shear Test

DS- Disturbed Sample
 CR- Core Recovery
 RQD- Rock Quality Designation

BOREHOLE LOG**Project No:** MSGTPL/SI-4513/19-20**Project:** Proposed Construction of (Partly Basement+G+4) Commercial Building

Location	Anna Nagar
Ground R.L	Nil
Drilling	Rotary

Borehole No	BH-2	
G.W.T (m)	(-) 2.0m	
Date of Start	2-Nov-2019	
Date of Complete	3-Nov-2019	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	20.00	2 of 2

**Graphical Representation of SPT**

EGL- Existing Ground Level

R.L- Reduced Level

GWT- Ground Water Table

SPT- Standard Penetration Test

UDS- Undisturbed Sample

VST- Vane Shear Test

DS- Disturbed Sample

CR- Core Recovery

RQD- Rock Quality Designation

Project No: MSGTPL/SI-4513/19-20																
Project : Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar																
BH No		1			Ground Water Level:(-)2.0m							Termination Depth:20.5m				
SUMMARY OF TEST RESULTS																
N' Value	Layer Thickness	Depth (m)	Soil Description	IS Classification	Index Properties (%)						Specific Gravity	Grain Size Analysis (%)				
					NMC	W _L	W _P	I _p	I _c	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay
	1.00	0.00	Medium Stiff Brownish CLAY	CI												
6		1.00			20	36	16	20		10.00	2.60					
	1.00		Soft Brownish CLAY	CI												
4		2.00			27	49	16	33		16.67						
9	3.00	3.00	Medium Stiff to Stiff Greyish CLAY	CH	30	63	26	38		54.55	2.60					
7		4.00			36	72	25	47		33.33						
4		5.00			30	61	25	36			2.60					
2	1.50	6.50	Very Soft Greyish CLAY	CH	49	54	22	32		66.67						
8	5.00	8.00	Loose Greyish Clayey SAND	SC	19						2.64	0	0	5	76	19
4		10.00			15							0	0	8	60	32
6		11.50			16						2.61	0	0	8	57	35
18	1.50	13.00	Medium Dense Greyish Silty Clayey SAND	SM-SC	21							0	0	2	47	51
61	3.00	14.50	Hard Greyish Sandy CLAY	CI	25						2.59	0	1	9	40	50
93		16.00			24							1	0	6	35	58
27	1.50	17.50	Very Stiff Brownish & Light Greyish CLAY	CH	32	51	19	32			2.60					
29	3.00	19.00	Very Stiff to Hard Light Greyish Sandy CLAY	CI	14	43	17	26				1	1	14	33	51
31		20.50			16						2.60	4	1	5	40	50

Project No: MSGTPL/SI-4513/19-20																
Project : Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar																
BH No		2		Ground Water Level:(-)2.0m						Termination Depth:20.0m						
SUMMARY OF TEST RESULTS																
N' Value	Layer Thickness	Depth (m)	Soil Description	IS Classification	Index Properties (%)						Specific Gravity	Grain Size Analysis (%)				
					NMC	W _L	W _P	I _p	I _c	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay
	1.00	0.00	Filled up soil													
		1.00														
	1.00		Medium Stiff Greyish Clayey SAND	SC												
6		2.00			21	37	17	20		33.33	2.60	0	0	1	40	59
7	4.50	3.00	Medium Stiff Greyish Sandy CLAY	CI-CH	27	46	19	27		60.00						
4		4.00			28	47	19	29		55.56	2.61					
7		5.00			31	66	26	40		45.45						
6		6.50			39	69	28	42		65.22	2.60					
2	6.50	8.00	Very Loose to Medium Dense Greyish Clayey SAND	SC	25							0	0	8	68	24
6		10.00			19					2.62	0	0	8	56	36	
24		11.50			13						0	0	36	39	25	
10		13.00			21					2.59	0	0	2	51	47	
98	2.00	15.00	Hard Greyish CLAY	CH	23	51	20	30				0	0	13	31	56
26	3.00	16.50	Very Stiff Greyish CLAY	CI	32	44	16	27			2.61					
24		18.00			34	51	21	30								
25	2.00	20.00	Medium Dense Greyish Clayey SAND	SC	16						2.62	5	1	17	35	42

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	1		1		1		1		1		1	
Depth (m)	1.0		2.0		3.0		4.0		5.0		6.5	
Tare No	37	200	179	270	161	208	89	192	35	132	191	98
Wt of Tare (gr)	29.38	29.03	27.50	32.64	29.40	29.07	29.41	30.34	30.78	30.15	30.13	29.84
Tare + Soil (gr)	56.85	65.69	59.22	68.48	61.47	56.82	58.57	54.91	55.92	63.46	51.57	53.98
Tare+Dry soil (gr)	52.26	59.70	52.61	60.90	54.10	50.44	50.74	48.41	50.25	55.78	44.50	46.07
Wt of Water (gr)	4.59	5.99	6.61	7.58	7.37	6.38	7.83	6.50	5.67	7.68	7.07	7.91
Wt Dry soil (gr)	22.88	30.67	25.11	28.26	24.70	21.37	21.33	18.07	19.47	25.63	14.37	16.23
Water Content (%)	20.06	19.53	26.32	26.82	29.84	29.85	36.71	35.97	29.12	29.96	49.20	48.74
Average Water Content (%)	20		27		30		36		30		49	

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	1		1		1		1		1		1	
Depth (m)	8.0		10.0		11.5		13.0		14.5		16.0	
Tare No	290	20	90	85	62	243	53	38	139	127	42	8
Wt of Tare (gr)	28.89	29.56	29.41	31.54	29.54	30.33	30.58	29.27	29.78	29.61	30.29	28.89
Tare + Soil (gr)	58.92	62.82	64.37	61.19	60.55	65.05	58.47	60.62	61.55	58.37	62.18	60.28
Tare+Dry soil (gr)	54.16	57.46	59.69	57.26	56.11	60.26	53.67	55.06	55.33	52.64	55.92	54.13
Wt of Water (gr)	4.76	5.36	4.68	3.93	4.44	4.79	4.80	5.56	6.22	5.73	6.26	6.15
Wt Dry soil (gr)	25.27	27.90	30.28	25.72	26.57	29.93	23.09	25.79	25.55	23.03	25.63	25.24
Water Content (%)	18.84	19.21	15.46	15.28	16.71	16.00	20.79	21.56	24.34	24.88	24.42	24.37
Average Water Content (%)	19		15		16		21		25		24	

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	1		1		1		2		2		2	
Depth (m)	17.5		19.0		20.5		2.0		3.0		4.0	
Tare No	4	248	69	210	203	39	166	240	172	124	199	72
Wt of Tare (gr)	29.52	28.75	29.41	30.32	29.21	28.50	28.99	28.82	29.06	29.26	29.80	29.36
Tare + Soil (gr)	56.08	54.65	58.55	58.00	63.26	54.92	55.41	54.28	54.27	55.88	44.90	50.31
Tare+Dry soil (gr)	49.65	48.50	55.04	54.74	58.33	51.46	50.88	49.85	48.93	50.35	41.55	45.67
Wt of Water (gr)	6.43	6.15	3.51	3.26	4.93	3.46	4.53	4.43	5.34	5.53	3.35	4.64
Wt Dry soil (gr)	20.13	19.75	25.63	24.42	29.12	22.96	21.89	21.03	19.87	21.09	11.75	16.31
Water Content (%)	31.94	31.14	13.69	13.35	16.93	15.07	20.69	21.07	26.87	26.22	28.51	28.45
Average Water Content (%)	32		14		16		21		27		28	

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	2		2		2		2		2		2	
Depth (m)	5.0		6.5		8.0		10.0		11.5		13.0	
Tare No	279	230	282	211	146	244	25	19	118	63	272	67
Wt of Tare (gr)	29.62	28.39	29.45	30.10	28.70	29.97	30.41	29.41	29.57	29.97	30.82	32.06
Tare + Soil (gr)	54.52	55.10	53.13	53.83	58.97	64.52	61.06	62.23	57.54	59.98	63.99	63.17
Tare+Dry soil (gr)	48.59	48.75	46.39	47.15	53.07	57.64	56.16	56.93	54.25	56.54	58.34	57.74
Wt of Water (gr)	5.93	6.35	6.74	6.68	5.90	6.88	4.90	5.30	3.29	3.44	5.65	5.43
Wt Dry soil (gr)	18.97	20.36	16.94	17.05	24.37	27.67	25.75	27.52	24.68	26.57	27.52	25.68
Water Content (%)	31.26	31.19	39.79	39.18	24.21	24.86	19.03	19.26	13.33	12.95	20.53	21.14
Average Water Content (%)	31		39		25		19		13		21	

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	2		2		2		2					
Depth (m)	15.0		16.5		18.0		20.0					
Tare No	149	160	2	130	122	12	13	78				
Wt of Tare (gr)	29.97	29.96	30.97	28.84	27.91	29.79	29.51	28.61				
Tare + Soil (gr)	56.29	57.14	55.15	59.47	58.28	54.48	55.51	59.95				
Tare+Dry soil (gr)	51.26	52.00	49.29	52.15	50.51	48.20	51.96	55.80				
Wt of Water (gr)	5.03	5.14	5.86	7.32	7.77	6.28	3.55	4.15				
Wt Dry soil (gr)	21.29	22.04	18.32	23.31	22.60	18.41	22.45	27.19				
Water Content (%)	23.63	23.32	31.99	31.40	34.38	34.11	15.81	15.26				
Average Water Content (%)	23		32		34		16					

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	1			
Depth(m)	1.0			
Pycnometer number			49	72
Weight of bottle	w_1	g	34.5200	34.0600
Weight of bottle + soil	w_2	g	46.6700	45.7000
Weight of bottle + soil + water	w_3	g	93.1700	95.0200
Weight of bottle full of water	w_4	g	85.6900	87.8500
Weight of soil	w_2-w_1	g	12.1500	11.6400
Specific gravity	$\frac{w_2-w_1}{(w_4-w_1)-(w_3-w_2)}$		2.60171	2.60403
Average value G_s			2.60	

BH.No	1			
Depth(m)	3.0			
Pycnometer number			46	12
Weight of bottle	w_1	g	32.7200	34.4500
Weight of bottle + soil	w_2	g	44.1400	46.4800
Weight of bottle + soil + water	w_3	g	94.8200	94.0900
Weight of bottle full of water	w_4	g	87.8000	86.6900
Weight of soil	w_2-w_1	g	11.4200	12.0300
Specific gravity	$\frac{w_2-w_1}{(w_4-w_1)-(w_3-w_2)}$		2.59545	2.59827
Average value G_s			2.60	

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	1				
Depth(m)	5.0				
Pycnometer number				5	44
Weight of bottle	w_1	g	28.5300	33.3500	
Weight of bottle + soil	w_2	g	38.4000	45.3800	
Weight of bottle + soil + water	w_3	g	85.5700	95.1200	
Weight of bottle full of water	w_4	g	79.5000	87.7200	
Weight of soil	w_2-w_1	g	9.8700	12.0300	
Specific gravity	w_2-w_1		2.59737	2.59827	
	$(w_4-w_1)-(w_3-w_2)$				
Average value G_s			2.60		

BH.No	1			
Depth(m)	8.0			
Pycnometer number			27	37
Weight of bottle	w_1	g	35.1400	34.0900
Weight of bottle + soil	w_2	g	50.1300	50.3100
Weight of bottle + soil + water	w_3	g	96.9400	96.9600
Weight of bottle full of water	w_4	g	87.6300	86.8900
Weight of soil	w_2-w_1	g	14.9900	16.2200
Specific gravity	w_2-w_1		2.63908	2.63740
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.64	

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	1			
Depth(m)	11.5			
Pycnometer number			69	51
Weight of bottle	w_1	g	34.9400	34.5600
Weight of bottle + soil	w_2	g	50.7700	50.7900
Weight of bottle + soil + water	w_3	g	96.5100	94.6000
Weight of bottle full of water	w_4	g	86.7400	84.5700
Weight of soil	w_2-w_1	g	15.8300	16.2300
Specific gravity	w_2-w_1		2.61221	2.61774
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.61	

BH.No	1			
Depth(m)	14.5			
Pycnometer number			23	68
Weight of bottle	w_1	g	28.6600	36.6200
Weight of bottle + soil	w_2	g	42.9900	49.4400
Weight of bottle + soil + water	w_3	g	88.7500	95.7300
Weight of bottle full of water	w_4	g	79.9500	87.8500
Weight of soil	w_2-w_1	g	14.3300	12.8200
Specific gravity	w_2-w_1		2.59132	2.59514
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.59	

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	1				
Depth(m)	17.5				
Pycnometer number				78	20
Weight of bottle	w_1	g	36.8700	31.2800	
Weight of bottle + soil	w_2	g	51.2300	43.8200	
Weight of bottle + soil + water	w_3	g	96.4100	88.6500	
Weight of bottle full of water	w_4	g	87.5600	80.9300	
Weight of soil	w_2-w_1	g	14.3600	12.5400	
Specific gravity	w_2-w_1		2.60617	2.60166	
	$(w_4-w_1)-(w_3-w_2)$				
Average value G_s			2.60		

BH.No	1				
Depth(m)	20.5				
Pycnometer number				11	50
Weight of bottle	w_1	g	35.2400	34.4400	
Weight of bottle + soil	w_2	g	47.9600	48.8800	
Weight of bottle + soil + water	w_3	g	95.9600	96.2600	
Weight of bottle full of water	w_4	g	88.1300	87.3600	
Weight of soil	w_2-w_1	g	12.7200	14.4400	
Specific gravity	w_2-w_1		2.60123	2.60650	
	$(w_4-w_1)-(w_3-w_2)$				
Average value G_s			2.60		

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	2			
Depth(m)	6.5			
Pycnometer number			4	71
Weight of bottle	w_1	g	35.0400	36.3400
Weight of bottle + soil	w_2	g	49.2300	46.5700
Weight of bottle + soil + water	w_3	g	96.2400	93.9100
Weight of bottle full of water	w_4	g	87.5200	87.6200
Weight of soil	w_2-w_1	g	14.1900	10.2300
Specific gravity	w_2-w_1		2.59415	2.59645
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.60	

BH.No	2			
Depth(m)	10.0			
Pycnometer number			14	41
Weight of bottle	w_1	g	35.5700	39.4200
Weight of bottle + soil	w_2	g	48.4200	50.2200
Weight of bottle + soil + water	w_3	g	95.7300	99.6900
Weight of bottle full of water	w_4	g	87.7900	93.0200
Weight of soil	w_2-w_1	g	12.8500	10.8000
Specific gravity	w_2-w_1		2.61711	2.61501
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.62	

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

BH.No	2			
Depth(m)	13.0			
Pycnometer number			82	86
Weight of bottle	w_1	g	33.2900	35.3400
Weight of bottle + soil	w_2	g	48.4000	49.5400
Weight of bottle + soil + water	w_3	g	95.4900	95.1500
Weight of bottle full of water	w_4	g	86.2100	86.4300
Weight of soil	w_2-w_1	g	15.1100	14.2000
Specific gravity	$\frac{w_2-w_1}{(w_4-w_1)-(w_3-w_2)}$		2.59177	2.59124
Average value G_s			2.59	

BH.No	2			
Depth(m)	16.5			
Pycnometer number			40	73
Weight of bottle	w_1	g	35.2100	37.0900
Weight of bottle + soil	w_2	g	47.2500	47.6800
Weight of bottle + soil + water	w_3	g	93.7800	95.3200
Weight of bottle full of water	w_4	g	86.3600	88.7900
Weight of soil	w_2-w_1	g	12.0400	10.5900
Specific gravity	w_2-w_1		2.60606	2.60837
	$(w_4-w_1)-(w_3-w_2)$			
Average value G_s			2.61	

**Project No:MSGTPL/SI-4513/19-20**

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

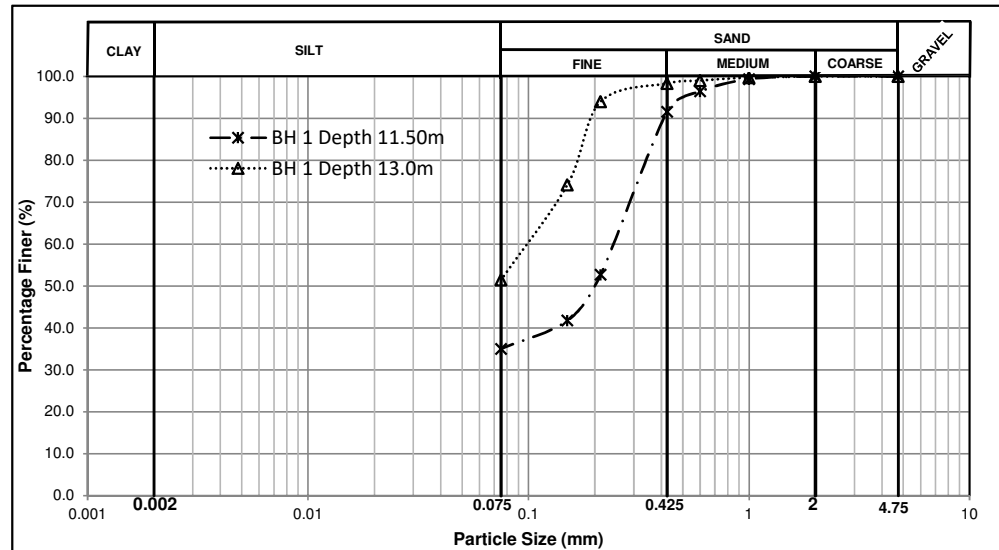
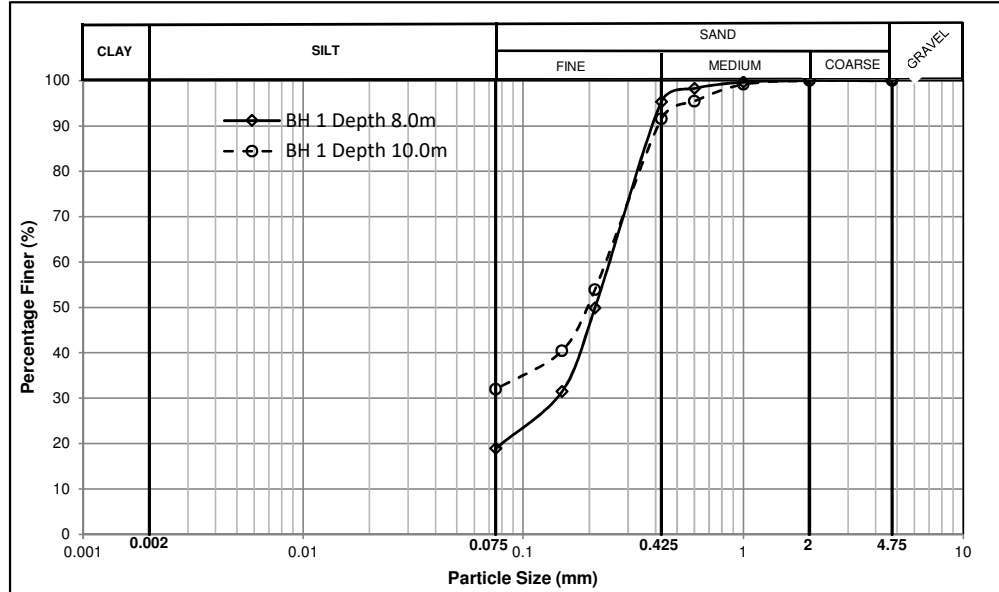
BH.No	2			
Depth(m)	20.0			
Pycnometer number			64	52
Weight of bottle	w_1	g	34.9300	35.5800
Weight of bottle + soil	w_2	g	48.5300	49.2500
Weight of bottle + soil + water	w_3	g	96.2100	95.2200
Weight of bottle full of water	w_4	g	87.8000	86.7500
Weight of soil	$w_2 - w_1$	g	13.6000	13.6700
Specific gravity	$\frac{w_2 - w_1}{(w_4 - w_1) - (w_3 - w_2)}$		2.62042	2.62885
Average value G_s			2.62	

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Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

GRAIN SIZE ANALYSIS

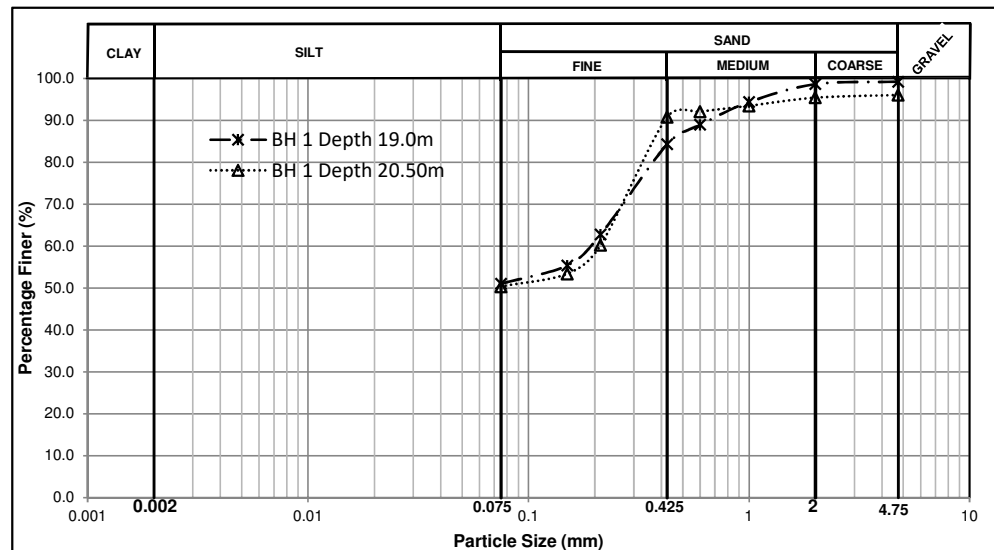
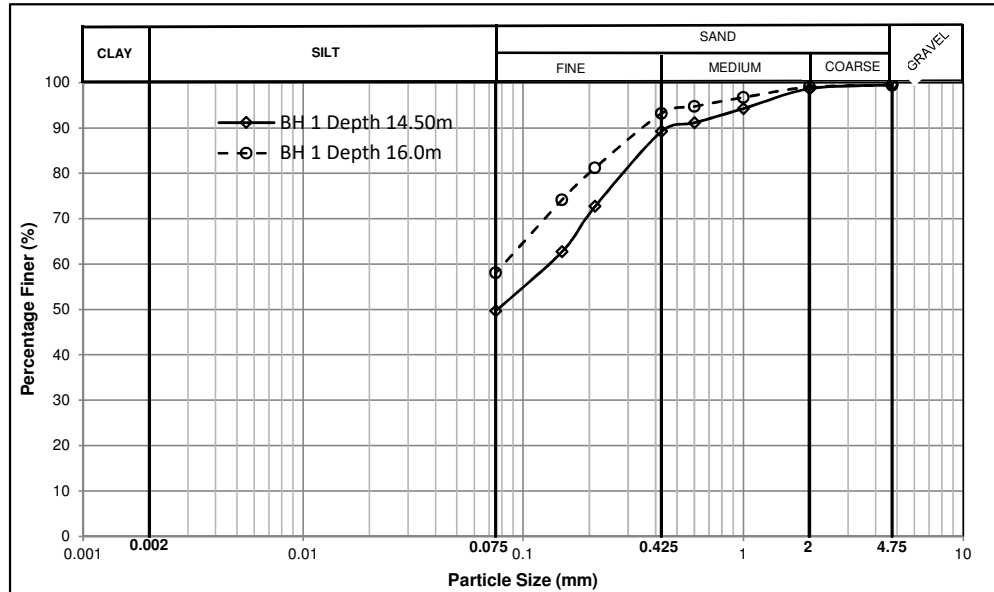


BH-No	Depth (m)	Gravel (%)	SAND (%)			SILT & CLAY (%)	D ₁₀ (mm)	D ₃₀ (mm)	D ₆₀ (mm)	Cu	Cc
			Coarse	Medium	Fine						
1	8.0m	0	0	5	76	19		0.141	0.259		
1	10.0m	0	0	8	60	32			0.246		
1	11.50m	0	0	8	57	35			0.111		
1	13.0m	0	0	2	47	51			0.103		

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

GRAIN SIZE ANALYSIS

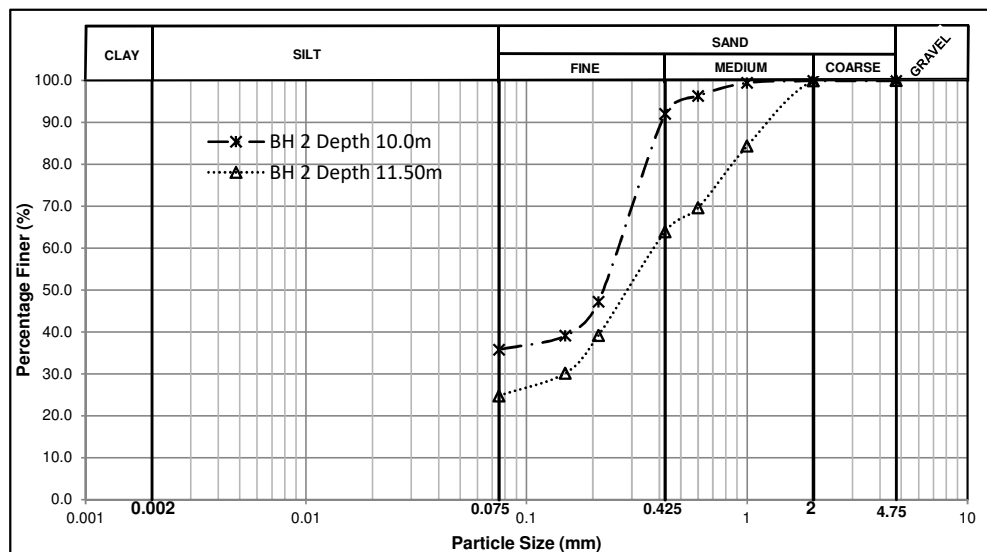
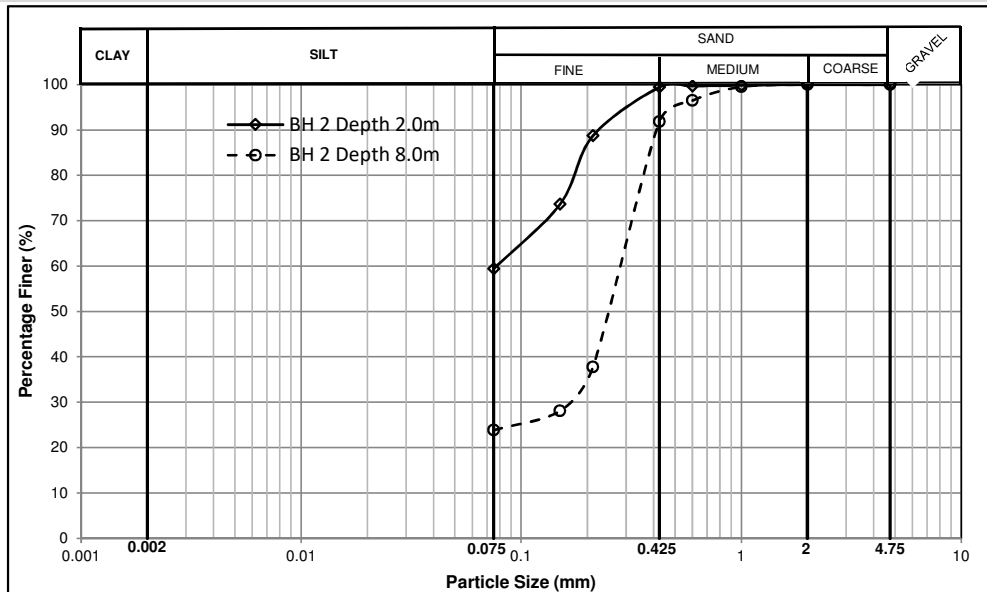


BH-No	Depth (m)	Gravel (%)	SAND (%)			SILT & CLAY (%)	D ₁₀ (mm)	D ₃₀ (mm)	D ₆₀ (mm)	Cu	Cc
			Coarse	Medium	Fine						
1	14.50m	0	1	9	40	50			0.134		
1	16.0m	1	0	6	35	58			0.084		
1	19.0m	1	1	14	33	51			0.144		
1	20.50m	4	1	5	40	50			0.210		

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

GRAIN SIZE ANALYSIS

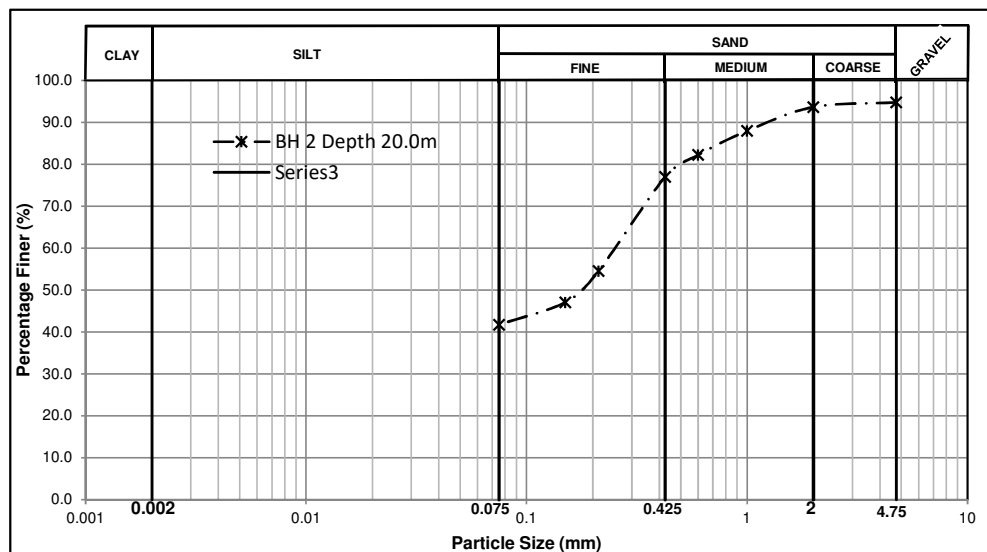
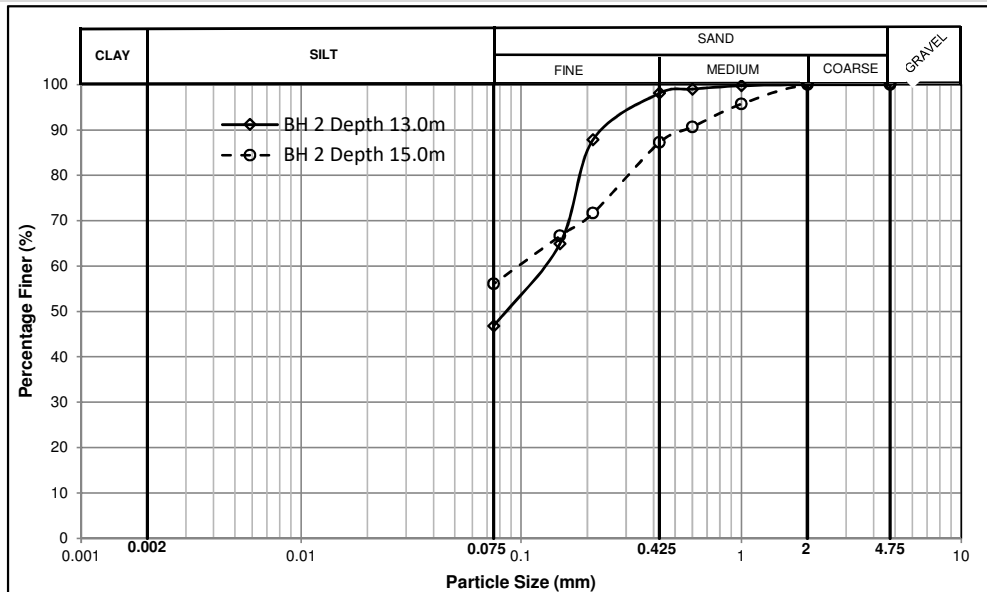


BH-No	Depth (m)	Gravel (%)	SAND (%)			SILT & CLAY (%)	D ₁₀ (mm)	D ₃₀ (mm)	D ₆₀ (mm)	Cu	Cc
			Coarse	Medium	Fine						
2	2.0m	0	0	1	40	59			0.078		
2	8.0m	0	0	8	68	24		0.162	0.300		
2	10.0m	0	0	8	56	36			-0.059		
2	11.50m	0	0	36	39	25		0.147	0.391		

Project No: MSGTPL/SI-4513/19-20

Project :Proposed Construction of (Partly Basement+G+4) Commercial Building at Anna Nagar

GRAIN SIZE ANALYSIS



BH-No	Depth (m)	Gravel (%)	SAND (%)			SILT & CLAY (%)	D ₁₀ (mm)	D ₃₀ (mm)	D ₆₀ (mm)	Cu	Cc
			Coarse	Medium	Fine						
2	13.0m	0	0	2	51	47			0.130		
2	15.0m	0	0	13	31	56			0.103		
2	20.0m	5	1	17	35	42			0.145		

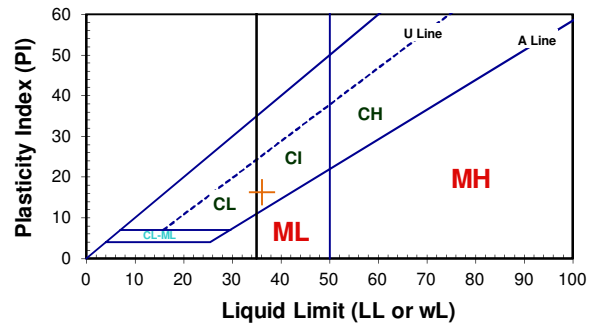
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	1.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	28	48					
Tare Number	---	---	20	13	118		12			
Weight of Empty Tare	M _C	(g)	29.56	29.51	29.57		29.79			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	50.35	49.69	43.57		51.92			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	44.72	44.34	39.94		48.82			
Weight of Soil	M _S	(g)	15.16	14.83	10.37		19.03			
Weight of Water	M _W	(g)	5.63	5.35	3.63		3.10			
Water Content	w	(%)	37.1	36.1	35.0		16.3			

Liquid Limit (LL or w_L) (%)	36
Plastic Limit (PL or w_P) (%)	16
Plasticity Index (PI) (%)	20
Soil Classification	CI



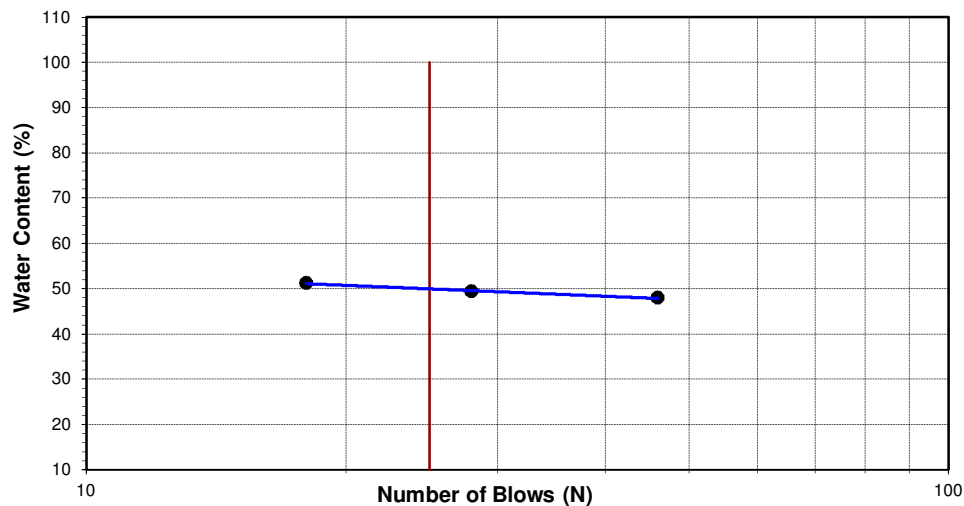
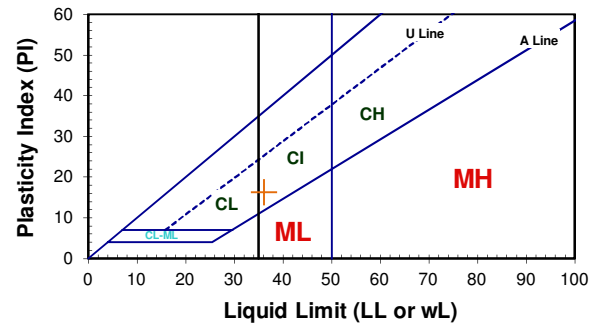
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	2.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	28	46					
Tare Number	---	---	210	184	64		272			
Weight of Empty Tare	M _C	(g)	30.32	28.77	29.15		30.82			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	56.75	49.53	53.47		49.73			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	47.80	42.67	45.59		47.12			
Weight of Soil	M _S	(g)	17.48	13.90	16.44		16.30			
Weight of Water	M _W	(g)	8.95	6.86	7.88		2.61			
Water Content	w	(%)	51.2	49.4	47.9		16.0			

Liquid Limit (LL or w_L) (%)	49
Plastic Limit (PL or w_P) (%)	16
Plasticity Index (PI) (%)	33
Soil Classification	CI



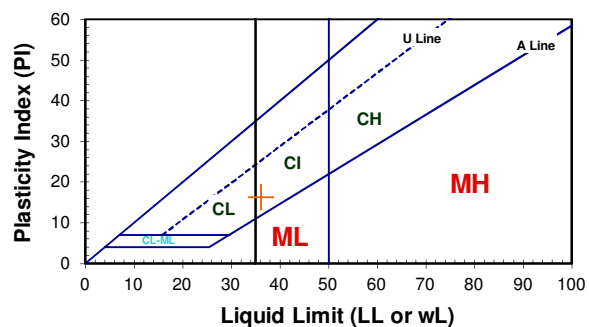
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	3.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	25	47					
Tare Number	---	---	166	161	191		98			
Weight of Empty Tare	M _C	(g)	28.99	29.4	30.13		29.84			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	52.03	52.6	54.53		47.18			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	42.89	43.61	45.33		43.64			
Weight of Soil	M _S	(g)	13.90	14.21	15.20		13.80			
Weight of Water	M _W	(g)	9.14	8.99	9.20		3.54			
Water Content	w	(%)	65.8	63.3	60.5		25.7			

Liquid Limit (LL or w_L) (%)	63
Plastic Limit (PL or w_P) (%)	26
Plasticity Index (PI) (%)	38
Soil Classification	CH



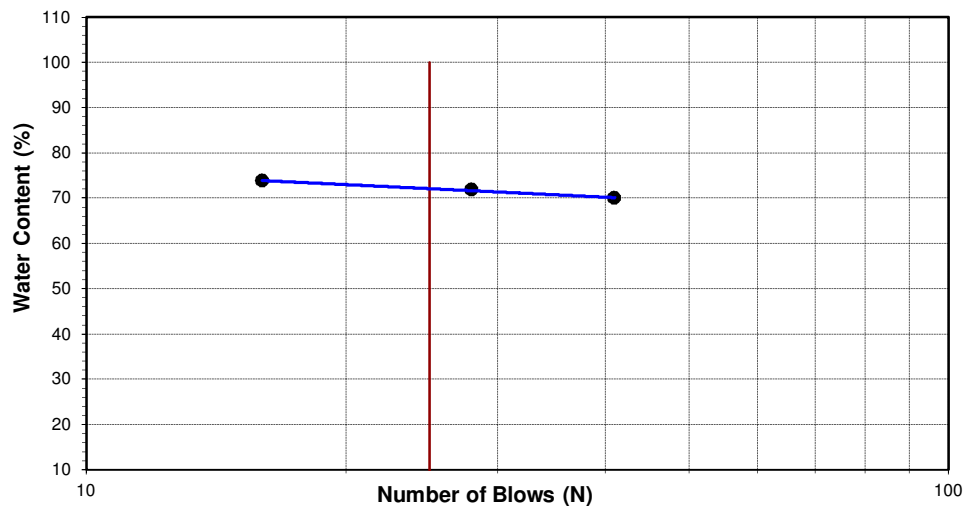
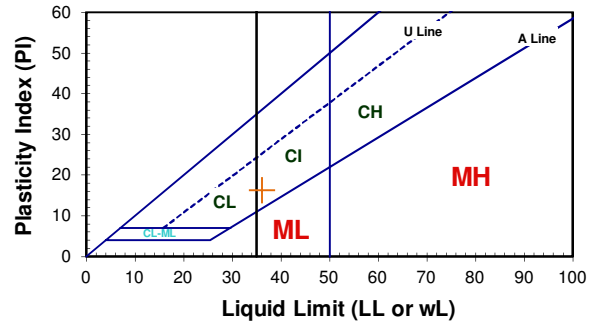
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	4.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	16	28	41					
Tare Number	---	---	85	2	8		37			
Weight of Empty Tare	M _C	(g)	31.54	30.97	28.89		29.38			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	51.42	46.32	43.03		47.36			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	42.98	39.90	37.21		43.73			
Weight of Soil	M _S	(g)	11.44	8.93	8.32		14.35			
Weight of Water	M _W	(g)	8.44	6.42	5.82		3.63			
Water Content	w	(%)	73.8	71.9	70.0		25.3			

Liquid Limit (LL or w_L) (%)	72
Plastic Limit (PL or w_P) (%)	25
Plasticity Index (PI) (%)	47
Soil Classification	CH



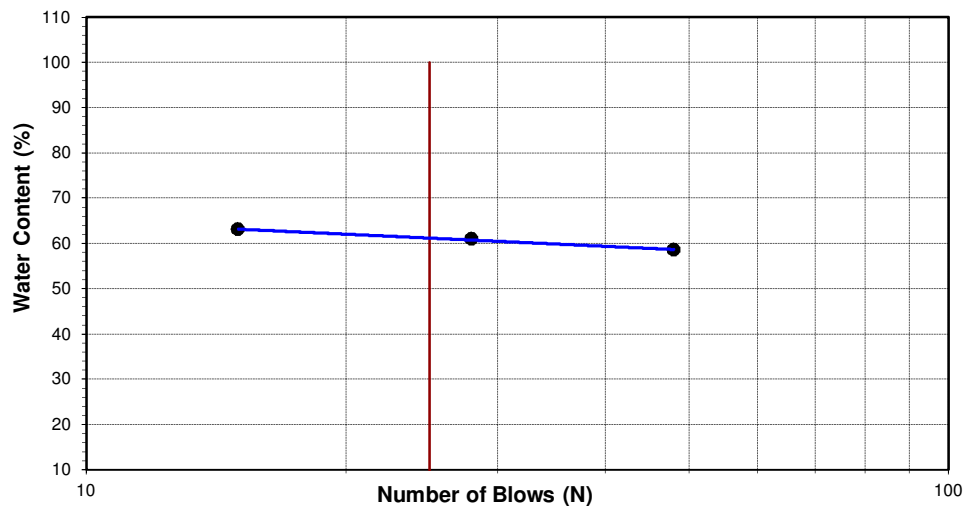
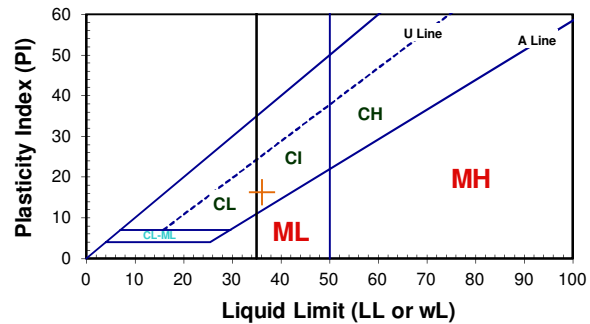
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	5.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	48					
Tare Number	---	---	43	29	270		91			
Weight of Empty Tare	M _C	(g)	30.86	29.78	32.64		29.68			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	60.93	53.72	44.12		44.74			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	49.30	44.66	39.88		41.76			
Weight of Soil	M _S	(g)	18.44	14.88	7.24		12.08			
Weight of Water	M _W	(g)	11.63	9.06	4.24		2.98			
Water Content	w	(%)	63.1	60.9	58.6		24.7			

Liquid Limit (LL or w_L) (%)	61
Plastic Limit (PL or w_P) (%)	25
Plasticity Index (PI) (%)	36
Soil Classification	CH



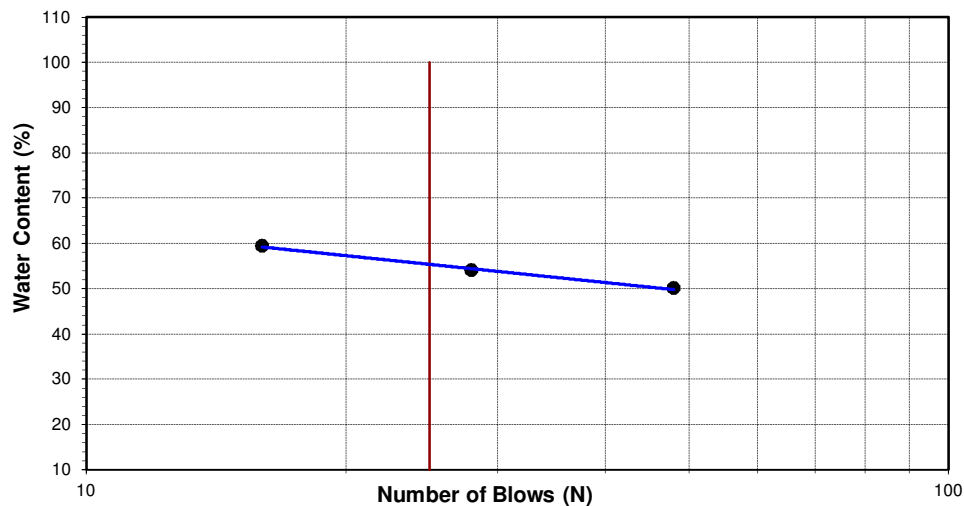
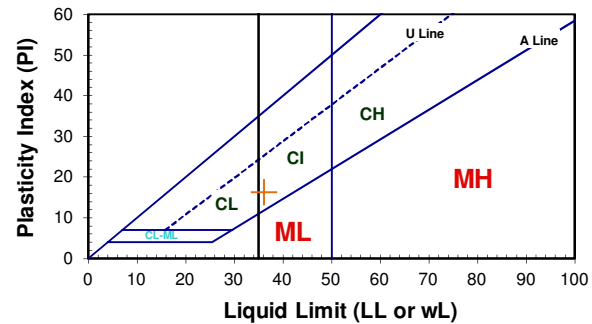
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	6.50m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	16	28	48					
Tare Number	---	---	251	262	170		140			
Weight of Empty Tare	M _C	(g)	29.2	31.51	30.49		27.99			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	48.36	43.29	42.73		42.46			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	41.22	39.16	38.65		39.85			
Weight of Soil	M _S	(g)	12.02	7.65	8.16		11.86			
Weight of Water	M _W	(g)	7.14	4.13	4.08		2.61			
Water Content	w	(%)	59.4	54.0	50.0		22.0			

Liquid Limit (LL or w_L) (%)	54
Plastic Limit (PL or w_P) (%)	22
Plasticity Index (PI) (%)	32
Soil Classification	CH



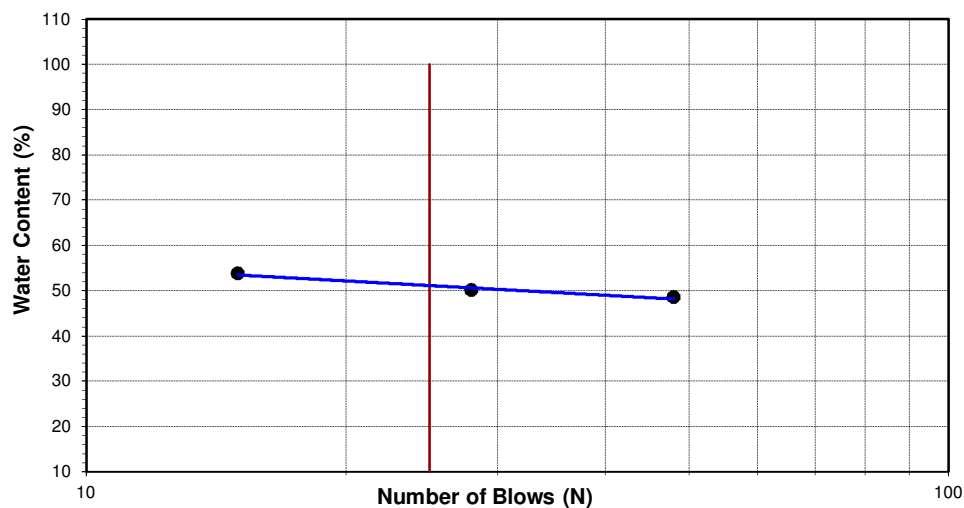
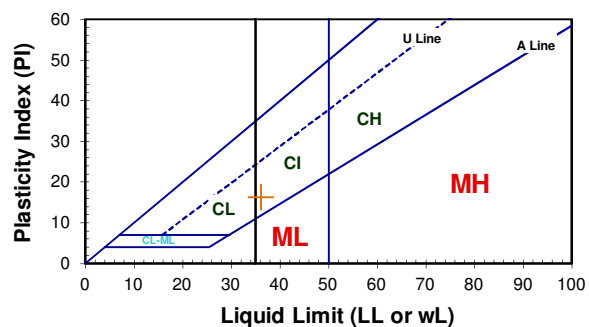
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Ana nagar
Boring No:	BH-1
Sample Depth:	17.50m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	48					
Tare Number	---	---	162	293	221		284			
Weight of Empty Tare	M _C	(g)	29.44	29.78	28.54		29.6			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	44.29	49.99	44.41		43.21			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	39.10	43.25	39.23		41.02			
Weight of Soil	M _S	(g)	9.66	13.47	10.69		11.42			
Weight of Water	M _W	(g)	5.19	6.74	5.18		2.19			
Water Content	w	(%)	53.7	50.0	48.5		19.2			

Liquid Limit (LL or w_L) (%)	51
Plastic Limit (PL or w_P) (%)	19
Plasticity Index (PI) (%)	32
Soil Classification	CH



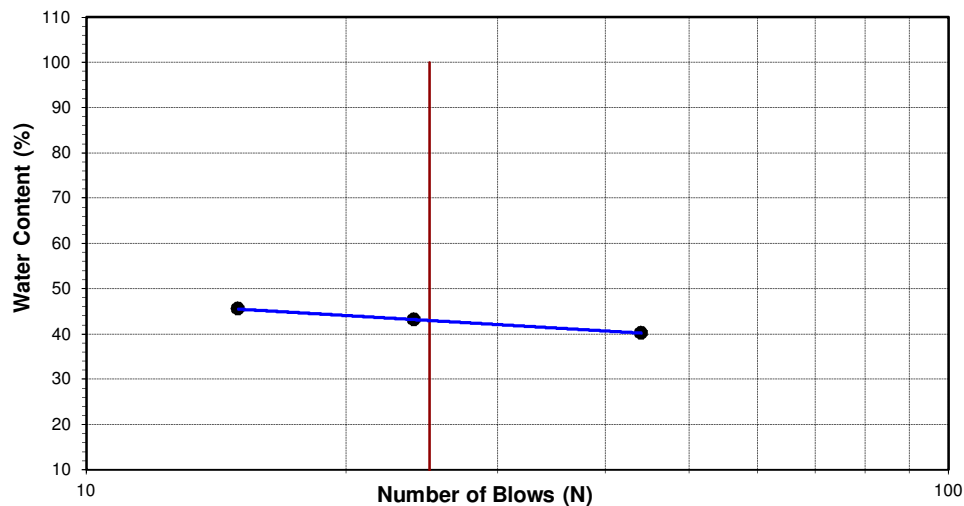
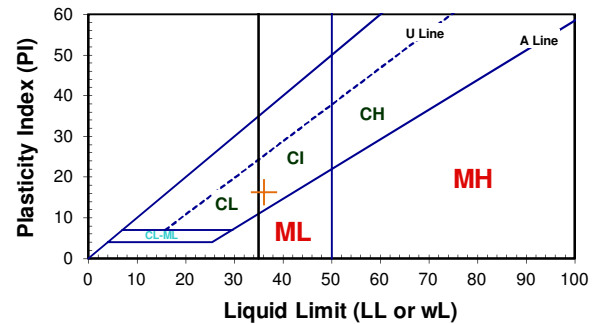
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-1
Sample Depth:	19.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	24	44					
Tare Number	---	---	89	160	4		179			
Weight of Empty Tare	M _C	(g)	29.41	29.96	29.52		27.5			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	52.37	45.69	42.39		50.93			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	45.19	40.95	38.70		47.6			
Weight of Soil	M _S	(g)	15.78	10.99	9.18		20.10			
Weight of Water	M _W	(g)	7.18	4.74	3.69		3.33			
Water Content	w	(%)	45.5	43.1	40.2		16.6			

Liquid Limit (LL or w_L) (%)	43
Plastic Limit (PL or w_P) (%)	17
Plasticity Index (PI) (%)	26
Soil Classification	CI



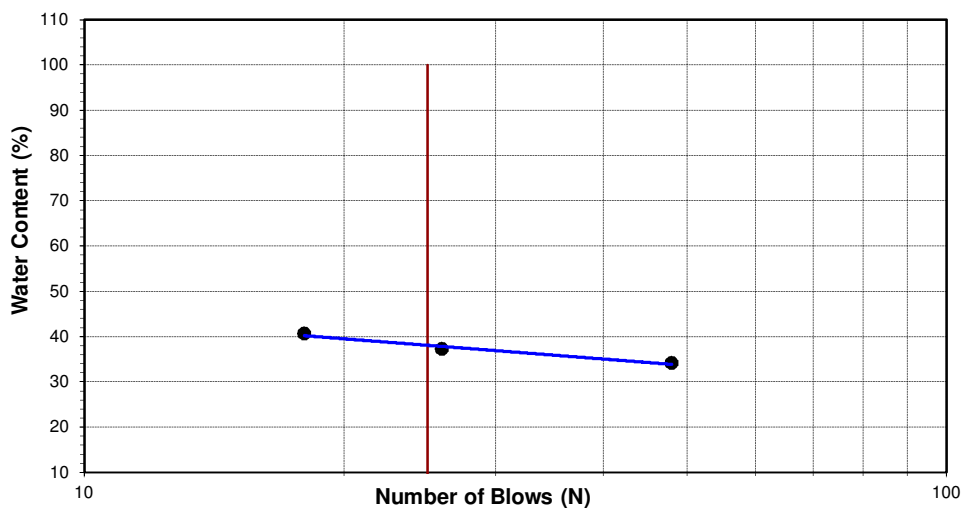
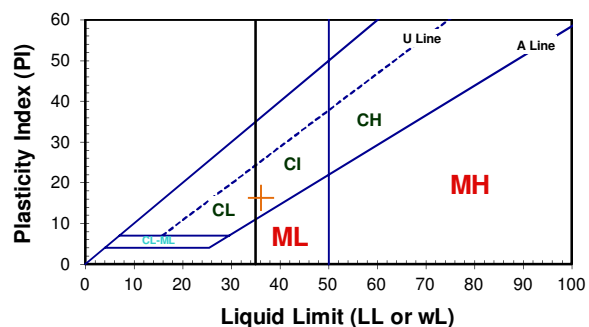
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	2.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	26	48					
Tare Number	---	---	50	277	186		125			
Weight of Empty Tare	M _C	(g)	30.36	29.23	28.79		29.08			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	57.68	49.02	44.32		45.72			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	49.79	43.66	40.37		43.27			
Weight of Soil	M _S	(g)	19.43	14.43	11.58		14.19			
Weight of Water	M _W	(g)	7.89	5.36	3.95		2.45			
Water Content	w	(%)	40.6	37.1	34.1		17.3			

Liquid Limit (LL or w_L) (%)	37
Plastic Limit (PL or w_P) (%)	17
Plasticity Index (PI) (%)	20
Soil Classification	CI



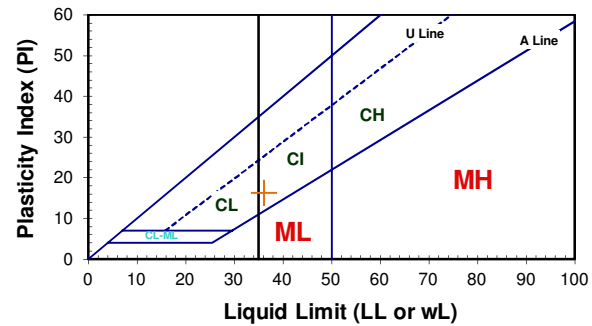
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	3.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	24	41					
Tare Number	---	---	35	282	183		84			
Weight of Empty Tare	M _C	(g)	30.78	29.45	31.19		29.46			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	53.96	46.22	49.72		46.18			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	46.45	41.00	44.11		43.51			
Weight of Soil	M _S	(g)	15.67	11.55	12.92		14.05			
Weight of Water	M _W	(g)	7.51	5.22	5.61		2.67			
Water Content	w	(%)	47.9	45.2	43.4		19.0			

Liquid Limit (LL or w_L) (%)	46
Plastic Limit (PL or w_P) (%)	19
Plasticity Index (PI) (%)	27
Soil Classification	CI



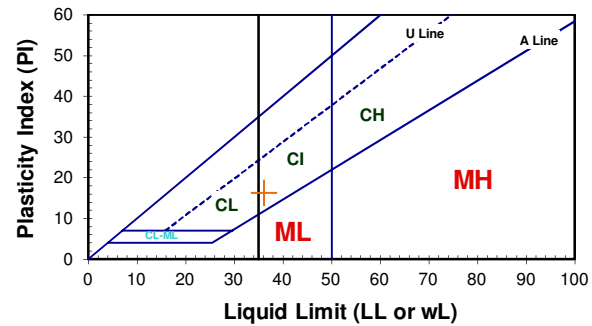
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	4.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	42					
Tare Number	---	---	53	92	203		150			
Weight of Empty Tare	M _C	(g)	30.58	29.76	29.21		29.43			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	56.67	52.1	53.41		49.63			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	48.03	44.96	45.84		46.47			
Weight of Soil	M _S	(g)	17.45	15.20	16.63		17.04			
Weight of Water	M _W	(g)	8.64	7.14	7.57		3.16			
Water Content	w	(%)	49.5	47.0	45.5		18.5			

Liquid Limit (LL or w_L) (%)	47
Plastic Limit (PL or w_P) (%)	19
Plasticity Index (PI) (%)	29
Soil Classification	CI



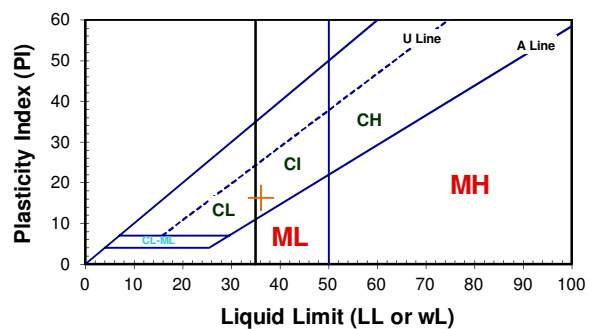
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	5.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	16	26	40					
Tare Number	---	---	90	63	36		192			
Weight of Empty Tare	M _C	(g)	29.41	29.97	30.36		30.34			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	47.84	43.85	45.89		47.66			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	40.38	38.31	39.79		44.05			
Weight of Soil	M _S	(g)	10.97	8.34	9.43		13.71			
Weight of Water	M _W	(g)	7.46	5.54	6.10		3.61			
Water Content	w	(%)	68.0	66.4	64.7		26.3			

Liquid Limit (LL or w_L) (%)	66
Plastic Limit (PL or w_P) (%)	26
Plasticity Index (PI) (%)	40
Soil Classification	CH



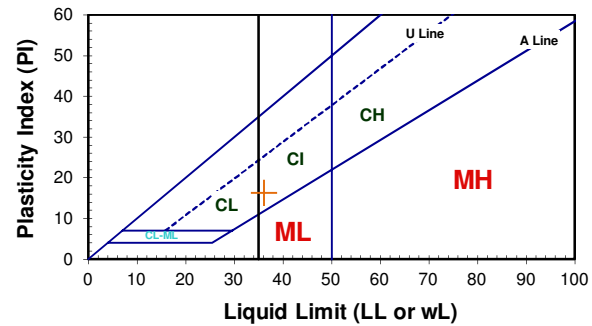
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	6.50m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	14	26	48					
Tare Number	---	---	118	146	279		149			
Weight of Empty Tare	M _C	(g)	29.57	28.7	29.62		29.97			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	48.23	45.48	40.68		50.55			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	40.38	38.61	36.30		46.1			
Weight of Soil	M _S	(g)	10.81	9.91	6.68		16.13			
Weight of Water	M _W	(g)	7.85	6.87	4.38		4.45			
Water Content	w	(%)	72.6	69.3	65.6		27.6			

Liquid Limit (LL or w_L) (%)	69
Plastic Limit (PL or w_P) (%)	28
Plasticity Index (PI) (%)	42
Soil Classification	CH



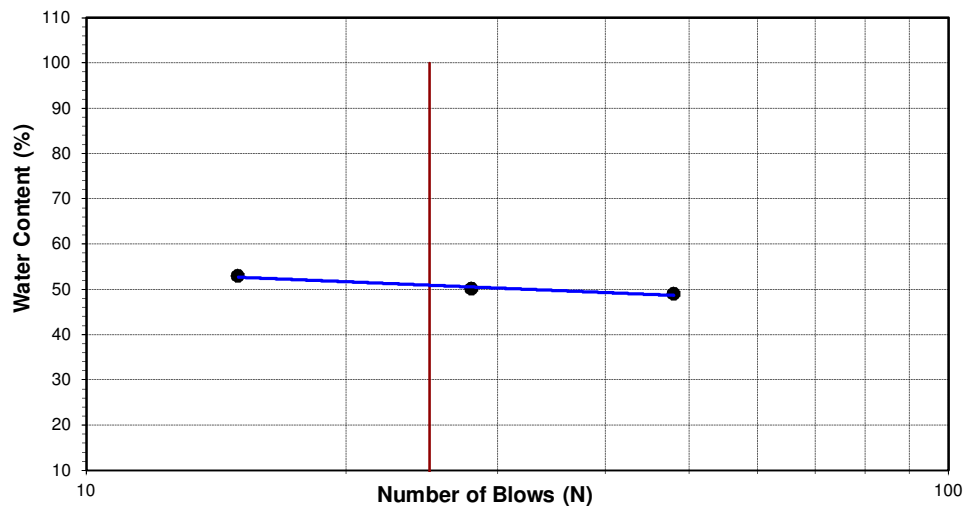
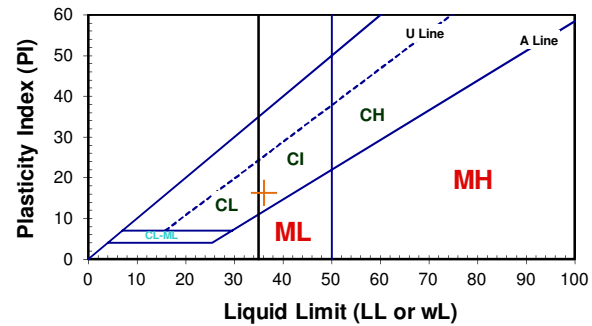
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	15.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	48					
Tare Number	---	---	172	62	124		244			
Weight of Empty Tare	M _C	(g)	29.06	29.54	29.26		29.97			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	53.48	56.93	49.35		44.32			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	45.03	47.80	42.75		41.88			
Weight of Soil	M _S	(g)	15.97	18.26	13.49		11.91			
Weight of Water	M _W	(g)	8.45	9.13	6.60		2.44			
Water Content	w	(%)	52.9	50.0	48.9		20.5			

Liquid Limit (LL or w_L) (%)	51
Plastic Limit (PL or w_P) (%)	20
Plasticity Index (PI) (%)	30
Soil Classification	CH



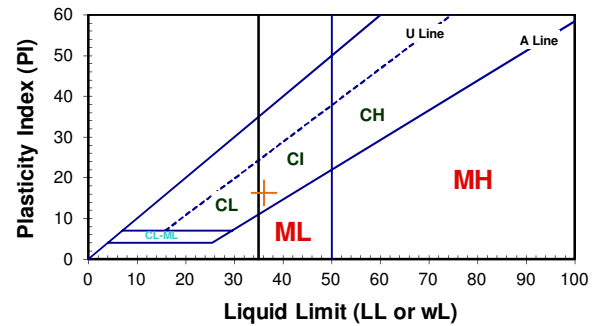
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	16.50m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	27	48					
Tare Number	---	---	69	42	230		25			
Weight of Empty Tare	M _C	(g)	29.41	30.29	28.39		30.41			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	46.23	47.29	46.03		43.35			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	40.87	42.17	40.93		41.52			
Weight of Soil	M _S	(g)	11.46	11.88	12.54		11.11			
Weight of Water	M _W	(g)	5.36	5.12	5.10		1.83			
Water Content	w	(%)	46.8	43.1	40.7		16.5			

Liquid Limit (LL or w_L) (%)	44
Plastic Limit (PL or w_P) (%)	16
Plasticity Index (PI) (%)	27
Soil Classification	CH



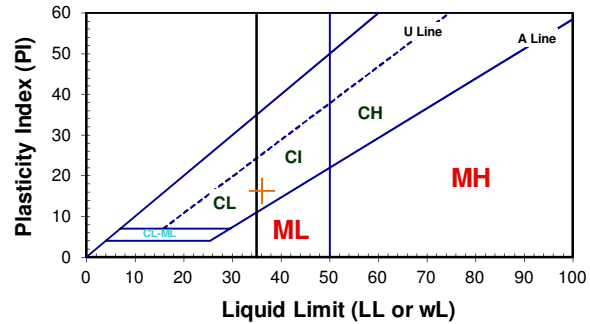
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

Project :	Proposed Construction of (Partly Basement+G+4) Commercial Building
Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	18.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	25	48					
Tare Number	---	---	38	122	199		139			
Weight of Empty Tare	M _C	(g)	29.27	27.91	29.8		29.78			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	44.39	45.38	45.2		44.83			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	39.03	39.48	40.26		42.19			
Weight of Soil	M _S	(g)	9.76	11.57	10.46		12.41			
Weight of Water	M _W	(g)	5.36	5.90	4.94		2.64			
Water Content	w	(%)	54.9	51.0	47.2		21.3			

Liquid Limit (LL or w_L) (%)	51
Plastic Limit (PL or w_P) (%)	21
Plasticity Index (PI) (%)	30
Soil Classification	CH



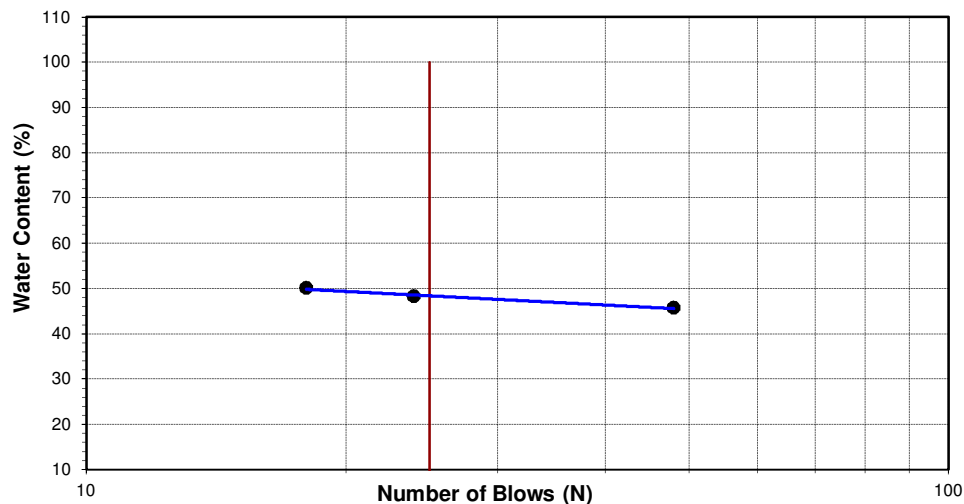
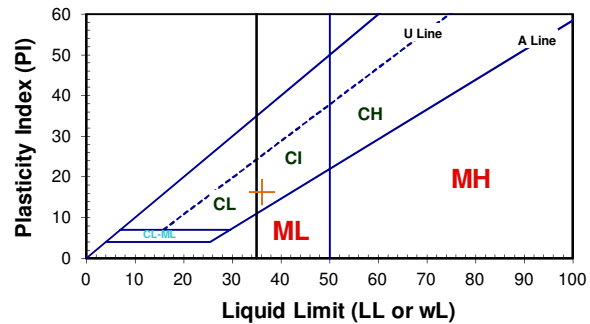
ATTERBERG LIMITS DATA SHEET

IS-2720-Part-5

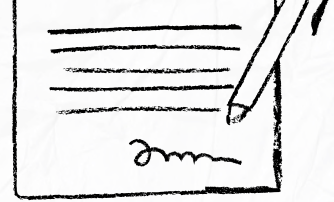
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Location:	Anna nagar
Boring No:	BH-2
Sample Depth:	20.0m
Project No:	MSGTPL/SI-4513/19-20

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	24	48					
Tare Number	---	---	252	246	168		181			
Weight of Empty Tare	M _C	(g)	29.77	28.8	29.39		29.98			
Wt of Tare + Soil (Wet)	M _{CMS}	(g)	49.09	42.62	45.92		46.12			
Wt of Tare + Soil (Dry)	M _{CDS}	(g)	42.65	38.12	40.74		43.56			
Weight of Soil	M _S	(g)	12.88	9.32	11.35		13.58			
Weight of Water	M _W	(g)	6.44	4.50	5.18		2.56			
Water Content	w	(%)	50.0	48.3	45.6		18.9			

Liquid Limit (LL or w_L) (%)	48
Plastic Limit (PL or w_P) (%)	19
Plasticity Index (PI) (%)	29
Soil Classification	CI



-----END OF THE REPORT-----



our services doesn't just end there



Buying & Selling Services

Property Buying Assistance, Property Selling Support, Market Price Analysis, Owner Outreach and Negotiation.



Legal & Documentation Services

Certified EC, Patta, legal opinions, property verification, due diligence, litigation solutions, and legal heir certificates.



Property Development & Approvals

Building plan approvals, construction, layout and sub-division approvals, zone conversion, and occupancy certification.



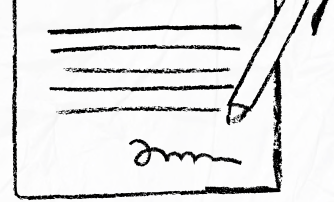
NRI & Investment Services

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



Compliance & Special Services

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



 **empowering your real estate decisions**
with smart tools



Property Valuation & Cost Estimation

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



Ownership, Compliance & Legal Verification

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



Zoning & Land Use Analysis

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



Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary



Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management



We're honored to be part of your
real estate journey

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