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PROPOSED CONSTRUCTION OF GROUND + 2 FLOORS VILLA "JONES CASSIA 8" AT OTTYAMBAKKAM

Report on Geotechnical Investigation

Client:

M/s. Jones Foundations Pvt Ltd

Jones Towers, Velachery - Tambaram Main Road,

Kamakoti Nagar, Pallikaranai, Chennai – 600100.

MARS SYNERGY GEOTECH Pvt Ltd

An ISO 9001: 2015 Certified Company

NABL Accredited Laboratory

Plot No.145A, 2nd Cross Street, Developed Plots Estate,
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NABL : ULR-TC867823100000216F

Project No: MSGTPL/SI-5918/23-24 **Aug-2023**

DRAFT REPORT

To

17th August 2023

M/s. Jones Foundations Pvt Ltd,
Jones Towers, Velachery – Tambaram Main Road,
Kamakoti Nagar, Pallikaranai, Chennai – 600 100.

Reg: Proposed construction of Ground + 2 Floors Villa **"Jones Cassia 8"** at S.No: 284/1A, 285/1, 2A, 2B, 2C1A, 2C1B, 2C2, 2D of Ottiyambakkam Village, Tamil Nadu, INDIA.

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

This geotechnical engineering report presents the results of the subsurface exploration and the recommendations for your proposed structures 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. Samples are retained for 30 days from sample received date at lab.

Sincerely,

Mars Synergy Geotech Pvt Ltd.

ULR-TC867823100000216F

Report No: **MSGTPL/SI-5918/23-24**

Copies Submitted: (2)

Total no of Pages: (44)

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DRAFT REPORT

REPORT ON GEOTECHNICAL INVESTIGATION AND RECOMMENDATION FOR THE PROPOSED CONSTRUCTION OF GROUND + 2 FLOORS RESIDENTIAL VILLA " JONES CASSIA 8" AT OTTIYAMBAKKAM, CHENNAI.

1.0 INTRODUCTION

M/s. Jones Foundations Pvt Ltd, Chennai is planning to construct a Ground + 2 Floors Residential Villa at **"Jones Cassia 8"** at S.No: 284/1A, 285/1, 2A, 2B, 2C1A, 2C1B, 2C2, 2D of Ottiyambakkam Village, Tamil Nadu, INDIA. **M/s. Mars Synergy Geotech Pvt Ltd**, Chennai has carried out this investigation and completed on 3rd Aug 2023 as per the client instructions.

The scope of work includes the following

- Making four (4) 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 recommendation for foundations.

1.1 DESCRIPTION OF STRUCTURE

The proposed structure is a Ground+2 Floors Residential Villa. The exact details of columns are not available at the time of preparation of this report. Assuming an approximate column spacing of 4.5x5.5m c/c considering this the central column load works about 80 to 100 tones for proposed structure. 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 set of Rotary mechanical drilling Rig. The following activities, carried out in chronological sequence, comprised the field work for the project

- Mobilization of rotary drilling 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, tests and laboratory tests conducted as per IS-1892 and IS -2720

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1.3 FIELD SAMPLING

Four (4) numbers of standard soil investigation boreholes of 100mm diameter was made at the locations shown in the drawing, **MSGTPL/SI-5918** enclosed. Investigations were conducted up to a maximum of 16.0m depth from existing ground level. SPTs were conducted at every 1.0m/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 distinctive layers there are

(i) Filled up soil up to -1.50m with **SPT's N=8**
(ii) Medium dense clayey SAND -1.50m to -2.50m with **SPT's N=23**
(iii) Stiff CLAY -2.50m to -4.50m with **SPT's N=11-16**
(iv) Very stiff CLAY-4.50m to -7.0m with **SPT's N=25-28**
(v) Very Dense Moorum -7.0m to -8.50m with **SPT's N=>50**
(vi) Soft Disintegrated Rock -8.50m to -10.0m with **SPT's N= >100**

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

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1.6 GROUND WATER TABLE

Determination of Ground water Table and water depth from Existing Ground level was done using Steel tape with weight. The depth of Ground water table was determined as per procedure laid in IS 6935-1973. At the time of Soil Investigation (01/08/2023 to 03/08/2023) at site, ground water table was encountered at **(-)1.0m** depth from Existing Ground Level.

1.7 DISCUSSION ON FOUNDATION

At this site four boreholes were investigated up 11.0m depth, the proposed structure is a three storied Residential Villa, the column loads are high it is about max 40 to 60 Tones.

Due to the presence of Stiff to very stiff clay at shallow depth, and SPT values of 14 to 28, shallow foundation is not appropriate; therefore, deep foundation such as drilled cast In-situ pile foundation is proposed for Three Storied Residential Villa.

Based on this borehole (BH-2) soil design parameters are arrived and same as used for foundation.

Soil Design Parameters									
From (m)	To (m)	Thickness (m)	Soil Type	Avg SPT 'N'	γ' (kN/m^3)	C (T/sq.m)	α	Φ (deg)	K
0	1.5	1.5	Filled up soil	8	7.5			18	1.0
1.5	2.5	1.0	Medium dense clayey SAND	23	8.5	-	-	32	1.0
2.5	4.5	2.0	Stiff CLAY	13	8.0	6.5	0.75	-	-
4.5	7.0	2.5	Very Stiff CLAY	26	9	13.0	0.35	-	-
7.0	8.5	1.5	Very Dense Moorum	>50	9.5	-	-	35	1.1
8.5	10.0	1.5	Soft Disintegrated Rock	>100	10	400	0.3	-	-

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1.8 RECOMMENDATIONS

- ✓ Considering that this structure is a three storied Residential Villa, pile foundation is recommended up to **8.50m 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 shall be about **8.50m** from the existing ground level.
- ✓ The pile capacities for varying diameters are provided below for the proposed structure.

Bored Cast In-situ Pile Capacities as per IS-2911 Part-1 Sec-2 :2010					
Pile Termination Level Below EGL (m)	Pile Dia (mm)	Safe Vertical Capacity (Tones)	Safe Uplift Capacity (Tones)	Safe Lateral Capacity wrt 5mm Ddeflection	
				Free Head (Tones)	Fixed Head* (Tones)
8.5	450	30	15	1.8	4.7
	500	40	17	2.0	5.2
	600	60	20	2.4	6.2
*Note: Apply 0.75 for Group efficiency for lateral capacities					

- ➢ The proposed project site is situated in Ottiyambakkam Village which falls under Seismic Zone III as per IS 1893 (Part 1) - 2002. Structure should be design against Earth quake resistance
- ➢ Pile Cut of level is considered 1.0m below EGL.
- ➢ Use minimum M25 Grade of concrete
- ➢ Centre to centre spacing of piles shall not be less than 3 times of the diameter of the pile shaft.
- ➢ **The above safe loads suggested are only tentative and these have to be confirmed by conducting through pile load tests conducted as per I.S-2911part –IV:2013**

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ESTIMATION OF VERTICAL CAPACITY OF PILE

Project No:	5918, Ground + 2 Floors Villa
Location:	Ottiyambakkam
Reference BH's	BH-1 to BH-4 (BH-2)

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

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

Dia of Pile		600	mm
Elevation		0	m
Pile Cut off Level (Below E.G.L)		1.0	m
Pile termination level below G.L		8.5	m
Total Length of Pile		7.5	m
Factor of safety		**2.5**	
P_{Di}=		72	kN/Sq.m

Soil Design Parameters

Layer.No	From (m)	To (m)	Thickness (m)	Soil Type	Avg 'N'	g' (kN/m^3)	C (kN/m^2)	α	φ (Deg)	K	Pdi (kN/m^2)
1	0	1.5	1.5	Filled up Soil	8	7.5	-	-	18	1	5.6
2	1.5	2.5	1	Medium dense clayey SAND	23	8.5	-	-	31	1	15.5
3	2.5	4.5	2	Stiff CLAY	13	8	65	0.75	-	-	27.8
4	4.5	7	2.5	Very Stiff CLAY	26	9	130	0.35	-	-	47.0
5	7	8.5	1.5	Very Dense Moorum	>50	9.5	-	-	35	1.1	65.4
6	8.5	10	1.5	Soft Disintegrated Rock	>100	10	400	0.3	-	-	80.0

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

Layer.No	From (m)	To (m)	Thickness (m)	γ' (kN/m3)	Pdi (kN/m2)	C (kN/m^2)	α	ϕ (Deg)	K	Asi	Sf (kN)	Sfi (kN)
1	1.0	1.5	0.5	7.5	1.9	-	-	18	1.00	0.94	0.57	0.6
2	1.5	2.5	1	8.5	8.0	-	-	31	1.00	1.88	9.06	9.6
3	2.5	4.5	2	8.0	20.3	65	0.75	-	-	3.77	183.78	193.4
4	4.5	7	2.5	9.0	39.5	130	0.35	-	-	4.71	214.41	**407.8**
5	7.0	8.5	1.5	9.5	54.1	-	-	35	1.10	2.83	117.87	**525.7**

End Bearing Strata	Very Dense Moorum										
Dia of Pile(m)	Ap (m^2)	γ' (kN/m^3)	P_{di}	ϕ (Deg)	Nq	Nγ	Nc	C (kN/m^2)	Qp (kN)	Qult (kN)	Qallow (kN)
0.6	0.28274	11.00	72	-	49	48.03	-	-	1042.3	1568	**627.21**

Safe Vertical Capacity of Single Pile	**63**	**Tones**

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Lateral Pile Capacity Calculation

Project Title : Proposed Construction of Residentail Villas G+2)
Site : Ottiyambakkam
BH: BH-1 to BH-4 (BH-2)

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

$$Deflection, y = \frac{H(e + Z_f)^3}{3EI} X10^3 \quad \text{...for free head pile}$$

$$Deflection, y = \frac{H(e + Z_f)^3}{12EI} X10^3 \quad \text{...for fixed head pile}$$

Input

Soil		Stiff CLAY	
Diameter of Pile	=	600	mm
Length of Pile Below FGL, (L)	=	8.5	m
Length of Pile Above FGL, (L1=e)	=	0	m
Grade of Concrete	=	25	
Allowable Deflection, (y)	=	5	mm
Young's modulus of pile material, (E)	=	25000.00	MN/m^2
Moment Inertia of the Pile Cross section (I)	=	0.0064	m^4

For CLAY

k_1=	23	MN/m^2
K=	7.6667	MN/m^3
R=	2.42	m

Stiffness factor R, in m $= \sqrt[4]{\frac{EI}{KB}}$

L1/R=	0
Lf/R (Free Head)=	1.9
Lf/R (Fixed Head)=	2.2

For SAND

η_h=		MN/m^3
T=	#DIV/0!	m
L_1/T=	#DIV/0!	

Stiffness factor T, in m $= \sqrt[5]{\frac{EI}{\eta_h}}$

L_f/T(Free Head)=	1.9
L_f/T(Fixed Head)=	2.2

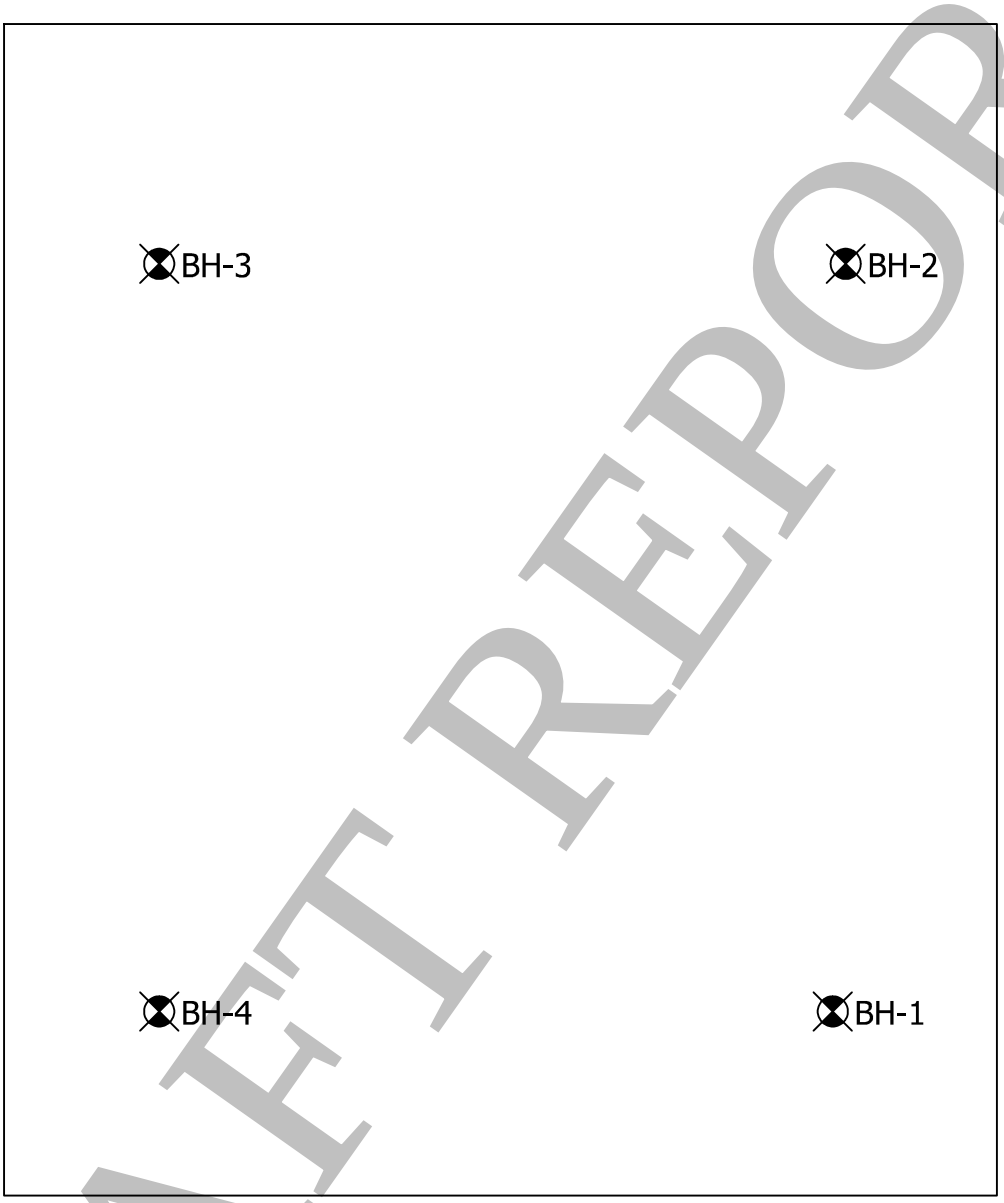
Output for CLAY Soil

Z_f (Free Head)/ Depth of Fixity =	4.61	m
Z_f (Fixed Head) / Depth of Fixity =	5.33	m

Result

Lateral Load Free Head =	**2.44**	**Tones**
Lateral Load Fixed Head =	**6.29**	**Tones**

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TITLE: DRAWING SHOWING THE SOIL INVESTIGATION BORE HOLE LOCATIONS

PROJECT: PROPOSED CONSTRUCTION OF GROUND + 2 FLOORS RESIDENTIAL VILLA AT OTTIYAMBAKKAM

LEGEND:		
BH: BORE HOLE	⊗ -SOIL TEST LOCATION	
ACTIVITY	EXECUTED BY	SCALE: N T S
FOREMEN	DEVARAJ	
DRAFTING	JB	

MARS SYNERGY GEOTECH Pvt Ltd
(An ISO 9001: 2015 Certified Company)
Engineering Survey & Soil Investigation
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DRAWING NO: MSGTPL/SI-5918/23-24

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Geotechnical, Geophysical & Engineering Survey in Offshore & Onshore

BOREHOLE LOG

Project No: MSGTPL/SI-5918/23-24

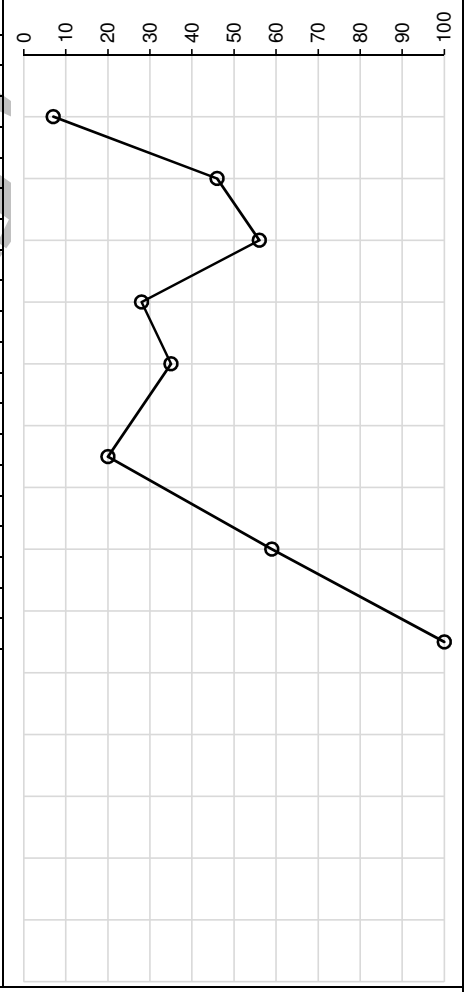
Project: Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Location	Ottiyambakkam
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-1**	
G.W.T (m)	(-)1.0	
Date of Start	1-Aug-2023	
Date of Complete	1-Aug-2023	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	9.50	1 of 1

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
0.0										
0.5	1.0	Loose Greyish Clayey SAND		SC						
1.0					SPT	1.0	2	3	4	**7**
1.5										
2.0	2.0	Dense to Very Dense Light Greyish Clayey SAND		SC	SPT	2.0	10	15	31	**46**
2.5										
3.0					SPT	3.0	13	19	37	**56**
3.5										
4.0					SPT	4.0	15	15	13	**28**
4.5										
5.0	3.5	Medium Dense to Dense Light Greyish Clayey SAND		SC	SPT	5.0	15	15	20	**35**
5.5										
6.0										
6.5					SPT	6.5	10	9	11	**20**
7.0										
7.5	1.5	Hard Light Greyish CLAY		CI						
8.0					SPT	8.0	15	20	39	**59**
8.5										
9.0	1.5	Soft Disintegrated Rock		GP						
9.5					SPT	9.5	50 Blows for 1Cm			
10.0										
10.5										
11.0										
11.5										
12.0										
12.5										
13.0										
13.5										
14.0										
14.5										
15.0										

Graphical Representation of SPT



Borehole Termination Depth (m) 9.5

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

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BOREHOLE LOG

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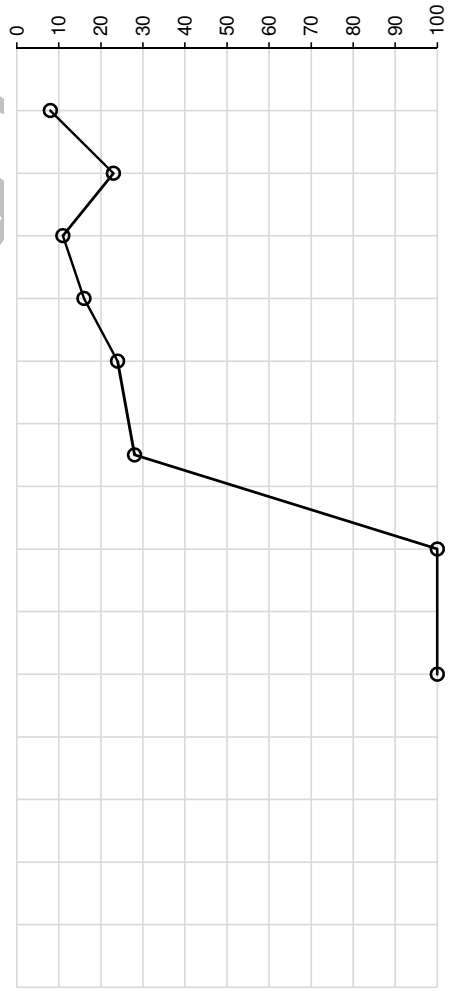
Project: Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Location	Ottiyambakkam
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-2**	
G.W.T (m)	(-)1.0	
Date of Start	2-Aug-2023	
Date of Complete	2-Aug-2023	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	10.00	1 of 1

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
0.0										
0.5	1.0	Filledup Soil								
1.0					SPT	1.0	3	4	4	**8**
1.5	1.0	Medium Dense Light Greyish Clayey SAND		SC						
2.0					SPT	2.0	7	10	13	**23**
2.5										
3.0	2.0	Stiff Greyish CLAY		CH	SPT	3.0	5	5	6	**11**
3.5										
4.0					SPT	4.0	7	8	8	**16**
4.5										
5.0					SPT	5.0	12	10	14	**24**
5.5	2.5	Very Stiff Greyish CLAY		CH						
6.0										
6.5					SPT	6.5	11	13	15	**28**
7.0										
7.5	1.5	Very Dense Brownish and light Greyish Moorum		SC-SM						
8.0					SPT	8.0	8	12	50 Blows for 13Cm	
8.5										
9.0	2.0	Soft Disintegrated Rock		GP						
9.5										
10.0					SPT	10.0	50 Blows for 1Cm			
10.5										
11.0										
11.5										
12.0										
12.5										
13.0										
13.5										
14.0										
14.5										
15.0										

Graphical Representation of SPT



Borehole Termination Depth (m) 10.0

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

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BOREHOLE LOG

Project No: MSGTPL/SI-5918/23-24

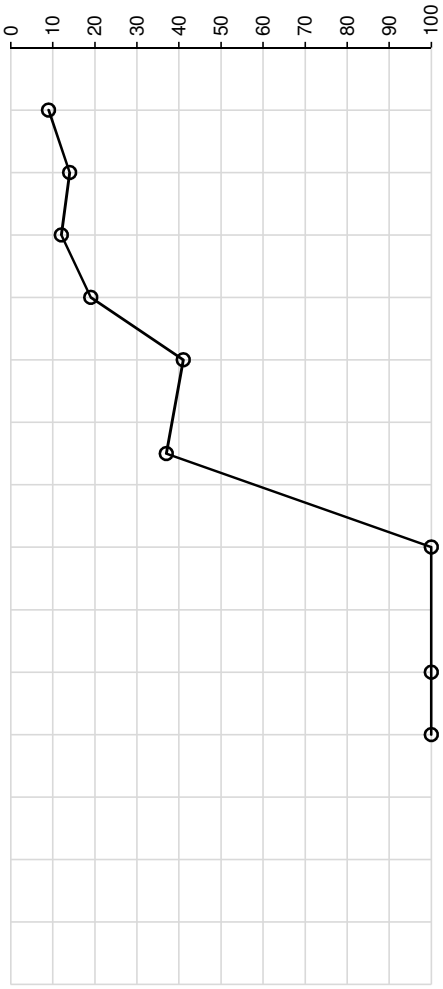
Project: Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Location	Ottiyambakkam
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-3**	
G.W.T (m)	(-)1.0	
Date of Start	2-Aug-2023	
Date of Complete	2-Aug-2023	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	11.00	1 of 1

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**
0.0										
0.5	1.0	Loose Light Greyish Clayey SAND		SC						
1.0					SPT	1.0	3	4	5	**9**
1.5										
2.0	2.0	Stiff Greyish CLAY		CH	SPT	2.0	5	7	7	**14**
2.5										
3.0					SPT	3.0	5	6	6	**12**
3.5	1.0	Very Stiff Greyish CLAY		CI						
4.0					SPT	4.0	7	8	11	**19**
4.5	1.0	Hard Brownish and Light Greyish CLAY		CI						
5.0					SPT	5.0	15	20	21	**41**
5.5	1.5	Dense Light Greyish Clayey SAND		SC						
6.0										
6.5					SPT	6.5	15	17	20	**37**
7.0	1.5	Hard Light Greyish CLAY		CI						
7.5										
8.0					SPT	8.0	10	15	50 Blows for 8Cm	
8.5	3.0	Soft Disintegrated Rock		GP						
9.0										
9.5										
10.0					SPT	10.0	50 Blows for 1Cm			
10.5										
11.0					SPT	11.0	50 Blows for 1Cm			
11.5										
12.0										
12.5										
13.0										
13.5										
14.0										
14.5										
15.0										

Graphical Representation of SPT



Borehole Termination Depth (m) 11.0

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

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BOREHOLE LOG

Project No: MSGTPL/SI-5918/23-24

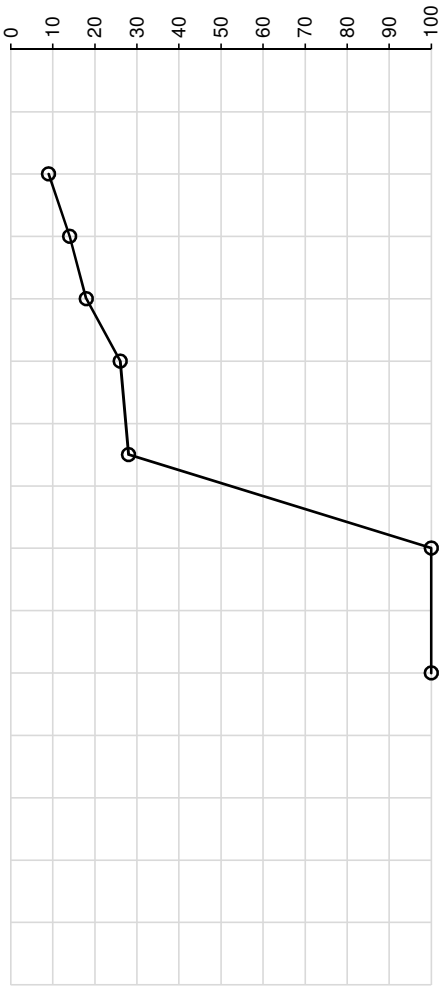
Project: Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Location	Ottiyambakkam
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-4**	
G.W.T (m)	(-)1.0	
Date of Start	3-Aug-2023	
Date of Complete	3-Aug-2023	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	10.00	1 of 1

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
0.0	1.0	Filledup Soil								
0.5										
1.0						1.0				
1.5	1.0	Stiff Light Greyish CLAY		CH						
2.0					SPT	2.0	4	4	5	**9**
2.5	1.0	Medium Dense Greyish Clayey SAND		SC						
3.0					SPT	3.0	4	6	8	**14**
3.5	1.0	Very Stiff Greyish CLAY		CH						
4.0					SPT	4.0	7	8	10	**18**
4.5	1.0	Medium Dense Light Greyish Clayey SAND		SC						
5.0					SPT	5.0	10	12	14	**26**
5.5	1.5	Very Stiff Light Greyish CLAY		CI						
6.0										
6.5					SPT	6.5	10	12	16	**28**
7.0	1.5	Hard Light Greyish CLAY		CH						
7.5										
8.0					SPT	8.0	13	14	50 Blows for 8Cm	
8.5	2.0	Soft Disintegrated Rock		GP						
9.0										
9.5										
10.0					SPT	10.0	50 Blows for 1Cm			
10.5										
11.0										
11.5										
12.0										
12.5										
13.0										
13.5										
14.0										
14.5										
15.0										

Graphical Representation of SPT



Borehole Termination Depth (m) 10.0

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

DRAFT REPORT

MS GEOTECH
Geotechnical, Geophysical & Engineering Survey in Offshore & Onshore

Project No: MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH No	**1**	**Ground Water Level:(-)1.0m**	**Termination Depth:9.50m**

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	Ic	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay
	1.0	0.00	Loose Greyish Clayey SAND	SC												
7		1.00			18						2.71	11	12	22	16	39
	2.0		Dense to Very Dense Light Greyish Clayey SAND	SC												
46		2.00			15							1	2	58	20	19
56		3.00			15						2.67	1	2	50	24	23
	3.5		Medium Dense to Dense Light Greyish Clayey SAND	SC												
28		4.00			15							0	3	49	21	27
35		5.00			15						2.62	0	0	48	32	20
20		6.50			20							0	1	12	32	55
	1.5		Hard Light Greyish CLAY	CI												
59		8.00			19	47	15	32			2.61					
	1.5		Soft Disintegrated Rock	GP												
>100		9.50														

DRAFT REPORT

MS GEOTECH
Geotechnical, Geophysical & Engineering Survey in Offshore & Onshore

Project No: MSGTPL/SI-5918/23-24																	
Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam																	
BH No	2			Ground Water Level:(-)1.0m							Termination Depth:10.0m						
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	Ic	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay	
	1.0	0.00	Filledup Soil														
8		1.00															
	1.0		Medium Dense Light Greyish Clayey SAND	SC													
23		2.00			17						2.60	2	1	27	42	28	
	2.0		Stiff Greyish CLAY	CH													
11		3.00			23	53	16	37									
16		4.00			21	51	17	34			2.58						
	2.5		Very Stiff Greyish CLAY	CH													
24		5.00			20	52	19	33									
28		6.50			25	62	21	42			2.59						
	1.5		Very Dense Brownish and light Greyish Moorum	SC-SM													
>100		8.00			15							28	12	16	17	27	
	2.0		Soft Disintegrated Rock	GP													
>100		10.00															

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MS GEOTECH
Geotechnical, Geophysical & Engineering Survey in Offshore & Onshore

Project No: MSGTPL/SI-5918/23-24																	
Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam																	
BH No	3			Ground Water Level:(-)1.0m							Termination Depth:10.0m						
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	Ic	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay	
	1.0	0.00	Loose Light Greyish Clayey SAND	SC													
9		1.00			17						2.60	6	7	28	29	30	
	2.0		Stiff Greyish CLAY	CH													
14		2.00			33	65	16	49									
12		3.00			22	50	17	33				0	1	14	30	55	
	1.0		Very Stiff Greyish CLAY	CI													
19		4.00			20	49	15	34									
	1.0		Hard Brownish and Light Greyish CLAY	CI													
41		5.00			12	45	16	29			2.61						
	1.5		Dense Light Greyish Clayey SAND	SC													
34		6.50			18							0	6	50	22	22	
	1.5		Hard Light Greyish CLAY	CI													
>100		8.00			24	47	20	27			2.60						
	3.0		Soft Disintegrated Rock	GP													
>100		10.00															
>100		11.00															

DRAFT REPORT

Project No: MSGTPL/SI-5918/23-24																	
Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam																	
BH No	4			Ground Water Level:(-)1.0m						Termination Depth:11.0m							
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	Ic	FreeSwell		Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay
	1.0	0.00	Filledup Soil													
		1.00														
	1.0		Stiff Light Greyish CLAY	CH												
9		2.00			22	70	18	51								
	1.0		Medium Dense Greyish Clayey SAND	SC												
14		3.00			15							0	1	41	27	31
	1.0		Very Stiff Greyish CLAY	CH												
18		4.00			27	70	17	53								
	1.0		Medium Dense Light Greyish Clayey SAND	SC												
26		5.00			22							1	2	19	31	47
	1.5		Very Stiff Light Greyish CLAY	CI												
28		6.50			22	45	14	31			2.62					
	1.5		Hard Light Greyish CLAY	CH												
>100		8.00			20	54	15	39								
	2.0		Soft Disintegrated Rock	GP												
>100		10.00														

DRAFT REPORT

Project No: MSGTPL/SI-5918/23-24

Project :Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

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	211	6	253	55	197	246	108	215	232	141	33	86
Wt of Tare (gr)	30.11	30.11	28.93	29.40	30.61	28.81	29.80	30.04	29.95	30.41	28.55	29.30
Tare + Soil (gr)	50.84	50.28	51.62	48.80	55.72	48.90	48.95	51.22	52.02	48.20	49.36	53.61
Tare+Dry soil (gr)	47.69	47.20	48.59	46.20	52.47	46.30	46.40	48.45	49.20	45.92	45.95	49.60
Wt of Water (gr)	3.15	3.08	3.03	2.60	3.25	2.60	2.55	2.77	2.82	2.28	3.41	4.01
Wt Dry soil (gr)	17.58	17.09	19.66	16.80	21.86	17.49	16.60	18.41	19.25	15.51	17.40	20.30
Water Content (%)	17.92	18.02	15.41	15.48	14.87	14.87	15.36	15.05	14.65	14.70	19.60	19.75
Average Water Content (%)	18		15		15		15		15		20	

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ULR-TC867823100000216F

Project No: MSGTPL/SI-5918/23-24

Project :Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	1		2		2		2		2		2	
Depth (m)	8.0		2.0		3.0		4.0		5.0		6.5	
Tare No	100	278	125	208	1	64	123	191	75	279	265	266
Wt of Tare (gr)	29.66	29.26	29.10	29.02	30.62	29.13	29.28	30.12	28.42	29.61	30.46	29.82
Tare + Soil (gr)	53.92	49.73	46.81	52.28	55.76	59.94	52.04	47.37	57.77	54.97	52.84	54.00
Tare+Dry soil (gr)	50.08	46.44	44.24	48.90	51.12	54.27	48.02	44.35	52.98	50.67	48.35	49.10
Wt of Water (gr)	3.84	3.29	2.57	3.38	4.64	5.67	4.02	3.02	4.79	4.30	4.49	4.90
Wt Dry soil (gr)	20.42	17.18	15.14	19.88	20.50	25.14	18.74	14.23	24.56	21.06	17.89	19.28
Water Content (%)	18.81	19.15	16.97	17.00	22.63	22.55	21.45	21.22	19.50	20.42	25.10	25.41
Average Water Content (%)	19		17		23		21		20		25	

DRAFT REPORT

Project No: MSGTPL/SI-5918/23-24

Project :Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	2		3		3		3		3		3	
Depth (m)	8.0		1.0		2.0		3.0		4.0		5.0	
Tare No	39	204	131	160	97	89	165	259	299	143	59	226
Wt of Tare (gr)	28.51	27.22	29.56	29.96	29.50	29.32	29.96	31.05	28.07	29.52	29.13	29.65
Tare + Soil (gr)	48.18	44.31	55.57	49.18	49.69	46.70	53.71	61.41	55.75	51.58	55.87	51.66
Tare+Dry soil (gr)	45.56	42.05	51.74	46.35	44.67	42.35	49.35	55.91	51.09	47.90	53.10	49.30
Wt of Water (gr)	2.62	2.26	3.83	2.83	5.02	4.35	4.36	5.50	4.66	3.68	2.77	2.36
Wt Dry soil (gr)	17.05	14.83	22.18	16.39	15.17	13.03	19.39	24.86	23.02	18.38	23.97	19.65
Water Content (%)	15.37	15.24	17.27	17.27	33.09	33.38	22.49	22.12	20.24	20.02	11.56	12.01
Average Water Content (%)	15		17		33		22		20		12	

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Project No: MSGTPL/SI-5918/23-24

Project :Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	3		3		4		4		4		4	
Depth (m)	6.5		8.0		2.0		3.0		4.0		5.0	
Tare No	14	229	260	221	111	38	110	168	94	36	295	187
Wt of Tare (gr)	30.18	29.78	29.05	28.56	30.93	29.28	30.87	29.40	29.16	30.41	29.49	29.61
Tare + Soil (gr)	57.94	61.19	55.14	52.23	47.40	45.31	46.58	53.62	48.19	48.60	63.91	68.92
Tare+Dry soil (gr)	53.63	56.32	50.15	47.68	44.41	42.45	44.58	50.50	44.10	44.71	57.60	61.82
Wt of Water (gr)	4.31	4.87	4.99	4.55	2.99	2.86	2.00	3.12	4.09	3.89	6.31	7.10
Wt Dry soil (gr)	23.45	26.54	21.10	19.12	13.48	13.17	13.71	21.10	14.94	14.30	28.11	32.21
Water Content (%)	18.38	18.35	23.65	23.80	22.18	21.72	14.59	14.79	27.38	27.20	22.45	22.04
Average Water Content (%)	18		24		22		15		27		22	

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Project No: MSGTPL/SI-5918/23-24

Project :Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	4		4									
Depth (m)	6.5		8.0									
Tare No	218	219	277	57								
Wt of Tare (gr)	29.83	27.86	29.21	29.25								
Tare + Soil (gr)	48.01	59.94	58.68	63.59								
Tare+Dry soil (gr)	44.71	54.26	53.80	57.80								
Wt of Water (gr)	3.30	5.68	4.88	5.79								
Wt Dry soil (gr)	14.88	26.40	24.59	28.55								
Water Content (%)	22.18	21.52	19.85	20.28								
Average Water Content (%)	22		20									

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SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH.No	1
Depth(m)	1.0

Pycnometer number			10	4
Weight of bottle	w_1	g	34.3500	35.0700
Weight of bottle + soil	w_2	g	46.0100	48.2200
Weight of bottle + soil + water	w_3	g	94.1900	95.8000
Weight of bottle full of water	w_4	g	86.8300	87.5000
Weight of soil	w_2-w_1	g	11.6600	13.1500
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.71163	2.71134
Average value G_s			2.71	

BH.No	1
Depth(m)	3.0

Pycnometer number			86	27
Weight of bottle	w1	g	35.3600	35.1400
Weight of bottle + soil	w2	g	48.5200	48.3300
Weight of bottle + soil + water	w3	g	94.7200	95.4000
Weight of bottle full of water	w4	g	86.4800	87.1500
Weight of soil	w2-w1	g	13.1600	13.1900
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.67480	2.67004
Average value Gs			2.67	

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SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH.No	1
Depth(m)	5.0

Pycnometer number			71	24
Weight of bottle	w_1	g	36.3500	34.4200
Weight of bottle + soil	w_2	g	50.2200	45.8500
Weight of bottle + soil + water	w_3	g	96.0700	93.2200
Weight of bottle full of water	w_4	g	87.5000	86.1600
Weight of soil	w_2-w_1	g	13.8700	11.4300
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.61698	2.61556
Average value G_s			2.62	

BH.No	1
Depth(m)	8.0

Pycnometer number			42	55
Weight of bottle	w1	g	34.4900	34.3400
Weight of bottle + soil	w2	g	44.9900	44.6100
Weight of bottle + soil + water	w3	g	93.6900	93.5600
Weight of bottle full of water	w4	g	87.2100	87.2200
Weight of soil	w2-w1	g	10.5000	10.2700
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.61194	2.61323
Average value Gs			2.61	

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SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH.No	2
Depth(m)	2.0

Pycnometer number			6	50
Weight of bottle	w_1	g	34.5400	34.4800
Weight of bottle + soil	w_2	g	46.6000	44.7400
Weight of bottle + soil + water	w_3	g	94.6900	93.7100
Weight of bottle full of water	w_4	g	87.2600	87.3900
Weight of soil	w_2-w_1	g	12.0600	10.2600
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.60475	2.60406
Average value G_s			2.60	

BH.No	2
Depth(m)	4.0

Pycnometer number			41	74
Weight of bottle	w1	g	39.4200	34.5900
Weight of bottle + soil	w2	g	50.3200	45.5000
Weight of bottle + soil + water	w3	g	99.6900	93.6900
Weight of bottle full of water	w4	g	93.0100	87.0000
Weight of soil	w2-w1	g	10.9000	10.9100
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.58294	2.58531
Average value Gs			2.58	

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SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH.No	2
Depth(m)	6.5

Pycnometer number			26	52
Weight of bottle	w_1	g	35.0400	35.4000
Weight of bottle + soil	w_2	g	46.8200	45.4400
Weight of bottle + soil + water	w_3	g	94.4700	92.9600
Weight of bottle full of water	w_4	g	87.2300	86.7900
Weight of soil	w_2-w_1	g	11.7800	10.0400
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.59471	2.59432
Average value G_s			2.59	

BH.No	3
Depth(m)	1.0

Pycnometer number			85	16
Weight of bottle	w_1	g	34.8600	34.7900
Weight of bottle + soil	w_2	g	44.4400	44.8200
Weight of bottle + soil + water	w_3	g	92.4100	92.6100
Weight of bottle full of water	w_4	g	86.5100	86.4300
Weight of soil	w_2-w_1	g	9.5800	10.0300
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.60326	2.60519
Average value G_s			2.60	

DRAFT REPORT

SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

BH.No	3
Depth(m)	5.0

Pycnometer number			80	49
Weight of bottle	w_1	g	35.5400	34.5600
Weight of bottle + soil	w_2	g	48.0100	48.3800
Weight of bottle + soil + water	w_3	g	96.0100	94.2600
Weight of bottle full of water	w_4	g	88.3100	85.7300
Weight of soil	w_2-w_1	g	12.4700	13.8200
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.61426	2.61248
Average value G_s			2.61	

BH.No	3
Depth(m)	8.0

Pycnometer number			28	63
Weight of bottle	w_1	g	34.3100	33.0300
Weight of bottle + soil	w_2	g	44.9900	44.8800
Weight of bottle + soil + water	w_3	g	92.8400	92.8400
Weight of bottle full of water	w_4	g	86.2600	85.5400
Weight of soil	w_2-w_1	g	10.6800	11.8500
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.60488	2.60440
Average value G_s			2.60	

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SPECIFIC GRAVITY TEST

Project No:MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

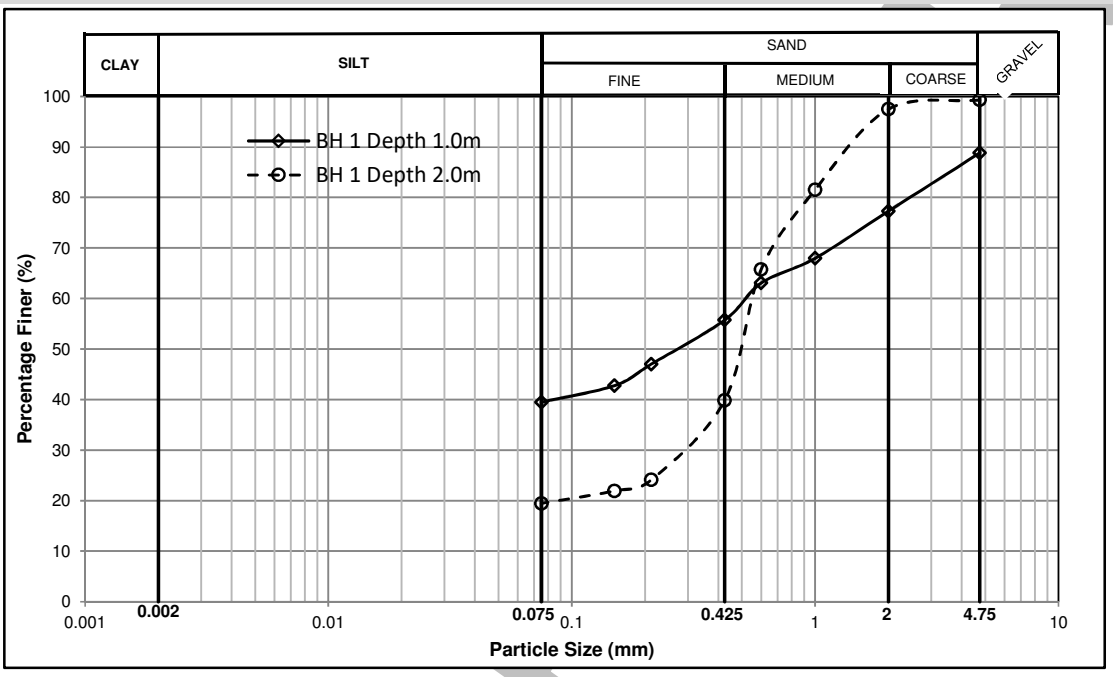
BH.No	4
Depth(m)	6.5

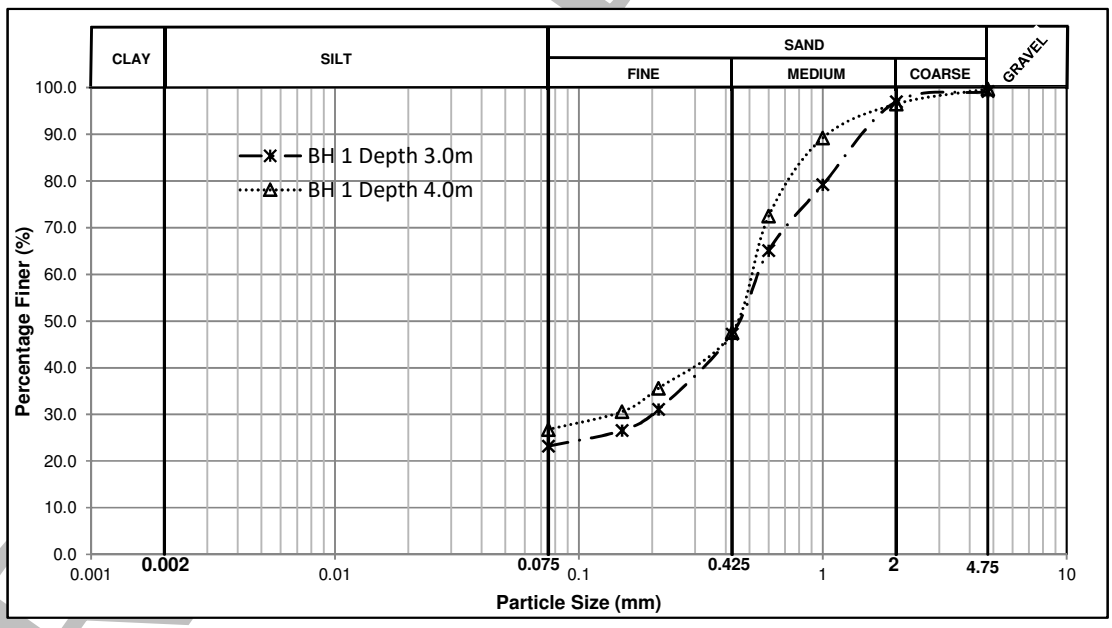
Pycnometer number			58	73
Weight of bottle	w_1	g	34.6500	37.1100
Weight of bottle + soil	w_2	g	44.9300	49.4200
Weight of bottle + soil + water	w_3	g	92.2400	96.2800
Weight of bottle full of water	w_4	g	85.8800	88.6600
Weight of soil	w_2-w_1	g	10.2800	12.3100
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.62245	2.62473
Average value G_s			2.62	

Project No: MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

GRAIN SIZE ANALYSIS





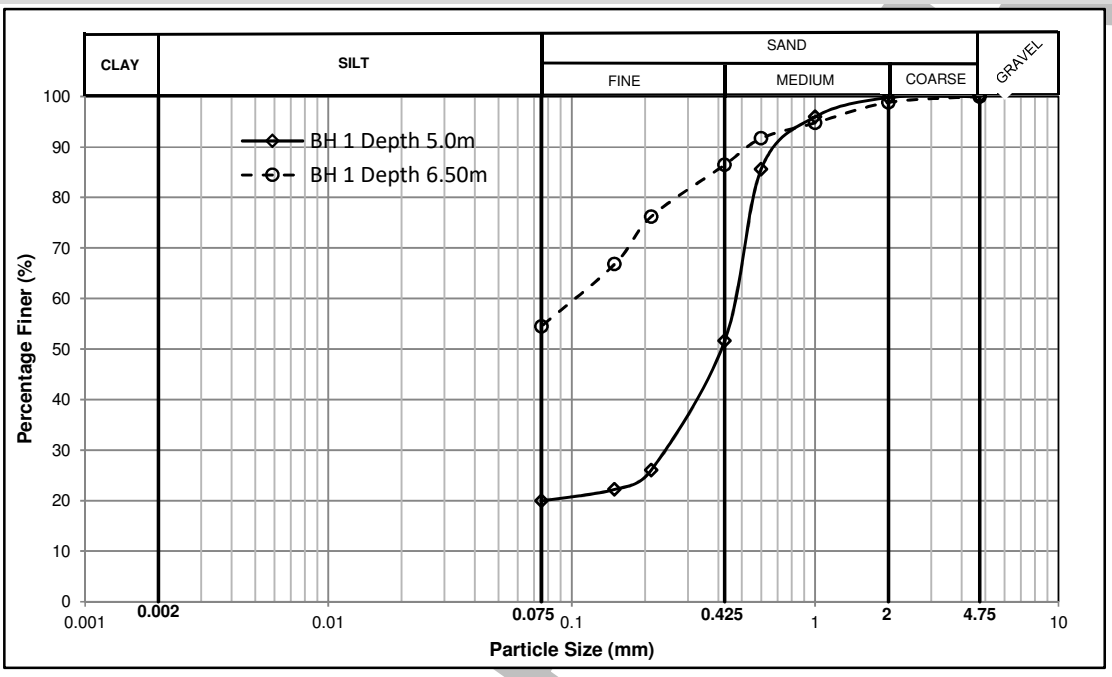
BH-No	Depth (m)	Gravel (%)	SAND (%)			SILT& CLAY (%)	D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	Cu	Cc
			Coarse	Medium	Fine						
1	1.0m	11	12	22	16	39			0.527	#####	#####
1	2.0m	1	2	58	20	19		0.292	0.561	#####	#####
1	3.0m	1	2	50	24	23		0.136	0.861	#####	#####
1	4.0m	0	3	49	21	27		0.139	0.513	#####	#####

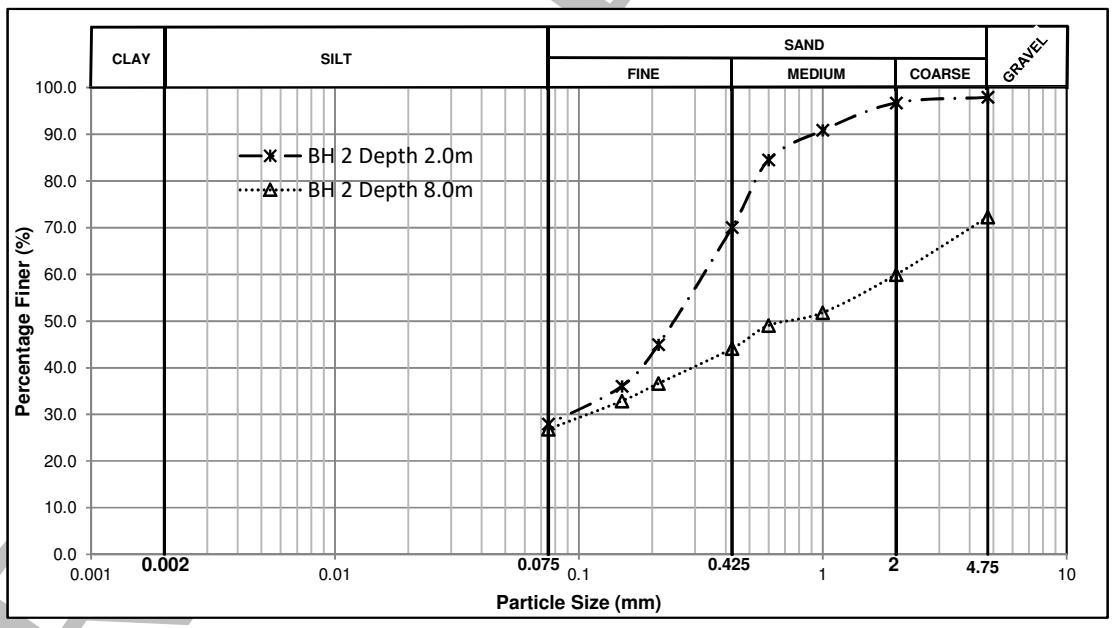
DRAFT

Project No: MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

GRAIN SIZE ANALYSIS





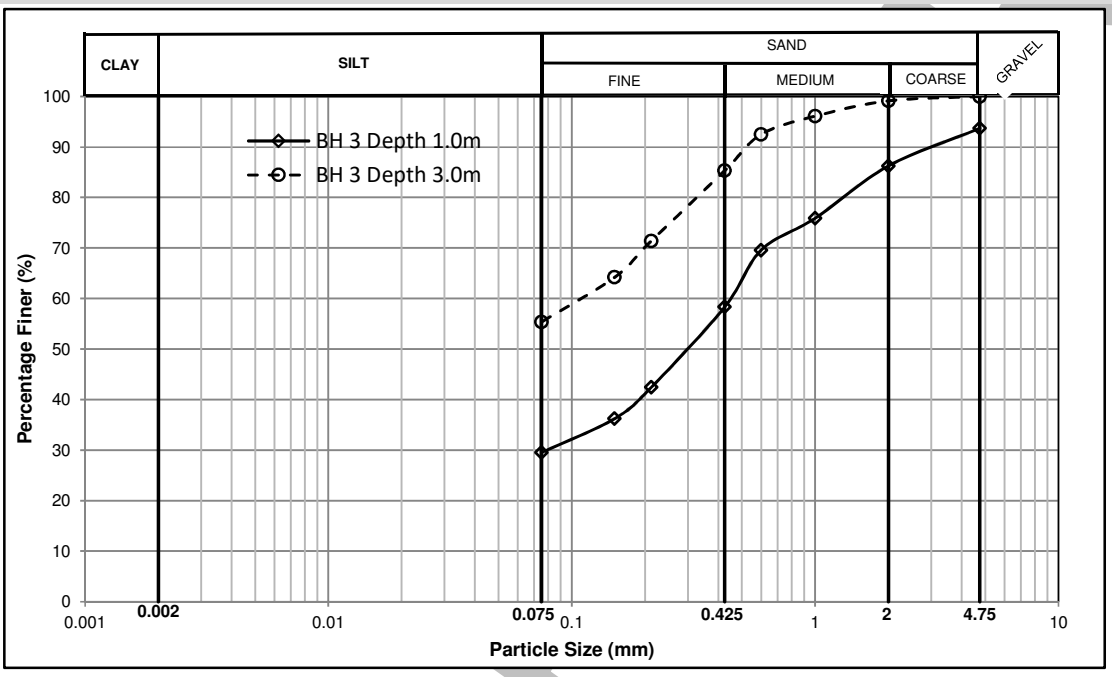
BH-No	Depth	Gravel	SAND (%)			SILT& CLAY	D_{10}	D_{30}	D_{60}	Cu	Cc
	(m)	(%)	Coarse	Medium	Fine	(%)	(mm)	(mm)	(mm)		
1	5.0m	0	0	48	32	20		0.245	0.468	#####	#####
1	6.50m	0	1	12	32	55			0.108	#####	#####
2	2.0m	2	1	27	42	28		0.068	-0.201	#####	#####
2	8.0m	28	12	16	17	27		0.114	2.009	#####	#####

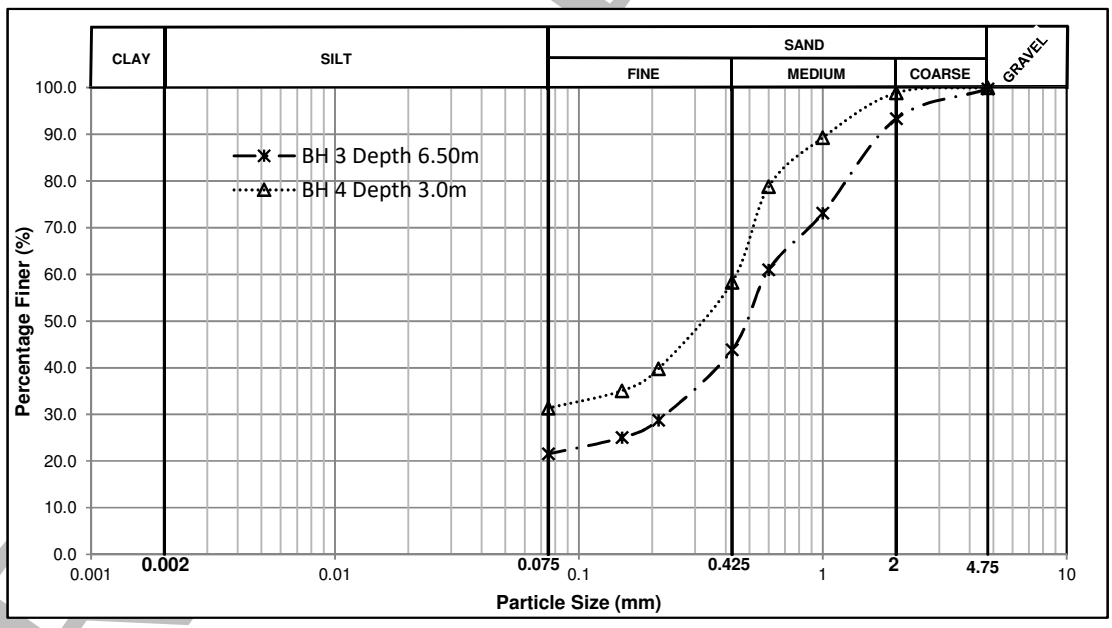
DRAFT

Project No: MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

GRAIN SIZE ANALYSIS





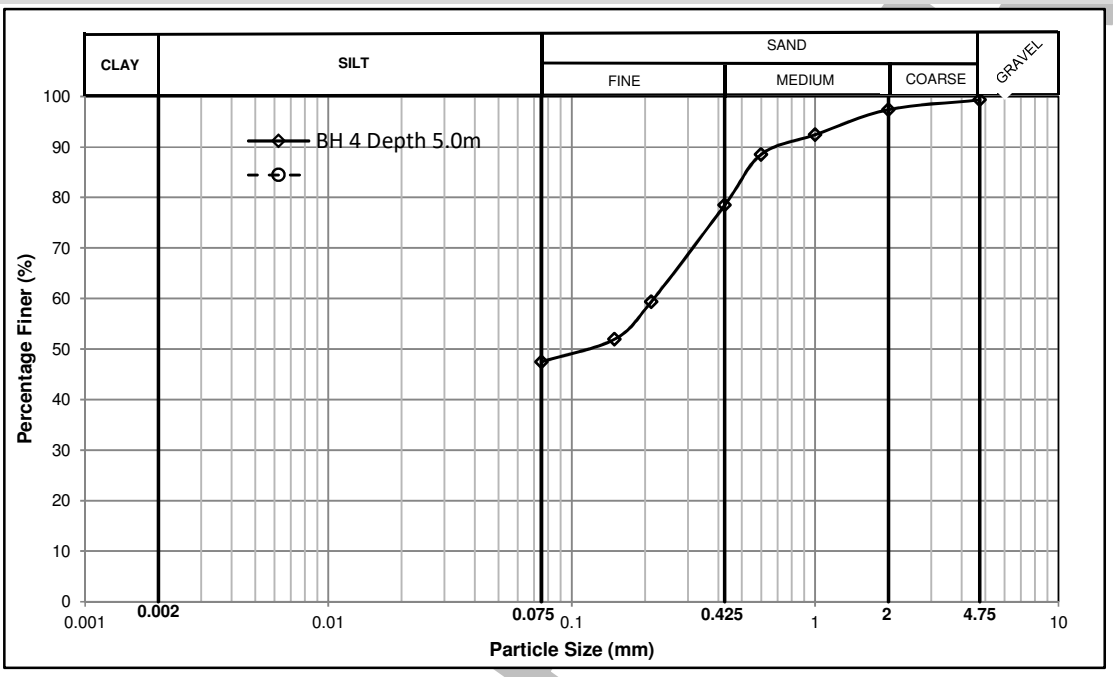
BH-No	Depth	Gravel	SAND (%)			SILT& CLAY	D_{10}	D_{30}	D_{60}	Cu	Cc
	(m)	(%)	Coarse	Medium	Fine	(%)	(mm)	(mm)	(mm)		
3	1.0m	6	7	28	29	30		0.081	0.451	#####	#####
3	3.0m	0	1	14	30	55			0.114	#####	#####
3	6.50m	0	6	50	22	22		0.243	0.757	#####	#####
4	3.0m	0	1	41	27	31			0.439	#####	#####

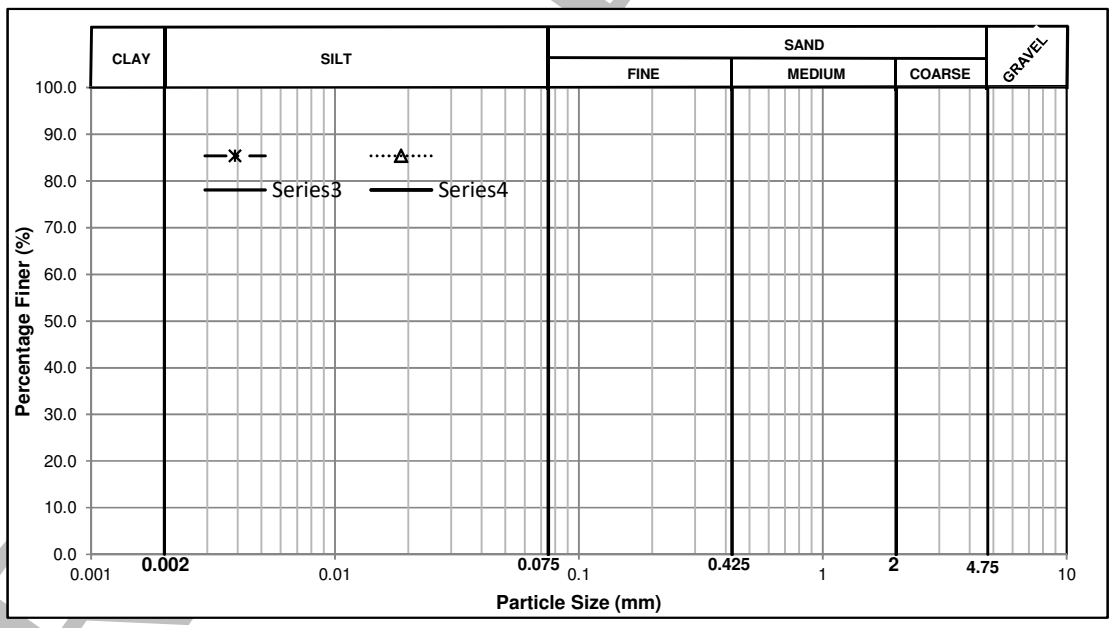
DRAFT

Project No: MSGTPL/SI-5918/23-24

Project : Proposed Construction of Ground + 2 Floors Villa at Ottiyambakkam

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						
4	5.0m	1	2	19	31	47			0.219	#####	#####

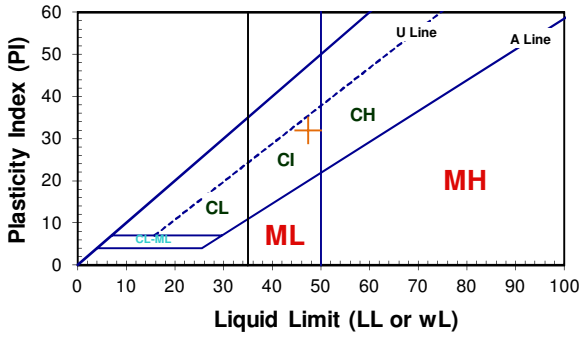
ATTERBERG LIMITS DATA SHEET

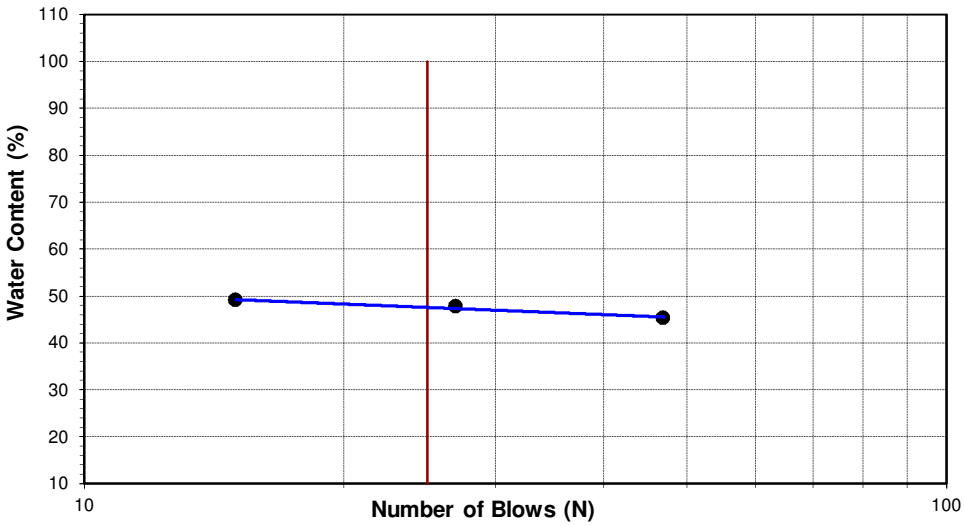
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	1
Sample Depth:	8.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	27	47					
Tare Number	---	---	159	149	116		68			
Weight of Empty Tare	M_C	(g)	30.51	29.97	30.06		28.27			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	59.43	65.46	67.31		54.14			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	49.92	53.99	55.70		50.7			
Weight of Soil	M_S	(g)	19.41	24.02	25.64		22.43			
Weight of Water	M_W	(g)	9.51	11.47	11.61		3.44			
Water Content	*w*	(%)	**49.0**	**47.8**	**45.3**		**15.3**			

Liquid Limit (LL or w_L) (%)	47
Plastic Limit (PL or w_P) (%)	15
Plasticity Index (PI) (%)	32
Soil Classification	CI





DRAFT REPORT

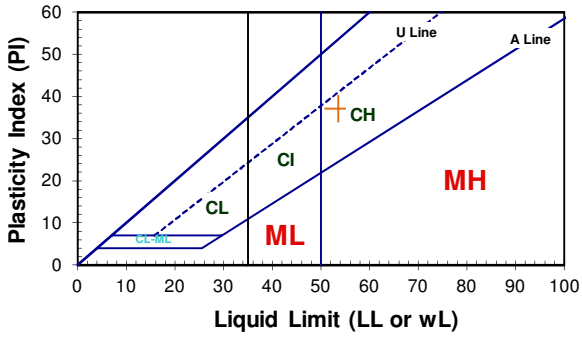
ATTERBERG LIMITS DATA SHEET

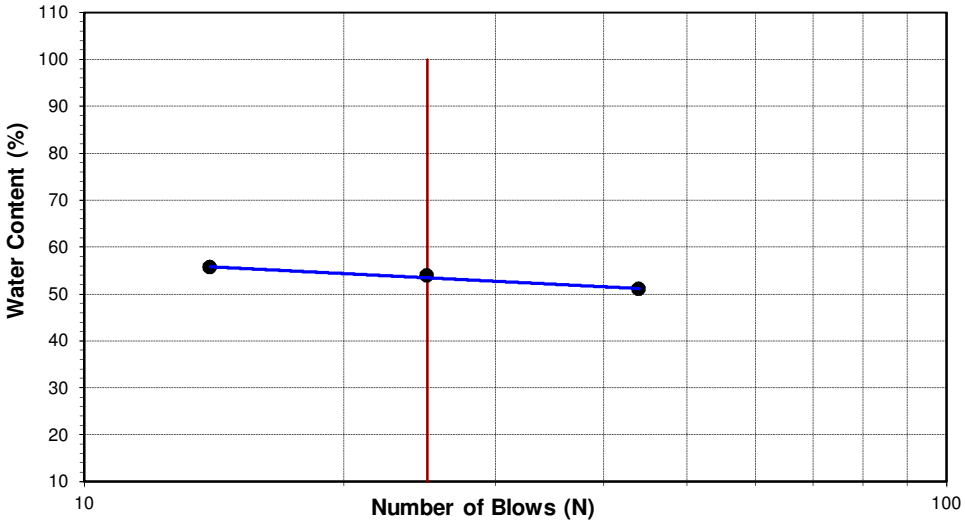
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	2
Sample Depth:	3.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	14	25	44					
Tare Number	---	---	146	120	44		281			
Weight of Empty Tare	M_C	(g)	28.67	29.13	28.66		29.13			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	61.89	62.08	66.46		46.07			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	50.02	50.55	53.70		43.7			
Weight of Soil	M_S	(g)	21.35	21.42	25.04		14.57			
Weight of Water	M_W	(g)	11.87	11.53	12.76		2.37			
Water Content	*w*	(%)	**55.6**	**53.8**	**51.0**		**16.3**			

Liquid Limit (LL or w_L) (%)	53
Plastic Limit (PL or w_P) (%)	16
Plasticity Index (PI) (%)	37
Soil Classification	CH





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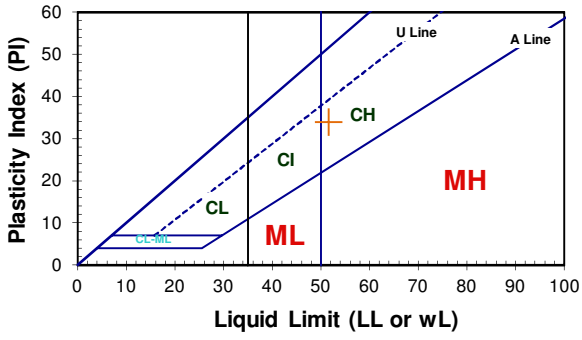
ATTERBERG LIMITS DATA SHEET

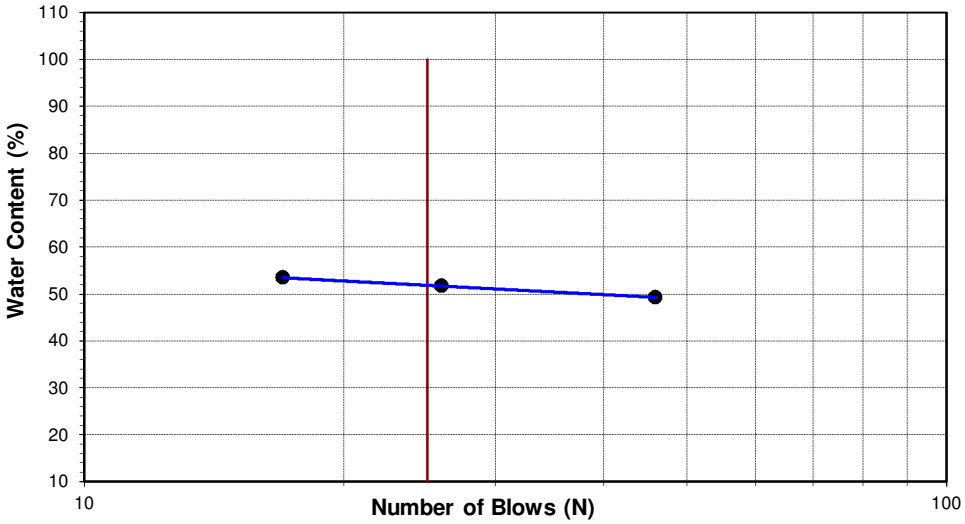
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	2
Sample Depth:	4.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	17	26	46					
Tare Number	---	---	208	137	91		24			
Weight of Empty Tare	M_C	(g)	29.02	30.2	29.69		29.92			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	58.57	61.33	60.9		50.91			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	48.28	50.72	50.60		47.8			
Weight of Soil	M_S	(g)	19.26	20.52	20.91		17.88			
Weight of Water	M_W	(g)	10.29	10.61	10.30		3.11			
Water Content	*w*	(%)	**53.4**	**51.7**	**49.3**		**17.4**			

Liquid Limit (LL or w_L) (%)	51
Plastic Limit (PL or w_P) (%)	17
Plasticity Index (PI) (%)	34
Soil Classification	CH





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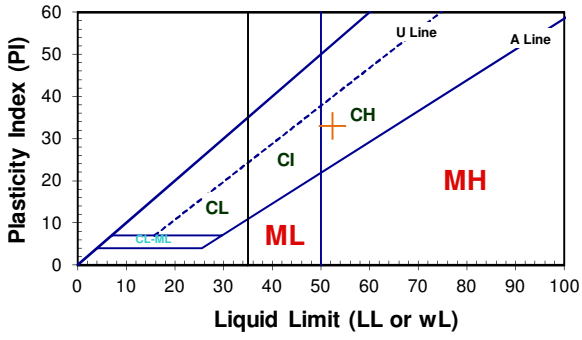
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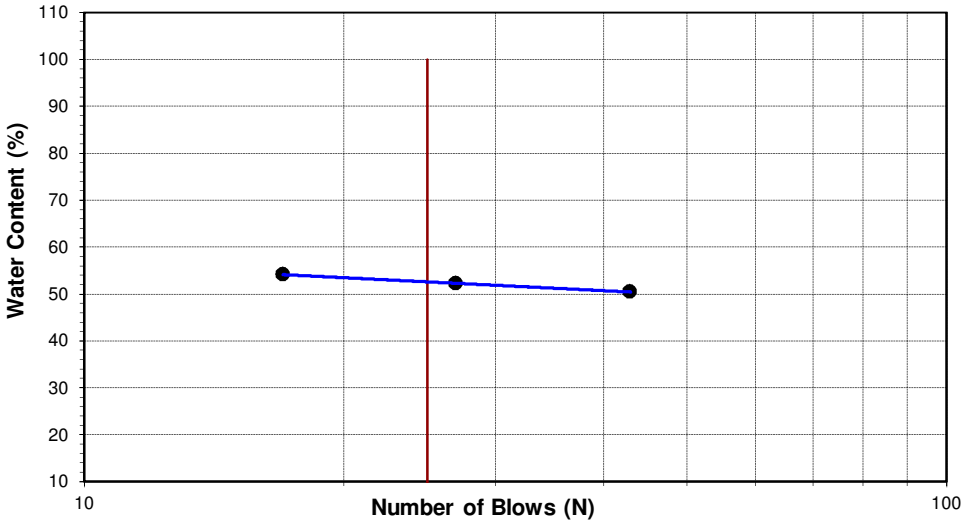
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	2
Sample Depth:	5.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	17	27	43					
Tare Number	---	---	184	222	268		202			
Weight of Empty Tare	M_C	(g)	28.76	28.63	30.4		29.69			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	60.88	67.29	66.35		41.98			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	49.60	54.02	54.30		40			
Weight of Soil	M_S	(g)	20.84	25.39	23.90		10.31			
Weight of Water	M_W	(g)	11.28	13.27	12.05		1.98			
Water Content	*w*	(%)	**54.1**	**52.3**	**50.4**		**19.2**			

Liquid Limit (LL or w_L) (%)	52
Plastic Limit (PL or w_P) (%)	19
Plasticity Index (PI) (%)	33
Soil Classification	CH





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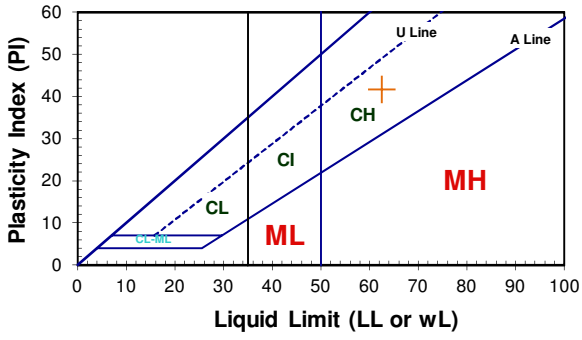
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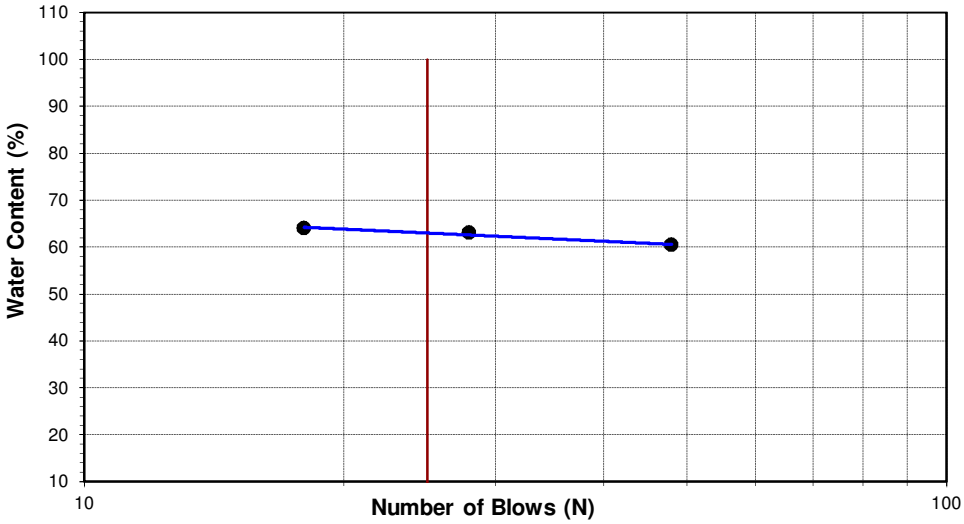
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	2
Sample Depth:	6.50m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	28	48					
Tare Number	---	---	267	176	201		104			
Weight of Empty Tare	M_C	(g)	30.4	27.9	28.03		29.89			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	63.2	58.73	60.06		49.82			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	50.40	46.82	48.00		46.4			
Weight of Soil	M_S	(g)	20.00	18.92	19.97		16.51			
Weight of Water	M_W	(g)	12.80	11.91	12.06		3.42			
Water Content	*w*	(%)	**64.0**	**62.9**	**60.4**		**20.7**			

Liquid Limit (LL or w_L) (%)	62
Plastic Limit (PL or w_P) (%)	21
Plasticity Index (PI) (%)	42
Soil Classification	CH





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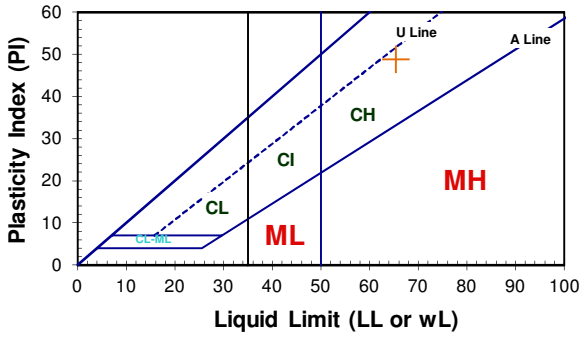
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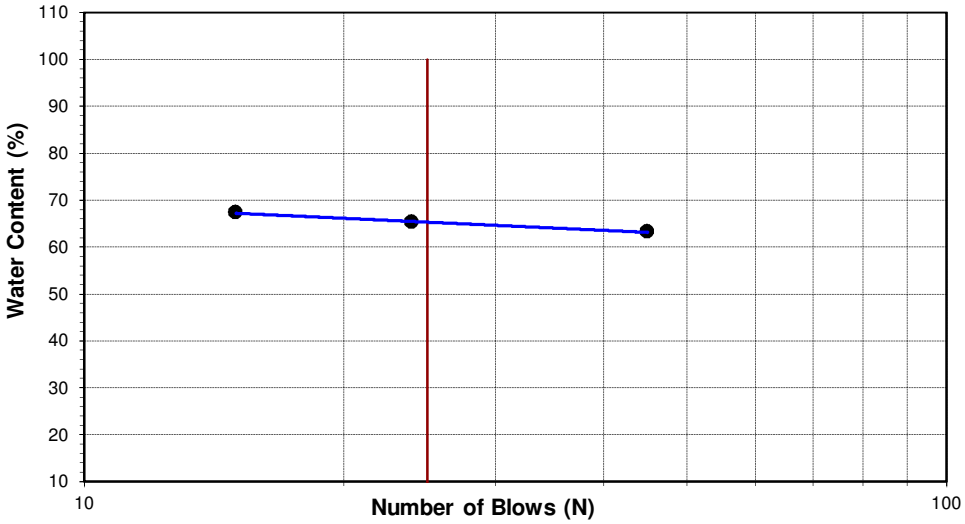
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	3
Sample Depth:	2.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	24	45					
Tare Number	---	---	51	234	170		192			
Weight of Empty Tare	M_C	(g)	28.68	29.13	30.47		30.35			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	62.94	58.29	61.77		49.5			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	49.16	46.77	49.65		46.8			
Weight of Soil	M_S	(g)	20.48	17.64	19.18		16.45			
Weight of Water	M_W	(g)	13.78	11.52	12.12		2.70			
Water Content	*w*	(%)	**67.3**	**65.3**	**63.2**		**16.4**			

Liquid Limit (LL or w_L) (%)	65
Plastic Limit (PL or w_P) (%)	16
Plasticity Index (PI) (%)	49
Soil Classification	CH





DRAFT REPORT

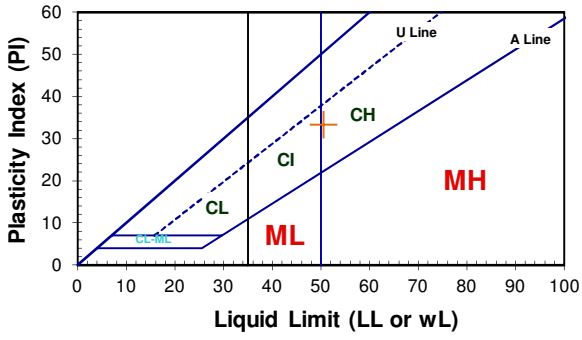
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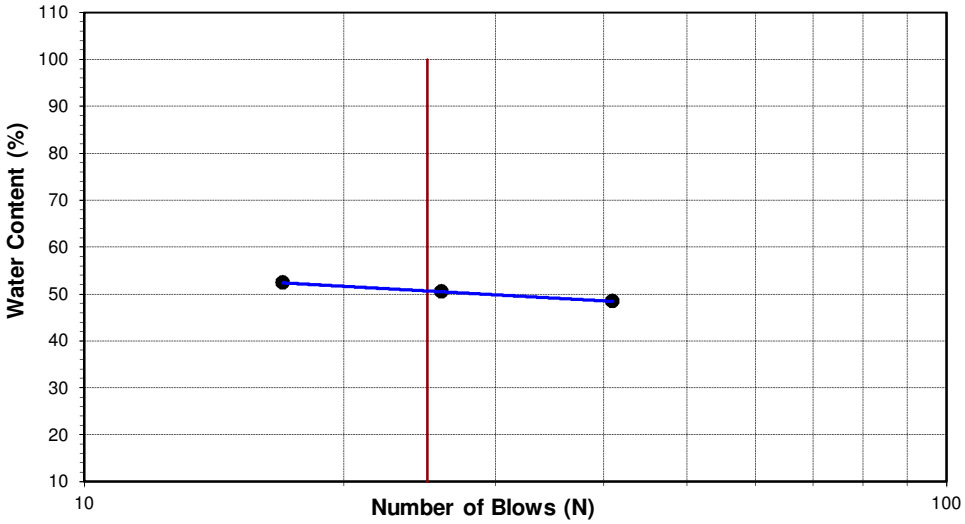
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	3
Sample Depth:	3.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	17	26	41					
Tare Number	---	---	68	209	5		161			
Weight of Empty Tare	M_C	(g)	28.27	29.26	31.87		29.4			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	53.26	62.7	65.06		42.98			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	44.67	51.49	54.23		41			
Weight of Soil	M_S	(g)	16.40	22.23	22.36		11.60			
Weight of Water	M_W	(g)	8.59	11.21	10.83		1.98			
Water Content	*w*	(%)	**52.4**	**50.4**	**48.4**		**17.1**			

Liquid Limit (LL or w_L) (%)	50
Plastic Limit (PL or w_P) (%)	17
Plasticity Index (PI) (%)	33
Soil Classification	CH





DRAFT REPORT

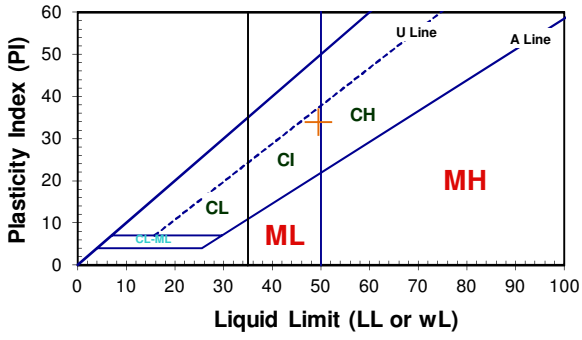
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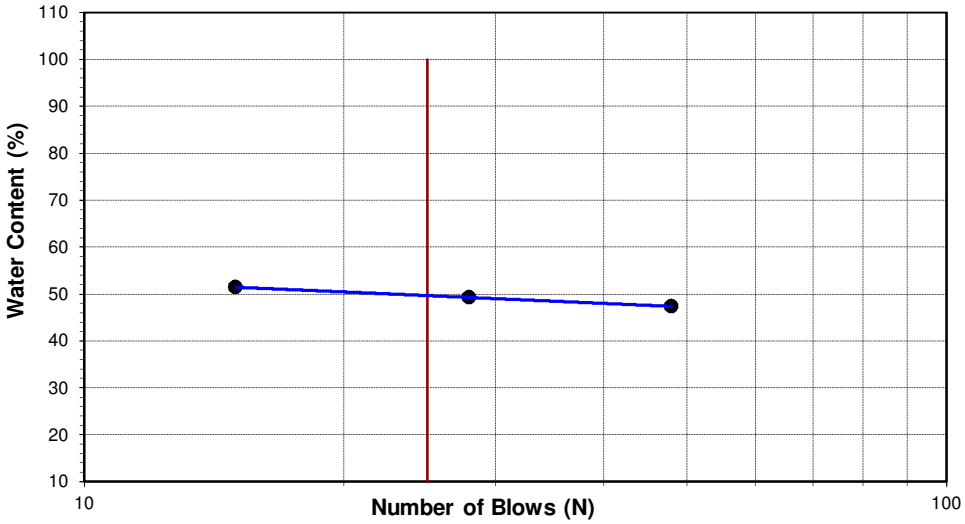
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	3
Sample Depth:	4.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	48					
Tare Number	---	---	272	233	114		235			
Weight of Empty Tare	M_C	(g)	30.82	31.14	29.4		29.01			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	53.96	60.08	58.09		48.26			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	46.10	50.53	48.87		45.7			
Weight of Soil	M_S	(g)	15.28	19.39	19.47		16.69			
Weight of Water	M_W	(g)	7.86	9.55	9.22		2.56			
Water Content	*w*	(%)	**51.4**	**49.3**	**47.4**		**15.3**			

Liquid Limit (LL or w_L) (%)	49
Plastic Limit (PL or w_P) (%)	15
Plasticity Index (PI) (%)	34
Soil Classification	CI





DRAFT REPORT

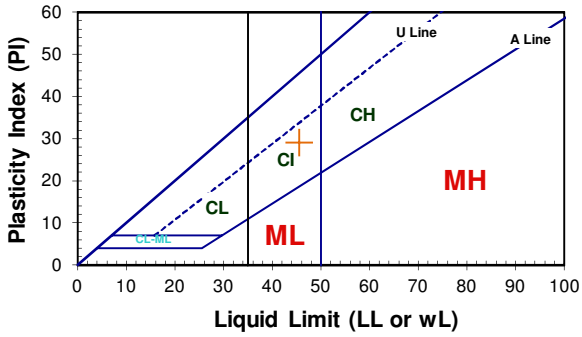
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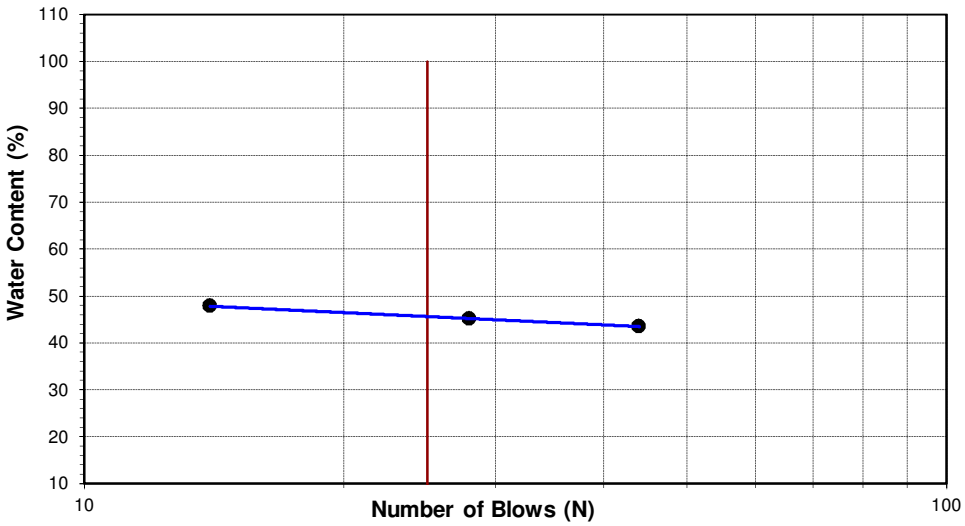
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	3
Sample Depth:	5.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	14	28	44					
Tare Number	---	---	162	118	30		121			
Weight of Empty Tare	M_C	(g)	29.45	29.57	28.12		29.01			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	52.73	57.47	61.67		51.11			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	45.20	48.79	51.50		48			
Weight of Soil	M_S	(g)	15.75	19.22	23.38		18.99			
Weight of Water	M_W	(g)	7.53	8.68	10.17		3.11			
Water Content	*w*	(%)	**47.8**	**45.2**	**43.5**		**16.4**			

Liquid Limit (LL or w_L) (%)	**45**
Plastic Limit (PL or w_P) (%)	**16**
Plasticity Index (PI) (%)	**29**
Soil Classification	**CI**





DRAFT REPORT

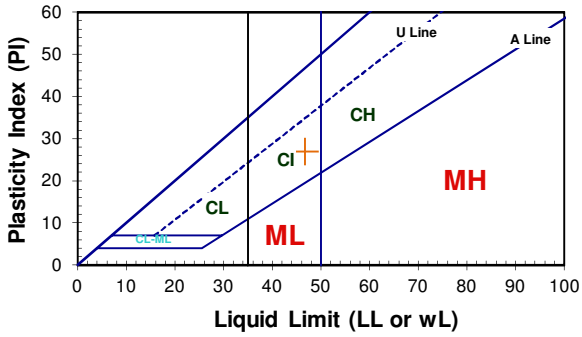
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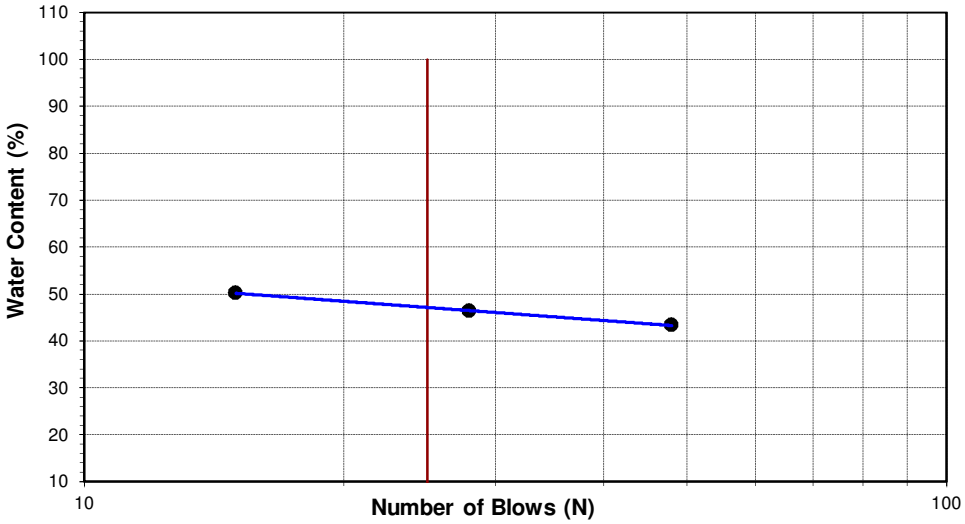
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	3
Sample Depth:	8.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	48					
Tare Number	---	---	47	181	30		99			
Weight of Empty Tare	M_C	(g)	31.8	29.98	28.12		29.97			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	54.18	54.05	53.09		53			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	46.70	46.43	45.54		49.23			
Weight of Soil	M_S	(g)	14.90	16.45	17.42		19.26			
Weight of Water	M_W	(g)	7.48	7.62	7.55		3.77			
Water Content	*w*	(%)	**50.2**	**46.3**	**43.3**		**19.6**			

Liquid Limit (LL or w_L) (%)	47
Plastic Limit (PL or w_P) (%)	20
Plasticity Index (PI) (%)	27
Soil Classification	CI





DRAFT REPORT

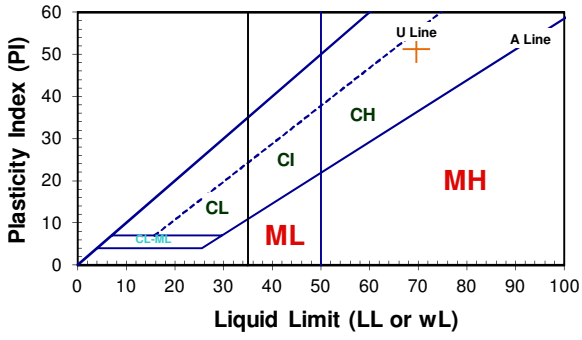
ATTERBERG LIMITS DATA SHEET

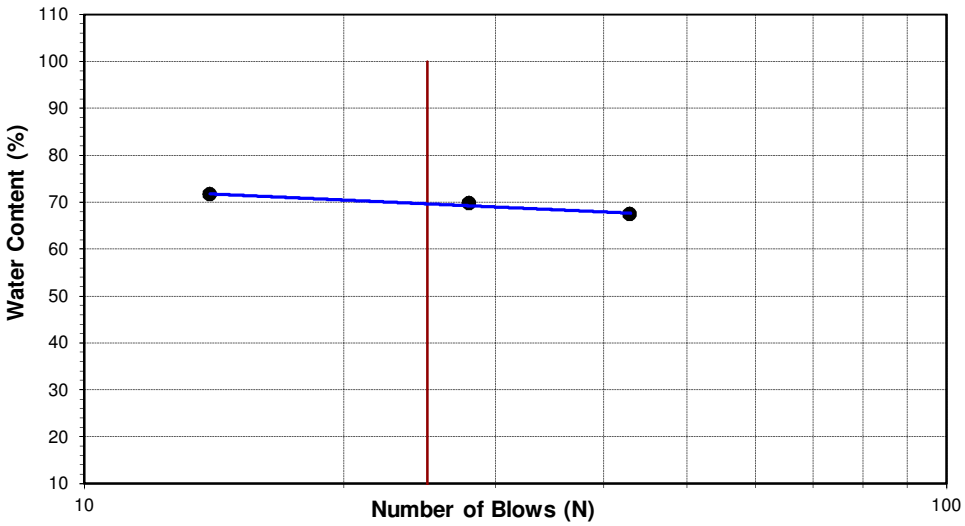
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	4
Sample Depth:	2.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	14	28	43					
Tare Number	---	---	294	261	179		189			
Weight of Empty Tare	M_C	(g)	29.15	28.96	27.53		30.31			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	57.72	61.26	53.04		53.23			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	45.80	48.00	42.77		49.7			
Weight of Soil	M_S	(g)	16.65	19.04	15.24		19.39			
Weight of Water	M_W	(g)	11.92	13.26	10.27		3.53			
Water Content	*w*	(%)	**71.6**	**69.6**	**67.4**		**18.2**			

Liquid Limit (LL or w_L) (%)	70
Plastic Limit (PL or w_P) (%)	18
Plasticity Index (PI) (%)	51
Soil Classification	CH





DRAFT REPORT

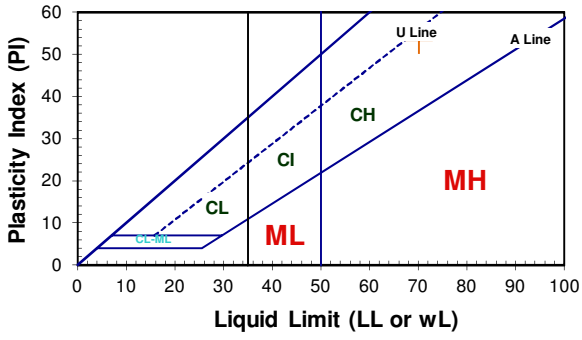
ATTERBERG LIMITS DATA SHEET

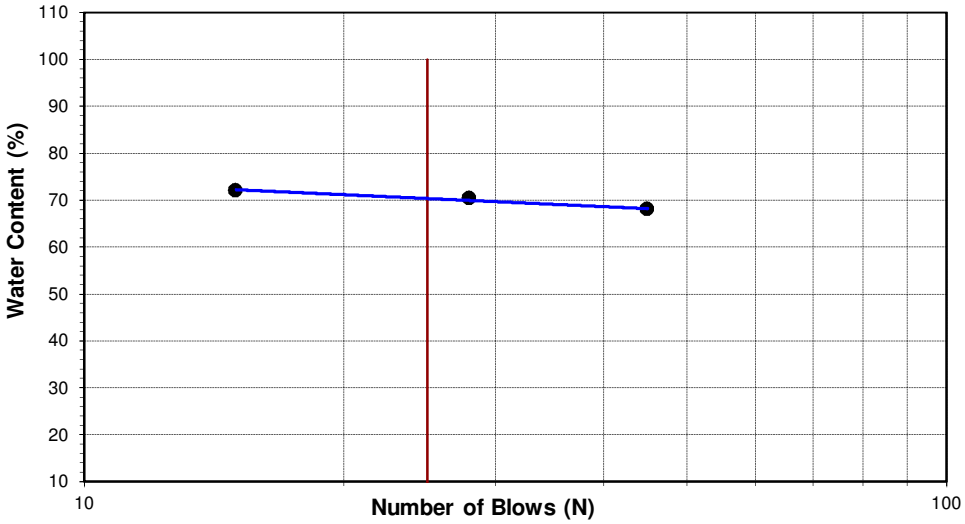
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	4
Sample Depth:	4.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	15	28	45					
Tare Number	---	---	2	163	200		102			
Weight of Empty Tare	M_C	(g)	31.01	29.39	29.04		29.07			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	58.52	53.15	58.03		53.83			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	47.00	43.34	46.30		50.3			
Weight of Soil	M_S	(g)	15.99	13.95	17.26		21.23			
Weight of Water	M_W	(g)	11.52	9.81	11.73		3.53			
Water Content	*w*	(%)	**72.0**	**70.3**	**68.0**		**16.6**			

Liquid Limit (LL or w_L) (%)	70
Plastic Limit (PL or w_P) (%)	17
Plasticity Index (PI) (%)	53
Soil Classification	CH





DRAFT REPORT

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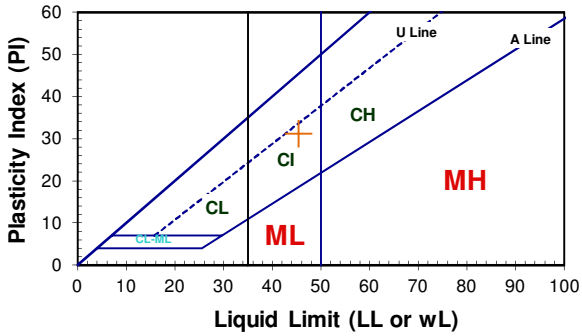
ATTERBERG LIMITS DATA SHEET

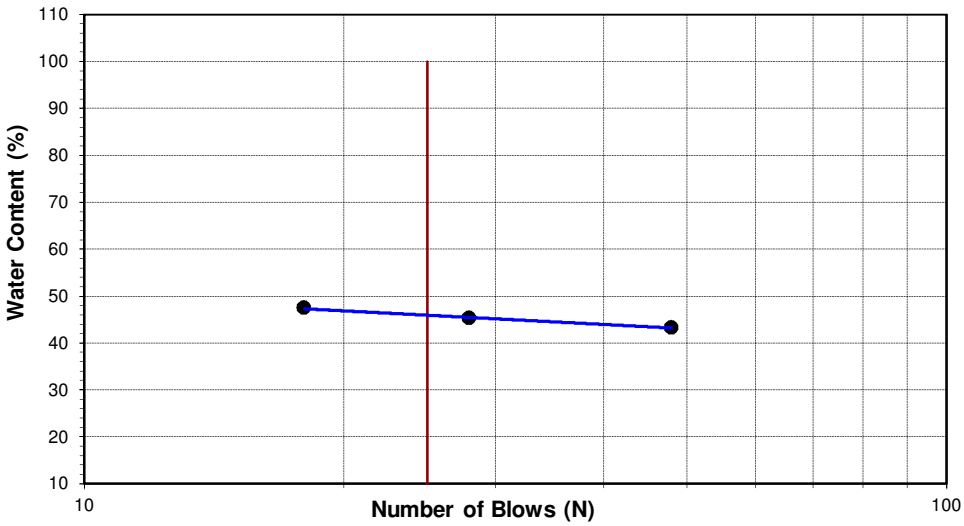
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	4
Sample Depth:	6.50m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	18	28	48					
Tare Number	---	---	157	2	213		282			
Weight of Empty Tare	M_C	(g)	30.38	31.01	29.73		29.44			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	56.64	55.55	56.06		52.9			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	48.20	47.90	48.11		50			
Weight of Soil	M_S	(g)	17.82	16.89	18.38		20.56			
Weight of Water	M_W	(g)	8.44	7.65	7.95		2.90			
Water Content	*w*	(%)	**47.4**	**45.3**	**43.3**		**14.1**			

Liquid Limit (LL or w_L) (%)	**45**
Plastic Limit (PL or w_P) (%)	**14**
Plasticity Index (PI) (%)	**31**
Soil Classification	**CH**





DRAFT REPORT

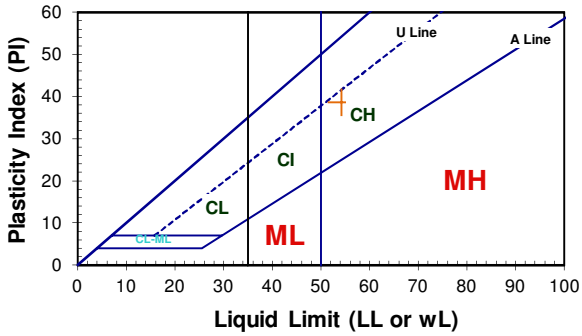
ATTERBERG LIMITS DATA SHEET

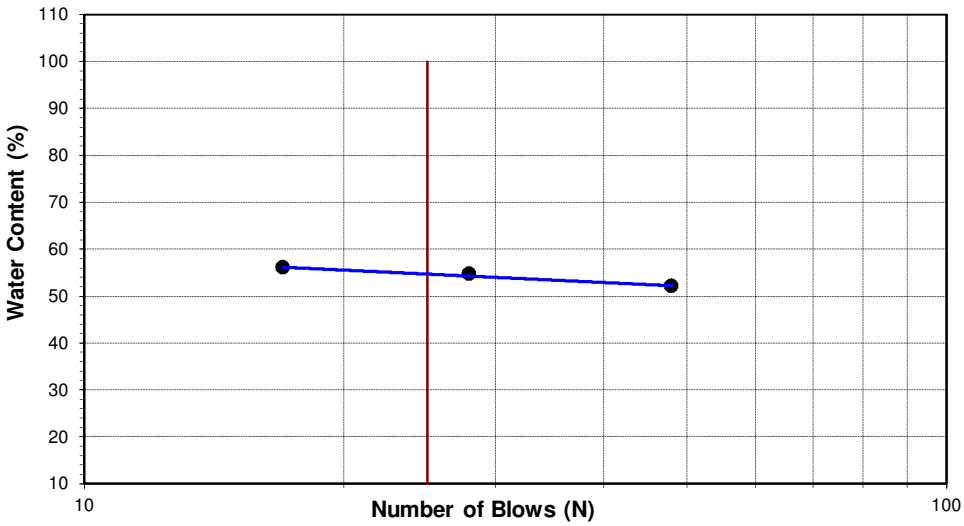
IS-2720-Part-5

Project :	Ground + 2 Floors Villa
Location:	Ottiyambakkam
Boring No:	4
Sample Depth:	8.0m
Project No:	**MSGTPL/SI-5918/23-24**

TEST			LIQUID LIMIT				PLASTIC LIMIT			
Variable	NO		1	2	3		1	2		
	Var.	Units								
Number of Blows	N	blows	17	28	48					
Tare Number	---	---	11	105	50		283			
Weight of Empty Tare	M_C	(g)	29.03	29.24	30.35		30.5			
Wt of Tare + Soil (Wet)	M_{CMS}	(g)	49.71	50.9	51.36		49.2			
Wt of Tare + Soil (Dry)	M_{CDS}	(g)	42.29	43.25	44.17		46.7			
Weight of Soil	M_S	(g)	13.26	14.01	13.82		16.20			
Weight of Water	M_W	(g)	7.42	7.65	7.19		2.50			
Water Content	*w*	(%)	**56.0**	**54.6**	**52.0**		**15.4**			

Liquid Limit (LL or w_L) (%)	**54**
Plastic Limit (PL or w_P) (%)	**15**
Plasticity Index (PI) (%)	**39**
Soil Classification	**CH**





.....End of the Report.....

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