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PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+5 UPPER FLOORS) AT SURVEY NO: 365/100, PADUR VILLAGE, KANCHEEPURAM DISTRICT.

Report on Geotechnical Investigation

Client:

Mr. S. Gunaseelan,

Chennai.

REPORT ISSUE STATUS			
<1>	11-06-2019	First Revision	Additional one floor added in the proposed structure (S+5Floors) Residential Building
<0>	01-03-2018	Final Report	-
Issue	**Date**	**Description**	**Corrections**

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

MARS SYNERGY GEOTECH Pvt Ltd
An ISO 9001: 2015 Certificate Company

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Project No: MSGTPL/SI-3974-R1/17-18

Feb- 2018

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REPORT ON SOIL INVESTIGATION AND RECOMMENDATIONS FOR THE PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+5UPPER FLOORS) AT PADUR.

1.0 INTRODUCTION

Mr. S. Gunaseelan, Chennai is planning to construct the residential building (Stilt+5upper floors) at Indra Avenue connecting from Old Kovalm Road Survey No: 365/100, Padur Village, Kancheepuram District, Tamilnadu, INDIA. **M/s. Mars Synergy Geotech Pvt Ltd**, Chennai has carried out this investigation and completed the field work on 19th Feb 2018 as per the instructions from the 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 recommendation for foundations.

1.1 DESCRIPTION OF STRUCTURE

The proposed structure is residential building (Stilt+5upper floors). 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 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 set 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, tests 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-3974-R1** enclosed. Investigations were conducted up to 8.0m from existing ground level where SPT is more than 50blows. 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
- 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 three distinctive layers there are

(i) Medium Dense SAND up to -3.50m with **SPT's N=12-18**
(ii) Very Dense Moorum -3.50m to -5.50m with **SPT's N= >50**
(iii) Soft disintegrated Rock -5.50m to 8.0m with **SPT's N= >10**

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

1.6 GROUND WATER TABLE

At the time of soil investigation (19/02/2018), the ground water table was (-)1.0m 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 soil is good at shallow depth onwards up to drilled depth -8.0m from existing ground level.

Based on soil strata it is ideal to adopt open shallow foundation at -2.0m level, recommended.

1.8 RECOMMENDATIONS

- ✓ The proposed structure is a Stilt+ Five upper floors residential building.
- ✓ Adopt open shallow foundation in the form of strip raft at a depth of 2.0m below the G.L
- ✓ The Safe bearing capacity can be taken of soil at 2.0m below G.L can be taken as **20T/Sq.m.**
- ✓ Foundation should rest on 100mm thick 1:3:6 concrete mat.
- ✓ Columns shall be tied in both directions at plinth level.
- ✓ All foundation works should be done in dry conditions only.
- ✓ Settlements are within permissible limits as per IS-1904-1986.

VASANTHI PADMANABAN, M.Tech.,
Registered Geotechnical Engineer
Reg. No: CGLRGN/RGTE/2019/08/011

2.0 DETERMINATION OF BEARING CAPACITY OF SHALLOW FOUNDATIONS

[Based On IS: 6403-1981]

Size of Footing (1.5x1.5m) Calculation Purpose
Depth of Foundation: 1.75m
Existing Ground level: 0.00M
Ground Water Table level: -0.00M (Due to Heavy Rain Temporary)
Bulk Density (W) of Soil above Footing Base: 1.75
Submerged Density (W') of Soil above Footing Base: 0.75T/Cu.M.
Bulk Density (W) of Soil Below Footing Base: 1.80T/Cu.M.
Factor of Safety 2.5

Shape factor	Depth Factor	Inclination Factor
Sq = 1.200	Dq = 1.21	Iq = 1.000
Sg = 0.600	Dg = 1.21	Ig = 1.000

Water Table Correction Factor w' = 0.50

Effective surcharge at base level q = 1.312 T/Sq.M.

Ultimate Net B.C. = Qult_n = q*(Nq-1)*Sq*Dq*Iq + 0.5*B*W*Ng*Sg*Dg*Ig*W'

Angle of Internal Friction (phai): 31^0

Bearing Capacity Factors
Nq = 21.38, Ng = 27.53

Thus Qult_n =51.96 T/Sq.M.
Allowable Bearing Capacity (Qall) =20.78T/Sq.M. **Say 20T/m²**

Settlement Calculations as per IS-8009-(Part1) 1998

S= Sc+Si

Sc≈10mm

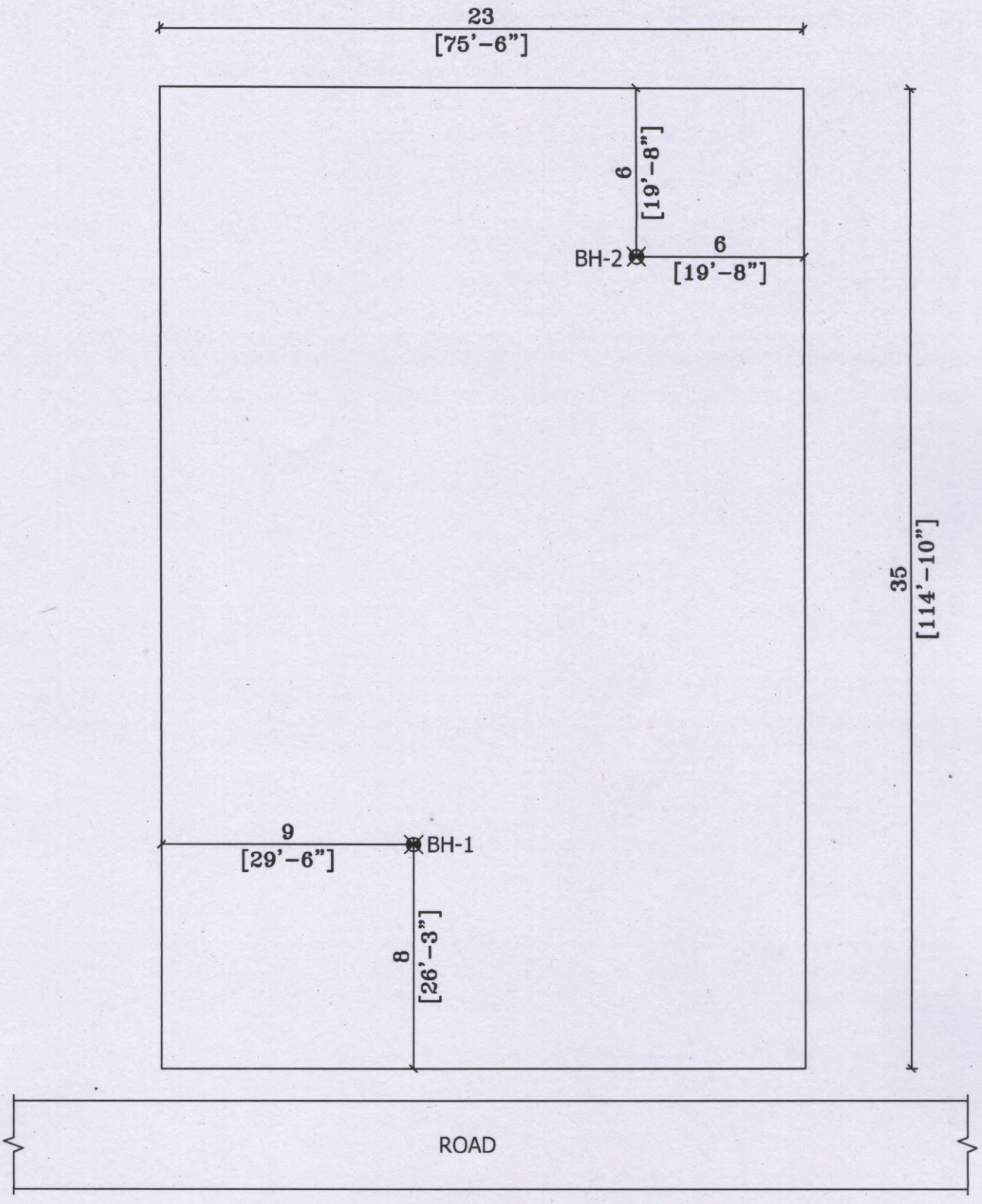
$$Si = pB\frac{(1-\mu^2)}{Es}I$$

$$Si = 20x1.5\frac{(1-0.3^2)}{3500}1.31 = 0.0102m$$ =0.0102x1000=10.21mm

S= Sc+Si

S=10+10.21=20.21mm **Say 21mm**

Total settlements 21.0 mm, it is less than 25mm hence it is safe as per IS-1904-1986.



TITLE: DRAWING SHOWING THE SOIL INVESTIGATION BORE HOLE LOCATIONS

PROJECT PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING AT PADUR

LEGEND:

BH: BORE HOLE	-SOIL TEST LOCATION		SCALE: N T S
ACTIVITY	EXECUTED BY	DATE STARTED	DATE FINISHED
FOREMEN	RAJA	19-02-2018	20-02-2018
DRAFTING	A SRINIVASAN	21-02-2018	21-02-2018

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DRAWING NO: MSGTPL/SI-3974/17-18

ALL DIMENSIONS ARE IN METER/FEET

BOREHOLE LOG

Project No: MSGTPL/SI-3974/17-18

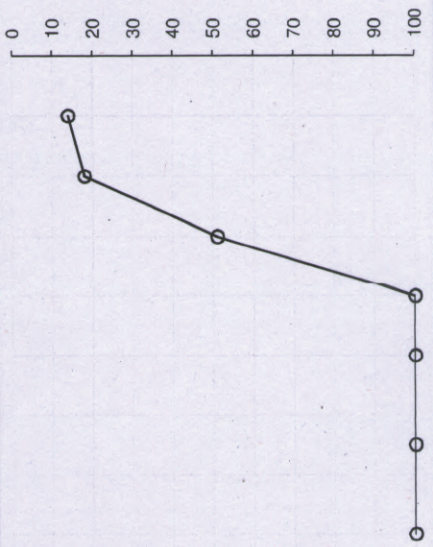
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

Location	Padur
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-1**	
G.W.T (m)	(-) 1.0m	
Date of Start	19-Feb-2018	
Date of Complete	19-Feb-2018	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	8.0m	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	2.0	Medium Dense Brownish Fine SAND		SW	SPT	1.0	4	6	8	**14**
1.5										
2.0					SPT	2.0	5	8	10	**18**
2.5	1.0	Very Dense Brownish Silty Fine SAND		SM						
3.0					SPT	3.0	10	21	30	**51**
3.5										
4.0	2.0	Very Dense Brownish Moorum		SM	SPT	4.0	26	50 Blows for 13Cm		
4.5										
5.0					SPT	5.0	50 Blows for 2Cm			
5.5										
6.0										
6.5	3.0	Soft Disintegrated Rock		GP	SPT	6.5	50 Blows for 0Cm			
7.0										
7.5										
8.0					SPT	8.0	-	-	-	>100
8.5										
9.0										
9.5										
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) 8.0m

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-3974/17-18

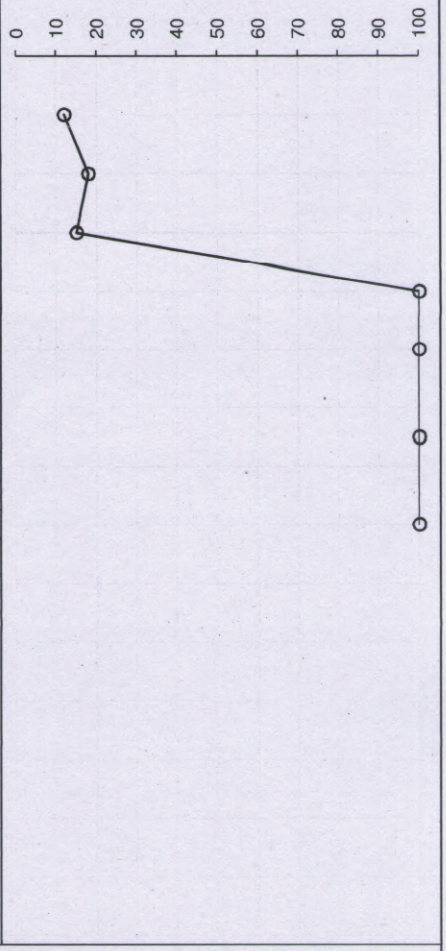
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

Location	Padur
Ground R.L	Nil
Drilling	Rotary

Borehole No	**BH-2**	
G.W.T (m)	(-) 1.0m	
Date of Start	19-Feb-2018	
Date of Complete	19-Feb-2018	
Dia of Bore (mm)	100	Sheet
Termination Depth (m)	8.0m	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					SPT	1.0	5	5	7	12
1.5	3.0	Medium Dense Brownish Fine SAND		SW						
2.0					SPT	2.0	6	8	10	18
2.5										
3.0					SPT	3.0	5	6	9	15
3.5	1.0	Very Dense Brownish Moorum		SM						
4.0					SPT	4.0	50 Blows for 13Cm			
4.5										
5.0					SPT	5.0	50 Blows for 3Cm			
5.5										
6.0	4.0	Soft Disintegrated Rock		GP						
6.5					SPT	6.5	50 Blows for 0Cm			
7.0										
7.5										
8.0					SPT	8.0	-	-	-	>100
8.5										
9.0										
9.5										
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) 8.0m

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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Project No: MSGTPL/SI-397417-18

Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

BH No 1 | **Ground Water Level:(-) 1.0m** | **Termination Depth:** 8.0m

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
		0.00														
14	2.00	1.00	Medium Dense Brownish Fine SAND	SW	16						2.70	0	1	20	76	3
18		2.00			15							0	0	21	76	2
51	1.00	3.00	Very Dense Brownish Silty Fine SAND	SM	13						2.64	0	0	14	53	32
>100	2.00	4.00	Very Dense Brownish Moorum	SM	17							15	4	26	28	27
>100		5.00			9						2.70					
>100	3.00	6.50	Soft Disintegrated Rock	GP												
>100		8.00														

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Project No: MSGTPL/SI-3974/17-18

Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

BH No 2 | **Ground Water Level:(-) 1.0m** | **Termination Depth: 8.0m**

SUMMARY OF TEST RESULTS

N' Value	Layer Thickness	Depth (m)	Soil Description	IS Classification	Index Properties (%) NMC	W_L	W_P	I_P	Ic	FreeSwell	Specific Gravity	Grain Size Analysis (%) Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt & Clay
		0.00														
12	3.00	1.00	Medium Dense Brownish Fine SAND	SW	6							0	1	26	68	5
18		2.00			11						2.67	0	0	34	59	6
15	1.00	3.00	Very Dense Brownish Moorum	SM	15											
>100		4.00			7						2.67	8	8	31	25	27
>100	4.00	5.00	Soft Disintegrated Rock	GP												
>100		6.50														
>100		8.00														

6.0 NATURAL MOISTURE COINTENT

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Project No: MSGTPL/SI-3974/17-18
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	1		1		1		1		1		2	
Depth (m)	1.0		2.0		3.0		4.0		5.0		1.0	
Tare No	33	18	128	51	292	67	22	161	163	40	115	231
Wt of Tare (gr)	28.52	28.95	30.48	28.68	30.76	32.06	29.86	29.40	29.37	29.69	31.26	27.49
Tare + Soil (gr)	63.57	56.98	57.36	55.38	62.57	67.10	60.64	58.39	55.87	53.42	64.11	48.95
Tare+Dry soil (gr)	58.85	53.18	53.78	51.82	58.90	63.07	56.16	54.19	53.78	51.52	62.14	47.70
Wt of Water (gr)	4.72	3.80	3.58	3.56	3.67	4.03	4.48	4.20	2.09	1.90	1.97	1.25
Wt Dry soil (gr)	30.33	24.23	23.30	23.14	28.14	31.01	26.30	24.79	24.41	21.83	30.88	20.21
Water Content (%)	15.56	15.68	15.36	15.38	13.04	13.00	17.03	16.94	8.56	8.70	6.38	6.19
Average Water Content (%)	16		15		13		17		9		6	

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Project No: MSGTPL/SI-3974/17-18
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

Method: IS-2720 P-2

Natural Moisture Content Data Sheet

BH.No/ Pit no	2		2		2							
Depth (m)	2.0		4.0		5.0							
Tare No	19	223	58	143	198	187						
Wt of Tare (gr)	29.41	29.10	29.64	29.53	30.16	29.56						
Tare + Soil (gr)	56.92	55.62	55.75	53.57	52.18	63.61						
Tare+Dry soil (gr)	54.25	53.03	52.32	50.42	50.68	61.37						
Wt of Water (gr)	2.67	2.59	3.43	3.15	1.50	2.24						
Wt Dry soil (gr)	24.84	23.93	22.68	20.89	20.52	31.81						
Water Content (%)	10.75	10.82	15.12	15.08	7.31	7.04						
Average Water Content (%)	11		15		7							

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SPECIFIC GRAVITY TEST

Project No: MSGTPL/SI-3974/17-18
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

BH.No	1
Depth(m)	1.0

Pycnometer number			61	65
Weight of bottle	w_1	g	34.5400	36.6100
Weight of bottle + soil	w_2	g	45.8900	47.0600
Weight of bottle + soil + water	w_3	g	93.3500	94.2100
Weight of bottle full of water	w_4	g	86.1900	87.6300
Weight of soil	w_2-w_1	g	11.3500	10.4500
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.70883	2.70026
Average value G_s			2.70	

BH.No	1
Depth(m)	3.0

Pycnometer number			32	72
Weight of bottle	w_1	g	46.3100	34.0700
Weight of bottle + soil	w_2	g	55.0300	42.7300
Weight of bottle + soil + water	w_3	g	102.2500	91.2500
Weight of bottle full of water	w_4	g	96.8300	85.8700
Weight of soil	w_2-w_1	g	8.7200	8.6600
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.64242	2.64024
Average value G_s			2.64	

SPECIFIC GRAVITY TEST

Project No: MSGTPL/SI-3974/17-18
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

BH.No	1
Depth(m)	5.0

Pycnometer number			2	74
Weight of bottle	w_1	g	35.9800	34.6100
Weight of bottle + soil	w_2	g	37.2500	42.2500
Weight of bottle + soil + water	w_3	g	88.2800	91.7200
Weight of bottle full of water	w_4	g	87.4800	86.9100
Weight of soil	w_2-w_1	g	1.2700	7.6400
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.70213	2.69965
Average value G_s			2.70	

BH.No	2
Depth(m)	2.0

Pycnometer number			5	15
Weight of bottle	w_1	g	28.5900	27.3900
Weight of bottle + soil	w_2	g	40.1600	40.7400
Weight of bottle + soil + water	w_3	g	86.7900	87.8500
Weight of bottle full of water	w_4	g	79.5500	79.4900
Weight of soil	w_2-w_1	g	11.5700	13.3500
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.67206	2.67535
Average value G_s			2.67	

SPECIFIC GRAVITY TEST

Project No: MSGTPL/SI-3974/17-18
Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

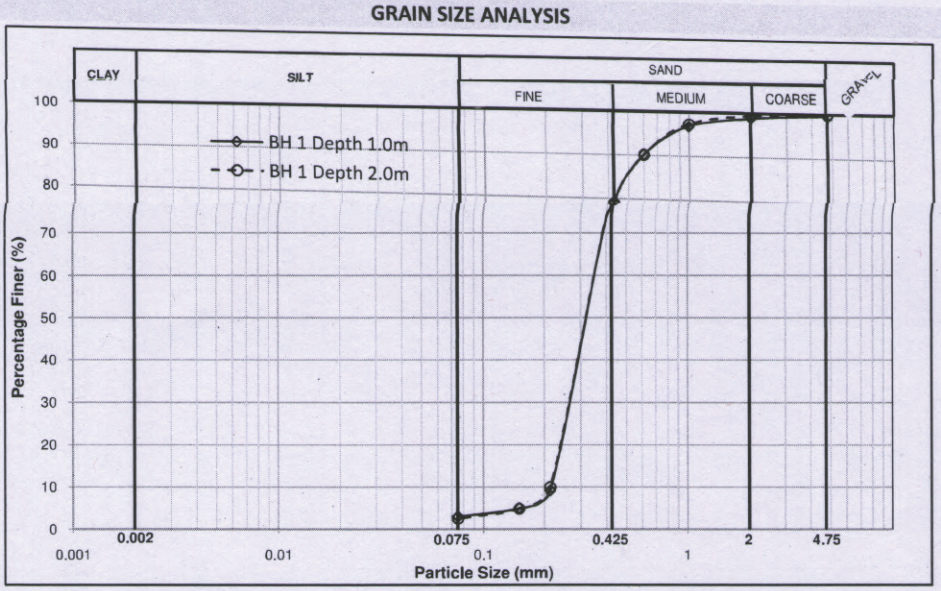
BH.No	2
Depth(m)	4.0

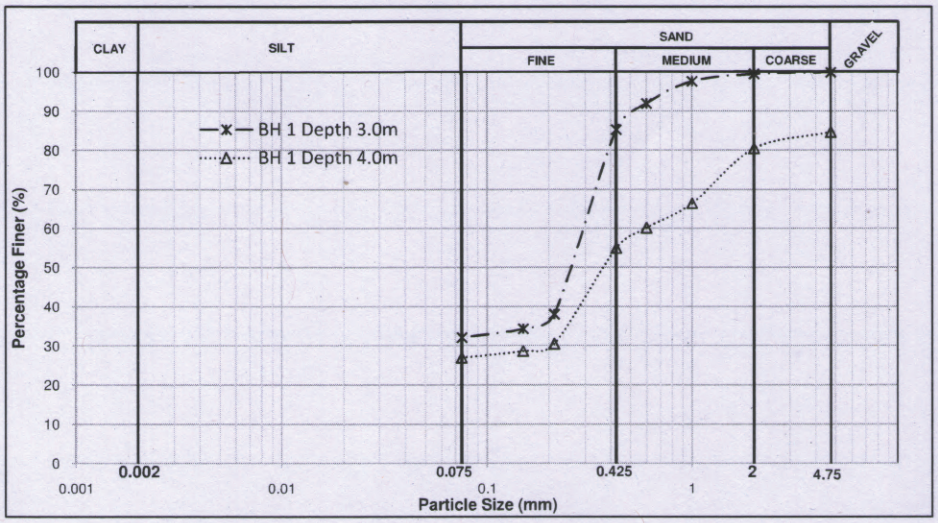
Pycnometer number			44	23
Weight of bottle	w_1	g	33.3900	35.2700
Weight of bottle + soil	w_2	g	44.1300	38.1200
Weight of bottle + soil + water	w_3	g	94.5200	90.0800
Weight of bottle full of water	w_4	g	87.8000	88.3000
Weight of soil	w_2-w_1	g	10.7400	2.8500
Specific gravity	$\frac{w2-w1}{(w4-w1)-(w3-w2)}$		2.67164	2.66355
Average value G_s			2.67	

Project No: MSGTPL/SI-3974/17-18

Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

GRAIN SIZE ANALYSIS



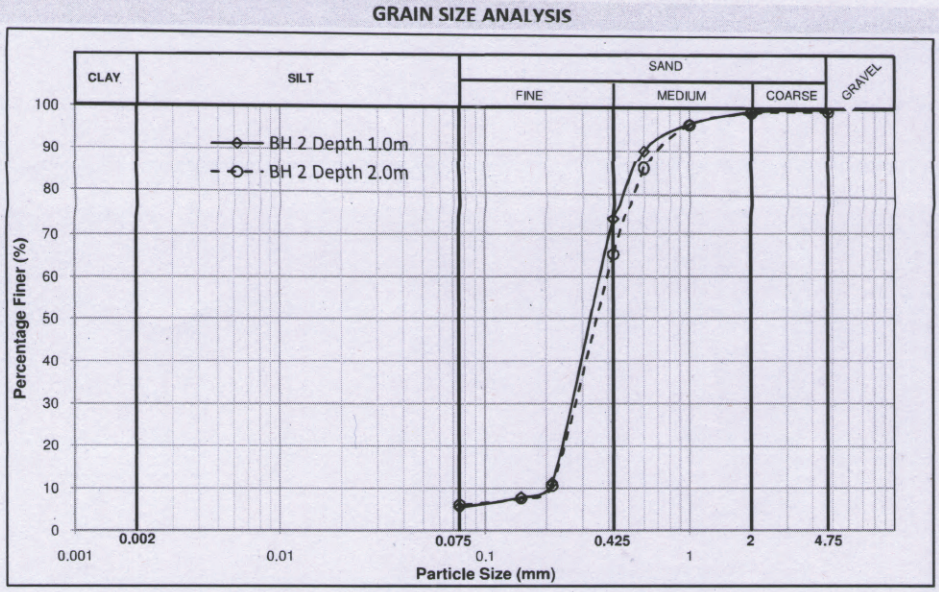


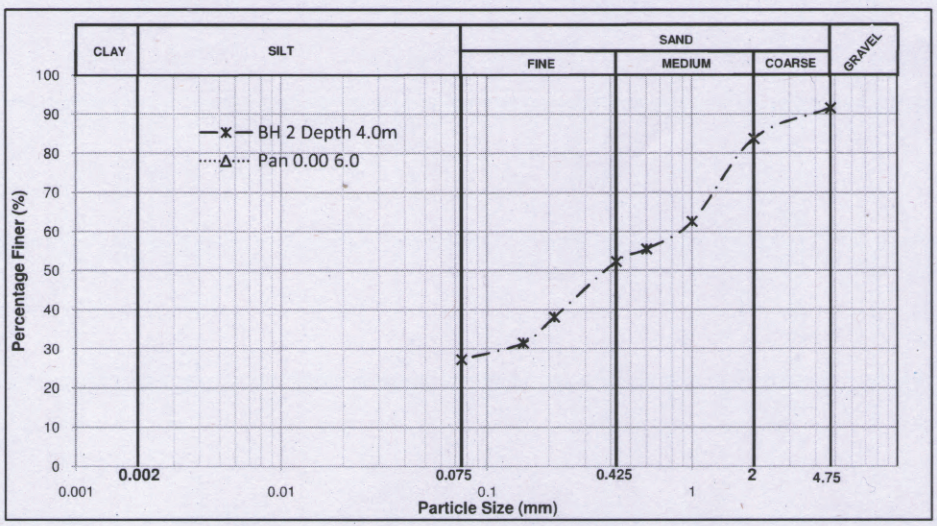
BH-No	Depth	Gravel	SAND (%)			SILT& CLAY	D_{10}	D_{30}	D_{60}	Cu	Cc
	(m)	(%)	Coarse	Medium	Fine	(%)	(mm)	(mm)	(mm)		
1	1.0m	0	1	20	76	3		0.276	0.367		
1	2.0m	0	0	21	76	2	0.212	0.274	0.367	1.7	1.0
1	3.0m	0	0	14	53	32			-4.858		
1	4.0m	15	4	26	28	27		0.196	0.597		

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Project: Proposed Construction of Residential Building (Stilt+4 Upper Floors)at Padur

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)		
2	1.0m	0	1	26	68	5		0.276	0.378		
2	2.0m	0	0	34	59	6	0.199	0.288	0.405	2.0	1.0
2	4.0m	8	8	31	25	27		0.066	0.644		
0	0	100	0	0	0	0					



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

Verified RealEstate™

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

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