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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
'ThalamuthuNatarajan Building', No.1, Gandhi Irwin Road,
Egmore, Chennai-600 008.

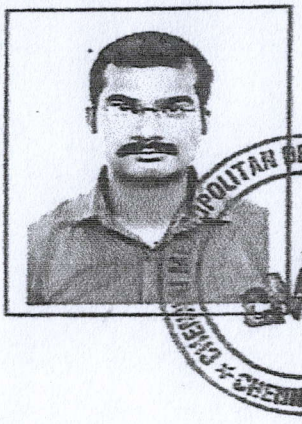
PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru M. AMMAIAPPAN** has enrolled as **Registered Geo-Technical Engineer (RGTE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.E.,(Geo Technical Engg.)** and experience in the relevant field for **07 years.**

He has been given the Registration No.**GTE/2020/08/046** on **29.08.2020.** He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part-V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(Ms) No.18 MAWS (MA1) Dept. dated 04.02.2019.

This Registration is valid upto **28.08.2025.**

Site address:
No: 35/2, Comprised in New Survey No:
266/6A1 & 266/6A2, Seemathammen
Nagar, Mettukuppam road,
Maduravoyal.



CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY * CHENNAI-600 008 *

25/09/2020

(R.SHIVAKUMAR)

M. AMMAIAPPAN B.E., (Civil), M.E.,(GEO TECH)
DTCP Reg No : TVLR / RGTE / 2021 / 06/002
CMDA Reg No : GTE / 2020 / 08 / 046
For SAY GEO TECH ENGINEERS

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GEO TECHNICAL INVESTIGATION REPORT

PROJECT:

GEO TECHNICAL INVESTIGATION FOR THE PROPOSED CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.

CLIENT: -

MR. KADERALI & MRS. BATHERSAMA

REPORT NO: SGT/ 024/2024 – MADURAVOYAL

REPORT DATE: 31.01.2024

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PLOT NO: 07, THIRUMAL NAGAR, PUTHAGARAM, CHENNAI – 600 099.
CONTACT : 98413 97852 ; 90808 70262, WEB SITE: WWW.SAYGEOTECH.COM
E-MAIL : SAYGEOTECHENGINEERS@GMAIL.COM, SAYGEO24X7@GMAIL.COM.

SGT/024/2024
31.01.2024

TO

MR. KADERALI & MRS. BATHERSAMA

NAME OF WORK: PROPOSED CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.

SUB : SUBMISSION OF GEO TECHNICAL INVESTIGATION REPORT.

DEAR SIR,

WE ARE PLEASED TO HEREBY TRANSMIT AN ORIGINAL HARD COPY AND SOFT COPY SENT TO YOUR CONCERN ADDRESS, OUR FINAL GEOTECHNICAL INVESTIGATION REPORT FOR THE ABOVE MENTIONED PROJECT. IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT THIS OFFICE.

IT HAS BEEN A PLEASURE BEING OF SERVICE TO YOU ON THIS PROJECT. ASSURING YOU OF OUR CONTINUED CO-OPERATION, WE REMAIN.

FOR SAY GEO TECH ENGINEERS,

M. AMMAIAPPAN B.E., (Civil), M.E.,(GEO TECH)
DTCP Reg No : TVLR / RGTE / 2021 / 06/002
CMDA Reg No : GTE / 2020 / 08 / 046
For SAY GEO TECH ENGINEERS
(AUTHORIZED SIGNATORY)

SAY GEO TECH ENGINEERS Chennai 600 099

SAY GEO TECH

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1.0 INTRODUCTION

MR. KADERALI & MRS. BATHERSAMA Proposed **CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.** For the purpose of designing the foundations, the responsibility of carrying out suitable soil investigation has been entrusted to **M/S. SAY GEO TECH ENGINEERS, CHENNAI- 600 099.** This report contains the field and laboratory test results along with Design computations and recommendations for suitable foundation systems. Client's representatives choose a no of location and selected the locations of borings. To accomplish these purposes, the following tasks were performed:

1. Detailed soil borings were done up to stratum to explore the sub surface stratigraphy and obtain soil samples for testing.
2. Field and laboratory tests were conducted to evaluate the index and engineering properties of the soils
3. Engineering analysis were performed to develop foundation design information for proposed structure

2.0 EXPLORATION PROGRAM

The scope of work completed at this site is summarized below:

- Two number (02) of boreholes as per locations specified by the client's instructions;
- Presented in this report are field investigation details and recommendations of foundation analysis;

3.0 FIELD BORING AND SAMPLING

One no of Calyx drilling machine rig was mobilized and drilling operation work was done. 150 mm diameter borehole was made at locations specified by Engineer-in-charge. The boreholes were sunk to 33.10 m & 10.45 m depth. SPT tests were conducting at 1.5m, 2.0m and 3.0m regular intervals and at all type of soil stratum and disturbed samples were collected.

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4.0 STANDARD PENETRATION TEST & CO RELATION OF SOIL

SPT split spoon sampler of standard dimensions was driven into the soil from the borehole bottom using 63.5 kg hammer with a fall of 75 cm height. The SPT weight was lifted to the specified height and allowed to fall freely on the anvil with the use of cat-head winch with one to one and half turn of the drum. Blow counts for the penetration of every 15 cm were recorded and the 'N' value is reported as the blow counts for 30 cm penetration of the sampler excluding the first 15 cm penetration as seating drive.

When the number of blows exceeded 50 to penetrate the first or second 15 cm length of the sampler, the SPT 'N' is regarded as more than 100 as described in IS 2131-1981.

The test is terminated in such case and a record of the penetration of the sampler under 50 blows is made. SPT refusal is recorded when there is no penetration of the sampler at any stage and also when a rebound of the sounding system is recorded.

These tests were conducted at close intervals of 1.0m so that a continuous SPT 'N' profile is available.

Disturbed soil collected in the SPT sampler was preserved in polythene covers and transported to the laboratory. Additional polythene cover was used to prevent the loss of moisture during the transit period.

CO – RELATION FOR SATURATED SAND/NON – PLASTIC SILT

Relative Density	Penetration Value (Blows/Ft)
Very loose	0 to 4 Blows
Loose	5 to 10 Blows
Medium	11 to 30 Blows
Dense	31 To 50 Blows
Very Dense	> 50 Blows

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CO – RELATION FOR SATURATED CLAY/PLASTIC SILT

Consistency	Penetration Value (Blows/Ft)
Very Soft	0 to 3 Blows
Soft	4 to 8 Blows
Firm	8 to 16 Blows
Stiff	16 To 25 Blows
Very Stiff	25 To 32 Blows
Hard	> 32 Blows

Rock samples were extracted by Rotary drilling technique using double tube core barrel of 76mm diameter, filter with a diamond bit. The extracted cores for every run, not exceeding 1.0 meter were arranged in the core boxes and the T.C.R as well as R.Q.D values were measured. The appropriate estimation of the properties of the encountered rock strata can be obtained by referring to the borehole logs and the following description

R.Q.D %	ROCK QUALITY
90 – 100	Excellent
75 – 90	Good
50 – 75	Fair
25 – 50	Poor
0 – 25	Very Poor

RECOVERY %	DESCRIPTION OF ROCK
0 – 20	Rock is treated as soil
20 – 35 with SPT > 50 blows / 30 cm	Soft or disintegrated rock
35 – 50	Intermediate rock
50 – 85	Medium rock
> 85	Sound rock

The fieldwork was carried out under the close supervision of our engineer in accordance with Indian Standard mentioned earlier.

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5.0 LABORATARY TESTS

The operations to be performed in the laboratory depend upon the type of the nature of data required for the problem at hand. In case of cohesionless material, like sand, the laboratory tests are usually minimum and the design parameters are worked out from field test data such as form SPT- N value, Core resistance and plate load test data.

In the case of cohesive soils, the programme of laboratory testing can vary from carrying out simple tests such as unconfined tests to comprehensive study of soil behaviour using triaxial shear tests and consolidation test.

Following laboratory tests are conducted.

For Cohesionless soil

a) Specific gravity
b) Sieve analysis
c) Natural moisture content

For Cohesive soil

a) Specific gravity
b) Natural moisture content
c) Atterberg's limits
d) Sieve Analysis.

6.0 SUBSOIL PROFILE

Location: BH-01 and BH - 02

LAYER I: Brownish Silty Clay

The top layer is Silty Clay layer from 0.00 m to 2.40 m depth with average SPT 'N' value of 7 to 9. This layer has the Consistency is Soft in nature.

LAYER II: Brownish Silty Sand

The second layer is Silty Sand layer from 2.40 m to 8.10 m depth with average SPT 'N' value of 15 to 17. This layer has the Relative density is Medium in nature.

LAYER III: Greyish Silty Fine Sand

The third layer is Silty Fine Sand layer from 8.10 m to 11.30 m depth with average SPT 'N' value of 24 to 25. This layer has the Relative density is Medium in nature.

LAYER IV: Greyish Silty Sand

The fourth layer is Silty Sand layer from 11.30 m to 14.70 m depth with average SPT 'N' value of 14. This layer has the Relative density is medium in nature.

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LAYER V: Blackish Clay

The fifth layer is Clay layer from 14.70 m to 25.15 m depth with average SPT 'N' value of 8. This layer has the Consistency is Soft in nature.

LAYER VI: Greyish Silty Fine Sand

The sixth layer is Silty Fine Sand layer from 25.15 m to 31.65 m depth with average SPT 'N' value of 51. This layer has the Relative density is Dense in nature.

LAYER VII: Greyish Fine to Medium Coarse Sand

The seventh layer is Fine to medium Coarse Sand layer from 31.65 m to 33.10 m depth with average SPT 'N' value of 100. This layer has the Relative density is Dense in nature.

6.1 GROUND WATER

Ground water table was encountered at 4.35 m depth below the existing ground level during last week of January 2024.

7.0 FOUNDATION ANALYSIS

7.1 Soil Profile

The profile of the area as observed in the bore hole is given in the chart. The Borehole is terminated at maximum depth of 33.10 m.

7.2 SAFE BEARING CAPACITY

The IS: 6403- 1981 gives the equation for the net ultimate bearing capacity of soil Qnu = Cu*Nc*dc*Ic + q*(Nq-1)*Sq*dq*Iq+ 0.5*γ*B*Nγ*Sγ*dγ*IγThe bearing capacity of granular soil depends upon the unit weight and angle of internal friction of the soil. These two properties of granular soils are determined by standard penetration tests. The allowable bearing pressure based on tolerable settlement has been established empirically by Terzaghi and Peck, 1948 and may be expressed by the equation.

Safe bearing capacity (qnp)= $3.5(N-3) \times ((B+0.3)/2B)^2 \times W' \times Rd$

Where,

N″ = Corrected N value B = Width of Foundation = constant 1

W′ = Water table correction = constant 0.5

Rd = Depth Correction factor = constant.

The Safe Bearing Capacity (SBC) recommendations are calculated for shallow footings for general sub soil profile.

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7.3 SHEAR CRITERIA

The first criterion is depending on shear strength. The calculations are based on "TERZAGHI" bearing capacity equation as recommended by IS: 6403 (with factor of Safety) which takes care of L/B ratio (shape), foundation depth etc., along with other parameters. The intensity of loading at the base of the foundation, which would cause shear failure of the soil support, is termed as Ultimate Bearing Capacity (UBC).The following equation is used to calculate Ultimate Bearing Capacity (UBC),UBC = C*NC*Sc*dc + q * (Nq-1) * Sq * dq + 0.5 * B * □ * N□□* S□□* d□ * W'. Safe bearing capacity (SBC) is the maximum intensity of loading that the foundation will safely carry without the risk of shear failure of soil irrespective of any settlement that may occur. Safe Bearing Capacity can be obtained by dividing the UBC with suitable factor of safety. SBC = UBC/3.0.

7.4SETTLEMENT CRITERIA:

The intensity of loading that will cause a permissible settlement or specified settlement of the structure is termed as allowable bearing pressure. The settlement in this type of layer will be elastic settlement. These foundation settlements are evaluated using elastic theory. The pressure distribution below the footing is assumed as 2 V: 1 H for estimating the settlement. Since rock formation is available at shallow depth. The settlement will be within the permissible limit. Hence open foundation is suitable.

8.0 DESIGN OF FOUNDATION

8.1 SHALLOW FOUNDATION – ISOLATED FOOTING: -

Shallow foundation system should be adopted. Isolated Footing Foundation shall be adopted for the Proposed **CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.**

S. NO	EXCUATED DEPTH (M)	THICKNESS OF FILL (M)	REST OF FOUNDATION (M)	S B C (KN/ M²)	S B C (T/M²)
1	3.00	0.00	3.00	170.73	17.40

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II. BACKFILLING:

Backfilling of the foundation excavation should be done with granular Soil and it should be compacted properly to achieve proper densification to avoid settlements in flooring. Exposed bottom surface of the foundation excavation must be properly compacted with the heavy duty mechanical vibrator to compact the exposed surface that gets loosened by mechanical excavation activities This is to minimize the settlements that can arise if the loosened soil in foundation excavation is not removed or compacted.

Strictly must not back filled (Clay) cohesive non swelling soil. Excavated sand soil from the site can be used for backfilling and site filling purposes. Foundations should be placed on natural soil and not on old foundations or filled up Soils.

8.1.2 CONCLUSIONS & RECCOMENDATIONS FOR ISOLATED FOOTING FOUNDATION

1. Shallow foundation type such as Isolated footing foundation may be adopted.
2. Rest of foundation placed at depth 3.00 m E.G.L
3. **Safe bearing Capacity at 170.73 KN /m² or 17.40 t/m²**
4. **Excavated soil not used for back filling purposes in this site.**
5. **Strictly must not back filled (Clay) cohesive non swelling soil.**
6. Backfilling of the foundation excavation should be done with granular Soil and it should be compacted properly to achieve proper densification to avoid settlements in flooring.

8.2 MAT / STRIP FOUNDATION: - IS :2950 (PART 1)-1981:
ALLOWABLE BEARING PRESSURE IS: 6403 – 1981

Shallow foundation system should be adopted. Strip/mat Foundation shall be adopted for the proposed **CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.**

A Strip or Mat Foundation is a sizable concrete Slab or Slab and beam system which supports all the loads of super structure through walls or columns in two or more rows and rests on soil layer or rock. A Mat

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foundation maybe rectangular or circular, when mat foundation is supported by columns rather than the underlying materials. Its formed as pilled raft foundation. Mat or raft foundation is classified as a shallow foundation since its depth is considerably smaller than deep foundation, but its depth is greater than other type of shallow foundation.

8.2.1 RECOMMENDATION:

MAT FOUNDATION DEPTH (M)	SAFE BEARING CAPACITY (KN/M^2)	SAFE BEARING CAPACITY (TON/M^2)	THICKNESS OF FOUNDATION (M)
1.80	69.10	7.05	0.45

8.3 PILE FOUNDATION

Pile foundation system should be adopted. Pile Foundation shall be adopted for the proposed **CONSTRUCTION OF NEW (STILT + 05) BUILDING AT NO: 35/2, COMPRISED IN NEW SURVEY NO: 266/6A1 & 266/6A2, SEEMATHAMMAN NAGAR, METTUKUPPAM ROAD, MADURAVOYAL VILLAGE, MADURAVOYAL TALUK, CHENNAI DISTRICT.**

8.3.1 CONCLUSIONS & RECCOMENDATIONS FOR PILE FOUNDATION

1. **Pile foundation (deep foundation) may be adopted** as bored cast in – situ concrete pile. The pile must be terminated in hard stratum, with required embedment as per structural design.
2. Using BH-02 data the length of pile assumed for the modal Calculation is 30.0 m from E.G.L.

DEPTH (M)	DIA. OF PILE (MM)	SAFE LOAD CAPACITY OF PILE (KN/M^2)	SAFE UPLIFT CAPACITY OF PILE (KN/M^2)	SAFE LATERAL LOAD CAPACITY OF PILE (KN/M^2)
30.00	450	982.92	351.64	58.61
	600	1534.28	543.43	90.57

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3. The theoretical Calculations have to be confirmed by conducting load test on test piles as per **IS:2911-partIV**
4. **For higher load intensity, depending upon load capacity requirement the pile maybe suitably grouped based on IS:2911(Part I/Sec-2)-2010.**
5. Deep foundations in the form of bored cast in-situ concrete piles are recommended considering the site conditions and soil stratum. Piling in hard strata with N value more than 100 shall be done preferably with chisel of suitable weight.
6. The Hard strata encountered in the exploratory bore may be verified through SPT tests in the pile bore. In case SPT "N" value is observed more than 100. In the pile shall be terminated with an embedment of minimum two to three times the shaft diameter depending upon hard strata or as per design requirement.
7. Immediately after such Clearance of pile bore, concreting should be allowed to be cast with tremie pipe always immersed in concrete.
8. This recommendation is based on the stratum available at the borehole locations. When excavations or drilling for foundation are made during execution, it may be verified whether the same stratum is available almost at all the locations. If any Change in stratum is observed it may be brought to our notice for further suggestion or modification of report.

FOR SAY GEO TECH ENGINEERS

M. AMMAIAPPAN B.E., (Civil), M.E.,(GEO TECH)
DTCP Reg No : TVLR / RGTE / 2021 / 06/002
CMDA Reg No : GTE / 2020 / 08 / 046
For SAY GEO TECH ENGINEERS

M. AMMAIAPPAN, B.E. (CIVIL), M.E. (GEO TECH),
GEO TECHNICAL ENGINEER.

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Chennai
600 099

PROJECT:- PROPOSED CONSTRUCTION OF NEW (STILT +05) BUILDING AT MADURAVOYAL

LOCATION: BH-01

STARTED ON : 24/01/2024 ENDED ON : 24/01/2024 G.W.T: 4.35 M BELOW EXISTING GROUND LEVEL

R.L of Layer (m)	G.W.T. (m)	Soil Profile	Engineering Description of Soil	SPT - Details: Depth of SPT below E.G.L (m)	0-15 cm	15-30 cm	30-45 cm	N-Value	Graphical Representation of SP (0 10 20 30 40 50 60 70 80 90)	Relative Density/Consistency	Type of Sample
			BROWNISH SILTY CLAY	1.50	3	4	3	7		SOFT	SS
2.25											
			BROWNISH SILTY SAND	3.00	3	5	7	12		MEDIUM	SS
				4.50	4	6	7	13		MEDIUM	SS
				6.00	5	8	8	16		MEDIUM	SS
8.00				7.50	7	8	11	19		MEDIUM	SS
			GREYISH SILTY FINE SAND	9.00	9	10	13	23		MEDIUM	SS
				10.00	9	12	13	25		MEDIUM	SS
10.45											

Bore Hole Terminated at a depth of 10.45 m below the existing ground level

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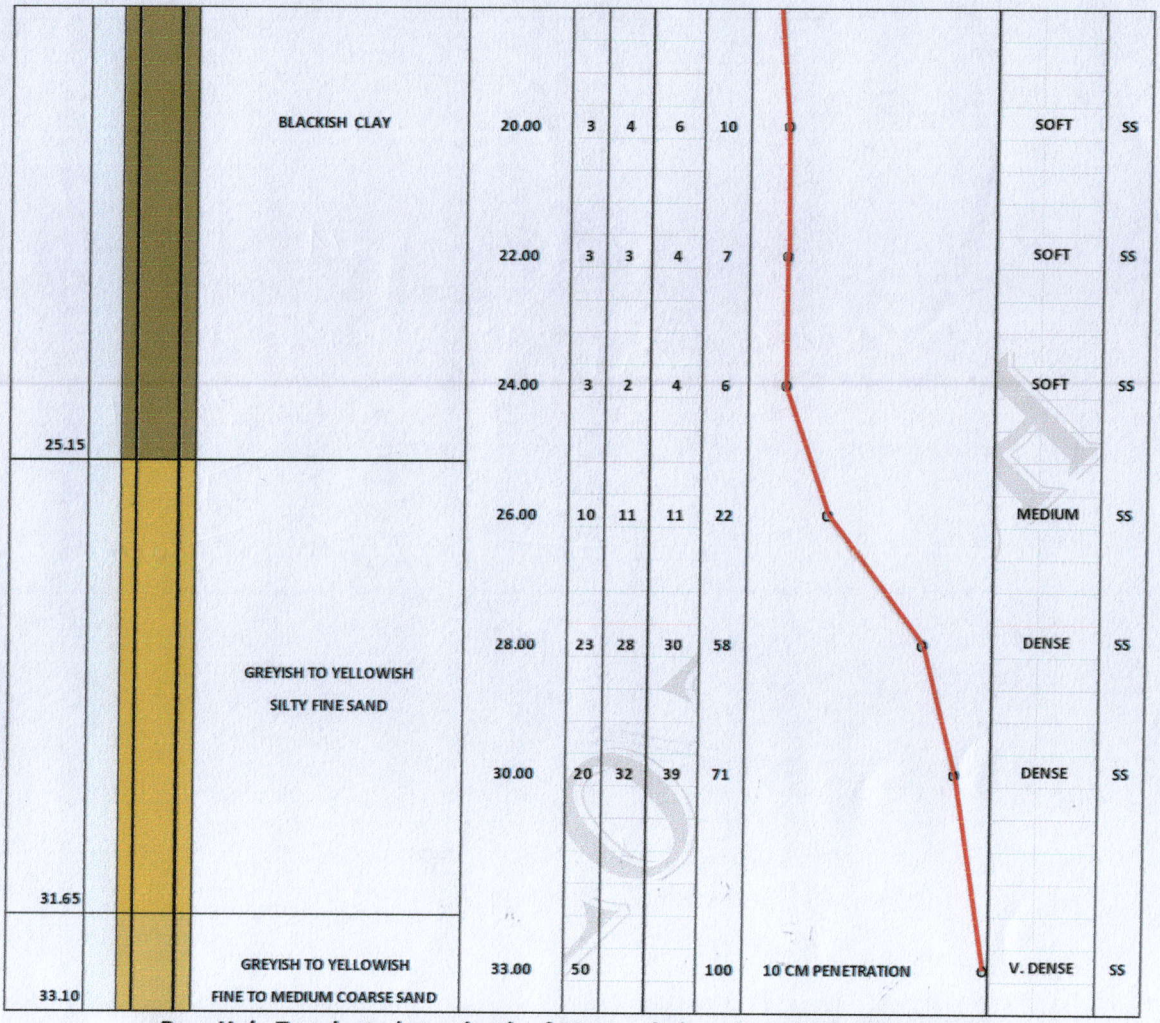
PROJECT:- PROPOSED CONSTRUCTION OF NEW (STILT +05) BUILDING AT MADURAVOYAL

LOCATION: BH-02

STARTED ON : 24/01/2024 ENDED ON : 26/01/2024 G.W.T: 4.35 M BELOW EXISTING GROUND LEVEL

R.L of Layer (m)	G.W.T. (m)	Soil Profile	Engineering Description of Soil	SPT - Details: Depth of SPT below E.G.L (m)	0-15 cm	15-30 cm	30-45 cm	N-Value	Graphical Representation of SPT N-Value (0 10 20 30 40 50 60 70 80 90)	Relative Density/Consistency	Type of Sample
			BROWNISH SILTY CLAY	1.50	3	4	5	9		SOFT	SS
2.40				3.00	4	6	8	14		MEDIUM	SS
				4.50	4	7	9	16		MEDIUM	SS
			BROWNISH SILTY SAND	6.00	5	7	12	19		MEDIUM	SS
8.10				7.50	7	10	12	22		MEDIUM	SS
			GREYISH SILTY FINE SAND	9.00	8	12	14	26		MEDIUM	SS
11.30				10.00	8	11	13	24		MEDIUM	SS
			GREYISH SILTY SAND	12.00	5	7	7	14		MEDIUM	SS
14.70				13.50	6	7	8	15		MEDIUM	SS
				15.00	2	3	5	8		SOFT	SS
				16.50	3	4	4	8		SOFT	SS
				18.00	3	4	5	9		SOFT	SS

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Bore Hole Terminated at a depth of 33.10 m below the existing ground level

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Laboratory Test Results on the Soil Samples Collected from BH-01 Maduravoyal

Depth of Sample below E.G.L. (m)	Corrected N "	Type of sample	Engineering Description of Soil	NMC(%)	Bulk Density (kg/m³)	Clay				Relative Density/ Consistency	Sieve Analysis					IS-Classification	Specific Gravity	Undrained Cohesion,Cu/Angle of shearing Resistance
						LL (%)	PL (%)	Plasticity Index,Ip	Consistency Index		Gravel (%)	Coarse Sand(%)	Medium sand(%)	Fine (%)	Silt & Clay (%)			
0.00 to 2.25	7	SS	Silty Clay	23.72	10.83	35	11	24	44.9	Soft						CH	2.71	26.92
2.25 to 8.00	15	SS	Silty Sand	23.05	14.87					Medium			5	36	59	SM	2.69	31.5 °
8.00 to 10.45	24	SS	Silty Fine Sand	21.40	15.34					Dense			10	55	35	SM	2.68	34.2 °

Laboratory Test Results on the Soil Samples Collected from BH-02 Maduravoyal

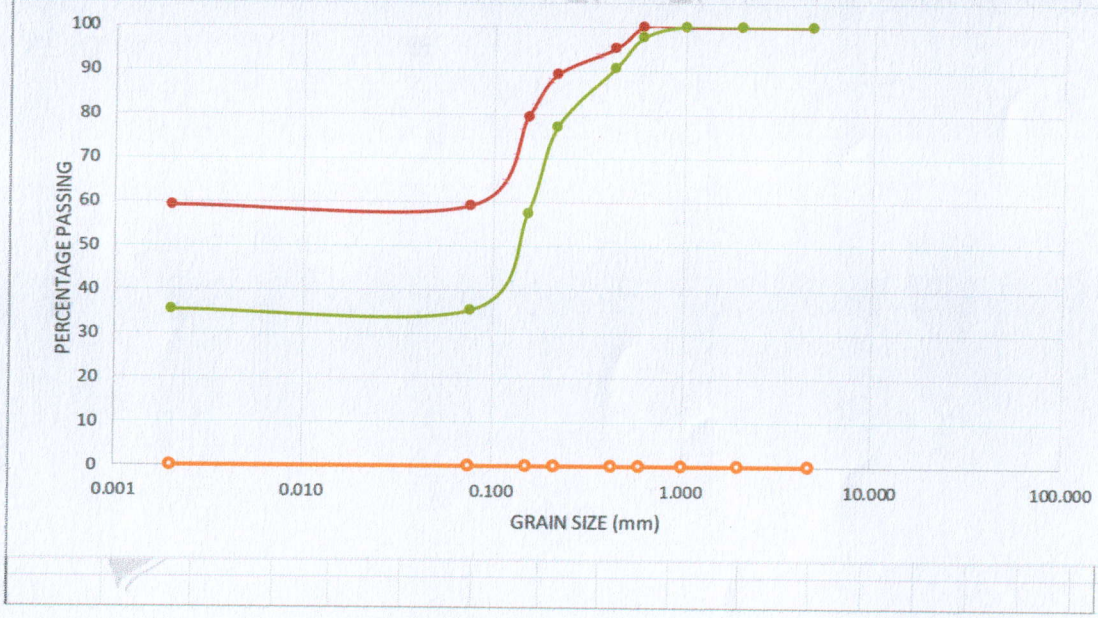
Depth of Sample below E.G.L. (m)	Corrected N "	Type of sample	Engineering Description of Soil	NMC(%)	Bulk Density (kg/m³)	Clay				Relative Density/ Consistency	Sieve Analysis					IS-Classification	Specific Gravity	Undrained Cohesion,Cu/Angle of shearing Resistance
						LL (%)	PL (%)	Plasticity Index,Ip	Consistency Index		Gravel (%)	Coarse Sand(%)	Medium sand(%)	Fine (%)	Silt & Clay (%)			
0.00 to 2.40	9	SS	Silty Clay	23.68	10.89	34	10	24	44.5	Soft						CH	2.70	34.62
2.40 to 8.10	17	SS	Silty Sand	24.09	14.98					Medium			8	37	55	SM	2.69	32.1 °
8.10 to 11.30	25	SS	Silty Fine Sand	22.16	15.46					Medium			14	53	33	SM	2.68	34.5 °
11.30 to 14.70	14	SS	Silty Sand	23.04	15.11					Medium			5	46	49	SM	2.69	31.2 °
14.70 to 25.15	8	SS	Clay	24.10	11.02	42	11	32	57.8	Soft						CH	2.70	30.77
25.15 to 31.65	51	SS	Silty Fine Sand	18.35	16.35					Dense		6	27	44	23	SP	2.66	41.15 °
31.65 to 33.10	100	SS	Fine to medium coarse Sand	14.21	16.90					Dense	10	16	34	32	8	SW	2.66	41.75 °

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Project : Geotechnical Investigation for Proposed Construction of New Building at Maduravoyal

Symbol	Bore hole No	Depth (m):	Sample Type	IS	Gravel %	Sand %	Silt %	Clay %	Cu	Cc	D60 mm	D30 mm	D10 mm
	BH-1	2.25 to 8.00	SPT	SM	0	41	59						
	BH-1	8.00 to 10.45	SPT	SM	0	65	35						

Particle Size	CLAY	SILT	SAND			GRAVEL		
			F	M	C	F	C	

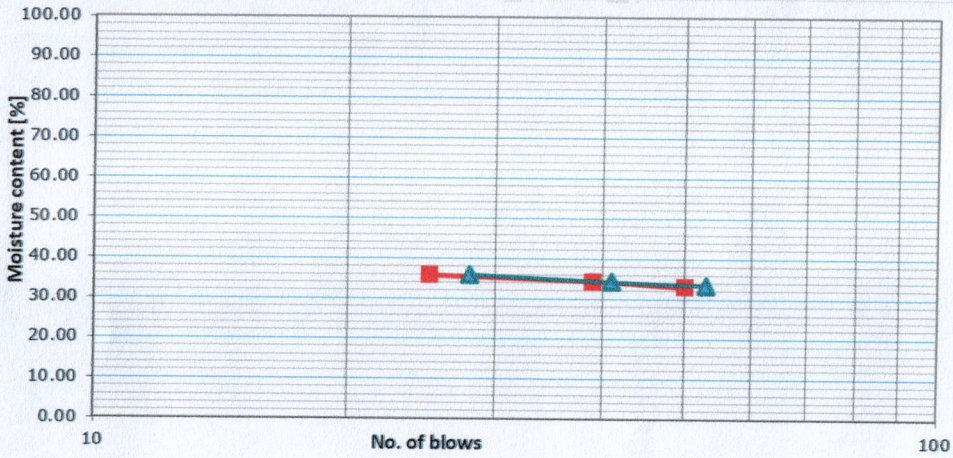


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ATTERBERG LIMITS - MADURAVOYAL

BH No.	DEPTH(m)		Liquid limit			Plastic limit	
BH-1	0.00 to 2.25	No. of blows (N)	53	41	28		
		Weight of wet specimen + container (g)	53.50	53.52	53.57	53.15	53.10
		Weight of dry specimen +container (g)	50.42	50.38	50.30	52.02	51.98
		Weight of container (g)	41.20	41.20	41.20	41.30	41.30
		Weight of water (g)	3.08	3.14	3.27	1.13	1.12
		Weight of dry specimen (g)	9.22	9.18	9.10	10.72	10.68
		Moisture content (%)	33.41	34.20	35.93	10.54	10.49

BH No.	DEPTH(m)		Liquid limit			Plastic limit	
BH-2	0.00 to 2.40	No. of blows (N)	50	39	25		
		Weight of wet specimen + container (g)	53.44	53.49	53.55	53.20	53.18
		Weight of dry specimen +container (g)	50.41	50.35	50.30	52.15	52.00
		Weight of container (g)	41.20	41.20	41.20	41.30	41.30
		Weight of water (g)	3.03	3.14	3.25	1.05	1.18
		Weight of dry specimen (g)	9.21	9.15	9.10	10.85	10.70
		Moisture content (%)	32.90	34.32	35.71	9.68	11.03

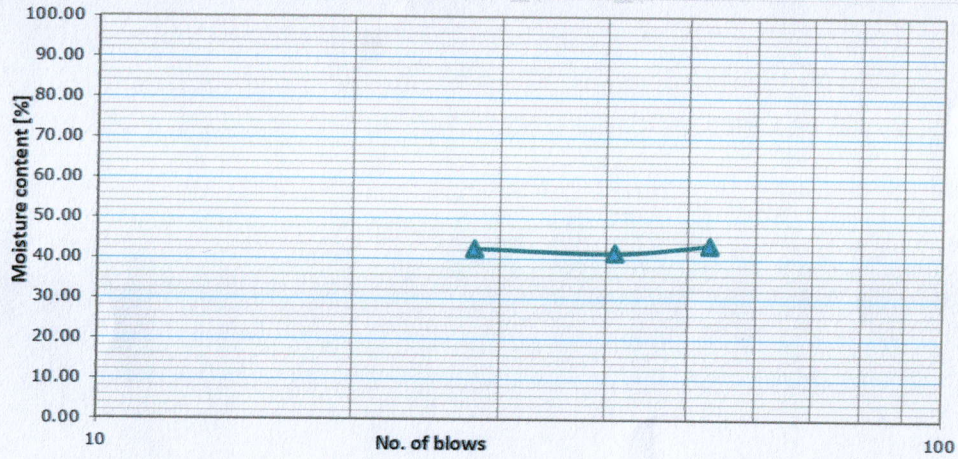


S.No	Symbol	BH NO :	Depth (m)	Liquid limit (W_L) : %	Plastic limit (W_P) : %	Plasticity Index (I_P): %
1		BH-1	0.00 to 2.25	34.51	10.50	24.01
2		BH-2	0.00 to 2.40	34.31	10.40	23.91

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ATTERBERG LIMITS - MADURAVOYAL

BH No.	DEPTH(m)		Liquid limit			Plastic limit	
BH-2	14.70 to 25.15	No. of blows (N)	53	41	28		
		Weight of wet specimen + container (g)	60.39	60.31	60.35	57.82	57.80
		Weight of dry specimen +container (g)	54.60	54.71	54.65	56.21	56.18
		Weight of container (g)	41.20	41.20	41.20	41.30	41.30
		Weight of water (g)	5.79	5.60	5.70	1.61	1.62
		Weight of dry specimen (g)	13.40	13.51	13.45	14.91	14.88
		Moisture content (%)	43.21	41.45	42.38	10.80	10.89



S.No	Symbol	BH NO :	Depth (m)	Liquid limit (W_L) : %	Plastic limit (W_P) : %	Plasticity Index (I_P): %
2		BH-2	14.70 to 25.15	42.35	10.80	31.55

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Project:	New Stilt + 05 building at Maduravoyal	
Description		
Depth of footing (D)	m	3.00
Width of footing (B)	m	1.00
Length (L)		1.00
Density	KN/M³	14.98
Overburden Correction for N		
N Record		17.00
Overburden Pressure	t/m²	4.58
N Corrected for Overburden		
N' (if Overburden < 7.18 ,or Overburden >7.18		23.32
N" Corrected for Dilatancy		
N" Nr >15		16.00
Corrected N'		**16.00**
Angle of Internal Friction		34.20
Water table correction		0.50
Bearing capacity factor	Nc	36.85
	Nq	24.69
	Nr	33.16
Shape Factor	Sc	1.30
	Sq	1.20
	Sr	0.80
Depth Factor	Dc	2.05
	Dq	1.35
	Dr	1.00
Inclination Factor	Ic,Iq,Ir	1.00
Ultimate Bearing Capacity	(t/M²)	52.21
Factor of Safety (F O S = 3.0)		3.00
Safe Bearing Capacity	(t/m²)	17.40
Allowable Bearing Pressur 25mm (t/sqr.m)		17.48

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Type of Instalation of pile		**Refer BH - 02**	**DEPTH - 30.0 M**	
Geometrical Data		**Bored cast in situ**		
	Assumed Diameter of pile (D)		**450.00**	**mm**
	Assumed RL of E. G.L		**0.00**	**m**
	Length of Pile below E.G.L		**30.00**	**m**
	R.L of bottom of Pile		**-30.00**	**m**
Design of pile vertical Compression				
Computation of Skin Resistance				
1		**Layer I**		
	Type of strata		**Silty Clay**	
	Average corrected N Value		9	
	Bulk density of stata	γ	10.89	KN/m^3
	Cohesion		34.62	KN/m^2
	R.L. of top strata		0.00	m
	R.L. of bottom strata		2.40	m
	Average thickness of strata		2.40	m
σ top	Effective overburden pressure over the top of strata,		0.00	KN/m^2
	Effective overburden pressure bottom of strata,		2.14	KN/m^2
	Effective overbuden pressure at the middle of strata		1.07	KN/m^2
	Adhesion Factor		0.68	
	Skin Resistance of pile, qs		**79.83**	KN
		Layer II		
	Type of strata		**Silty Sand**	
	Average corrected N Value		17	
	Bulk density of stata	γ	14.98	KN/m^3
	Angle of shearing Resistance		31.5	Deg
	R.L. of top strata		2.40	m
	R.L. of bottom strata		8.10	m
	Average thickness of strata		5.70	m
σ top	Effective overburden pressure over the top of strata,		2.14	KN/m^2
	Effective overburden pressure bottom of strata,		30.52	KN/m^2
	Effective overbuden pressure at the middle of strata		16.33	KN/m^2
	Co efficient of earth pressure		1.17	
	Skin Resistance of pile, qs		**84.55**	KN
		Layer III		
	Type of strata		**Silty Fine Sand**	
	Average corrected N Value		25	
	Bulk density of stata	γ	15.46	KN/m^3
	Angle of shearing Resistance		34.2	Deg
	R.L. of top strata		8.10	m
	R.L. of bottom strata		11.30	m
	Average thickness of strata		3.20	m
σ top	Effective overburden pressure over the top of strata,		30.52	KN/m^2
	Effective overburden pressure bottom of strata,		47.99	KN/m^2
	Effective overbuden pressure at the middle of strata		39.26	KN/m^2
	Co efficient of earth pressure		1.23	
	Skin Resistance of pile, qs		**130.26**	KN
		Layer IV		
	Type of strata		**Silty Sand**	
	Average corrected N Value		14	

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		Bulk density of stata γ	15.11	KN/m³
		Angle of shearing Resistance	32.1	Deg
		R.L. of top strata	11.30	m
		R.L. of bottom strata	14.70	m
		Average thickness of strata	3.40	m
	σ top	Effective overburden pressure over the top of strata,	47.99	KN/m²
		Effective overburden pressure bottom of strata,	65.37	KN/m²
		Effective overbuden pressure at the middle of strata	56.68	KN/m²
		Co efficient of earth pressure	1.14	
		Skin Resistance of pile, qs	**173.83**	KN
		Layer V		
		Type of strata	**Clay**	
		Average corrected N Value	8	
		Bulk density of stata γ	11.02	KN/m³
		Cohesion	30.77	KN/m²
		R.L. of top strata	14.70	m
		R.L. of bottom strata	25.15	m
		Average thickness of strata	10.45	m
	σ top	Effective overburden pressure over the top of strata,	65.37	KN/m²
		Effective overburden pressure bottom of strata,	76.03	KN/m²
		Effective overbuden pressure at the middle of strata	70.70	KN/m²
		Adhesion Factor	0.69	
		Skin Resistance of pile, qs	**313.50**	KN
		Layer VI		
		Type of strata	**Silty Fine Sand**	
		Average corrected N Value	51	
		Bulk density of stata γ	16.35	KN/m³
		Angle of shearing Resistance	41.15	Deg
		R.L. of top strata	25.15	m
		R.L. of bottom strata	30.00	m
		Average thickness of strata	4.85	m
	σ top	Effective overburden pressure over the top of strata,	76.03	KN/m²
		Effective overburden pressure bottom of strata,	106.82	KN/m²
		Effective overbuden pressure at the middle of strata	91.43	KN/m²
		Co efficient of earth pressure	1.46	
		Skin Resistance of pile, qs	**656.65**	KN
2		**Ultimate Skin Resistance of pile QS**	**1438.62**	**KN**
3		**Computation ofEnd bearing Resistance of pile, qp**		
		Type of strata	**Silty Fine Sand**	
		Cross sectional area of pile (Ap)	0.159	m²
		RL bottom of pile	30.00	M
		Minimum SPT value of the Bearing strata	51	
		Angle of internal Friction	41.15	Deg
		Bearing Capacity Factor, Nq	88.93	
		Effective overburden pressure of bottom	106.82	KN/m²
4		**Ultimate end bearing Resitance of pile, Qp**	**1510.13**	**KN/m²**
5		**Ultimate Load carrying capacity of pile, Qu**	**2948.75**	**KN/m²**
6		**Safe load carrying capacity (Q safe = Qu/3)**	**982.92**	**KN/m²**
7		**Safe Uplift capacity of pile**	**351.64**	**KN/m²**
8		**Safe Lateral load capacity of pile**	**58.61**	**KN/m²**

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