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**SOIL INVESTIGATION FOR THE PROPOSED CONSTRUCTION
OF (BASEMENT+STILT + 4 FLOORS) OFFICE BUILDING AT OLD
NO. 158 & NEW NO. 21, MMRD SCHEME ROAD
ROAD,(OPPOSITE TO MANTRI SERENE), JOTHI COLONY,
ZAMIN PALLAVRAM, KANCHEEPURAM DISTRICT, NEW SL.
NO : 255/1B & 255/2, T.S.NO: 34/2 & 34/3; WARD NO: D; BLOCK
NO: 49, PALLAVARAM MUNICIPALITY, CHENNAI – 600043.**

CLIENT

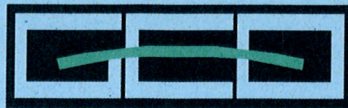
M/s. BRILLIANT CORPORATE SERVICES PVT. LTD.

TITLE

REPORT

REPORT NO: SI/CHN/18/1404/02

FEBRUARY 2018



GEO FOUNDATIONS & STRUCTURES PVT LTD

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SOIL INVESTIGATION REPORT

1.0 INTRODUCTION

- 1.1 The work of sub-soil Investigation for the proposed construction of (B+ Stilt + 4 Floors) Office building at Old No.158, & New No.21, MMRD Scheme Road, (Opposite To Mantri Serene), Jothi Colony, Zamin Pallavaram, Kancheepuram District, New Sl. No : 255/1B & 255/2, T.S.NO: 34/2 & 34/3; Ward No: D; Block No: 49, Pallavaram Municipality, Chennai – 600043, was entrusted to **M/s. Geo Foundations & Structures (P) Ltd.**, Adyar, Chennai-600020, by **M/s. Brilliant Corporate Services Pvt. Ltd.**, , Chennai - 600044.
- 1.2 The soil Investigation and laboratory studies were carried out during **February 2018**. This report summarizes the results of the soil investigation and presents recommendation for suitable type of foundations.

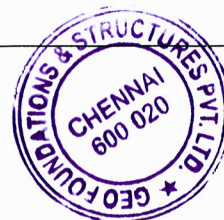
2.0 OBJECTIVE OF INVESTIGATION

- 2.1 The objective of soil investigation is to determine the nature and characteristics of sub-soil below the ground level for the proposed structure. The study includes identification of suitable type of foundations for the proposed structure and assessment of safe bearing capacities.

3.0 SCOPE OF WORK

The scope of work at this site comprises of the following:

- 3.1 Mobilization of boring rig with all necessary equipments and personnel.
- 3.2 Boring of **three** bore holes of 150 mm diameter with Calyx drilling equipments through sand, silt, clay & rock etc up to hard strata.
- 3.3 Conducting Standard Penetration Tests in the bore holes and collecting the disturbed but representative soil samples including packing and transportation to laboratory.
- 3.4 To conduct the following laboratory tests on soil samples:



-
- (a) Sieve analysis
 - (b) Index properties:
 - (i) Liquid limit
 - (ii) Plastic limit
 - (c) Dry & bulk density
 - (d) Natural moisture content
 - (e) Specific gravity
 - (f) Direct shear test
 - (g) UCS

3.5 Preparation and submission of detailed report of field and laboratory results with recommendations for foundations.

4.0 **FIELD INVESTIGATIONS-GEO-TECHNICAL STUDIES**

- 4.1 Boring rig with all requisite equipments and accessories were mobilized at the worksite. A team of technical personnel with skilled labours were also deputed.
- 4.2 **Three** bore holes of 150 mm diameter were bored to a maximum depth up to **6 m** below the existing ground level. The bore holes were made as per relevant Indian Standard IS: 1892.
- 4.3 Representative soil samples were collected in the bore holes at every change of strata or about 1 m depth interval up to termination depth from the exiting ground level, the samples so collected were sealed and numbered with full particulars for identification and sent to the laboratory for conducting the required tests.
- 4.4 Standard Penetration tests were conducted in the bore holes at 1 m depth interval up to termination depth, as per the relevant Indian Standard, IS: 2131. In this test, a standard split spoon sampler is driven into the ground at the required depth by means of standard hammer of 63.5 kgs weight, falling from a height of



75 cm. Number of blows for the first 15 cm is not taken into consideration because of possible disturbances or presence of settled, suspended matters at the bottom of the bore- holes. The total number of blows for the next 30 cm depth of penetration is considered as SPT 'N' value as shown in Figure nos. 1 to 3.

5.0 LABORATORY INVESTIGATION

The following laboratory tests were conducted on the selected soil samples collected from the test bore holes:

- (a) Sieve analysis
- (b) Index properties:
 - (i) Liquid limit
 - (ii) Plastic limit
- (c) Dry & bulk density
- (d) Water content
- (e) Specific gravity

All the above laboratory tests were carried out as per relevant Indian Standards.

All the soil samples were identified and classified as per relevant Indian Standard, IS: 1498. The results are shown in Table Nos. 1 to 3.

6.0 SOIL PROFILE

Soil profile of the bore holes are as given below:

In bore hole BH 1, Medium dense clayey sand occurs from ground level up to 2 m, followed by medium dense silty sand up to 3 m, very dense silty sandy gravel up to 4 m, very dense silty sand up to **5 m**, followed by very dense gravelly silty sand, at which depth the borehole was terminated.

In bore hole BH 2, Medium dense clayey sand occurs from ground level up to 2 m, followed by medium dense gravelly silty sand up to 3 m, very dense silty sand up to 4 m, very dense



gravelly silty sand up to 5 m, followed by weathered rock up to **6 m**, at which depth the borehole was terminated.

In bore hole BH 3, Medium dense gravelly clayey sand occurs from ground level up to 2 m, followed by dense gravelly silty sand up to 3 m, followed by weathered rock up to **6 m**, at which depth the borehole was terminated.

7.0 GROUND WATER LEVEL

Ground water levels were met at depth ranging **1.9 m to 2.8 m** from the existing ground level at the time of investigation, during boring on **07.02.2018 to 08.02.2018**.

8.0 DISCUSSION AND RECOMMENDATIONS ON RESULTS AND TYPE OF FOUNDATIONS:

Based on the subsoil conditions discussed in Sl. No. 6, the following recommendations are made for suitable type of foundation for the proposed structure.

OPEN FOUNDATIONS

- Open foundations (Individual column footings or combined footings or strip raft combining each row of columns or raft foundation) are recommended.
- Excavation shall be made up to the required depth below the existing ground level as given in the table 4, for all foundations, irrespective of the importance of the column or the loading on the column.
- After thorough compaction of the bottom of excavation, PCC for the foundations can be laid on the compacted surface.
- The safe bearing capacity under the RCC foundation is recommended in the table-4.
- After thorough compaction of the bottom of excavation, PCC for the foundations can be laid at required depth.
- At the time of excavation for foundations, if ground water table occurs within the recommended depth of excavation, sumps may be made to an additional depth



of 0.3 m at one or more corners of the foundation pits for column footings/combined footings or at desired locations along the periphery of excavation for strip raft/raft foundation and the water collected in the sumps may be bailed out. Dewatering shall be maintained until that part of the concrete in the foundations, which comes below the ground water table level, sets.

- The excavated sandy soil can be used for back filling of foundations. Back filling shall be done in layers of not more than 200 mm thickness. Each 200 mm thick layer shall be watered and well compacted (mere spreading the back fill material for back filling is not adequate. Layered compaction shall be done for back filling).

Table 4

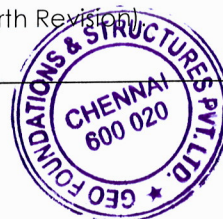
Ref. BH No.	Corrected N Value	Φ *	Depth of footing	Width of footing (m)	Net Safe bearing capacity from shear criteria (t/m ²)	All bearing capacity from settlement criteria (t/m ²) for 25 mm	Recommended net allowable Bearing capacity (t/m ²)
BH - 1	19	32	1.5	2	15.89	16.67	15
	27	34	2		25.45	25	20
	27	34	2.5		30.95	25	25
	100	38	4		89.32	62.5	40

*- As per IS 6403:1981 Fig 1, Relationship between Φ & N – Value.

9.0 CHEMICAL COMPOSITION OF GROUND WATER

The results of chemical analysis on the water samples presented in Appendix – III shows that:

- Since the pH value is more than 6, the ground water, in terms of pH value), is suitable for mixing concrete as per Clause 5.4.2 of Indian Standard: 456-2000, (Reaffirmed 2005), plain and reinforced concrete – code of practice (Fourth Revision).



- The organic solid and inorganic solid contents are less than the upper permissible limit of 200 mg/l and 3000 mg/l respectively. Therefore, the ground water is suitable for mixing concrete for RCC.
- The chloride content is less than the permissible upper limit of 500 mg/l. for use of ground water for mixing in concrete for RCC, as per IS: 456-2000, (Reaffirmed 2005). Therefore, in terms of chloride content in the ground water, the ground water is suitable for mixing concrete for RCC.
- The sulphate content (expressed as SO_3) is also less than the permissible upper limit of 300 mg/l for use of ground water for mixing in concrete, as per IS: 456-2000 (Reaffirmed 2005). Therefore, in terms of sulphate content also, the ground water is suitable for mixing concrete for RCC.
- The sulphate content (expressed as SO_3) is less than 300 mg/l which comes under Class 1 of "Requirements for concrete exposed to sulphate attack", as per IS: 456-2000, Table 4. For this Class, the requirements are: Ordinary Portland cement or Portland slag cement or Portland pozzolana cement can be used with a minimum cement content of 280 kg/ m³ of concrete and with a maximum free water: cement ratio of 0.55"
- Hence, the ground water is suitable for Construction purposes.



Client: M/s. Brilliant Corporate Services Pvt. Ltd.,

Soil Investigation for the Proposed Construction of
(B+S+ 4) Floors Office Building at Pallavaram, Chennai.

- 10.0 The results and recommendations given in this report are based on the results of the soil investigation carried out. In actual execution, if any variation is found, the consultants may also be referred to.

For GEO FOUNDATIONS & STRUCTURES PVT. LTD.

For, 

A. Suresh Kumar, M.Tech (Geo technical), M.B.A (T.M)
D.G.M. (Geo Technical)



GEO FOUNDATION & STRUCTURES PRIVATE LIMITED

Project: **SOIL INVESTIGATION FOR THE PROPOSED
CONSTRUCTION OF (BASEMENT+STILT + 4
FLOORS)
OFFICE BUILDING AT PALLAVARAM, CHENNAI**

SBC Calculations:

BH 1

Corrected SPT N Value is 27

Angle of internal friction from Fig.1 of IS6403
with reference to SPT N value 34

Data and Calculations for Square Foundation

Foundation strata:	Silty SAND
Width of foundation, m	2.00
Thickness of overburden soil, m	2.50
SPT value of the soil in the zone of	27
Angle of Internal friction, Degrees	34
Unit weight of over-burden soil, kN/Cu.m.	16.00
Length of foundation, m	2.00
Shear strength of soil, kN/Sq.m.	0.00
Bearing capacity factor N_c	42.92
Bearing capacity factor N_q	30.32
Bearing capacity factor N_y	42.90
Depth factor, d_c	1.47
Depth factor, d_q	1.24
Depth factor, d_y	1.24
Shape Factor, s_c	1.20
Shape Factor, s_q	1.20
Shape Factor, s_y	0.60
Inclination Factor, i_c	1.00
Inclination Factor, i_q	1.00
Inclination Factor, i_y	1.00
Water Table Correction Factor, w	0.50
Ultimate Bearing Capacity, UBC1, kN/Sq.m.	0.00
Ultimate Bearing Capacity, UBC2, kN/sq.m.	674.06
Ultimate Bearing Capacity, UBC3, kN/Sq.m.	254.35
Ultimate Bearing Capacity, UBC, kN/Sq.m.	928.42
SBC with a factor of safety of 3, kN/Sq.m.	309.47
SBC with a factor of safety of 3, t/Sq.m.	30.95



CALCULATION OF SETTLEMENT AS PER IS: 8009- PART 1- FIG. 9

Foundation size = 2 M 2 M
 Foundation depth = 2.5 m from EGL

Average N value below the founding stratum & within the depth of pressure bulb: N = 27

Corrected Average N value below the founding & Mid of the pressure bulb: N = 27

The settlement in meter/ unit pressure, i.e., for 1 kg/cm^2 or for 10 t/m^2 read from Fig. 9 of IS: 8009- Part 1, corresponding to the average N value

= 10.00 mm

(From the graph- m is converted to mm by multiplying it with 1000)

Correction factor for water = 0.5 20.0 mm

Depth factor 0.5

Hence, the pressure corresponding to 25 mm settlement is given by

$$= \left(\frac{1}{20} \times 25 \right) \text{ kg/cm}^2 = 1.25 \text{ kg/cm}^2$$

$$= 25.00 \text{ T/sq.m}$$

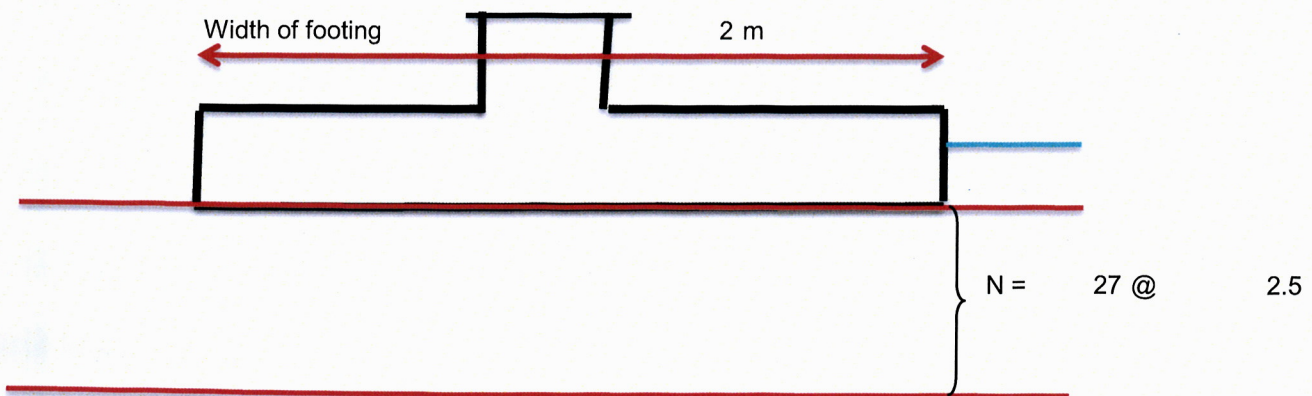
Hence the SBC is 25.0 T/sq.m

Note:

For averaging of corrected N value taken from Borelog is 27

Referring to the N values from cross-sectional soil profile-figure no:4.2 BH1

Ref BH BH1 depth 2.5 m from the EGL



APPENDIX I

BORELOGS



Client: M/s. Brilliant Corporate Services Pvt. Ltd.

Soil Investigation for the proposed construction of (Basement+Stilt+4 floors)
Office building at Pallavaram, Chennai.

Project : Soil Investigation for the proposed construction of (Basement+Stilt+4 floors) Office building at Pallavaram, Chennai.

GEO FOUNDATIONS & STRUCTURES
PVT. LTD

Bore Hole No : 1
 Location : Pallavaram
 Type of Boring : Calyx
 Ground Water Level : 2.70 m From G.L. on 09.02.2018
 Termination Depth : 5.00 m

Drillhole Record - BH 01

Fig No. 1

Start Date : 08.02.2018

End Date : 08.02.2018

SOIL DESCRIPTION	COLOUR	STRUCTURE	GROUND LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH (m)	TEST DEPTH (m)	PENETRATION VALUES			SPT 'N' Blows/300mm	SPT 'N' PROFILE					C.R (%)	R.Q.D (%)	REMARKS
									15cm	30cm	45cm		20	40	60	80	100			
Clayey SAND (SC)	Brown	Medium dense, Granular	2.00		SPT-1	SS	1.00	1.00-1.45	4	7	9	16								
					SPT-2	SS	2.00	2.00-2.45	7	12	17	29								
Silty SAND (SM)	Brown	Medium dense, Granular	3.00																	
Silty Sandy Gravel (GM)	Brown	Very dense, Granular	4.00		SPT-3	SS	3.00	3.00-3.45	16	37	42	79								
Silty SAND (SM)	Brown	Very dense, Granular	5.00		SPT-4	SS	4.00	4.00-4.43	26	29	>50	>100								50/13 cm Penetration
Very dense, Gravelly Silty SAND (SM)					SPT-5	SS	5.00	5.00-5.12	>50	-	-	>100								50/12 cm Penetration
G.W.L : 2.07 m From G.L. on 09.02.2018			No. of. SPT: 5 nos			No. of. CR: Nil			REMARKS											

Note: SPT-Standard Penetration Test SS-Soil Sample,
OT - Open Tube

UDS-Un Disturbed Sample CS-Core Sample

CR-Core Recovery , RQD-Rock Quality Designation

Client: M/s. Brilliant Corporate Services Pvt. Ltd.

Soil Investigation for the proposed construction of (Basement+Stilt+4 floors)
Office building at Pallavaram, Chennai.

Project : Soil Investigation for the proposed construction of (Basement+Stilt+4 floors) Office building at Pallavaram, Chennai.

GEO FOUNDATIONS & STRUCTURES
PVT. LTD

Bore Hole No : 2
 Location : Pallavaram
 Type of Boring : Calyx
 Ground Water Level : 2.80 m From G.L. on 09.02.2018
 Termination Depth : 6.00 m

Drillhole Record - BH 02

Fig No. 2

Start Date : 08.02.2018
 End Date : 08.02.2018

SOIL DESCRIPTION	COLOUR	STRUCTURE	GROUND LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH (m)	TEST DEPTH (m)	PENETRATION VALUES			SPT 'N' Blows/300mm	SPT 'N' PROFILE					C.R. (%)	R.Q.D. (%)	REMARKS
									15cm	30cm	45cm		20	40	60	80	100			
Clayey SAND (SC)	Brown	Medium dense, Granular	2.00		SPT-1	SS	1.00	1.00-1.45	4	4	8	12								
Gravelly Silty SAND (SM)	Brown	Medium dense, Granular	3.00		SPT-2	SS	2.00	2.00-2.45	8	15	19	34								
Silty SAND (SM)	Brown	Very dense, Granular	4.00		SPT-3	SS	3.00	3.00-3.39	18	42	>50	>100								50/09 cm Penetration
Gravelly Silty SAND (SM)	Brown	Very dense, Granular	5.00		SPT-4	SS	4.00	4.00-4.11	>50	-	-	>100								50/11 cm Penetration
Weathered Rock					SPT-5	SS	5.00	5.00-5.00	>50	-	-	>100								Rebound
					SPT-6	SS	6.00	6.00-6.00	>50	-	-	>100								Rebound
G.W.L : 2.80 m From G.L. on 09.02.2018			No. of. SPT: 6 nos			No. of. CR: Nil			REMARKS											



Note: SPT-Standard Penetration Test SS-Soil Sample,
 OT - Open Tube

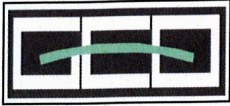
UDS-Un Disturbed Sample CS-Core Sample

CR-Core Recovery , RQD-Rock Quality Designation

Client: M/s. Brilliant Corporate Services Pvt. Ltd.

Soil Investigation for the proposed construction of (Basement+Stilt+4 floors)
Office building at Pallavaram, Chennai.

Project : Soil Investigation for the proposed construction of (Basement+Stilt+4 floors) Office building at Pallavaram, Chennai.

GEO FOUNDATIONS & STRUCTURES
PVT. LTD
 Bore Hole No : 3
 Location : Pallavaram
 Type of Boring : Calyx
 Ground Water Level : 1.90 m From G.L. on 08.02.2018
 Termination Depth : 6.00 m

Drillhole Record - BH 03

Fig No. 3

Start Date : 07.02.2018

End Date : 07.02.2018

SOIL DESCRIPTION	COLOUR	STRUCTURE	GROUND LEVEL (m)	LEGEND	TEST NO	SAMPLE TYPE	DEPTH (m)	TEST DEPTH (m)	PENETRATION VALUES			SPT "N" Blows/300mm	SPT 'N' PROFILE					C.R (%)	R.Q.D (%)	REMARKS
									15cm	30cm	45cm		20	40	60	80	100			
Gravelly Clayey SAND (SC)	Brown	Medium dense, Granular	2.00		SPT-1	SS	1.00	1.00-1.45	3	11	21	32								
Gravelly Silty SAND (SM)	Grey	Dense, Granular	3.00		SPT-2	SS	2.00	2.00-2.45	13	20	20	40								
Weathered Rock					SPT-3	SS	3.00	3.00-3.00	>50	-	-	>100								Rebound
					SPT-4	SS	4.00	4.00-4.00	>50	-	-	>100								Rebound
					SPT-5	SS	5.00	5.00-5.00	>50	-	-	>100								Rebound
					SPT-6	SS	6.00	6.00-6.00	>50	-	-	>100								Rebound
G.W.L : 1.90 m From G.L. on 08.02.2018			No. of. SPT: 6 nos			No. of. CR: Nil			REMARKS											

Note: SPT-Standard Penetration Test SS-Soil Sample,
OT - Open Tube

UDS-Un Disturbed Sample CS-Core Sample

CR-Core Recovery , RQD-Rock Quality Designation

APPENDIX II

LABORATORY TEST RESULTS



TEST RESULTS		Project : Soil Investigation for the proposed construction of (Basement+Silt+4 floors) Office building at Old No.158, & New No.21, MMRD Scheme Road, (Opposite To Mantri Serene), Jothi Colony, Zamin Pallavram, Kancheepuram District, New Sl. No : 255/1B & 255/2, T.S.NO: 34/2 & 34/3; Ward No: D; Block No: 49, Pallavaram Municipality, Chennai – 600043.										Boring Start: 08.02.2018		Termination Depth (m)				Table No.	
N VALUE	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS			DRY DENSITY, gm/cc	BULK DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	TEST METHOD	C in Kg/cm²	Φ in degrees	
16	1.00	SPT-1	Clayey SAND	SC	GRAVEL, %	1	64	35	LIQUID LIMIT, %	37	14	23		16					
29	2.00	SPT-2	Silty SAND	SM		6	57	37	Non - Plastic					16					
79	3.00	SPT-3	Silty Sandy GRAVEL	GM		52	33	15						13					
>100	4.00	SPT-4	Silty SAND	SM		7	63	30	Non - Plastic					19					
>100	5.00	SPT-5	Gravelly Silty SAND	SM		18	59	23						14					



NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS- Direct Shear
TA - Tri Axial test

Project : Soil Investigation for the proposed construction of (Basement+Stilt+4 floors) Office building at Old No.158, & New No.21, MMRD Scheme Road, (Opposite To Mantri Serene), Jothi Colony, Zamin Pallavram, Kancheepuram District, New Sl. No : 255/1B & 255/2, T.S.NO: 34/2 & 34/3; Ward No: D; Block No: 49, Pallavaram Municipality, Chennai – 600043.																		Boring Start: 08.02.2018		Termination Depth (m)		Table No.	
TEST RESULTS		N VALUE	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS				DRY DENSITY, gm/cc	BULK DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS				
							GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	TEST METHOD						C in Kg/cm²	Φ in degrees			
		12	1.00	SPT-1	Clayey SAND	SC	1	60	39	35	12	23			21								
		34	2.00	SPT-2	Gravelly Silty SAND	SM	17	57	26						17	2.67							
		>100	3.00	SPT-3	Silty SAND	SM	4	72	24						13								
		>100	4.00	SPT-4	Gravelly Silty SAND	SM	10	69	21						14								
		>100	5.00	SPT-5	Weathered Rock																		
		>100	6.00	SPT-6																			



NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS-Direct Shear
TA - Tri Axial test

TEST RESULTS		Project : Soil Investigation for the proposed construction of (Basement+Stilt+4 floors) Office building at Old No.158, & New No.21, MMRD Scheme Road, (Opposite To Mantri Serene), Jothi Colony, Zamin Pallavaram, Kancheepuram District, New Sl. No : 255/1B & 255/2, T.S.NO: 34/2 & 34/3; Ward No: D; Block No: 49, Pallavaram Municipality, Chennai – 600043.										Boring Start: 07.02.2018	Termination Depth (m)	Table No.				
											Boring End : 07.02.2018	5.00	3					
											Location	G.W.T (m)	Bore-Hole No.					
											Pallavaram	1.90	3					
N VALUE	DEPTH (m)	SAMPLE	SOIL DESCRIPTION	IS. CLASSIFICATION	GRAIN SIZE ANALYSIS			ATTERBERG LIMITS			DRY DENSITY, gm/cc	BULK DENSITY, gm/cc	WATER CONTENT, %	SPECIFIC GRAVITY	FREE SWELL INDEX, %	SHEAR PARAMETERS		
					GRAVEL, %	SAND, %	SILT & CLAY %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX						TEST METHOD	C in Kg/cm²	Φ in degrees
32	1.00	SPT-1	Gravelly Clayey SAND	SC	23	54	23	38	17	21			15					
40	2.00	SPT-2	Gravelly Silty SAND	SM	18	54	28						12	2.66				
>100	3.00	SPT-3																
>100	4.00	SPT-4																
>100	5.00	SPT-5																
>100	6.00	SPT-6																
			Weathered Rock															

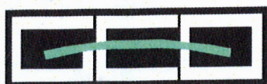


NOTE: Type of Sample
SPT- Standard Penetration Test
UDS- Un Disturbed Sample

Test Method:
UCS- UnConfined Compressive Strength
DS- Direct Shear
TA - Tri Axial test

APPENDIX III
CHEMICAL ANALYSIS
OF WATER





ISO 9001 : 2008 Certified

GEO FOUNDATIONS & STRUCTURES PVT LTD

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PROJECT NAME: Soil Investigation for the proposed construction of (Basement + Stilt + 4 Floors) Office building at Pallavaram, Chennai.

A) NATURE OF SAMPLE : WATER
B) REFERENCE NO. : GFS/CHN/SI/18/1404

RESULTS OF ANALYSIS

Sl.No	TESTS	BH-1	BH-3	LIMITS
1	Free acidity: To neutralize 100 ml. of water using Phenolphthalein as indicator.	3.0 ml	2.0 ml	Not more than 5.0 ml. of 0.02N NaOH
2	Alkalinity: to neutralize 100 ml sample using mixed indicator	23.0 ml	16.0 ml	Not more than 25.0 ml of 0.02 N HCl
3	Organic matters mg/l	107	85	200 max
4	Inorganic solids mg/l	1343	1202	3000 Max
5	Sulphate as SO ₃ mg/l	71.19	75.8	300 Max.
6	Chloride as Cl mg/l	280.12	390.06	I. 2000 Max for Plain concrete II. 500 Max for reinforced concrete
7	Total Suspended matters mg/l	78	20	2000 Max
8	pH @ 25°C	7.24	7.54	6.0 Min

Remarks: The sample submitted conforms to IS 456:2000. Hence, it can be used for construction purposes.

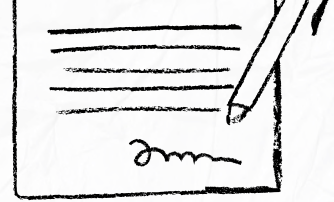


APPENDIX- IV

BORE HOLES LOCATION

DRAWING





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.



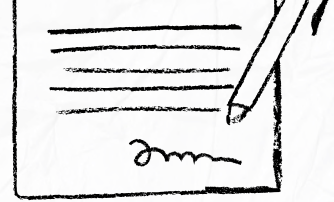
NRI & Investment Services

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



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