Verified RealEstate™

Your trusted partner for buying, selling, and managing property, ensuring hassle-free service with 100% transparency.

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996

Official Property Record

Digitally Verified Record - Powered by Verified RealEstate™



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

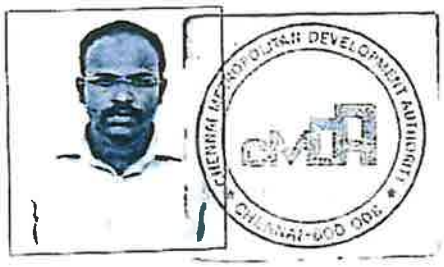
PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru. P. ARUN PERUMAL** has enrolled as **Registered Geo-Technical Engineer (RGTE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.E., (Soil Mechanics & Foundation Engg.)** and experience in the relevant field for **6years.**

He has been given the Registration No.**GTE/2019/03/013** Renewed on **21.03.2024.** 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 **20.03.2029**

Client Name: Thai Homes Pvt Ltd.



P. ARUN PERUMAL, M.E.(Soil).,MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddha Street, V.S.A. Nagar, Chennai-82.

21/3/24.

(A. MEGANATHAN)
Superintendent

For **Ayyan Associates**

P. Arun Perumal M.E(Soil), ME, PE
Chartered Engineer (India)
CMDA Registered Geotechnical Consultant

For THAI HOMES PRIVATE LIMITED

Managing Director

SOIL INVESTIGATION REPORT

Report No : **AY/JAN/2024/1**

NAME OF PROJECT :

Soil Investigation for the Construction of (S+5) Residential building at Door No. New Door No.3 & 5, Old No. 2 & 3, Block No: 2, Ward - F, Plot No: 25 & 26, Survey No T. S. No. 72 & 73, Parthasarathi Nagar 2nd Street, Adambakkam, Chennai - 600 088.



BH I



BH II

P. ARUN PERUMAL, M.E.(Soil)., MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.
CM:DAR.no :- 8(TE)/19/03/013

Project :

THAI PARTHA

For THAI HOMES PRIVATE LIMITED

Client :

Thai Homes

Managing Director

Soil Investigation carried out by :

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Soil Testing - Stability Certificate - Load Test - Ground Improvement - Construction

No.16/47, Buddhar Street, V.S.A Nagar (Near villivakkam), Chennai-82.
Mobile – 98418 32444. Email : ayyansoiltest@gmail.com www.ayyanassociates.com

SOIL INVESTIGATION REPORT

Name of the Project :

Soil Investigation for the Construction of (S+5) Residential building at Door No. New Door No.3 & 5, Old No. 2 & 3, Block No: 2, Ward - F, Plot No: 25 & 26, Survey No T. S. No. 72 & 73, Parthasarathi Nagar 2nd Street, Adambakkam, Chennai - 600 088.

P. ARUN PERUMAL, M.E.(Soil).,MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Soil Testing - Stability Certificate - Load Test - Ground Improvement - Construction

No.16/47, Buddhar Street, V.S.A Nagar (Near villivakkam), Chennai-82.
Mobile : 98418 32444. Email : ayyansoiltest@gmail.com. Web : www.ayyanassociates.com

Name of the Project :

Soil Investigation for the Construction of (S+5) Residential building at Door No. New Door No.3 & 5, Old No. 2 & 3, Block No: 2, Ward - F, Plot No: 25 & 26, Survey No T. S. No. 72 & 73, Parthasarathi Nagar 2nd Street, Adambakkam, Chennai - 600 088.

CONTENTS

Sl.No	Description
1	Report
2	Bearing Capacity Calculation
3	Consolidated Soil Test Results
4	Bore log
5	Bore Hole Location
6	Photos

P. ARUN PERUMAL, M.E.(Soil).,MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Soil Testing - Stability Certificate - Load Test - Ground Improvement - Construction

No.16/47, Buddhar Street, V.S.A Nagar (Near villivakkam), Chennai-82.
Mobile : 98418 32444. Email : ayyansoiltest@gmail.com. Web : www.ayyanassociates.com

'Report no: AY/JAN/2024/1'

SOIL EXPLORATION REPORT

Name of Project: Soil Investigation for the Construction of (S+5) Residential building at Door No. New Door No.3 & 5, Old No. 2 & 3, Block No: 2, Ward - F, Plot No: 25 & 26, Survey No T. S. No. 72 & 73, Parthasarathi Nagar 2nd Street, Adambakkam, Chennai - 600 088.

Period of test: 02-01-2024 to 04-01-2024

1. INTRODUCTION

"**M/s.Thai Homes**" has proposed to Construct S+5 Residential buildings at Door No. New Door No.3 & 5, Old No. 2 & 3, Block No: 2, Ward - F, Plot No: 25 & 26, Survey No T. S. No. 72 & 73, Parthasarathi Nagar 2nd Street, Adambakkam, Chennai - 600 088. For the construction of any structure a detailed soil investigation is essential for collecting the relevant data required for preparing the design. The sub surface investigation reveals the presence and the extent of soil and rock stratum in the region likely to be affected by the proposed work and determines the nature of each stratum and engineering properties of soil which may affect the design.

In this context the client required to have Preliminary soil investigations to understand the soil conditions for construction of S+5 Residential buildings with the proposed Plot area of 4800sft. The data collected provides reliable, specific and detailed information to facilitate a safe and economic design for the estimation of the proposed structure.

This report contains the field and laboratory test results along with Design computations and recommendations for suitable foundation systems.

For THAI HOMES PRIVATE LIMITED

Managing Director

1.1 Scope of Work

- Sinking two Standard Soil investigation bore holes of 100mm diameter up to a depth of 10.00m below the existing ground level or where the SPT value is >100 or as directed by the engineer-in-charge.
- Conducting Standard Penetration Test (SPT) at regular depth intervals.
- Collection of Split Spoon Samples or Disturbed Soil Samples.

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil),.MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
#16/47, Buddhar Street, V.S.A. Nagar, Chen

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832414
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

- Conducting relevant laboratory test results as instructed.
- Assessing Safe bearing capacity and allowable bearing pressure based on the field and laboratory test carried out in the soil stratum encountered.
- The type and depth of foundation for the proposed structure has to be recommended for estimation.

1.2 Structure of the Report

1. Introduction
2. Field Investigation Methodology & Lab Test
3. Sub-Surface Stratification
4. Foundation Systems
5. Recommendations

Annexure

- Design Computations
- Laboratory Test Results
- Bore Logs
- Field Test Location Drawing
- Photos

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil)., MIE
Chartred Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
No. 16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

For THAI HOMES PRIVATE LIMITED

Managing Director

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

2. Field Investigation Methodology & Lab Test

2.1 Field Testing:

Penetration and sounding tests are the generally adopted field Tests. Standard Penetration Test is performed as per I.S. 2131-1981 as an in-situ test especially for cohesion less soils. The resistance is empirically correlated with some of the Engineering properties of soil such as density index, consistency, bearing capacity, etc. These tests are useful for general exploration of erratic soil profiles for finding depth to bedrock or hard stratum and to have an approximate indication of the strength and other properties of soils, particularly for cohesion less soil where it is difficult to obtain U.D.S.

The proposed site is situated in the developing area. The exploration was carried out during the Post rainfalls in the city. Two boreholes were made at the locations specified by the client.

The locations of the boreholes are shown in the site plan attached. The equipment used and the methodology adopted to carry out the fieldwork is described below.

2.2 Equipment Used and Method of Drilling:

2.2.1 Equipment Used

The equipment used for performing the drilling operations is a Calyx Rotary Drill Rig using cutting augers with circulating bentonite slurry.

For THAI HOMES PRIVATE LIMITED

Managing Director

2.2.2 Methodology of drilling

Calyx rotary drilling with auger of 100mm dia has been used for making bore holes duly circulating bentonite slurry. In this method, the advancement of boring is made by the cutting action of a rotating bit that is kept in firm contact with the bottom of the hole. The bit is attached to the lower end of hollow drill rod, which is rotated by a suitable chuck. Drilling mud, (viz) bentonite is continuously forced down the hollow drill rods. The mud returning upward through the annular space between the drill rods and side of the hole brings the soil particles to the surface.

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

The soil exploration consists of three stages i.e., boring, sampling and testing which includes both field and lab tests. Samples were collected at every 1.00 m up to 5m depth and at every 1.5m up to 10m depth of the bore hole. Samples were properly labeled for Lab tests. Bore log particulars and location of bore holes are annexed with this report.

2.3 In-Situ Strength Tests:

2.3.1 Standard Penetration Test:

In the field test the Standard Penetration Test sampler is driven by the free fall of a hammer weighing 63.50kg dropped from a height of 76cm.The sampler is initially driven through 15cm as a seating drive. It is further driven through 30cm. The number of blows required to drive the sampler 30cm below the seating drive is termed the penetration resistance 'N'. Standard penetration tests were conducted at the borehole locations, in accordance with IS: 2131. The Samples were collected at every 1.00 m up to 5m depth and at every 1.5m up to 8m depth of the bore holes directed by the engineer-in-charge.

2.4. Collection of Samples:

2.4.1 Disturbed Soil Samples

The SPT-samples collected were used as disturbed soil samples. These samples were used for visual and physical identification and for conducting laboratory classification tests as per I.S.1498-1970.

2.5 Summary of Field Work

- Two boreholes were made up to N value > 100.
- Standard Penetration Test (SPT) at regular intervals was conducted and Disturbed Soil Samples were collected.
- The locations of the boreholes are shown in site plan attached.
- The soil profiles obtained at each location is shown in the tables attached.

For THAI HOMES PRIVATE LIMITED

Managing Director

AYYAN ASSOCIATES CHENNAI 600 082

P. SIVARUN PERUMAL, M.E.(Soil)., MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

2.6 Laboratory Testing:

2.6.1 Coarse Grained Samples:

2.6.1.1 Grain size Analysis Tests:

On the coarse-grained samples, grain size distribution tests were conducted as per I.S.2720 (Part 4)-1985, to know the gradation characteristics and to classify them. These results are presented in Laboratory Test Results.

2.6.2 Fine Grained Samples:

2.6.2.1 Index Property – Free Swell Tests:

Atterberg's Limits were carried out on fine grained soil samples to evaluate the limits of different consistency states. Generally Liquid limits, Plastic limits and Shrinkage Limits tests were conducted as per I.S.2720 (Part-5)-1985 and I.S.2720 (Part 6)-1972. On such types of strata encountered at the investigation locations, such tests were conducted and the test results are presented in tables.

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
#16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

For THAI HOMES PRIVATE LIMITED

Managing Director

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

3. SUB-SURFACE STRATIFICATION

3.0 Preamble

The details of soil conditions encountered at the Bore Hole locations are presented in this chapter based on visual identification, laboratory testing and other engineering characteristics derived from SPT-value which are having correlation with strength parameters.

The stratigraphy of the soil in BH1 is comprised of Clayey Sand layer in the top 2.5m and from 3.0m to 4.0m. Clayey Gravel layer is present from 2.5m to 3.0m. Silty Gravel layer is present from 4.0m to 5.0m. Below 5m, there is Weathered Rock layer.
The stratigraphy of the soil in BH2 is comprised of Sandy Gravel layer in the top 2.0m. Clayey Sand layer is present from 2.0m to 5.0m. Silty Gravel layer is present from 5.0m to 6.30m. Below 6.3m, there is Weathered Rock layer.

The top soil is having differential free swell of 19% to 50% based on the free swell index carried out according to IS: 2720 (Part. XL)-1977. As per the appendix A under clause 3.1(b) of IS 2911 (Part III) -1980, the qualitative indication of the degree of expansiveness of the soil is Low to High. The relative compaction of the Sandy Stratum is Medium Dense to Very Dense.

3.1 Water Table

Water level was met with during the borehole operations at the depth of about 1.0m from existing ground level. The water level might be due to the influence of Bentonite slurry. Actual water level has to be confirmed before foundation excavation.

AYYAN ASSOCIATES CHENNAI 600 082

For THAI HOMES PRIVATE LIMITED

Managing Director

P. ARUN PERUMAL, M.E.(Soil).,MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associate
16/47, Buddhar Street, V.S.A. Nagar, Chenna

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

4. FOUNDATION SYSTEM

4.0 Preamble

The foundation system design is an interface between super structure and the sub soil bearing strata characteristics. A sound foundation system should be safe against bearing strata shear response under the super structure load intensity. Similarly, the stability of the foundation system is governed by the bearing strata deformation response under the super structure load intensity. In addition, as a combined system of super structure and foundation, the overall stability is also governed by the super structure arrangement. Considering the above aspects of foundation design, suitable type of foundation system with respect to the sub soil conditions encountered at the borehole locations is presented in the subsequent sections.

4.1 Bearing Strata Characteristics

At the investigation locations, it can be observed that the sub-soil strata are non- uniformly stratified with some variation. The sub-soil stratum at the location of borehole is clayey at the shallow depths.

4.2 Proposed Foundation System

Considering the sub soil conditions encountered at the investigation locations, the foundation system discussed below is technically viable solution and depending upon the relative economics and construction feasibility the foundation system discussed below can be adopted. The top layer up to 3.00 m is considered for shallow foundation. The water table is considered to be at the ground level in worst conditions.

The bearing capacity has been assessed as per the IS 6403: 1981 based on the field test (SPT) conducted at site as per IS 2131:1981. The allowable bearing pressure is calculated as per IS 8009(Part I)-1976 (Reaffirmed 1998). A factor of safety of 3 has been adopted to arrive at the safe bearing capacity.

Since the structural design is not yet done for the proposed building, the maximum column load is not known. Therefore, the bearing capacity for different type of foundation is calculated.

AYYAN ASSOCIATES CHENNAI 600 082

For THAI HOMES PRIVATE LIMITED

Managing Director

Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

The calculated allowable bearing pressure for isolated footing is listed in the table for the maximum footing size of 3.0m x 3.0m at the depth of 2.0m and 3.0m from the existing ground level.

BH No	ISOLATED FOOTING		Calculated Safe allowable bearing pressure in kN/m²	Total settlement in mm
	Assumed Size	Depth		
BH 1	3.0m x 3.0m	2.0m	150 kN/m²	14 mm
		3.0m	300 kN/m²	23 mm
BH 2	3.0m x 3.0m	2.0m	150 kN/m²	13 mm
		3.0m	300 kN/m²	18 mm

The calculated allowable bearing pressure for strip raft foundation is listed in the table for the maximum footing size of 1.5 m x 10.0m at the depth of 2.0m and 3.0m from the existing ground level.

BH No	STRIP RAFT FOUNDATION		Calculated Safe allowable bearing pressure in kN/m²	Total settlement in mm
	Assumed Size	Depth		
BH 1	1.5m x 10.0m	2.0m	120 kN/m²	7 mm
		3.0m	250 kN/m²	11 mm
BH 2	1.5m x 10.0m	2.0m	120 kN/m²	8 mm
		3.0m	250 kN/m²	9 mm

Since the ground water table is at shallow depth the excavation for shallow foundation may be difficult. If the dewatering is found difficult, the excavation may be planned during post rainfall season when the water table is below the excavation level. If deep excavation and the dewatering is found difficult, Deep Pile foundation can be adopted after deep and detailed soil investigation.

Based on the above assessment the conclusion and recommendation are furnished below

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil), MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
1 1/47, Buddhar Street, V.S.A. Nagar, Chen

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile : 9841832444,
E-mail : ayyanassociates@gmail.com, www.ayyanassociates.com

For THAI HOMES PRIVATE LIMITED

Managing Director

5. CONCLUSIONS & RECOMMENDATIONS

5.1 Foundation Type – I :(Isolated footing)

- The recommended safe bearing capacity considering Isolated Foundation for a foundation size of 3.0m X 3.0m **is 300 kN/m²** at the depth of about **3.00m** from the existing lowest ground level.

- Under the recommended bearing pressure, the settlements of the bearing strata based on Schmertzmann method is within the permissible limits for isolated column footing as per I.S: 1904.

5.2 Foundation Type – II: (Strip Foundation)

- For higher load carrying capacity requirement Strip Raft may be adopted. The recommended safe bearing capacity considering Strip Foundation for a foundation size of 1.50m X 10.0m **is 250 kN/m²** at the depth of about **3.00m** from the existing lowest ground level.

- Under the recommended bearing pressure, the settlements of the bearing strata based on Schmertzmann method is within the permissible limits for Strip footing.

5.3 General Recommendations:

1. The calculations are theoretical and have to be confirmed by conducting Plate load test on foundation soil as per relevant standards.

2. For back filling the foundation trench, non-swelling soil may be used with proper layer by layer compaction. The floor may also be raised using non-cohesive material.

3. **Trial pit has to be done in the proposed site to check the feasibility for foundation excavation.**

4. Since the ground water table is at shallow depth the excavation for shallow foundation may be difficult. If the dewatering is found difficult, the excavation may be planned during post rainfall season when the water table is below the excavation level.

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL. M.E.(Soil).,MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
#16/47, Buddhar Street, V.S.A. Nagar, Chennai

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

For THAI HOMES PRIVATE LIMITED

Managing Director

5. Proper shuttering arrangements are required during foundation construction work for the stability of excavation cut and the nearby structure.

6. The Foundation and grade beam may be placed over a minimum 200mm thickness of Compacted CNS soil layer (Cohesive non swelling) spreading at least 200mm in excess on all sides.

7. During the foundation construction, If the ground water level is raised higher than the foundation level due to rain, then continuous dewatering has to be done with proper design to keep the water level 2m below the foundation level.

8. Care shall be taken in locating the foundation system such that the ultimate bearing strata are with "N value" more than "14" at 2m depth and "47" at 3m depth.

9. The maximum flood level data of the nearby area has to be collected to decide the floor level.

10. The load carrying capacity should not be increased than the recommended values. For higher load carrying capacity requirement, alternate foundation has to be adopted after deep and detailed soil investigation.

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.

AYYAN ASSOCIATES CHENNAI 600 082

P. ARUN PERUMAL, M.E.(Soil).,MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.
CMDA Regn:- GTE/19/03/013

No. 16/47, Buddhar Street, V.S.A.Nagar (Near Villivakkam), Chennai – 82. Mobile – 9841832444,
Email: ayyansoiltest@gmail.com, Web: www.ayyanassociates.com

For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BEARING CAPACITY OF SHALLOW FOUNDATIONS

Model Bearing capacity calculations based on IS : 6403-1981 & Settlement by Schmertmann method

Report No : **AY/JAN/2024/1**

Design particulars

Assumed Foundation size and depth — **Isolated Column Square Footing**

Depth of foundation (D) =		**2.00 m**	**3.00 m**
Foundation width (B) =		*3.00* m	*3.00* m
Foundation Length (L) =		*3.00* m	*3.00* m
Foundation Shape =		Square	Square
Shear strength parameters	Data from BH:	**1**	
angle of internal friction correlated/measured (Φ) =		34 ° (deg)	36 ° (deg)
Cohesion correlated/measured =		kPa	kPa
Density of soil (Y) =		15.6 kN/m^3	18.1 kN/m^3
Depth of water table from EGL (D_w) =		0.00 m	0.00 m
Shear failure criterion		**Interpolation**	**General**
Bearing capacity factors **Nc** and Dc		***30.81*** 1.25	***50.68*** 1.39
Nq and Dq		***19.52*** 1.12	***37.85*** 1.20
Ny and Dy		***25.12*** 1.12	***56.49*** 1.20

Sc/Sq/Sy
1.30
1.20
0.80

UBC = CNcScDc+q(Nq-1)Dq+0.5ByNyDyRW' (General) or **(2/3)CN'cScDc+q(N'q-1)Dq+0.5ByN'yDyRW'** (Local) or **interpolating both**

Ultimate bearing capacity	457 kPa	1375 kPa
Factor of Safety	3.00	3.00
Result		
Safe bearing capacity assessed	152 kPa	458 kPa
Allowable bearing pressure	**150** kPa	**300** kPa
Anticipated Total settlement in **25** years =	14 mm	23 mm

Depending upon anticipated load intensity the foundation may be adopted at suitable depth as recommended below

Depth of foundation (m):	Safe bearing capacity (kPa):	
2.00 m	**150** kPa	14 mm
3.00 m	**300** kPa	23 mm

For THAI HOMES PRIVATE LIMITED

Managing Director

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

AYYAN ASSOCIATES CHENNAI 600 082

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BEARING CAPACITY OF SHALLOW FOUNDATIONS

Model Bearing capacity calculations based on IS : 6403-1981 & Settlement by Schmertmann method

Report No : **AY/JAN/2024/1**

Design particulars

Assumed Foundation size and depth — **Isolated Column Square Footing**

Depth of foundation (D) =		**2.00 m**	**3.00 m**
Foundation width (B) =		*3.00* m	*3.00* m
Foundation Length (L) =		*3.00* m	*3.00* m
Foundation Shape =		Square	Square
Shear strength parameters	Data from BH:	**2**	
angle of internal friction correlated/measured (Φ) =		35 ⁰ (deg)	39 ⁰ (deg)
Cohesion correlated/measured =		kPa	kPa
Density of soil (γ) =		16.1 kN/m^3	21.0 kN/m^3
Depth of water table from EGL (D_w) =		0.00 m	0.00 m
Shear failure criterion		**Interpolation**	**General**
Bearing capacity factors **Nc** and Dc		***38.27*** 1.26	***64.82*** 1.42
Nq and Dq		***26.38*** 1.13	***52.65*** 1.21
Ny and Dy		***36.87*** 1.13	***85.50*** 1.21

Sc/Sq/Sy
1.30
1.20
0.80

UBC = CNcScDc+q(Nq-1)Dq+0.5ByNyDyRW' (General) or **(2/3)CN'cScDc+q(N'q-1)Dq+0.5ByN'yDyRW'** (Local) or **interpolating both**

Ultimate bearing capacity	690 kPa	2321 kPa
Factor of Safety	3.00	3.00
Result		
Safe bearing capacity assessed	230 kPa	774 kPa
Allowable bearing pressure	**150** kPa	**300** kPa
Anticipated Total settlement in **25** years =	13 mm	18 mm

Depending upon anticipated load intensity the foundation may be adopted at suitable depth as recommended below

Depth of foundation (m):	Safe bearing capacity (kPa):	
2.00 m	**150** kPa	13 mm
3.00 m	**300** kPa	18 mm

For THAI HOMES PRIVATE LIMITED

Managing Director

Dr. ARUN PERUMAL, M.E.(Soil).,MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

AYYAN ASSOCIATES CHENNAI 600 082

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BEARING CAPACITY OF SHALLOW FOUNDATIONS

Model Bearing capacity calculations based on IS : 6403-1981 & Settlement by Schmertmann method

Report No : **AY/JAN/2024/1**

Design particulars

Assumed Foundation size and depth		**Strip Raft Footing**		
Depth of foundation (D) =		**2.00 m**	**3.00 m**	
Foundation width (B) =		*1.50* m	*1.50* m	
Foundation Length (L) =		*10.00* m	*10.00* m	
Foundation Shape =		Rectangle	Rectangle	
Shear strength parameters	Data from BH: **1**			
angle of internal friction correlated/measured (Φ) =		34 ⁰ (deg)	36 ⁰ (deg)	
Cohesion correlated/measured =		kPa	kPa	
Density of soil (Y) =		15.6 kN/m^3	18.1 kN/m^3	
Depth of water table from EGL (D_w) =		0.00 m	0.00 m	
Shear failure criterion		**Interpolation**	**General**	**Sc/Sq/Sy**
Bearing capacity factors **Nc** and Dc		***30.81*** 1.50	***50.68*** 1.79	*1.00*
Nq and Dq		***19.52*** 1.25	***37.85*** 1.39	*1.00*
Ny and Dy		***25.12*** 1.25	***56.49*** 1.39	*1.00*

UBC = CNcScDc+q(Nq-1)Dq+0.5ByNyDyRW' (General) or **(2/3)CN'cScDc+q(N'q-1)Dq+0.5ByN'yDyRW'** (Local) or **interpolating both**

Ultimate bearing capacity	363 kPa	1150 kPa
Factor of Safety	3.00	3.00
Result		
Safe bearing capacity assessed	121 kPa	383 kPa
Allowable bearing pressure	**120** kPa	**250** kPa
Anticipated Total settlement in **25** years =	7 mm	11 mm

Depending upon anticipated load intensity the foundation may be adopted at suitable depth as recommended below

Depth of foundation (m):	Safe bearing capacity (kPa):	
2.00 m	**120** kPa	7 mm
3.00 m	**250** kPa	11 mm

For THAI HOMES PRIVATE LIMITED

Managing Director

P. ARUN PERUMAL, M.E.(Soil).,MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

AYYAN ASSOCIATES CHENNAI 600 082

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BEARING CAPACITY OF SHALLOW FOUNDATIONS

Model Bearing capacity calculations based on IS : 6403-1981 & Settlement by Schmertmann method

Report No : **AY/JAN/2024/1**

Design particulars

Assumed Foundation size and depth			**Strip Raft Footing**		
Depth of foundation (D) =			**2.00 m**	**3.00 m**	
Foundation width (B) =			*1.50* m	*1.50* m	
Foundation Length (L) =			*10.00* m	*10.00* m	
Foundation Shape =			Rectangle	Rectangle	
Shear strength parameters	Data from BH:	**2**			
angle of internal friction correlated/measured (Φ) =			35 ⁰ (deg)	39 ⁰ (deg)	
Cohesion correlated/measured =			kPa	kPa	
Density of soil (У) =			16.1 kN/m^3	21.0 kN/m^3	
Depth of water table from EGL (D_w) =			0.00 m	0.00 m	
Shear failure criterion			**Interpolation**	**General**	**Sc/Sq/Sy**
Bearing capacity factors **Nc** and Dc			***38.27*** 1.52	***64.82*** 1.83	*1.00*
Nq and Dq			***26.38*** 1.26	***52.65*** 1.42	*1.00*
Ny and Dy			***36.87*** 1.26	***85.50*** 1.42	*1.00*

UBC = CNcScDc+q(Nq-1)Dq+0.5ByNyDyRW' (General) or **(2/3)CN'cScDc+q(N'q-1)Dq+0.5ByN'yDyRW'** (Local) or **interpolating both**

Ultimate bearing capacity		547 kPa	1952 kPa
Factor of Safety		3.00	3.00
Result			
Safe bearing capacity assessed		182 kPa	651 kPa
Allowable bearing pressure		**120** kPa	**250** kPa
Anticipated Total settlement in	**25** years =	8 mm	9 mm

Depending upon anticipated load intensity the foundation may be adopted at suitable depth as recommended below

Depth of foundation (m):	Safe bearing capacity (kPa):	
2.00 m	**120** kPa	8 mm
3.00 m	**250** kPa	9 mm

For THAI HOMES PRIVATE LIMITED

Managing Director

T. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82

AYYAN ASSOCIATES CHENNAI 600 082

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Table of Laboratory Test Results

Report No : AY/JAN/2024/1

Bore Hole No	Depth (m)		SPT Depth (m)	N Value	Type of Soil	Grain Size Analaysis (Particle Retained in IS Sieve) %					Atterberg Limits			IS Classification	Natural Moisture Content %	Free swell (%)	Liquidity Index (NMC-PL)/PI	Remarks
	From	To				Gravel (4.75 mm)	Coarse Sand (2.00 mm)	Medium Sand (0.425 mm)	Fine Sand (0.075 mm)	Silt & Clay (<0.075mm)	LL	PL	PI					
BH 1	0.00	2.00	1.00	12	Clayey Sand	0.60	6.17	25.14	32.86	35.22				SC	13.07	20.00		
	2.00	2.50	2.00	14	Clayey Sand	6.11	13.72	15.77	32.25	32.15				SC	26.71	34.38		
	2.50	3.00	2.50	32	Clayey Gravel	39.95	5.42	8.63	20.99	25.01				GC	24.23	33.33		
	3.00	4.00	3.00	66	Clayey Sand	13.23	10.61	11.70	18.80	45.66	47.0	20.0	27.0	SC	17.90		-0.08	
	4.00	5.00	4.00	30	Silty Gravel	44.79	11.85	15.68	15.28	12.40					11.80			
	5.00	5.80	5.00	100	No Sample													
	5.80	5.80	5.80	100	No Sample													
BH 2	0.00	2.00	1.00	25	Sandy Gravel	49.73	10.18	23.69	12.05	4.36					13.64	18.18		
	2.00	3.00	2.00	17	Clayey Sand	24.84	10.15	13.29	15.49	36.23				SC	31.52	50.00		
	3.00	4.00	3.00	47	Clayey Sand	15.76	15.02	20.18	24.87	24.17				SC	7.74			
	4.00	5.00	4.00	100	Clayey Sand	25.75	15.94	17.85	18.32	22.14				SC	6.40			
	5.00	6.30	5.00	100	Silty Gravel	42.45	10.06	15.90	14.62	16.98					10.36			
	6.30	6.34	6.30	100	No Sample													

AS - Augur Sample

For THAI HOMES PRIVATE LIMITED

Managing Director

AYYAN ASSOCIATES CHENNAI 600 082

HARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-62.

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BORE LOG

Report No : **AY/JAN/2024/1**

BH No	**1**	RL of the EGL	m	Water level	**1.00** m below ground level
Date of commencement		**02-01-2024**		Type of Drilling	**Calyx Rotary drilling**
Date of completion		**03-01-2024**		Dia of Bore hole	**100** mm

Depth from RL (m)	Description of soil stratum	Soil profile	Thickness of layer	Standard Penetration Test: Depth	Number of blows: I	II	III	N	Relative density / consistency	Graphical representation of penetration resistance (0 20 40 60 80 100)
0.00	Existing ground level									
0.50	Filled up soil		0.50							
2.00	Brown Clayey Sand		1.50	1.00	4	5	7	12	Medium Dense	
2.50	Brown Clayey Sand with Gravel		0.50	2.00	6	6	8	14	Medium Dense	
3.00	Brown Clayey Gravel		0.50	2.50	10	12	20	32	Dense	
4.00	Brown Clayey Sand with Weathered Stones		1.00	3.00	15	40	26	66	Very dense	
5.00	Brown Silty Gravel (Weathered Stones)		1.00	4.00	29	30	50#	>100	Medium Dense	
					#50 blows for 10cm penetration					
				5.00	15#			>100	Very dense	
					#15 blows for no penetration					
5.80	Weathered Rock		0.80	5.80	10#			>100	Very dense	
					#10 blows for no penetration					
	Bore Hole terminated at 5.8 m									

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82.

AYYAN ASSOCIATES CHENNAI 600 082

For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BORE LOG

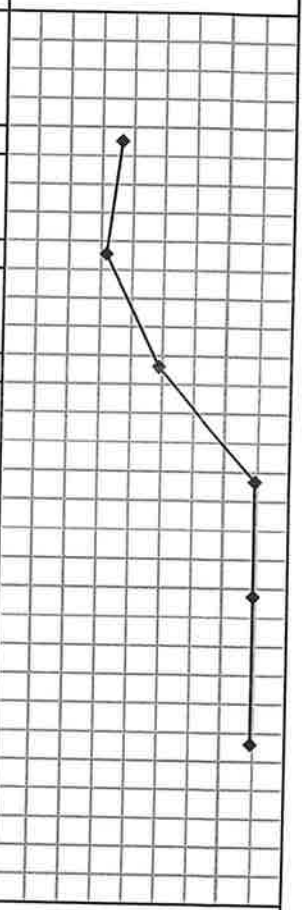
Report No : **AY/JAN/2024/1**

BH No	2	RL of the EGL	m	Water level	1.00 m below ground level
Date of commencement		03-01-2024		Type of Drilling	Calyx Rotary drilling
Date of completion		04-01-2024		Dia of Bore hole	100 mm

Depth from RL (m)	Description of soil stratum	Soil profile	Thickness of layer	Standard Penetration Test: Depth	Number of blows: I	II	III	N	Relative density / consistency
0.00	Existing ground level								
1.50	Filled up soil		1.50	1.00	8	11	14	25	Medium Dense
2.00	Brown Sandy Gravel		0.50						
3.00	Brown Clayey Sand with Gravel		1.00	2.00	5	7	10	17	Medium Dense
5.00	Brown Clayey Sand with Weathered Stones		2.00	3.00	12	15	32	47	Dense
				4.00	50#			>100	Very dense
					#50 blows for 14cm penetration				
6.30	Brownish Grey Silty Gravel (Weathered Stones)		1.30	5.00	40	33	50#	>100	Very dense
					#50 blows for 10cm penetration				
6.33	Soft Rock drilled by T.C.Bit (15mins for 3cm penetration)		0.03	6.30	50#			>100	Very dense
					#50 blows for no penetration				
6.34	Soft Rock drilled by T.C.Bit (10mins for 1cm penetration)		0.01						

Graphical representation of penetration resistance

0 20 40 60 80 100



Bore Hole terminated at 6.34 m

AYYAN ASSOCIATES CHENNAI 600 052

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-62.

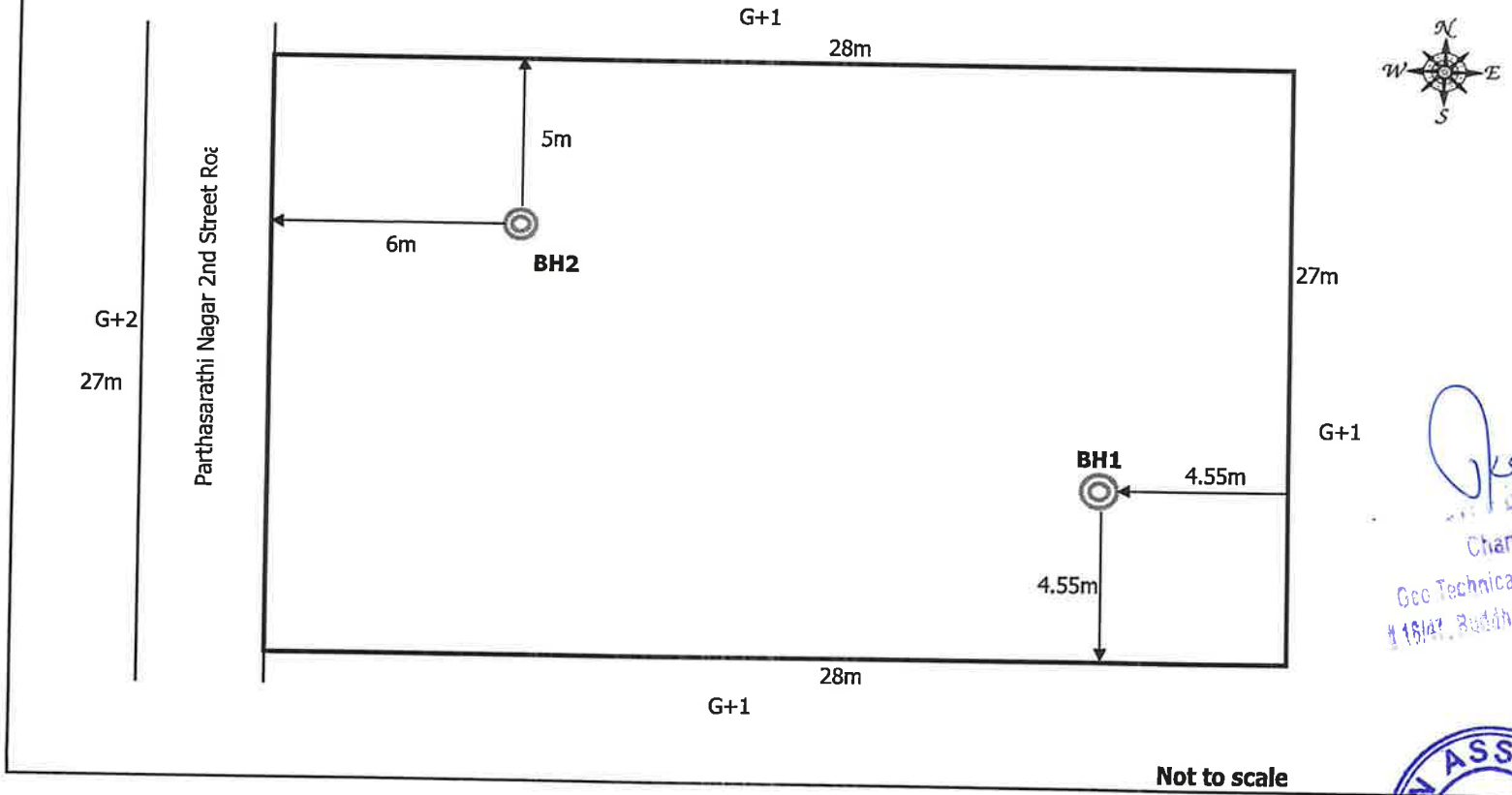
For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

BORE HOLE LOCATION

Report No : AY/JAN/2024/1



Not to scale

M.E.(Soil).,MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Ramakrishna Street, V.S.A. Nagar, Chennai-82.

AYYAN ASSOCIATES
CHENNAI
600 082

For THAI HOMES PRIVATE LIMITED

Managing Director

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Photo

Report No : AY/JAN/2024/1



BH 1



BH1 - 2.5m Sample

For THAI HOMES PRIVATE LIMITED

Managing Director

P. ARUN PERUMAL, M.E.(Soil)., MIE
Charted Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82

AYYAN ASSOCIATES
CHENNAI
600 082

Ayyan Associates
The Soil Testing Company
An ISO 9001:2015 Certified Organisation

Photo

Report No : AY/JAN/2024/1



BH 2



BH2 - 2m Sample

For THAI HOMES PRIVATE LIMITED

Managing Director

P. ARUN PERUMAL, M.E.(Soil)., MIE
Chartered Engineer (INDIA)
Geo Technical Consultant, Ayyan Associates
16/47, Buddhar Street, V.S.A. Nagar, Chennai-82

AYYAN ASSOCIATES
CHENNAI
600 082



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

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996
www.verified.realestate