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**GEOTECHNICAL INVESTIGATION REPORT
FOR
PROPOSED CONSTRUCTION OF APARTMENT BUILDING**

JOB NO: YPI/SIR/2023-24/007

SITE NAME: PROPOSED CONSTRUCTION OF APARTMENT BUILDING

SITE ADDRESS: PROPOSED CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI, COIMBATORE.

LAT-LONG: 11.076338, 76.984588

SITE INVESTIGATION DATE: 12.04.2023

REPORT SUBMITTING DATE: 18.04.2023

CLIENT
**PURNAYA DEVELOPERS PVT LIMITED,
COIMBATORE**



" Expert in Geo-technical Services "

**No 48, 1st Floor, Palaniappa Nagar, Suramangalam Post, Salem, Tamilnadu – 636 005
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Job No: YPI/SIR/2023-24/007

Date: 18.04.2023

To

PURNAYA DEVELOPERS PVT LIMITED,
COIMBATORE.

Name of Work : GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED
CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI,
COIMBATORE.

Sub : Submission of Soil Investigation Report - Reg

Dear Sir,

We are pleased to hereby transmit Two (02) original Hard Copies and Soft Copies 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 Yube Prime Infra.,



(Authorized Signatory)



SOIL INVESTIGATION REPORT
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SOIL INVESTIGATION REPORT**1 INTRODUCTION**

Sub surface investigation and laboratory tests for "PROPOSED CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI, COIMBATORE".

The objective of the exploration work was to determine the probable sub surface conditions such as stratification, denseness or hardness of the strata, position of ground water table etc. and to evaluate probable range of safe bearing capacity for the structure. To fulfill the objective, the work carried out is comprises of:

- Drilling two boreholes each borehole depth upto 6.00m below existing ground level in order to know the sub surface stratification, conducting necessary field tests and to collect disturb and undisturbed soil samples for laboratory testing.
- Testing soil samples in the laboratory to determine its physical and engineering properties of the soil samples, and
- Analyzing all field and laboratory data to evaluate safe bearing capacity of the soil for given foundation sizes and necessary recommendations for foundation design and construction.

2 PROCEDURE OF INVESTIGATION

The actual site investigation work was started on 11.04.2023 and was completed on 12.04.2023.

2.1 Galaxy Drilling

Two boreholes of 150mm diameter is drill up to the depth of 6.00m from the ground level. The work was in general accordance with IS: 1892 – 1979. The Client's representatives choose and selected the location of trail pit to test with Engineers in charge.

2.1.1 Disturbed Samples: Disturbed representative samples were collected, logged, labelled and placed in polythene bags.

SOIL INVESTIGATION REPORT

2.1.2 Undisturbed Samples: Undisturbed soil samples are collected in 100 mm diameter thin walled sampler (Shelby tube) from the borehole. The sampler used for the sampling had smooth surface and appropriate area ratio and cutting edge angle thereby minimizing disturbance of soil during sampling. Samples are logged and labelled properly and transfer to the laboratory for further testing.

2.1.3 Water Table: Water table was not met during the sub soil exploration work carried out in the month of **April - 2023**.

2.1.4 Seismic Zone: The proposed project is situated at **COIMBATORE**. It falls under the Seismic Zone-III, according to the Indian Standard Seismic Zoning Map. Zone - III: This is said to **Moderate seismic zone**.

2.1.5 Method of Sampling: Sampler is coupled together with a sampler head to form a sampling assembly. The sampler head provide a non-flexible connection between the sampling tube and the drill rods. Vent holes are provided in the sampler head to allow escape of water from the top of sampler tube during penetration. The sampling tubes are made free from dust and rust. Coating of oil is applied on both sides to obtain the undisturbed samples in best possible manner.

The sampler is then lowered inside the bore hole on a string of rods and driven to a predetermined level. On completion of driving the sampler is first rotated within the borehole to shear the soil sample at bottom and then pulled out. Upon removal of the sampling tubes, the length of sample in the tube is recorded. The disturbed material in the upper end of the tube, if any, is completely removed before sealing.

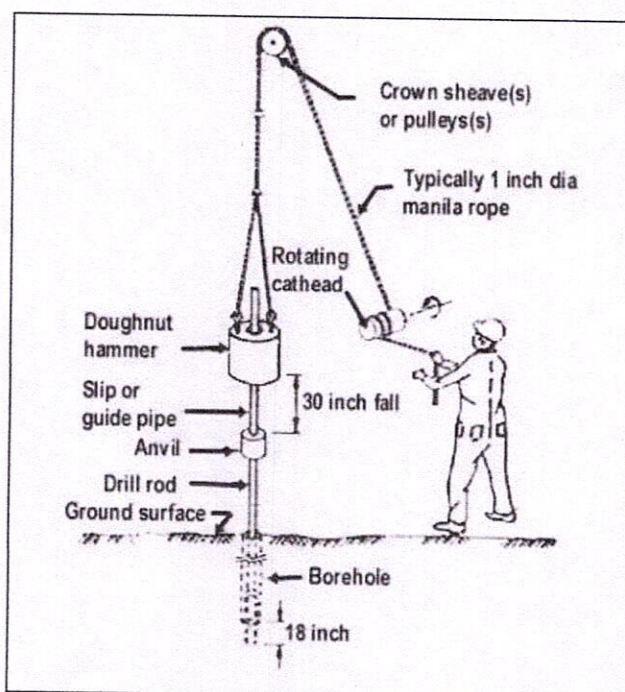
The soil at the lower end of the tube is trimmed to a distance of about 10 to 20 mm. After cleaning and inserting an impervious disc at each end, both ends are sealed. The empty space in the sampler, if any, is filled with the moist soil, and the ends covered with tight wrapper. The identification mark is then made on each sample.

2.2 Standard Penetration Test (SPT)

A standard penetration test was conducted at 1.0/1.5 m intervals or at change of stratum as per Indian standard IS 2133-1981 and split spoon sampler used confirmed to the Indian standard, IS 9640-1980.

The standard penetration test is conducted in a borehole using a Standard split spoon sampler. When the borehole has been drilled to the desired depth, the drilling tools are removed and the sampler is lowered to the bottom of the hole. The sampler is driven into the soil by a drop hammer of 63.5 kg mass falling through a height of 75 cm at the rate of 30 blows per minute as per IS 2133-1963. The number of hammer blows required to drive 15 cm of the sample is counted. The sample is further driven by 15 cm and the number of blows recorded. Likewise, the sample is once again further driven by 15 cm and the number of blows recorded. The number of blows recorded for the first 15 cm is disregarded. The number of blows recorded for the last two 15 cm intervals are added to give the standard penetration number (N). If the number of blows for 30 cm drive exceeds 50, it is taken as refusal and the test is discontinued.

Sufficient disturbed soil samples were collected from the split spoon sampler while performing the standard penetration tests in each hole.



SOIL INVESTIGATION REPORT

2.3 Laboratory 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 tests. Following laboratory tests are conducted.

COHESIVE SOIL	COHESIVE LESS SOIL
Specific gravity	Specific gravity
Natural moisture content	Natural moisture content
Sieve Analysis	Sieve analysis
Unconfined compression test	Direct shear test
Wet / Dry Density	Wet / Dry Density
Atterberg's limits	
Consolidation test	
Triaxial test	

3 RELEVANT IS – CODES

All the test are carried out as per IS codes. Some of the prominent test and there relevant IS Codes are given in the table.

S No.	Type of Testing	As per IS Code
01	Excavation of bore holes (Field Test)	IS 1892 - 1979 (Reaffirmed 2002)
02	Standard Penetration Test (Field Test)	IS 2131 - 1981 (Reaffirmed 2002)
03	Atterberg' s Limit (Laboratory Test)	IS 2720 Part 5 - 1970 (Reaffirmed 2006)
04	Grain Size Analysis (Laboratory Test)	IS 2720 Part 4 - 1975 (Reaffirmed 2006)
05	Specific Gravity Test (Laboratory Test)	IS 2720 Part 3 – 1981 (Reaffirmed 2002)
06	Density Test (Laboratory Test)	IS 2720 Part 8 -1983 (Reaffirmed 2006)
07	Direct Shear Test (Laboratory Test)	IS 2720 Part 13-1986 (Reaffirmed 2002)
08	Tri-axial Compression Test (Laboratory Test)	IS 2720 Part 10-1973 (Reaffirmed 2002) IS 2720 Part 11-1971 (Reaffirmed 2002) IS 2720 Part 12-1981 (Reaffirmed 2002)
09	Soil Classification (Laboratory Test)	IS 1498-1970 (Reaffirmed 2007)
10	Soil Bearing Capacity as per settlement criteria	IS 8009 -1976 (Reaffirmed 2006)
11	Soil Bearing Capacity as per shear criteria	IS 6403 – 1981 (Reaffirmed 2004)

SOIL INVESTIGATION REPORT

4 FOUNDATION ANALYSIS

4.1 Soil Profile

The profile of the area as observed in the borehole is given in the chart. Borehole soil profiles are given in below,

Borehole: 01

Depth of Soil (m)	Soil Description	IS Classification
0 – 0.70	Clay	CH – Inorganic Clay
0.70 – 1.80	Kankar	SM – Silty Sand
1.80 – 6.00	Soft Disintegrated Rock	SDR - Soft Disintegrated Rock

Borehole: 02

Depth of Soil (m)	Soil Description	IS Classification
0 – 0.80	Clay	CH – Inorganic Clay
0.80 – 1.70	Kankar	SM – Silty Sand
1.70 – 6.00	Soft Disintegrated Rock	SDR - Soft Disintegrated Rock

4.2 Safe Bearing Capacity

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.

$$\text{Safe Bearing Capacity (SBC)} = q = 0.314 N^2 B.Rw2 + 0.943 (100 + N^2) Df. Rw1$$

Where,

N	:	Standard Penetration Value
B	:	Width of Footing (or least lateral dimensions)
Df	:	Depth of Foundation
Rw1 & Rw2	:	Water Reduction Factor

4.3 Allowable Bearing Pressure

The net intensity of loading which the foundation will carry without undergoing settlement in excess of the permissible value for the structure under consideration but not exceeding net safe bearing capacity. The safe bearing pressure, q_s corresponding to a settlement of 25mm is given by,

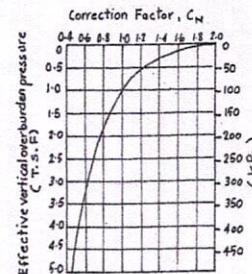
$$q = 1.36 (N - 3) ((B+0.3)/2B)^2 Rw2 . Rd$$

Where,

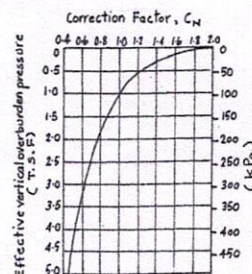
B	:	Maximum Size of the Footing
R	:	Water table correction factor (For the worst case, Taken as 0.5)

SOIL INVESTIGATION REPORT
SBC CALCULATION

Allowable bearing capacity calculation		
Width of the footing, B	=	2 m
Depth of foundation, Df	=	2 m
Unit weight of soil	=	18 kN/m ³
Submergible unit wt	=	8 kN/m ³
Avg. observed N value	=	38
Eff. overburden pressure at foundation level	=	16 kN/m ²
Overburden correction factor	=	1.4
N value after overburden correction, N'	=	53.2
Depth of GWT	=	0 m
Dialtancy correction, N"	=	34.1
Factor of Safety	=	3
Rw1	=	0.5
Rw2	=	0.5
Ultimate Bearing capacity based on shear	=	$0.314 \times N'^2 \times B \times R_{w1} + 0.943 \times (100 + N'^2) \times D_f \times R_{w2}$
	=	1555.95 kN/m ²
Safe bearing capacity based on shear	=	518.651 kN/m ²
Safe bearing capacity based on settlement	=	$1.36 \times (N' - 3) \times ((B + 0.3)/2B)^2 \times S_x \times R_d \times R_w$
Settlement for Sand	=	25 mm
Depth factor, Rd	=	$1 + D_f/B < 2$
Rd	=	1.2 Say
Water table factor, Rw	=	$0.5 + 0.5(D_w/B)$ $0.5 < R_w < 1$
Rw	=	0.5 Since GWT is below 0m from EGL
Qs	=	419.523 kN/m ² For 50mm controlled Settlement
Qs	=	335.62 kN/m ² For 40mm controlled Settlement
Qs	=	209.762 kN/m ² For 25mm controlled Settlement
Allowable Bearing Pressure at Df depth is	=	209 kN/m ² For CONTROLLED SETTLEMENT OF 25MM



Allowable bearing capacity calculation		
Width of the footing, B	=	2 m
Depth of foundation, Df	=	3 m
Unit weight of soil	=	18 kN/m ³
Submergible unit wt	=	8 kN/m ³
Avg. observed N value	=	50
Eff. overburden pressure at foundation level	=	24 kN/m ²
Overburden correction factor	=	1.4
N value after overburden correction, N'	=	70
Depth of GWT	=	0 m
Dialtancy correction, N"	=	42.5
Factor of Safety	=	3
Rw1	=	0.5
Rw2	=	0.5
Ultimate Bearing capacity based on shear	=	$0.314 \times N'^2 \times B \times R_{w1} + 0.943 \times (100 + N'^2) \times D_f \times R_{w2}$
	=	3263.55 kN/m ²
Safe bearing capacity based on shear	=	1087.85 kN/m ²
Safe bearing capacity based on settlement	=	$1.36 \times (N' - 3) \times ((B + 0.3)/2B)^2 \times S_x \times R_d \times R_w$
Settlement for Sand	=	25 mm
Depth factor, Rd	=	$1 + D_f/B < 2$
Rd	=	1.2 Say
Water table factor, Rw	=	$0.5 + 0.5(D_w/B)$ $0.5 < R_w < 1$
Rw	=	0.5 Since GWT is below 0m from EGL
Qs	=	532.835 kN/m ² For 50mm controlled Settlement
Qs	=	426.27 kN/m ² For 40mm controlled Settlement
Qs	=	265.418 kN/m ² For 25mm controlled Settlement
Allowable Bearing Pressure at Df depth is	=	265 kN/m ² For CONTROLLED SETTLEMENT OF 25MM



SOIL INVESTIGATION REPORT
5 FIELD INVESTIGATION REPORT
BORE LOG DETAILS
Borehole No: 01
Job No: YPI/SIR/2023-24/007
Name Of Work: GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI, COIMBATORE.

Soil Investigation done by:		Yube Prime Infra, Salem - 05	Method: Rotary drilling						Ground Water Table		Not met			
									Commencement Date		11.04.2023			
									Completion Date		11.04.2023			
Depth below G.L.(R.L)	Soil Profile	IS Classification of Soil	Thickness of layer (m)	Depth at which test is conducted	Standard Penetration Test Data				Relative density / Consistency	Graphical representation of penetration resistance				
					N1	N2	N3	N = N2+N3		20	40	60	80	100
0.70		Clay	0.70	1.00	6	8	12	20	Medium					
1.80		Kankar	1.10	2.00	13	17	21	38	Dense					
		Soft Disintegrated Rock	4.20	3.00	50/8	-	-	>50	V Dense					
				4.00	50/2	-	-	>50	do					
				5.00	R									
				6.00	R									

***R – Refusals**


SOIL INVESTIGATION REPORT
Borehole No: 02
Job No: YPI/SIR/2023-24/007

Name Of Work: GEOTECHNICAL INVESTIGATION WORK FOR PROPOSED CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI, COIMBATORE.

Soil Investigation done by:		Yube Prime Infra, Salem - 05	Method: Rotary drilling						Ground Water Table		Not met			
									Commencement Date		12.04.2023			
									Completion Date		12.04.2023			
Depth below G.L.(R.L.)	Soil Profile	IS Classification of Soil	Thickness of layer (m)	Depth at which test is conducted	Standard Penetration Test Data				Relative density / Consistency	Graphical representation of penetration resistance				
					N1	N2	N3	N = N2+N3		20	40	60	80	100
0.80		Clay	0.80	1.00	10	16	16	32	Dense					
1.70		Kankar	0.90	2.00	14	21	24	45	do					
		Soft Disintegrated Rock	4.30	3.00	50/8	-	-	>50	V Dense					
				4.00	50/2	-	-	>50	do					
				5.00	R									
				6.00	R									

***R – Refusals**


SOIL INVESTIGATION REPORT

6 LABORATORY INVESTIGATION REPORT

MECHANICAL PROPERTIES OF SOIL

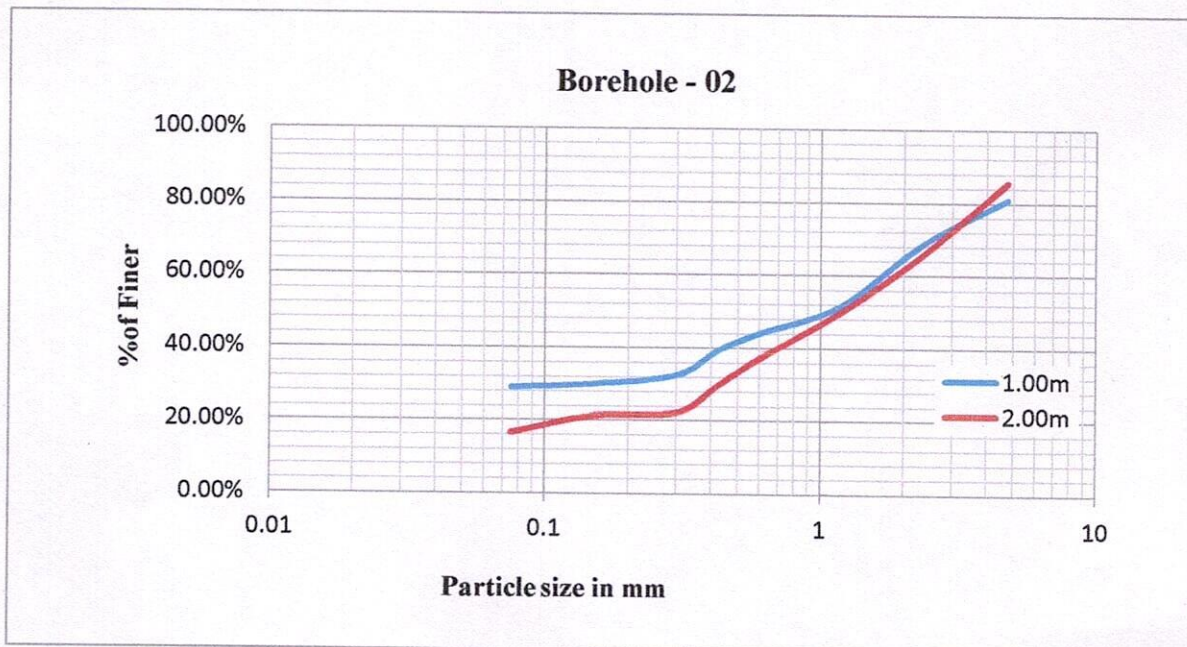
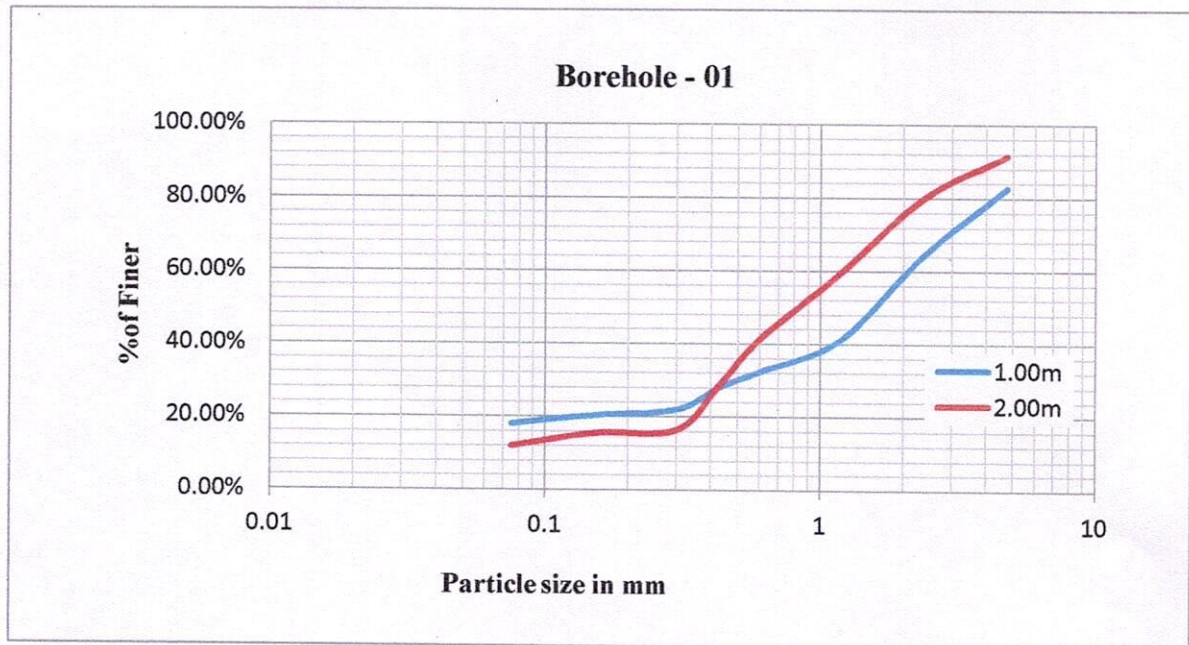
Depth (m) from EGL	Method of Sample	Number of sample collected	Grain Size Analysis			Consistency limits			IS Classification	Specific Gravity	Density g/cc	Observed N Value	Corrected N Value
			Gravel %	Sand %	Silt + Clay	Liquid Limit %	Plastic Limit %	Plasticity Index %					
1.00	SPT	1	17.2	64.8	18	NP	NP	NP	SM	2.62	1.60	20	20.00
2.00	SPT	1	8.4	79.6	12	NP	NP	NP	SM	2.65	1.72	38	38.00
3.00	SPT	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
4.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
5.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
6.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
1.00	SPT	1	19	52	29	NP	NP	NP	SM	2.64	1.66	32	32.00
2.00	SPT	1	14.3	69	16.7	NP	NP	NP	SM	2.66	1.74	45	45.00
3.00	SPT	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
4.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
5.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00
6.00	DS	1	-	-	-	-	-	-	SDR	-	-	>50	50.00

*SPT – Standard Penetration Test, DS – Disturbed Sample

Bore No	Depth (m) from EGL	Moisture Content %	Cohesion value C kN/m ²	Angle of shearing resistance (Ø)	Remarks
01	1.00	10.69	-	32	
	2.00	7.56	-	34	
02	1.00	7.53	-	33	
	2.00	7.00	-	35	



7 SIEVE ANALYSIS



8 RECOMMENDATIONS

Type of Foundation

After critical review of the results, OPEN FOUNDATION in the form of ISOLATED FOOTING may be designed for this project.

Depth of foundation & Safe Bearing Capacity

The depth of foundation and Safe Bearing Capacity shall be given in the table.

SI No	DEPTH (m)	ALLOWABLE SETTLEMENT	WATER TABLE	SBC t/m ²	SIZE OF FOOTING (m)
01	2.00	25mm	Not Met	20.00	2.00 x 2.00
02	3.00	25mm	Not Met	26.00	2.00 x 2.00

Permissible Settlement

The safe bearing capacity is recommended for a permissible settlement of 25mm.

Safety Measures

The top layer soil should not be used for back filling. A good quality moorum shall be used for backfilling and well rammed.



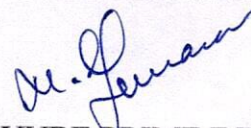
SOIL INVESTIGATION REPORT**9 CERTIFICATION**

FOR M/S PURNAYA DEVELOPERS PVT LIMITED, COIMBATORE WE (YUBE PRIME INFRA) HAVE A PROPOSED CONSTRUCTION OF APARTMENT BUILDING AT CHINNAVEDAMPATTI, COIMBATORE. GEOTECHNICAL INVESTIGATION WORK WAS CONDUCTED AT THE SITE ON 11-APRIL-2023. AFTER ANALYSIS OF THE TEST REPORTS, IT IS RECOMMENDED THAT **ISOLATED FOUNDATION** TO BE ADOPTED FOR DESIGN PURPOSE WITH SAFE BEARING CAPACITY AND DEPTH OF FOUNDATION ARE GIVEN IN THE TABLE.

SOIL DATA AS PER COMPUTATION

SI No	DEPTH (m)	ALLOWABLE SETTLEMENT	WATER TABLE	SBC t/m^2	SIZE OF FOOTING (m)
01	2.00	25mm	Not Met	20.00	2.00 x 2.00
02	3.00	25mm	Not Met	26.00	2.00 x 2.00

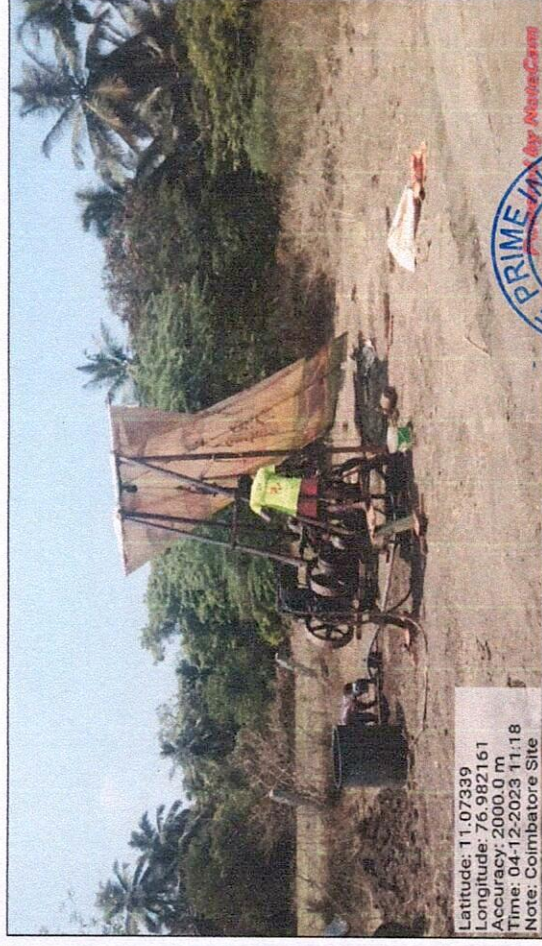
FOR YUBE PRIME INFRA

FOR YUBE PRIME INFRA
Er. M.YUVARAJ, ME (GEOTECH), MIGS
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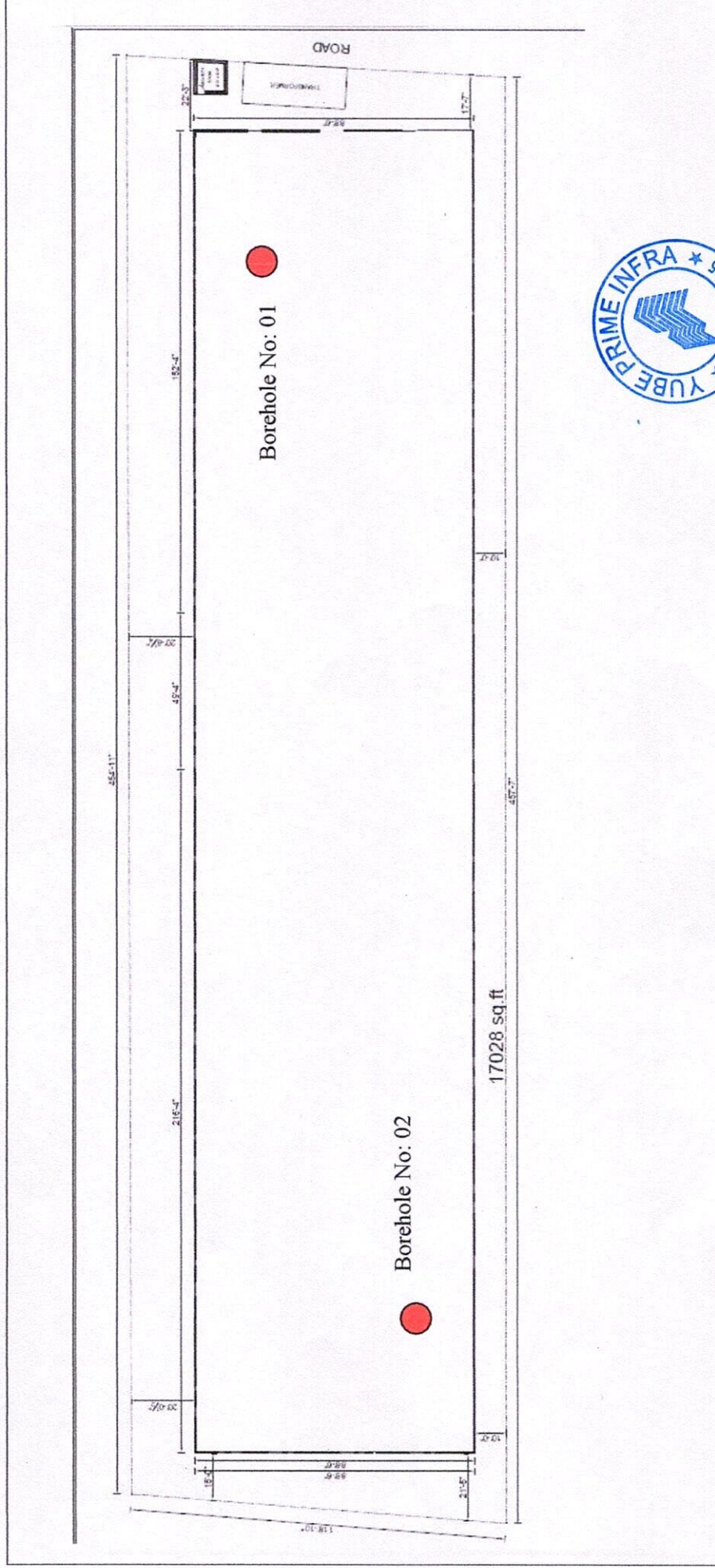


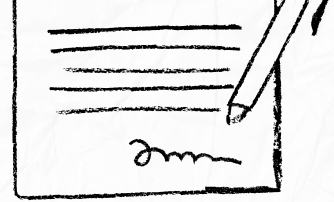
10 PHOTOGRAPHS



11 SITE LAYOUT

PROPOSED CONSTRUCTION OF APARTMENT BUILDING CHINNAVEDAMPATTI, COIMBATORE





our services doesn't just end there



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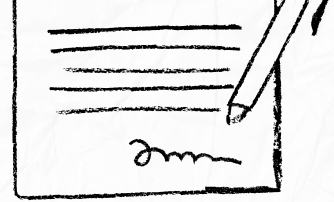
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with smart tools**



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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



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

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