

GEO TECHNICAL INVESTIGATION REPORT

REPORT No.: GT / 1936 / 2021-22

PROJECT: Proposed Construction of (S+5 Floors) Building at
Sri Sai Lingeshwara Officers Colony, Kandiguda,
Kapra, Sainikpuri

CLIENT: M/s Avisun Properties LLP

DURATION: May 2021

GEOTECHNICAL
CONSULTANTS:



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CONTENTS

S.NO.	TITLE	PAGE
1.	INTRODUCTION	3
2.	FIELD INVESTIGATIONS	3
3.	LABORATORY TESTING	4
4.	RESULTS	4
5.	SUB SOIL PROFILE	4
6.	RECOMMENDATIONS	5
7.	TABLE-1: Results of lab testing of soil samples	6
8.	APPENDIX: Calculations for SBC	6
9.	FIG-1: Log of Bore hole	
11.	Annexure-1: Field Bore Log charts	
12.	Annexure-2: BIS (IS) Codes	

1. INTRODUCTION

M/s Avisun Properties LLP has engaged M/s Geo Technologies as Consultant to carryout soil investigation work for the proposed (S+5 Floors) building at Sri Sai Lingeshwara Officers Colony, Kandiguda, Kapra, Sainikpuri.

Soil investigation was carried out by drilling one (1) bore hole.

The results of these investigations and recommendations are presented in this Report.

2. FIELD INVESTIGATIONS

DRILLING:

150 mm / NX size rotary core drilling was performed. The size of the casing used was 150 mm / 90 mm.

All the field operations were conducted as per IS: 1892.

The boreholes were drilled at the locations shown in the site plan (Fig.1). Depth of drilling was 6.0 m.

Standard Penetration Tests (SPT):

Standard Penetration Tests were conducted in accordance with IS: 2131-1981, in soil and SDR layers, and SPT samples were collected.

Field Bore Logs:

All the details collected from the field operations are recorded in Field Bore Log Chart (devised by combining the Record of Boring of IS: 1892 and Drilling Log of IS: 4464). The field bore log charts are given in Annexure-1.

Collection of soil samples

Split-spoon samples and disturbed soil samples were collected from borehole at frequent intervals.

All the soil samples collected were properly packed, labeled and transported to Geo Technologies Soil Testing Laboratory at Hyderabad.

3. LABORATORY TESTING

The samples were tested at Soil Testing Laboratory of GEO TECHNOLOGIES at Hyderabad.

As the soil in the site is essentially coarse grained and cohesionless, the following tests were performed on the Soil samples:

- Specific gravity
- Grain size distribution
- Unit weight
- Direct Shear test

All the tests were conducted in accordance with IS Code: 2720 (various parts).

4. RESULTS

Fig. 1 gives the Log of bore hole.

Table 1 gives the results of lab tests of soil samples.

Appendix gives the calculations for SBC for foundations.

Annexure-1 gives the Field Bore Log Charts.

5. SUB SOIL PROFILE

Based on the single bore log data, the subsoil profile in the site is as follows:

Depth, m	Strata	N value
0.00 – 3.00	Silty gravel	36
3.00 – 4.50	Gravel	56
4.50 – 5.40	SDR	>50
5.40 – 8.40	Rock	Cores (CR: 85 – 87%; RQD: 46 – 75 %)

At the time of drilling, no water table was observed in the borehole.

6. RECOMMENDATIONS

The following recommendations are made for the proposed (S+5 Floors) building at Sri Sai Lingeshwara Officers Colony, Kandiguda, Kapra, Sainikpuri. These are based on one (1) borehole only.

- 1) The subsoil profile in the site is borehole as follows:

Depth, m	Strata	N value
0.00 – 3.00	Silty gravel	36
3.00 – 4.50	Gravel	56
4.50 – 5.40	SDR	>50
5.40 – 8.40	Rock	Cores (CR: 85 – 87%; RQD: 46 – 75 %)

- 2) At the time of drilling, no water table was observed in the borehole.

- 3) Based on soil conditions, Open foundations are recommended.

- 4) Safe Bearing Capacity is recommended as follows:

Depth of foundation below EGL, m	Foundations resting in	SBC, t / sq m
2.0	Silty gravel	25
3.0	Gravel	35

- 5) This is based on the assumption of footings of width 2 m. The actual shape and size would be based on loads from the super structure.
- 6) Foundations should be backfilled with well-compacted gravelly morum.
- 7) These recommendations are based on a single borehole. In other locations, the soil conditions may be different, and hence all the foundation pits should be carefully examined by the structural designer to confirm SBC.

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Project: Proposed (S+5 Floors) building at Sri Sai Lingeshwara Officers Colony,
Kandiguda, Kapra, Sainikpuri

TABLE-1: Results of Lab testing of Soil samples

BH No.	Depth, m	Soil	Sp. Gr.	Grain size, Percentage			γ KN/Cum	Direct Shear Test	
				Gr >4.75mm	Sa 4.75 to 0.075 mm	Fines (Si+Cl) <0.075 mm		C	ϕ
BH-1	1.5	Silty gravel	2.66	39	27	34	18.2	12	32
	3.0	Gravel	-	53	40	7	-	10	33

Appendix: Calculation of SBC for Open foundations

Foundations at 2.0 m depth:

Assumed depth of foundation $D = 2.0$ m;

Assumed Width of foundation $B = 2.0$ m

Unit wt. $r = 18.3$ kN / cu m; Cohesion = 12 kN / sq m (Neglected); $\phi = 32$ degrees

Using IS Code 6403 -1981 formula for Isolated footings:

$$N_c' = 27.23 \quad N_q' = 16.55 \quad N_r' = 20.54$$

$$\text{Net ult B.C.} = 1.3 c' N_c' + r D (N_q' - 1) + 0.4 r B N_r' = 865 \text{ kN/ sq m}$$

$$\text{With a FS of 3, SBC} = 288 \text{ kN / sq m}$$

Recommended SBC for foundations resting at 2.0 m depth is 25 tonnes per sq m.

Foundations at 3.0 m depth:

Assumed depth of foundation $D = 3.0$ m;

Assumed Width of foundation $B = 2.0$ m

Unit wt. $r = 18.6$ kN / cu m; Cohesion = 10 kN / sq m (Neglected); $\phi = 33$ degrees

Using IS Code 6403 -1981 formula for Isolated footings:

$$N_c' = 29.37 \quad N_q' = 18.39 \quad N_r' = 23.55$$

$$\text{Net ult B.C.} = 1.3 c' N_c' + r D (N_q' - 1) + 0.4 r B N_r' = 1320 \text{ kN/ sq m}$$

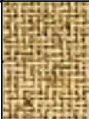




$$\text{With a FS of 3, SBC} = 440 \text{ kN / sq m}$$

Recommended SBC for foundations resting at 3.0 m depth is 35 tonnes per sq m.

Low SBC is recommended in view of inadequate sampling (single borehole).

Annexure-1

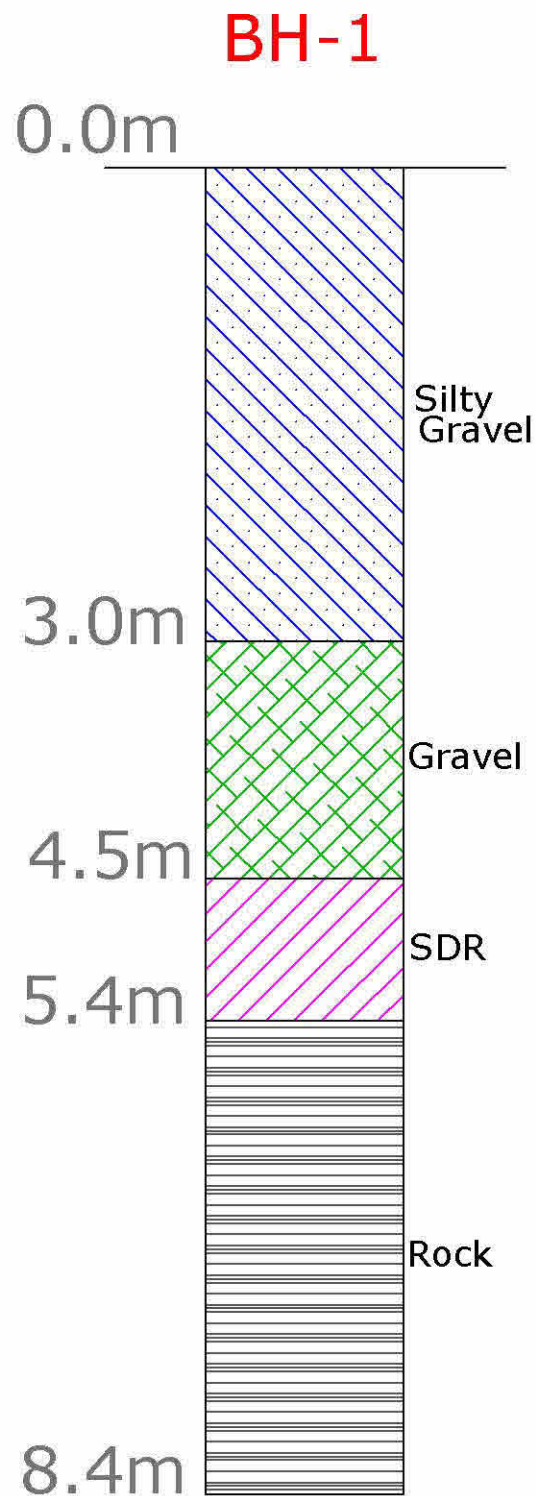
FIELD BORE CHARTS

FIELD BORE LOG CHART																
Project: Sainikpuri 1BH May-2021								BORE HOLE NO. 1		Ground Level:						
										Dia. Of Casing: 150mm/NX						
Date : 11-05-2021								Water Table:								
3 (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT		Details of Rock core				RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
					Depth	Type	No. blows for Penetration of	N	>10cm core	Total	No. of	% of core				
From	To				(m)		(15-30-45)cm	Value	Pieces(cm)	Length (cm)	Pieces	Recovery				
0.0	1.5	1.5	Silty Gravel		1.00	D/S									Red	
					1.50	SPT	12-16-20	36								
1.5	3.0	1.5			2.00	D/S									Brownish	
					3.00	SPT	16-25-31	56								
3.0	4.5	1.5	Gravel		4.00	D/S									Brownish	
					4.50	SPT	18cm/50blows	>50								
4.5	5.4	0.9	SDR		5.00	D/S									Brownish	
5.4	6.4	1.0	Rock				Core sample		25+21=46	80	2no+ small	80%	46%		Milky	
6.4	7.4	1.0					Core sample		35+40=75	85	2no+ small	85%	75%		Milky	
7.4	8.4	1.0					Core sample		15+40+12=67	87	3no+ small	87%	67%		Milky	

ANNEXURE – 2: IS CODES

1. IS: 1892 – 1962: Code of Practice for Site Investigations for Foundations.
2. IS: 2131 – 1981: Method of Standard Penetration Test for Soils.
3. IS: 2132 – 1986: Code of Practice for thin walled tube sampling of Soils.
4. IS: 4464 – 1985: Code of Practice for presentation of drilling information and core description in foundation investigations.
5. IS: 3043 – 1987: Code of Practice for Earthing – Clause 37: Measurement of Soil Resistivity.
6. IS: 2720 Part 4 – 1985: Methods of Test for Soils – Part 4: Grain size analysis.
7. IS: 1498 – 1970: Classification and Identification of Soils for General Engineering Purpose.
8. IS: 2720 Part 29 – 1975: Methods of Test for Soils – Part 29: Determination of dry density of soils by core-cutter method.
9. IS: 2720 Part 2 – 1973: Methods of Test for Soils – Part 2: Determination of water content.
10. IS: 2720 Part 13 – 1986: Methods of Test for Soils – Part 13: Direct shear test.
11. IS: 2720 Part 2 – 1985: Methods of Test for Soils – Part 2: Determination of water content.
12. IS: 2720 Part 3 / section 2 – 1980: Methods of Test for Soils – Part 3: Determination of Specific gravity; Section 2: Fine, Medium and Coarse Grained Soils.
13. IS: 2720 Part 7 – 1980: Methods of Test for Soils – Part 7: Determination of water content – Dry density relation using light compaction .
14. IS: 2720 Part 16 – 1979: Methods of Test for Soils – Part 16: Laboratory Determination of CBR.
15. IS: 9143 – 1979: Method for determination of unconfined compressive strength of rock materials.
16. IS: 10785 – 1983: Method for determination of Compressive and Tensile Strengths of from Point Load Test of rock lump.
17. IS: 11315 (Part 2) – 1987: Method for Quantitative Description of Discontinuities in Rock Mass – Part 2: Spacing.
18. IS: 11315 (Part 11) – 1985: Method for Quantitative Descriptions of Discontinuities in Rock Masses – Part 11: Core Recovery and Rock Quality Designation.
19. IS: 11315 (Part 12) – 1992: Quantitative Description of Discontinuities in Rock Mass – Methods – Part 12: Drill Core study.
20. IS: 12070 – 1987: Code of Practice for Design and Construction of Shallow Foundations on Rocks.
21. IS: 6403 – 1981: Code of Practice for determination of Bearing Capacity of Shallow Foundations.
22. IS: 8009 – 1976 (Part I): Code of Practice for calculation of settlements of Foundations.

FIG:1 LOG OF BORE HOLES
Project: Sainikpuri 1BH May-2021



NOT TO SCALE