

**TSERC HYDERABAD
INWARD**

13 SEP 2022

No.

Sign

**REPORT ON
PRELIMINARY SOIL INVESTIGATIONS FOR THE PROPOSED
CONSTRUCTION OF TSERC OFFICE BUILDING AT
KALYAN NAGAR, S.R. NAGAR, HYDERABAD, TELANGANA.**



**FOR
THE SECRETARY,
TELANGANA STATE ELECTRICITY REGULATORY COMMISSION,
RED HILLS,
HYDERABAD.**



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

SGS REPORT NO. 1448

**REPORT ON PRELIMINARY SOIL INVESTIGATIONS FOR THE PROPOSED
CONSTRUCTION OF TSERC OFFICE BUILDING AT KALYAN NAGAR,
S.R. NAGAR, HYDERABAD, TELANGANA.**

1.0 INTRODUCTION :

1.1 **The Secretary, Telangana State Electricity Regulatory Commission, Red Hills, Hyderabad** has entrusted the work of conducting preliminary Soil Investigations for the proposed **Construction of TSERC Office Building at Kalyan Nagar, S.R. Nagar, Hyderabad, Telangana (Vide Work Order No. A-OA-158, dated 03.09.2022)**. The aim of this report is to evaluate the nature and depth of the soils and strata at the site, and to determine the safe bearing capacity of the foundations, accordingly. The methods and procedures adopted in the soil investigations are to provide the clients a general idea in the shortest duration possible and are in no way to replace the detailed investigations as Per Standards. Also this report cannot be used as a legal document as the scope of work is very limited in its nature.

2.0 PROJECT DETAILS :

2.1 The Site :

2.1.1 The site for the proposed structure is located at Kalyan Nagar X Roads which is about 13 Km. from MGBS, Hyderabad. The topography of the site area is highly undulated. Site plan with location of boreholes drilled at the site is given in Page No.

2.2 STRUCTURE :

2.2.1. As per the clients information the proposed structure is an RCC framed structure comprises of Stilt and Five Upper Floors.



SAI GEOTECHNICAL SERVICES
(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

2.3 Weather Conditions :

2.3.1 Weather was clear and dry during field investigations, which were carried out in the month of September, 2022.

2.4 Seismic Zone :

2.4.1 The proposed project site is situated near Hyderabad, which falls under Seismic Zone II as per IS 1893 (Part I) - 2002.

3.0 OBJECT OF INVESTIGATIONS :

3.1 For designing the foundation system of the proposed structure, the following data are required :

- a) Type of foundation system.
- b) Depth below the ground level at which the foundation system is to be laid.
- c) Allowable bearing pressure on the foundation at different depths.

3.2 To determine above factors, the following information would be required :

- a) The sub soil profile indicating thickness of the various soil strata, to a depth down to the influence zone below the foundations.
- b) Engineering properties of the soil strata at various levels.
- c) Physical characteristics of the soil strata.
- d) Variation of the strength of the strata with depth.



3.3 For evaluating the above parameters, field investigations and laboratory tests on the soil samples collected during the field investigations have been carried out.

3.4 The results from these investigations have been analyzed to provide the recommendations for the design of foundations.

3.5 These recommendations are valid for the investigated locations only.

4.0 SCOPE OF INVESTIGATIONS :

4.1 In order to achieve the above objectives, the scope of investigations given by the client includes the following :

- a) Drilling Four boreholes at four specified locations as shown by the clients upto depths between 12.0M to 15.0M below existing groundlevels with **Percussion Drilling Method as Per IS 1892.**
- b) Collection of Disturbed and Undisturbed soil samples in the foundation Pits.
- c) Conducting calibrated standard penetration tests at regular intervals in the foundation Pits.
- d) Conducting relevant laboratory tests on soil samples recovered.
- e) Preparation and submission of a technical report containing the details of the tests carried out, their analysis and recommendations regarding the foundation system to be adopted.



5.0 FIELD INVESTIGATIONS :

5.1 Preliminary Details :

5.1.1 Field investigations was carriedout in the month of September, 2022.

5.2 BOREHOLES :

5.2.1 The boreholes were drilled at the specified location as shown by the client.

5.2.2 The termination depth of the boreholes below Original GL are given in the following table.

Bore Hole No.	Termination Depth from Existing GL (m)	Water Table below the Existing GL (m)
1	15.0	Not met
2	12.0	Not met
3	12.0	Not met
4	13.0	Not met

5.2.3 The following operations were undertaken in the borehole.

- i. Conducting standard penetration tests.
- ii. Collecting undisturbed samples.

5.2.4 Disturbed soil samples recovered from the split spoon sampler were packed in polythene bags and retained for identification purposes.



- 5.2.6 Undisturbed soil samples were recovered by thin walled shell - by tubes conforming to IS 2132. These tubes had an area ratio of less than 10%.
- 5.2.7 The diameter of soil samples were 50 mm and its length was 45 cm. However in the refusal strata samples of smaller lengths were collected as further penetration was not practical.
- 5.2.8 The ends of sample tubes were sealed by wax to prevent loss/ ingress of moisture.
- 5.2.9 Standard Penetration tests were conducted as per IS 2131 - 1981.

6.0 LABORATORY INVESTIGATIONS :

- 6.1 The soil samples brought to the laboratory were tested to evaluate the following properties.
- a) Type of soil and its gradation
 - b) Consistency limits
 - c) Natural density
 - d) Natural water content
 - e) Shear strength properties
- 6.2 In order to determine the above properties the following tests have been conducted.
- a) Sieve analysis on the coarse grained soil fraction
 - b) Hydrometer analysis on the fine grained soil fraction
 - c) Liquid and plastic limits
 - d) Natural Density and Water Content tests
 - e) Triaxial Shear tests



7.0 RESULTS OF INVESTIGATIONS :

7.1 The results of field investigations and laboratory tests conducted on the soil samples collected from the borehole have been presented in the form of soil profile tables.

7.2 The soil profile tables (Table No 1) as well as the compiled soil profile (Figure 2) gives the details of the strata including their classification and strength properties as ascertained from the tests conducted.

7.3 The soil profile tables indicate the following :

- a) Standard Penetration Test Values (i.e. N- values observed) at various depths.
- b) Soil description identifying the type of soil.
- c) In-situ bulk density and Water content.
- d) Triaxial Shear test results.

8.0 ANALYSIS OF RESULTS :

8.1.1 The compiled subsoil profile as determined from the results of the field and laboratory investigations has been presented in **Table 1**.



8.1.2 An analysis of the data provided in soil profile tables indicates stratification with the presence of the following strata in the sub soil :

- i. Stratum I : Filled up
- ii. Stratum II : Clayey Silty Sand with Gravels
- iii. Stratum III : Highly Weathered Rock with Lime/Clay intrusions
- iv. Stratum IV : Weathered Rock with Lime/Clay intrusions
- v. Stratum V : Soft Disintegrated Rock

Bore Hole No	(Depth in m : from - to -)				
	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V
BH 1	0.0 - 5.0	-	-	5.0 - 7.0	7.0 - 15.0
BH 2	0.0 - 3.0	3.0 - 4.5		4.5 - 7.0	7.0 - 12.0
BH 3	0.0 - 4.5	-	-	4.5 - 12.0	-
BH 4	0.0 - 3.0	-	3.0 - 3.1	3.1 - 13.0	-

9.0 DESIGN CRITERIA :

9.1 Design of Foundations :

9.1.1 As per the clients information the proposed structure is a RCC framed structure.



9.1.2 The design of foundation depends upon the founding strata, loading intensity at the foundation level and configuration at loading points.

9.1.3 For the above conditions, Open foundations are recommended for the proposed structure. The footings may be either isolated or combined depending upon the column loads, their spacing and configuration.

9.2 DEPTH OF FOUNDATIONS :

9.2.1 Minimum depth of foundations is governed by the following factors :

- a) Top loose zone.
- b) Adequate depth of soil above founding level, to ensure mobilization of full safe bearing capacity.
- c) Adequate depth of soil strata below founding level of requisite strength to mobilize the safe bearing capacity and at the same time restricts the total and differential settlements within the allowable limits.

9.2.2 The actual depth of foundation shall be decided by the design engineer.

9.3 ALLOWABLE BEARING PRESSURE :

9.3.1 Typical calculation for allowable bearing pressure is given in **Appendix-1 to 4** may be adopted.



10.0 RECOMMENDATIONS :

a) Type of Foundations : Open

b) Type of Footing : Isolated

c) Allowable Bearing Pressure : Allowable bearing pressure as given in the following table may be adopted.

10.0

Foundation		Strata	Location	Allowable Settlement (mm)	Allowable Bearing Pressure (tons/m ²)
Depth (m)	Width (m)				
5.00 (Below existing GL)	1.50	Weathered Rock with Lime/ Clay intrusions	BH 1	25	27
4.50 (Below existing GL)	1.50	Weathered Rock with Lime/ Clay intrusions	BH 2	25	26.5
4.50 (Below existing GL)	1.50	Weathered Rock with Lime/ Clay intrusions	BH 3	25	27.5
4.00 (Below existing GL)	1.50	Weathered Rock with Lime/ Clay intrusions	BH 4	25	26.7

11.0 PRECAUTIONS :

11.1 Entire report should be studied before implementing the recommendation

11.2 Loose pockets of soil if encountered shall be removed and backfilled with concrete. A leveling course of concrete shall be laid and construction of foundations can be taken up subsequently.



12.0 LIMITATIONS :

- 12.1 The soil investigations have been carried out at locations in the site chosen by the client so as to represent the entire site. The recommendations provided in this report are hence valid only for these test locations. However, if there is any change in sub soil conditions and properties at places between or beyond chosen test locations, Sai Geotechnical Services may be contacted for further advice.
- 12.2 With passage of time, the recommendations may vary due to manmade and natural environmental changes.

13.0 REFERENCES :

- 13.1 A list of IS codes referred for providing the recommendations and that which might be required to implement the same has been given in Appendix-3.

for SAI GEOTECHNICAL SERVICES,



A handwritten signature in blue ink, appearing to read "K. Kasthuri Nadh".

K. KASTHURI NADH,
M.Tech, (IIT Madras), M.IS.T.E
Chief Consultant.



SAI GEOTECHNICAL SERVICES
(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

CALCULATIONS FOR ALLOWABLE BEARING PRESSURESHEAR FAILURE CRITERION (Ref. IS: 6403)Soil Properties as in the BH 1Depth of foundations $D = 500 \text{ cm}$ Width of foundation $B = 150 \text{ cm}$ Length of foundation $L = 150 \text{ cm}$ Angle of shearing resistance $\phi = 32^\circ$ Cohesion $C = 0.05 \text{ kg/cm}^2$ Natural density $\gamma = 1.73 \text{ g/cm}^3$ Submerged density $\gamma_b = 0.73 \text{ g/cm}^3$ Bearing Capacity Factors $N_c = 18.07 \quad N_q = 9.75 \quad N_\gamma = 8.44, \quad N_\phi = 3.25$ Shape Factors $S_c = 1.30, S_q = 1.20, S_\gamma = 0.80$ Depth factors $d_c = 2.20, d_q = 1.60, d_\gamma = 1.60$ Inclination factors $i_c = i_q = i_\gamma = 1.0$ Water table factor $W' = 0.5$ Safe Bearing Capacity (under Submerged conditions)

$$q_s = 1/3 [2/3C N_c s_c d_{c_i} + \gamma_b D_f (N_q - 1) S_q d_{q_i} + 0.5 \gamma_b B N_\gamma S_\gamma d_{\gamma_i} i_\gamma W']$$

$$q_s = 2.72 \text{ kg/cm}^2 = 27.2 \text{ t/m}^2$$

SETTLEMENT CRITERION

Bearing Pressure for 25 mm settlement

Where	N	=	N - value	=	45
	W'	=	water table correction factor	=	0.50
	R_d	=	depth factor = $[1+0.2D/B] \leq 1.2$	=	1.20
	D	=	depth of foundation	=	5.00 m
	B	=	width of footing	=	1.50 m

Substituting the values in the above equation we get:

$$q_n = 0.346 (N-3) [(B + 0.3)/2B]^2 W' R_d$$

$$q_n = 3.14 \text{ kg/cm}^2 = 31.4 \text{ t/m}^2$$

Allowable Bearing Pressure

The lower value of the allowable bearing pressure shall be adopted. Therefore, adopt an allowable bearing pressure of:

$$q_a = 2.7 \text{ kg/cm}^2 \text{ i.e. } 27.0 \text{ tons/m}^2$$

Note: q_a is a NET VALUE, Weight of backfill etc. need not be added to the loading except in case of filling above original Ground Level.



CALCULATIONS FOR ALLOWABLE BEARING PRESSURE

Shear Failure Criterion (Ref. IS: 6403)

Soil Properties as in the BH 2

Depth of foundations **D = 450 cm**

Width of foundation **B = 150 cm**

Length of foundation **L = 150 cm**

Angle of shearing resistance $\phi = 32^\circ$

Cohesion $C = 0.05 \text{ kg/cm}^2$

Natural density $\gamma = 1.83 \text{ g/cm}^3$

Submerged density $\gamma_b = 0.83 \text{ g/cm}^3$

Bearing Capacity Factors $N_c = 18.07$ $N_q = 9.75$ $N_\gamma = 8.44$, $N_\phi = 3.25$

Shape Factors $S_c = 1.30$, $S_q = 1.20$, $S_\gamma = 0.80$

Depth factors $d_c = 2.08$, $d_q = 1.54$, $d_\gamma = 1.54$

Inclination factors $i_c = i_q = i_\gamma = 1.0$

Water table factor $W' = 0.5$

Safe Bearing Capacity (under Submerged conditions)

$$q_s = 1/3 [2/3C N_c s_c d_c i_c + \gamma_b D_f (N_q - 1) S_q d_q i_q + 0.5 \gamma_b B N_\gamma S_\gamma d_\gamma i_\gamma W']$$

$$q_s = 2.67 \text{ kg/cm}^2 = 26.7 \text{ t/m}^2$$

SETTLEMENT CRITERION

Bearing Pressure for 25 mm settlement

Where	N	=	N - value	=	44
	W'	=	water table correction factor	=	0.50
	R _d	=	depth factor = $[1+0.2D/B] \leq 1.2$	=	1.20
	D	=	depth of foundation	=	4.50 m
	B	=	width of footing	=	1.50 m

Substituting the values in the above equation we get:

$$q_n = 0.346 (N-3) [(B + 0.3)/2B]^2 W' R_d$$

$$q_n = 3.06 \text{ kg/cm}^2 = 30.6 \text{ t/m}^2$$

Allowable Bearing Pressure

The lower value of the allowable bearing pressure shall be adopted. Therefore, adopt an allowable bearing pressure of:

$$q_a = 2.65 \text{ kg/cm}^2 \text{ i.e. } 26.5 \text{ tons/m}^2$$

Note: q_a is a NET VALUE, Weight of backfill etc. need not be added to the loading except in case of filling above original Ground Level.



CALCULATIONS FOR ALLOWABLE BEARING PRESSURE

Shear Failure Criterion (Ref. IS: 6403)

Soil Properties as in the BH 3

Depth of foundations **D = 450 cm**

Width of foundation **B = 150 cm**

Length of foundation **L = 150 cm**

Angle of shearing resistance $\phi = 32^\circ$

Cohesion $C = 0.05 \text{ kg/cm}^2$

Natural density $\gamma = 1.87 \text{ g/cm}^3$

Submerged density $\gamma_b = 0.87 \text{ g/cm}^3$

Bearing Capacity Factors $N_c = 18.07$ $N_q = 9.75$ $N_\gamma = 8.44$, $N_\phi = 3.25$

Shape Factors $S_c = 1.30$, $S_q = 1.20$, $S_\gamma = 0.80$

Depth factors $d_c = 2.08$, $d_q = 1.54$, $d_\gamma = 1.54$

Inclination factors $i_c = i_q = i_\gamma = 1.0$

Water table factor $W' = 0.5$

Safe Bearing Capacity (under Submerged conditions)

$$q_s = 1/3 [2/3C N_c s_c d_c i_c + \gamma_b D_f (N_q - 1) S_q d_q i_q + 0.5 \gamma_b B N_\gamma S_\gamma d_\gamma i_\gamma W']$$

$$q_s = 2.77 \text{ kg/cm}^2 = 27.7 \text{ t/m}^2$$

SETTLEMENT CRITERION

Bearing Pressure for 25 mm settlement

Where	N	=	N - value	=	45
	W'	=	water table correction factor	=	0.50
	R _d	=	depth factor = $[1+0.2D/B] \leq 1.2$	=	1.20
	D	=	depth of foundation	=	4.50 m
	B	=	width of footing	=	1.50 m

Substituting the values in the above equation we get:

$$q_n = 0.346 (N-3) [(B + 0.3)/2B]^2 W' R_d$$

$$q_n = 3.14 \text{ kg/cm}^2 = 31.4 \text{ t/m}^2$$

Allowable Bearing Pressure

The lower value of the allowable bearing pressure shall be adopted. Therefore, adopt an allowable bearing pressure of:

$$q_a = 2.75 \text{ kg/cm}^2 \text{ i.e. } 27.5 \text{ tons/m}^2$$

Note: q_a is a NET VALUE, Weight of backfill etc. need not be added to the loading except in case of filling above original Ground Level.



CALCULATIONS FOR ALLOWABLE BEARING PRESSURE

Shear Failure Criterion (Ref. IS: 6403)

Soil Properties as in the BH 4

Depth of foundations $D = 400 \text{ cm}$

Width of foundation $B = 150 \text{ cm}$

Length of foundation $L = 150 \text{ cm}$

Angle of shearing resistance $\phi = 32^\circ$

Cohesion $C = 0.04 \text{ kg/cm}^2$

Natural density $\gamma = 1.64 \text{ g/cm}^3$

Submerged density $\gamma_b = 0.64 \text{ g/cm}^3$

Bearing Capacity Factors $N_c = 24.22 \quad N_q = 13.95 \quad N_\gamma = 16.51, \quad N_\phi = 3.25$

Shape Factors $S_c = 1.30, S_q = 1.20, S_\gamma = 0.80$

Depth factors $d_c = 1.96, d_q = 1.48, d_\gamma = 1.48$

Inclination factors $i_c = i_q = i_\gamma = 1.0$

Water table factor $W' = 0.5$

Safe Bearing Capacity (under Submerged conditions)

$$q_s = 1/3 [2/3C N_c s_c d_c i_c + \gamma_b D_f (N_q - 1) S_q d_q i_q + 0.5 \gamma_b B N_\gamma S_\gamma d_\gamma i_\gamma W']$$

$$q_s = 2.67 \text{ kg/cm}^2 = 26.7 \text{ t/m}^2$$

SETTLEMENT CRITERION

Bearing Pressure for 25 mm settlement

Where	N	=	N - value	=	44
	W'	=	water table correction factor	=	0.50
	R_d	=	depth factor = $[1+0.2D/B] \leq 1.2$	=	1.20
	D	=	depth of foundation	=	4.00 m
	B	=	width of footing	=	1.50 m

Substituting the values in the above equation we get:

$$q_n = 0.346 (N-3) [(B + 0.3)/2B]^2 W' R_d$$

$$q_n = 3.06 \text{ kg/cm}^2 = 30.6 \text{ t/m}^2$$

Allowable Bearing Pressure

The lower value of the allowable bearing pressure shall be adopted. Therefore, adopt an allowable bearing pressure of:

$$q_a = 2.67 \text{ kg/cm}^2 \text{ i.e. } 26.7 \text{ tons/m}^2$$

Note: q_a is a NET VALUE, Weight of backfill etc. need not be added to the loading except in case of filling above original Ground Level.



LIST OF IS CODES

LABORATORY TESTS

1. IS 2720 (Part 1) - 1983 : Preparation of soil samples
2. IS 2720 (Part 2) - 1973 : Determination of water content
3. IS 2720 (Part 4) - 1985 : Grain Size Analysis
4. IS 2720 (Part 5) - 1985 : Atterberg Limits
5. IS 2720 (Part 11) - 1973 : Determination of shear Strength parameters using triaxial shear apparatus.

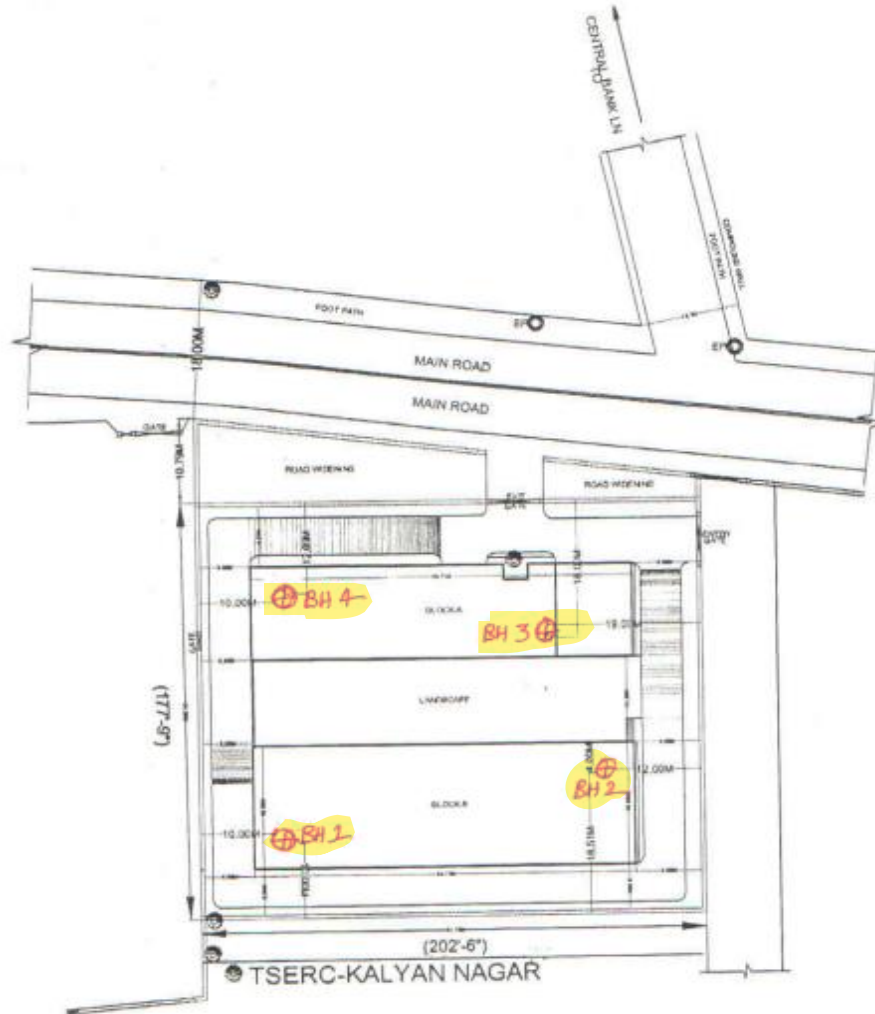
FIELD INVESTIGATIONS

1. IS 1498 : 1970 : Classification and Identification of soils for general engineering purposes.
2. IS 1892 : 1979 : Code of practice for sub surface investigations for foundations.
3. IS 2131 : 1981 : Method of standard penetration test for soils.
4. IS 2132 : 1986 : Code of practice for thin walled tube sampling of soil.



Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

LOCATION PLAN
(NOT TO SCALE)
(FIGURE-1)



LEGEND :

⊕ BH : BOREHOLE

SITE : TSERC-KALYAN NAGAR

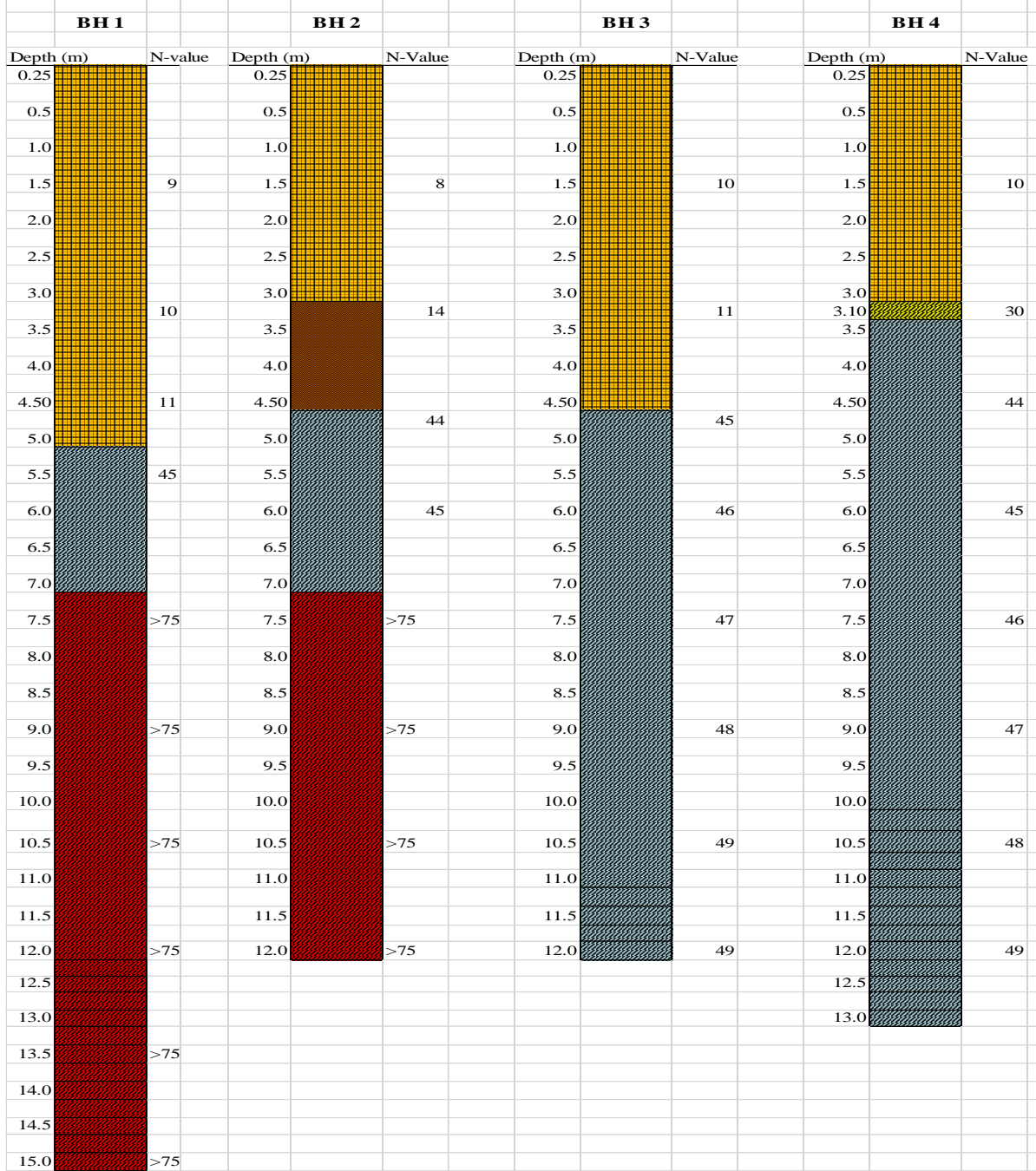


SAI GEOTECHNICAL SERVICES
(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

FIGURE-2

COMBINED SOIL PROFILE



LEGEND:



Filled up



Weathered Rock with Lime/ Clay intrusions



Soft Disintegrated Rock



Highly Weathered Rock with Lime/ Clay intrusions

44

Observed N - Value Forty Four blows for 30cm penetrator



TABLE-1
SUMMARY OF SOIL PROPERTIES

Property /Bore Hole No.	Soil	Depth (m)	Specific Gravity	Water Content (%)	Natural Density (g/cc)	Grain Size Distribution (%)			Atterberg Limits (%)			Shear Parameters	
						Gravel > 4.75mm	Sand 4.75 - 0.075mm	Silt+Clay < 0.075mm	Liquid Limit	Plastic Limit	Plasticity Index	Cohesion kg/sq cm	Φ degrees
BH 1	Filling	1.5	2.57	1.4	1.42	12	25	63	-	NP	NP	0.31	20
BH 1	Filling	3.0	2.61	2.1	1.43	14	31	55	-	NP	NP	0.36	21
BH 1	Filling	4.5	2.61	2.8	1.44	15	32	53	-	NP	NP	0.35	22
BH 1	W/Rock with Lime/Clay	5.5	2.70	3.4	1.73	-	-	-	-	NP	NP	0.05	32
BH 1	W/Rock with Lime/Clay	6.5	2.71	4.1	1.80	-	-	-	-	NP	NP	0.04	32
BH 1	SDR	8.0	2.75	5.3	2.04	-	-	-	-	NP	NP	0.03	34
BH 1	SDR	9.5	2.76	6.4	2.06	-	-	-	-	NP	NP	0.02	34
BH 1	SDR	11.0	2.77	7.2	2.08	-	-	-	-	NP	NP	0.01	34
BH 1	SDR	12.5	2.77	8.4	2.08	-	-	-	-	NP	NP	0.01	35
BH 1	SDR	14.0	2.77	8.5	2.09	-	-	-	-	NP	NP	0.00	35



SAI GEOTECHNICAL SERVICES
(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

TABLE-1A
SUMMARY OF SOIL PROPERTIES

Property /Bore Hole No.	Soil	Depth (m)	Specific Gravity	Water Content (%)	Natural Density (g/cc)	Grain Size Distribution (%)			Atterberg Limits (%)			Shear Parameters	
						Gravel > 4.75mm	Sand 4.75 - 0.075mm	Silt+Clay < 0.075mm	Liquid Limit	Plastic Limit	Plasticity Index	Cohesion kg/sq cm	Φ degrees
BH 2	Filling	1.50	2.61	1.8	1.40	11	30	59	-	NP	NP	0.38	22
BH 2	CL	3.00	2.61	2.6	1.61	12	31	57	35	24	11	0.33	26
BH 2	W/Rock with Lime/Clay	4.50	2.70	3.2	1.83	-	-	-	-	NP	NP	0.05	32
BH 2	W/Rock with Lime/Clay	6.00	2.71	4.3	1.85	-	-	-	-	NP	NP	0.05	33
BH 2	SDR	7.50	2.74	5.2	2.01	-	-	-	-	NP	NP	0.03	34
BH 2	SDR	9.00	2.75	6.4	2.03	-	-	-	-	NP	NP	0.02	34
BH 2	SDR	10.5	2.76	7.2	2.05	-	-	-	-	NP	NP	0.01	34
BH 2	SDR	12.0	2.77	8.4	2.07	-	-	-	-	NP	NP	0	35



SAI GEOTECHNICAL SERVICES
(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

TABLE-1B
SUMMARY OF SOIL PROPERTIES

Property /Bore Hole No.	Soil	Depth (m)	Specific Gravity	Water Content (%)	Natural Density (g/cc)	Grain Size Distribution (%)			Atterberg Limits (%)			Shear Parameters	
						Gravel > 4.75mm	Sand 4.75 - 0.075mm	Silt+Clay < 0.075mm	Liquid Limit	Plastic Limit	Plasticity Index	Cohesion kg/sq cm	Φ degrees
BH 3	Filling	1.50	2.70	1.3	1.49	-	-	-	-	NP	NP	0.05	28
BH 3	Filling	3.00	2.61	2.4	1.58	12	30	58	-	NP	NP	0.35	22
BH 3	W/Rock with Lime/Clay	4.50	2.70	3.4	1.87	-	-	-	-	NP	NP	0.05	32
BH 3	W/Rock with Lime/Clay	6.00	2.71	4.2	1.88	-	-	-	-	NP	NP	0.05	32
BH 3	W/Rock with Lime/Clay	7.50	2.71	5.3	1.90	-	-	-	-	NP	NP	0.04	33
BH 3	W/Rock with Lime/Clay	9.00	2.71	6.4	1.91	-	-	-	-	NP	NP	0.04	33
BH 3	W/Rock with Lime/Clay	10.5	2.72	7.2	1.92	-	-	-	-	NP	NP	0.04	33
BH 3	W/Rock with Lime/Clay	12.0	2.72	8.4	1.93	-	-	-	-	NP	NP	0.04	33



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

TABLE-1C
SUMMARY OF SOIL PROPERTIES

Property /Bore Hole No.	Soil	Depth (m)	Specific Gravity	Water Content (%)	Natural Density (g/cc)	Grain Size Distribution (%)			Atterberg Limits (%)			Shear Parameters	
						Gravel > 4.75mm	Sand 4.75 - 0.075mm	Silt+Clay < 0.075mm	Liquid Limit	Plastic Limit	Plasticity Index	Cohesion kg/sq cm	Φ degrees
BH 4	Filling	1.50	2.65	1.7	147	-	-	-	-	NP	NP	0.10	28
BH 4	H.W.R. with Lime/Clay	3.00	2.70	2.6	1.74	-	-	-	-	NP	NP	0.05	31
BH 4	W/Rock with Lime/Clay	4.50	2.71	3.4	1.64	-	-	-	-	NP	NP	0.05	32
BH 4	W/Rock with Lime/Clay	6.00	2.71	4.2	1.85	-	-	-	-	NP	NP	0.05	32
BH 4	W/Rock with Lime/Clay	7.50	2.72	5.6	1.87	-	-	-	-	NP	NP	0.04	33
BH 4	W/Rock with Lime/Clay	9.00	2.72	6.4	1.89	-	-	-	-	NP	NP	0.04	33
BH 4	W/Rock with Lime/Clay	10.5	2.72	7.1	1.92	-	-	-	-	NP	NP	0.04	33
BH 4	W/Rock with Lime/Clay	12.0	2.72	8.3	1.93	-	-	-	-	NP	NP	0.04	33



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

FIGURE-3

FIELD BORE LOG CHART AND DATA SHEET - PROFORMA SHEET NO. (1)																		
BORE HOLE LOCATION: BH 1																		
Depth below G.L. (m)	Strata thickness (m)	Visual Description of strata by field person	Symbolic rep.	Nature of sampling	Depth of sample below G.L.	SPT Details					Core Recovery Data		% Core recovery	RQD Value (m)	RQD, %	Rate of drill / 30cm/min	Colour of drilling water	Remarks
						Depth (m)	No. of Blows			Corrected N Value	Total length of cores (m)							
							0 - 15 cm	15 - 30 cm	30 - 45 cm									
0.00		Filled up	⊙ ⊙ ⊙	SPT	1.5	1.5	1	3	6	9								
2.00	2.00	Filled up	⊙ ⊙ ⊙	DS	1.0	1.0											Brown	
3.00	1.00	Filled up	⊙ ⊙ ⊙	SPT	3.0	3.0	1	3	7	10							Brown	
5.00	1.55	Filled up	⊙ ⊙ ⊙	SPT	4.5	4.5	1	4	7	11							Brown	
7.00	2.00	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	5.5	5.5	18	21	24	45		0%		Nil			Yellow	
9.00	2.00	Soft Disintegrated Rock	X X X	SPT	7.0	7.0	60/8CM	-	-	Refusal		0%		Nil			Yellow	
10.50	1.50	Soft Disintegrated Rock	X X X	SPT	8.5	8.5	62/5cm	-	-	Refusal		0%		nil			Yellow	
12.00	1.50	Soft Disintegrated Rock	X X X	SPT	10.0	10.0	65/4cm	-	-	Refusal		0%		Nil			Yellow	
13.50	1.50	Soft Disintegrated Rock	X X X	SPT	11.5	11.5	68/3cm	-	-	Refusal		0%		Nil			Yellow	
15.00	1.50	Soft Disintegrated Rock	X X X	SPT	13.0	13.0	65/4cm	-	-	Refusal		0%		Nil			Yellow	
		Soft Disintegrated Rock	X X X	SPT	15.0	15.0	68/3cm	-	-	Refusal		0%		Nil			Yellow	



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

FIGURE-3

FIELD BORE LOG CHART AND DATA SHEET - PROFORMA SHEET NO. (2)																	
BORE HOLE LOCATION: BH 2																	
Depth below G.L. (m)	Strata thickness (m)	Visual Description of strata by field person	Symbolic rep.	Nature of sampling	Depth of sample below G.L.	SPT Details					Core Recovery Data		RQD Value (m)	RQD, %	Rate of drill / 30cm/min	Colour of drilling water	Remarks
						Depth (m)	No. of Blows			Corrected N Value	Total length of cores (m)	% Core recovery					
							0 - 15 cm	15 - 30 cm	30 - 45 cm								
0.00		Filled up	⊙ ⊙ ⊙	SPT	1.5	1.5	1	2	6	8							
3.00	3.00		⊙ ⊙ ⊙														Brown
		Clayey Silty Sand with Gravels	~ ~ ~	SPT	3.0	3.0	1	5	9	14							
4.50	1.50		~ ~ ~														Avg 15 Brown
		Weathered Rock with Lime/ Clay intrusions	# # #	SPT	4.5	4.5	16	20	24	44		0%		Nil			
6.00	1.50		# # #														Avg 43 Brown/ White
		Weathered Rock with Lime/ Clay intrusions	# # #	SPT	6.0	6.0	18	21	24	45		0%		Nil			
7.00	1.00		# # #														Avg 44 Brown/ White
		Soft Disintegrated Rock	X X X	SPT	7.5	7.5	62/6cm	-	-	Refusal		0%		Nil			
9.00	2.00		X X X														Avg 52 Yellow
		Soft Disintegrated Rock	X X X	SPT	9.0	9.0	63/4cm	-	-	Refusal		0%		nil			
10.50	1.50		X X X	SPT	10.5	10.5	65/3cm	-	-	Refusal							Avg 54 Yellow
		Soft Disintegrated Rock	X X X	SPT	12.0	12.0	70/2cm	-	-	Refusal		0%		nil			
12.00	1.50		X X X														Avg 56 Yellow



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

FIGURE-3

FIELD BORE LOG CHART AND DATA SHEET - PROFORMA SHEET NO. (3)																	
BORE HOLE LOCATION: BH 3																	
Depth below G.L. (m)	Strata thickness (m)	Visual Description of strata by field person	Symbolic rep.	Nature of sampling	Depth of sample below G.L.	SPT Details				Core Recovery Data		RQD Value (m)	RQD. %	Rate of drill / 30cm/min	Colour of drilling water	Remarks	
						Depth (m)	No. of Blows			Corrected N Value	Total length of cores (m)						% Core recovery
							0 - 15 cm	15 - 30 cm	30 - 45 cm								
0.00		Filled up	⊙ ⊙ ⊙ ⊙	DS	1.0	1.0								6	Brown		
1.00	1.00	Filled up	⊙ ⊙ ⊙ ⊙	SPT	1.5	1.5	1	3	7	10				Avg 7	Brown/ White		
2.00	1.00	Filled up	⊙ ⊙ ⊙ ⊙	DS	2.0	2.0								Avg 8	own/ White		
3.00	1.00	Filled up	⊙ ⊙ ⊙ ⊙	SPT	3.0	3.0	1	4	7	11				Avg 9	Brown		
4.50	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	4.5	4.5	18	21	24	45		0%	Nil	Avg 44	own/ White		
6.00	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	6.0	6.0	17	21	25	46		0%	nil	Avg 45	own/ White		
7.50	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	7.5	7.5	19	22	25	47							
9.00	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	9.0	9.0	18	22	26	48		0%	Nil	Avg 46	own/ White		
10.50	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	10.5	10.5	20	23	26	49		0%	Nil	Avg 47	own/ White		
11.00	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	10.5	10.5	20	23	26	49		0%	Nil	Avg 47	own/ White		
12.00	1.00	Weathered Rock with Lime/ Clay intrusions	X X X	SPT	12.0	12.0	21	22	27	49		0%	nil	Avg 55	Yellow		



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

FIGURE-3

FIELD BORE LOG CHART AND DATA SHEET - PROFORMA SHEET NO. (4)																	
BORE HOLE LOCATION: BH 4																	
Depth below G.L. (m)	Strata thickness (m)	Visual Description of strata by field person	Symbolic rep.	Nature of sampling	Depth of sample below G.L.	SPT Details				Core Recovery Data		% Core recovery	RQD Value (m)	RQD, %	Rate of drill / 30cm/min	Colour of drilling water	Remarks
						Depth (m)	No. of Blows			Corrected N Value	Total length of cores (m)						
							0 - 15 cm	15 - 30 cm	30 - 45 cm								
0.00		Filled up	⊙ ⊙ ⊙	DS	1.0	1.0								9	Brown		
1.00	1.00	Filled up	⊙ ⊙ ⊙	SPT	1.5	1.5	1	3	7	10				Avg 10	Brown		
3.00	2.00	Highly Weathered Rock with Lime/ Clay intrusions	# # #	SPT	3.0	3.0	9	13	17	30		0%	Nil	Avg 32	own/ White		
3.10	0.10	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	4.5	4.5	16	20	24	44		0%	Nil	Avg 43	own/ White		
5.00	1.90	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	6.0	6.0	18	21	24	45		0%	Nil	Avg 44	own/ White		
7.00	2.00	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	7.5	7.5	17	21	25	46		0%	nil	Avg 45	own/ White		
8.50	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	9.0	9.0	19	22	25	47		0%	nil	Avg 46	own/ White		
10.00	1.50	Weathered Rock with Lime/ Clay intrusions	# # #	SPT	10.5	10.5	20	23	25	48		0%	Nil	Avg 47	own/ White		
11.50	1.50	Weathered Rock with Lime/ Clay intrusions	X X X	SPT	13.0	13.0	21	23	26	49		0%	nil	Avg 52	Yellow		



SAI GEOTECHNICAL SERVICES

(SOIL INVESTIGATIONS)

Neredmet, Secunderabad. Mobile : 9948843777

Name of work : C/o TSERC Office Building at Kalyan Nagar, Hyderabad, Telangana.

