REPORT OF GEOTECHNICAL INVESTIGATION

FOR

CONSTRUCTION OF AIIMS AT GUNTUR, ANDHRA PRADESH

REPORT NO : GT – 1764

CLIENT:

DEPUTY GENERAL MANAGER (CIVIL)

ह.स.कं.क.
HSCC

HSCC (INDIA) LTD.

(A Govt. Of India Enterprise)
(CONSULTANTS & ENGINEERS FOR MEGA HOSPITALS & LABORATORIES)
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1. INTRODUCTION

The present report deals with the Geotechnical field and lab investigations conducted for **Construction of AIIMS at Guntur, Andhra Pradesh.** The work was taken in hand on Behest of **DGM (Civil), HSCC (I) Ltd.**

The objective of the report is restricted to the factual information to be collected during the investigation period along with laboratory tests results and so as to obtain sequence & extent of soil so as to arrive at design parameters for the foundations from the recommended safe bearing capacity of foundation soil.

2. SCOPE OF WORK

2.1. Reconnaissance / field trip for studying the general topography and geology of the area/ terrain

2.2. The field Geotech investigations consisted of conducting 12 nos. of bore holes for SPT/DCPT up to maximum depth of 20.0 m or refusal and 12 nos. of of DCPT upto maximum explored depth of 20 m or refusal , below N.S.L whichever is earlier as per IS code .

2.3. Conducting SPT/DCPT in the bore-hole/trial pits at regular intervals and collecting disturbed/undisturbed soil samples from the bores hole at regular intervals and conducting field density tests as per Indian code of practice.

2.4. Conducting Plate Load Test using 75 cm square plate at 1 nos of locations and Collection of Disturbed & Undisturbed Sample & Preparation of Test Reports.

2.5. Recording of water table level in the bore holes at the time of boring (if encountered).

2.6. Conducting laboratory tests on the samples collected and thereby determining various index and engineering properties and summarizing the detail of soil classification.

2.7. A comprehensive Geotechnical investigation report embodying all the above information along with tables of Field / Lab tests results and bearing capacity computations.

3. DETAILS OF FIELD WORK

3.1. BORING/TRIAL PITS OPERATION & SAMPLING

150 mm dia hole was advanced at the location by Manual/mechanical boring and steel casing was advanced with the boring and the full length of the bore hole was encased at each bore location. However in case of Boulder/rocky Strata, trial pits were excavated and SPT/DCPT was conducted upto maximum depth of 20.0m or refusal, whichever is earlier.

3.2. DISTURBED AND UNDISTURBED SAMPLE

Disturbed and undisturbed soil samples were obtained depending upon the nature of soil from different depths in the bore hole. The undisturbed samples were collected in sampling tubes. The ends of the tubes are sealed with molten wax to prevent evaporation. These samples were subsequently tested in the laboratory so as to determine the various index and engineering proportion of various sub soil strata met in the bore holes.

3.3. STANDARD PENETRATION TESTS (SPT)

1. Standard Penetration Test was performed in the borehole. The standard split spoon sampler, attached to a string of drill rods was lowered to the bottom of the hole and allowed to rest under self weight. The drill rods were connected to driving assembly which consisted of a hoisting equipments, a drive weight (Hammer) of 63.5 Kg, and a guide to ensure a 75 cm free fall of hammer on an anvil. The number of hammer blows that were required to penetrate the sampler through three runs of 150 mm each were recorded. Initial driving of 150 mm was disregarded and the number of blows required to drive the sampler through the remaining 300 mm is called BLOW COUNT or PENETRATION NUMBER,N. At the end of the test, the sampler was withdrawn and the soil extracted for subsequent testing in the laboratory . If the penetration was less than 30 cm for 50 blows, it is considered as refusal and the actual penetration was recorded.

3.4. DYNAMIC CONE PENETRATION TEST

1. Dynamic Cone penetration Tests is carried out in open pits up at required depth at suitable intervals by driving a standard cone of outside diameter 50 mm and having an apex angle of 60^0 attached to a string of drill rods using a hammer weighing 63.5 kg falling freely through a height of 75.0 cm. The total number of blows required for the 30.0 cm penetration is termed Cone penetration Resistance or 'N_{cd}' value. . N_{cd} value is correlated with SPT value, N as under:

$$N_{cd} = 1.5\ N$$

2. Refusal is deemed to have met if under 35 blows, penetration achieved is less than 10 cms. The above correlation is meant for sandy soils. In boulder deposit / rocky strata evaluation of strength and compressibility characteristics by using elaborate tests is uneconomical for a type of structure proposed to be constructed at site. As a conservative approach, the above correlation can be used such strata to arrive at a safe value of 'N' that takes care of the highly erratic vibrations of properties such strata. Once value of 'N' based on least N_{cd} value is known, then bearing capacity analysis can be performed as done in case of Sandy deposits.

3.5. CORRECTION OF 'N'- VALUES

In case of sandy/cohesion-less soil, the observed SPT values, designated as 'N', are to be corrected to account for the following two effects:

a) Correction due to effect of overburden pressure,

$$N_N = C_N \text{ X } N$$

C_N' is overburden pressure correction and is calculated as $C_N = 0.77 \log_{10}(200/\sigma_0)$.

b) Correction due to submerge effect (in case of fine sand and silt),

$$N_c = 15 + (N_N - 15)/2, \text{ provided } N_N > 15. \text{ Else } N_C = N_N$$

Where ' N_c' is the final corrected value.

4. GROUND WATER TABLE

Determination of Ground water Table and water depth from Existing Ground level was done using Steel tape with weigh. The depth of Ground water table was determined as per procedure laid in IS 6935-1973. At the time of Soil Investigation at site, ground water table was not encountered till the explored depth from Existing Ground Level.

5. OBSERVATION AND DISCUSSIONS

From the field borehole logs, the laboratory test result and the visual examination of soil samples indicates the following type of strata in the bore holes.

5.1. SOIL CLASSIFICATION & GENERAL NATURE OF THE SOIL STRATA:

Classification and identification is the pre–requisite of any site investigation report. The sub soil strata are classified on the basis of lab tests as per IS: 1498 -1978. The classification on the soil samples were obtained from the % age of grain size distribution of gravel sand silt and clay in different layers of deposit met at site. The classification soil groups are given in the data sheets attached.

6. LABORATORY TESTS

6.1. Index Properties [As per SP 36 (Part-I)-1987] :

All the relevant classification on the samples obtained from the four bore holes were carried out in the laboratory. The index properties obtained from such classification tests at different depths in the bore holes are reported in the bore hole log sheets.

6.2. UNDISTURBED SOIL SAMPLES:

Undisturbed soil sample collected in field have been tested in laboratory and preparation of sample for the under mentioned tests have been done in accordance with I.S.2720-(Part-I)-1983.

1. Sieve analysis test as per I.S. Specification No. 2720 --(Part-IV).
2. Atterberg limit test (L.L. & P.I.) as per I.S. Specification No. 2720 --(Part-II).
3. Natural moisture content as per I.S. Specification No.2720 – (Part-IV).
4. Particle size analysis test as per I.S. Specification No. 2720-(Part-VI).
5. Wet density test as per I.S. Specification No 2720- (Part-VI).

6. Dry density test as per I.S. Specification No. 2720- (Part-VI)
7. Specific Gravity test as per I.S. Specification No-2720-(Part-III)-Sec.2.
8. Triaxial compression test and determination of shear parameter (C & Ø as per I.S. XII) & I.S. 2720 – (part – XIII).
9. Consolidation test conducted as per I.S Specification No. 2720- (Part-XV).

6.3. DISTURBED SOIL SAMPLES:

Disturbed Soil samples have been prepared in accordance with I.S. Specification No. 2720- (Part-I)-1983 and tested as follows:-

1. Sieve analysis test as per I.S. Specification No. 2720- (Part- IV).
2. Atterberg limit test (L.L.. & P.I..) as per I.S. Specification No. 2720 --(Part-II).
3. Particle size analysis test as per I.S. Specification No. 2720-(Part-VI).

Calculation of bearing capacity is governed generally by I.S. Specification No. 8009- (Part-I)-1976, I.S.No.2720- (Part – II)- 1980, I.S. No 6403-1981, I.S. 1904-1978 and I.S. 1080-1985 and other relevant I.S. Codes as well as based on assessment and latest developments.

Test results are shown in the respective borehole data sheets.

7. FOUNDATION PARAMETERS

Allowable Bearing capacity values are based on the following parameters

Table 1: Foundation Parameters

S No.	Type of Footing	Foundation Size	Foundation Depth(m)
1.	Isolated Footing	4.0 x 3.0 m	1.5 m, 2.5 m & 3.5 m
2.	Isolated Footing	4.0 x 4.0 m	
3.	Raft Footing	15.0 x 10.0 m	

8. ESTIMATION OF ALLOWABLE BEARING CAPACITY

A foundation can fail by two modes i.e.

i) Shear failure.

ii) Excessive settlement.

Shear failure being catastrophic, an adequate factor of safety is applied to ultimate bearing capacity that can initiate this type of failure. BIS recommends a value of FOS = 2.5 to obtain the net safe bearing capacity q_{ns} by using the physical characteristics of the foundation and relevant shear strength parameters of soil.

Settlement analysis a net loading intensity q_n is obtained by using the physical characteristics of the foundation and the relevant compressibility characteristics of the Underlying soil. The value so obtained ensures that the foundation shall not settle more than that which is permissible as per BIS recommendations. The permissible settlement depends upon the type of superstructure and the nature of supporting strata.

The lesser of these computed values i.e. q_{ns} or q_n is adopted as the allowable bearing capacity for proportioning the foundation of superstructures

9. COMPUTATION OF ALLOWABLE BEARING CAPACITY

Table 2: SPT N-Value and Angle of Shearing Resistance

S.No.	Depth (m)	Minimum Average N-Value	Angle of Shearing Resistance, Φ		Cohesion, c (t/m^2)
			from fig 9, IS: 6403 – 1981	from shear failure considerations	
1.	1.5	14	31.5	29.5	-
2.	2.5	19	32.5	30.3	-
3.	3.5	26	34.4	31.2	-

SHEAR FAILURE ANALYSIS

Net Ultimate bearing capacity for general shear failure,

$$q_{nu} = c\, N_c\, S_c\, D_c + q\,(N_q-1)\, S_q\, D_q + ½\, B\, \gamma\, N_\gamma\, S_\gamma\, D_\gamma\, W' \quad \text{--------(1)}$$

Net Ultimate bearing capacity for local shear failure,

$$q_{nu} = 2/3\, c\, N_c\, S_c\, D_c + q\,(N'_q-1)\, S_q\, D_q + ½\, B\, \gamma\, N'_\gamma\, S_\gamma\, D_\gamma\, W' \quad \text{--------(2)}$$

Shape factors,

For Strip Footing:

$S_c = 1$; $S_q = 1$; $S_\gamma = 1$

For Rectangle Footing:

$S_c = 1+0.2\, B/L$; $S_q = 1+0.2\, B/L$; $S_\gamma = 1-0.4\, B/L$

For Square Footing:

$S_c = 1.3$; $S_q = 1.2$; $S_\gamma = 0.8$

For Circular Footing:

$S_c = 1.3$; $S_q = 1.2$; $S_\gamma = 0.6$

Depth factors,

$d_c = 1 + 0.2 \times D/B \tan(45 + \Phi/2)$; $d_q = d_\gamma = 1 + 0.1 \times D/B \tan(45 + \Phi/2)$

(For Cohesive soil, $\Phi = 0$)

Inclination Factors,

$i_c = 1.0$; $i_q = 1.0$; $i_\gamma = 1.0$

SETTLEMENT ANALYSIS

As per BIS recommendation permissible settlement for both isolated column footing and raft footing on cohesion less soil is 50 mm and 75 mm respectively. Because of the erratic and pronounced variations of the compressibility characteristics of supporting strata, even slight differential settlement can cause distress to superstructure. As such differential settlement should be kept as low as possible. Depending upon the ability of the strata to absorb settlements, maximum permissible settlement is conservatively chosen so that resultant differential settlements do not cause distress to the superstructure. . However based on experience and to be on more conservative side, maximum permissible settlement for isolated and raft footing on cohesion less soil has been considered as 50mm.

Max. Settlement in cohesion less soil is calculated from IS 8009(Part I):1976, from fig.9

ISOLATED FOOTING (4.0 M x 4.0 M)

Depth of Footing, D = 1.5 m, 2.5 m, 4.0 m
Width of Footing, B = 4.0 m
Density, γ =2.07 t/m^3

Table 3: Shear Parameters

Depth of Footing	Angle of internal friction, Ø	Mobilized angle of internal friction, Ø'	Bearing Capacity Factors		
			N_c	N_q	N_y
1.5 m	29.5	20.66	15.61	6.97	6.12
2.5 m	30.3	21.28	16.34	7.49	6.80
3.5 m	31.2	21.98	17.17	8.09	7.57

Table 4: Shape & Depth Factor

Depth of Footing	Shape Factors			Depth Factors			Surcharge (YxD), q (t/m^2)	Water Table Correction Factor, W'
	S_c	S_q	S_y	D_c	D_q	D_y		
1.5 m	1.30	1.20	0.80	1.129	1.064	1.064	3.105	1.0
2.5 m	1.30	1.20	0.80	1.218	1.109	1.109	5.175	1.0
3.5 m	1.30	1.20	0.80	1.310	1.155	1.155	7.245	1.0

Calculation of bearing capacity from Local shear failure

Substituting values in equation, q_{nu} = q (N'$_q$-1) S_q D_q + ½ B γ N'$_\gamma$ S_γ D_γ W'

q_{ns} = q_{nu}/ FOS = q_{nu}/ 2.5

Table 5: Safe bearing capacity in Shear Criteria

Foundation Size	Depth of Foundation	Net Ultimate Bearing Capacity, q_{nu}	*Net Safe Bearing Capacity, q_{ns}*
Isolated Footing 4.0 x 4.0 m	1.5 m	45.24 t/m^2	**18.09 t/m^2**
	2.5 m	69.69 t/m^2	**27.87 t/m^2**
	3.5 m	100.20 t/m^2	**40.08 t/m^2**

SETTLEMENT ANALYSIS

Max. Settlement in cohesion less soil is calculated from IS 8009(Part I):1976, from fig. 9

Table 6: Settlement in Cohesion less Soil

Foundation Size	Depth of Footing	N-Value	Settlement per unit pressure from fig 9	Net Settlement Δ (mm)
Isolated footing (4.0 m x 4.0 m)	1.5 m	14	24	43.41
	2.5 m	19	17	47.37
	3.5 m	26	12	48.96

Net Settlement, Δ< 50 mm, Hence safe

ISOLATED FOOTING (4.0 M x 3.0 M)

Depth of Footing, D = 1.5 m, 2.5 m, 3.5 m
Width of Footing, B = 3.0 m
Density, γ =2.07 t/m^3

Table 7: Shear Parameters

Depth of Footing	Angle of internal friction, Ø	Mobilized angle of internal friction, Ø'	Bearing Capacity Factors		
			N_c	N_q	N_y
1.5 m	29.5	20.66	15.61	6.97	6.12
2.5 m	30.3	21.28	16.34	7.49	6.80
3.5 m	31.2	21.98	17.17	8.09	7.57

Table 8: Shape & Depth Factor

Depth of Footing	Shape Factors			Depth Factors			Surcharge (YxD), q (t/m^2)	Water Table Correction Factor, W'
	S_c	S_q	S_y	D_c	D_q	D_y		
1.5 m	1.15	1.15	0.70	1.171	1.086	1.086	3.105	1.0
2.5 m	1.15	1.15	0.70	1.290	1.145	1.145	5.175	1.0
3.5 m	1.15	1.15	0.70	1.414	1.207	1.207	7.245	1.0

Calculation of bearing capacity from Local shear failure
Substituting values in equation, q_{nu} = q (N'_q-1) S_q D_q + ½ B γ N'_γ S_γ D_γ W'
q_{ns} = q_{nu}/ FOS = q_{nu}/ 2.5

Table 9: Safe bearing capacity in Shear Criteria

Foundation Size	Depth of Foundation	Net Ultimate Bearing Capacity, q_{nu}	*Net Safe Bearing Capacity, q_{ns}*
Isolated Footing 4.0 x 3.0 m	1.5 m	37.58 t/m^2	**15.03 t/m^2**
	2.5 m	61.18 t/m^2	**24.47 t/m^2**
	3.5 m	91.18 t/m^2	**36.47 t/m^2**

SETTLEMENT ANALYSIS

Max. Settlement in cohesion less soil is calculated from IS 8009(Part I):1976, from fig. 9

Table 10: Settlement in Cohesion less Soil

Foundation Size	Depth of Footing	N-Value	Settlement per unit pressure from fig 9	Net Settlement Δ (mm)
Isolated footing (4.0 m x 3.0 m)	1.5 m	14	20	30.06
	2.5 m	19	15	36.70
	3.5 m	26	9.5	34.64

Net Settlement, Δ< 50 mm, Hence safe

RAFT FOOTING (15.0 M x 10.0 M)

Depth of Footing, D = 1.5 m, 2.5 m, 4.0 m & 7.0 m
Width of Footing, B = 10.0 m
Density, γ =2.07 t/m^3

Table 11: Shear Parameters

Depth of Footing	Angle of internal friction, Ø	Angle of internal friction, Ø'	Bearing Capacity Factors		
			N_c	N_q	N_y
1.5 m	29.5	20.66	15.61	6.97	6.12
2.5 m	30.3	21.28	16.34	7.49	6.80
3.5 m	31.2	21.98	17.17	8.09	7.57

Table 12: Shape & Depth Factor

Depth of Footing	Shape Factors			Depth Factors			Surcharge (YxD), q (t/m^2)	Water Table Correction Factor, W'
	S_c	S_q	S_y	D_c	D_q	D_y		
1.5 m	1.13	1.13	0.73	1.051	1.026	1.026	3.105	1.0
2.5 m	1.13	1.13	0.73	1.087	1.044	1.044	5.175	1.0
3.5 m	1.13	1.13	0.73	1.124	1.062	1.062	7.245	1.0

Calculation of bearing capacity from Local shear failure
Substituting values in equation, q_{nu} = q (N'_q-1) S_q D_q + ½ B γ N'_γ S_γ D_γ W'
q_{ns} = q_{nu}/ FOS = q_{nu}/ 2.5

Table 13: Safe bearing capacity in Shear Criteria

Foundation Size	Depth of Foundation	Net Ultimate Bearing Capacity, q_{nu}	*Net Safe Bearing Capacity, q_{ns}*	*Reduced Safe Bearing Capacity, q_{ns}*
Raft Footing 15.0 x 10.0 m	1.5 m	69.19 t/m^2	27.67 t/m^2	**19.50 t/m^2**
	2.5 m	93.61 t/m^2	37.44 t/m^2	**27.00 t/m^2**
	3.5 m	122.88 t/m^2	49.15 t/m^2	**41.00 t/m^2**

SETTLEMENT ANALYSIS

Max. Settlement in cohesion less soil is calculated from IS 8009(Part I):1976, from fig. 9

Table 14: Settlement in Cohesion less Soil

Foundation Size	Depth of Footing	N-Value	Settlement per unit pressure from fig 9	Net Settlement Δ (mm)
Isolated footing (15.0 m x 10.0 m)	1.5 m	14	25	48.75
	2.5 m	19	18	48.60
	3.5 m	26	12	49.20

Net Settlement, Δ< 50 mm, Hence safe

10. COMPUTATION OF ALLOWABLE BEARING CAPACITY FROM PLATE LOAD TEST

For proposed foundation the computations have been done for the open foundation at 2.0 m from existing Ground Level. These analyses and test results have been reported below:

From PLT-1,

Foundation Size 4.0 m x 4.0 m

Ultimate bearing capacity from load settlement curve (q_{up}) = 17.3 t/m^2

Ultimate bearing capacity for Foundation (q_{uf})= 17.3 x 4.0 /0.75 = 92.26 t/m^2

Using FOS = 3.0, net allowable bearing capacity, q_f = q_{uf} /FOS

=36.90 t/m^2.

SETTLEMENT ANALYSIS

From settlement consideration, the settlement of the test plate S_p of width B_P, corresponding to settlement S_f for a foundation width of B_f can be worked out from the following equation,

$$S_f = S_p [\{B \times (B_p + 0.3)\} / \{B_p \times (B + 0.3)\}]^2$$

Where B_p and B_f are in cm.

S_f = Maximum Permissible Settlement = 20 mm

B_p = Width of plate

B_f = Width of footing

S_p = Maximum Settlement of plate

q_s = Bearing Capacity of Foundation from Load Settlement Curve

S.No	Location	Settlement of Plate (mm)	Allowable Pressure (t/m^2)
		For 4.0m Wide Footing	For 4.0 m Wide Footing
1.	**PLT – 1**	29.5 mm	**Greater than 50.00**

11.ESTIMATION OF MODULUS OF SUBGRADE REACTION (K-VALUE)

Modulus of Sub grade Reaction (k) is required for foundation & Calculated as per IS 9214-1979 and is estimated from Plate Load Test data.

For PLT

By equation,

$$K = p/0.125 \quad Kgf/cm^2/cm$$

Where,

'K' = Modulus of Sub grade Reaction

'p' = load intensity required for unit settlement from load-settlement curve at figure 1 which is 1.71 Kgf/ cm^2/cm

Therefore, k = 1.71/0.125

= 13.68 Kg/cm^2/cm

12. RECOMMENDATIONS

Recommended bearing capacity for different types of foundation may be assumed as follow:

Table 15: Recommendations

S.No	Type of foundation	At 1.5 m depth		At 2.5 m depth		At 3.5 m depth	
		$(q_a)_{net}$ (t/m^2)	$(q_a)_{gross}$ (t/m^2)	$(q_a)_{net}$ (t/m^2)	$(q_a)_{gross}$ (t/m^2)	$(q_a)_{net}$ (t/m^2)	$(q_a)_{gross}$ (t/m^2)
1.	**Isolated Footing**	**15.03**	18.13	**24.47**	29.64	**36.47**	43.71
2.	**Raft Foundation**	**19.50**	22.60	**27.00**	32.17	**41.00**	48.24

Modulus of Sub Grade (K- Value) **= 13.68 Kg/cm^2/cm**

Note:

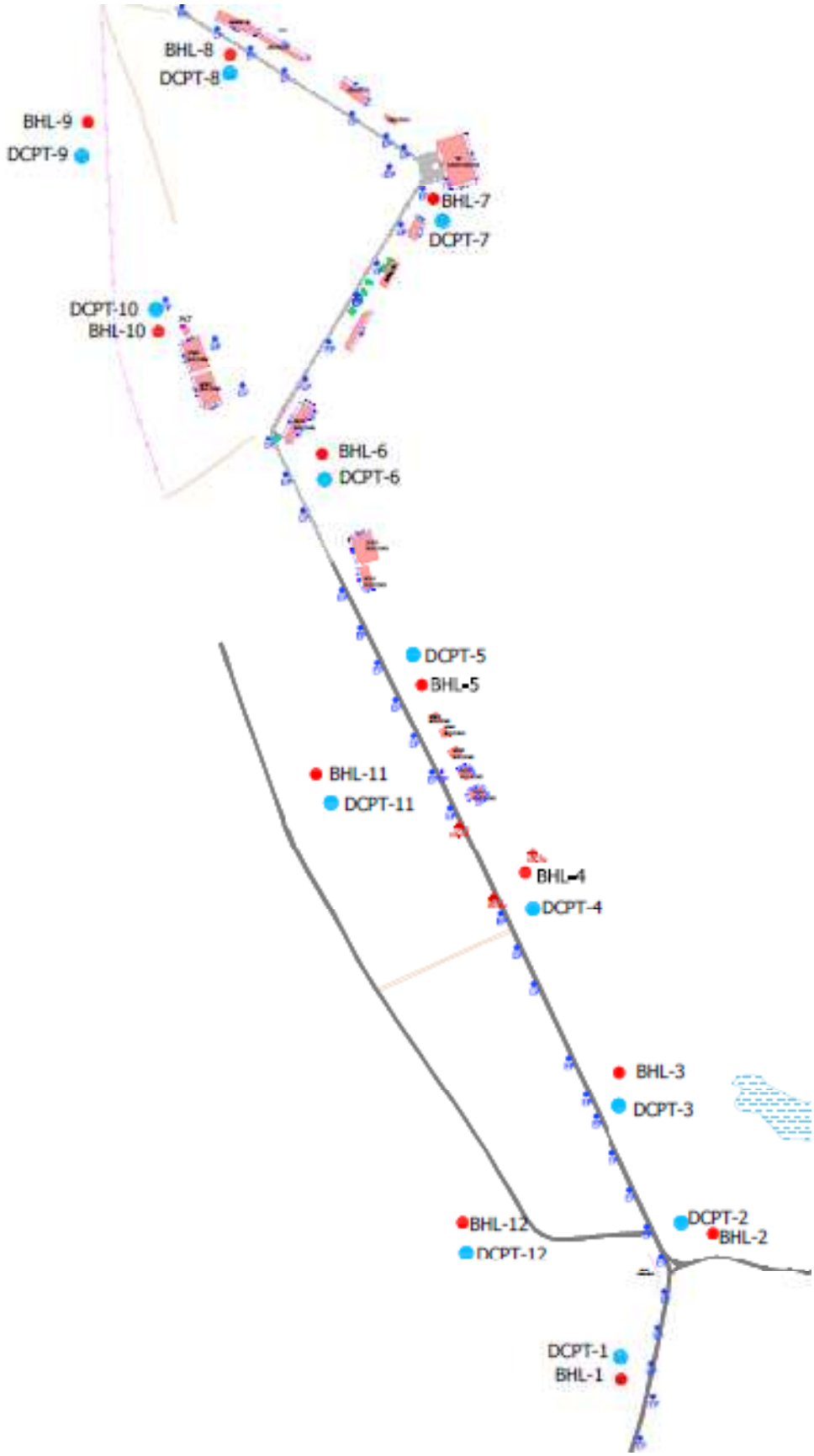
1. Sub Soil Profile observed was predominantly red colored medium dense poorly graded sand with traces of laterite gravel upto 5.0 m and beyond 5.0 m upto explored depth dense sand and laterite gravel mixture was observed .
2. Subsoil below foundation level should be properly compacted before laying of Foundation.
3. The area under investigation falls under seismic zone-III as per India seismic code.
4. It is also suggested that the backfilling of the foundation soil should be well compacted in layer at optimum moisture content to achieve at least 95% of proctor density, followed by suitable plinth protection & effective drainage system.
5. For any other size and depth of footing bearing capacity of soil can be calculated from the data provided.

ANNEXURE A

Table 16: Plate Load Test Results

Load (Kg)	Load Intensity (t/m^2)	Maximum Settlement of Plate (0.01mm Least Count)		
		Dial Gauge – 1	Dial Gauge - 2	Average
0	0.00	0	0	0
3125	5.67	20	18	19
6250	11.23	66	60	63
9375	16.78	119	120	120
12500	22.34	194	201	198
15625	27.89	281	275	278
18750	33.45	362	336	349
21875	39.00	418	398	408
25000	44.56	455	443	449

LOCATION MAP



LIST OF I.S. CODES

FIELD INVESTIGATION:

1.	IS : 1498 – 1970	:	Classification and Identification of soils for general engineering purpose (First Revision).
2.	IS : 1892 – 1979	:	Code of practice for sub surface investigation for foundations (First Revision).
3.	IS : 2131 – 1981	:	Method of Standard Penetration Tests for soils.
4.	IS : 2132 – 1986	:	Code of practice for thin walled tube sampling of soils (Second Revision).
5.	IS : 4968 – 1976 (Part – 3)	:	Method of sub surface sounding for soils : Static cone penetration test.

LABORATORY TESTS:

1.	IS 2720 – 1983 (Part – 1)	:	Methods of test for soils : Preparation of dry soil sample for various tests (Second Revision).
2.	IS : 2720 – 1980 (Part – 2)	:	Method of test for soils : Determination of water content (Second Revision).
3.	IS : 2720 – 1980 (Part – 3) (Section – 1)	:	Method of test for soils : Determination of Specific Gravity : Fine Grained Soils.
4.	IS : 2720 – 1980 (Part – 3) (Section – 2)	:	Method of test for soils : Determination of Specific Gravity : Fine, Medium, Coarse Grained Soils (First Edition).
5.	IS : 2720 – 1985 (Part – 4)	:	Method of test for soils : Grain Size Analysis.
6.	IS : 2720 – 1985 (Part – 5)	:	Method of test for soils : Determination of liquid & plastic limit (Second Revision).
7.	IS : 2720 – 1986 (Part – 15)	:	Method of test for soils : Determination of consolidation properties (First Revision).
8.	IS : 2809 – 1972	:	Method of test for soils : Glossary of terms & symbols relating to soil engineering.

FOUNDATION CONSTRUCTION:

1.	IS : 1080 – 1986	:	Code of practice for design and construction of shallow foundations on soils (other than raft, ring and shell) (Second Revision).
2.	IS : 1904 – 1986	:	Code of practice for design and construction of foundation in soils : General requirements.
3.	IS : 1080 – 1986	:	Code of practice for design and construction of shallow foundations on soils (other than raft, ring and shell) (Second Revision).
4.	IS 6403 – 1981	:	Code of practice for determination of bearing capacity of shallow foundations.
5.	IS 8009 – 1976 (Part – 1)	:	Code of practice for calculations of settlements of foundations : shallow foundations subject to symmetrical static vertical loads.

NOTATIONS USED

N	=	Observed SPT value
C_N	=	Correction factor
N_N	=	Corrected SPT values
γ	=	Bulk unit weight
γ'	=	Submerged unit weight
γ_d	=	Dry unit weight
γ_{sat}	=	Saturated unit weight
G	=	Specific gravity of soil
W_L	=	Liquid limit
W_P	=	Plastic limit
I_P	=	Plasticity index
Q_u	=	Unconfined compressive strength
C_u	=	Undrained shear strength
C	=	Effective cohesional parameter
Ø	=	Effective angle of shearing resistance
$Ø_m$	=	Mobilized angle of shearing resistance
N Ø	=	Flow value $Tan^2 (45 + Ø / 2)$
GSF	=	General shear failure
LSF	=	Local shear failure
C_c	=	Compression index
B	=	Width of foundation
L	=	Length of foundation
D	=	Depth of foundation

q	=	Effective surcharge
N_γ, N_q, & N_c	=	Bearing capacity factors
S_γ, S_q, & S_c	=	Shape factors
d_γ, d_q, & d_c	=	Depth factors
S.S.W.L.	=	Sub soil water level
W′	=	W.T. correction factor
H	=	Thickness of clayey layer
σ'_o	=	Original effective overburden pressure
$\Delta\sigma$	=	Vertical stress increment
e_o	=	Original void ratio
w	=	Water content
H_t	=	Thickness of sandy layer
B_t	=	Top width of sandy layer
$\Delta\sigma_t$	=	Stress increment at the top of a sandy layer
D_f	=	Depth factor
L_{yf}	=	Lateral yield factor
R_f	=	Rigidity factor
q_{nf}	=	Net ultimate bearing capacity
q_{ns}	=	Net safe bearing capacity against shear failure
q_n	=	Net foundation loading intensity for a given settlement
q_a	=	Allowable bearing capacity
S_o	=	Settlement due to a net unit foundation loading intensity
S_{ob}	=	Settlement due to a net unit foundation loading intensity under submerged conditions (1Kg / cm^2)

WT	=	Water table
S_t	=	Total settlement
S_a	=	Maximum allowable settlement
GW	=	Well graded gravels
GP	=	Poorly graded gravels
GM	=	Silty gravels
GC	=	Clayey gravels
SW	=	Well graded sands
SP	=	Poorly graded sands
SM	=	Silty sands
SC	=	Clayey sands
ML	=	Silt of low compressibility
CL	=	Clay of low plasticity
MI	=	Silt of medium compressibility
CI	=	Clay of medium plasticity
MH	=	Silt of high compressibility
CH	=	Clay of high plasticity
M(NP)	=	Non plastic silt
ML-CL	=	Mixture of ML and CL

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

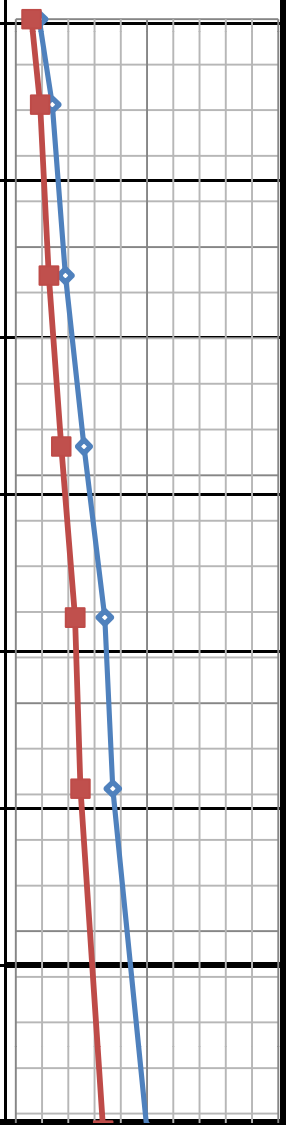
Bore Hole - 1

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 1/1	9.0	6.0	
2	**1.50**					DCPT	DCPT 1/2	14.0	9.3	
3	**3.00**					DCPT	DCPT 1/3	19.0	12.7	
4	**4.50**					DCPT	DCPT 1/4	26.0	17.3	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 1/5	34.0	22.7	
6	**7.50**					DCPT	DCPT 1/6	37.0	24.7	
7	**10.50**					DCPT	DCPT 1/7	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

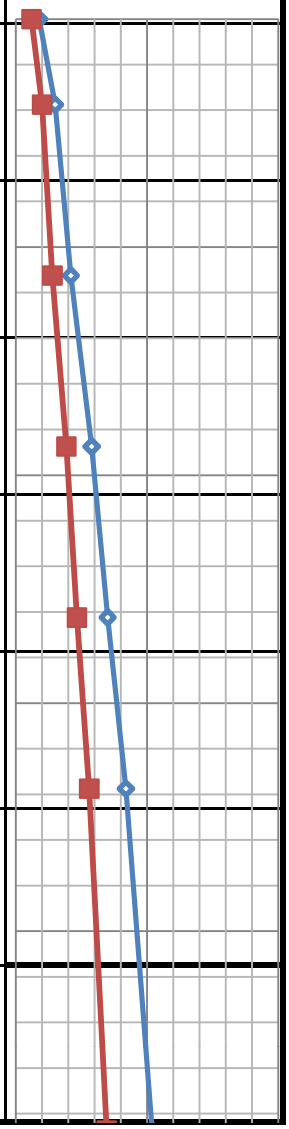
Bore Hole - 2

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 2/1	9.0	6.0	
2	**1.50**					DCPT	DCPT 2/2	15.0	10.0	
3	**3.00**					DCPT	DCPT 2/3	21.0	14.0	
4	**4.50**					DCPT	DCPT 2/4	29.0	19.3	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 2/5	35.0	23.3	
6	**7.50**					DCPT	DCPT 2/6	42.0	28.0	
7	**10.50**					DCPT	DCPT 2/7	52.0	34.7	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

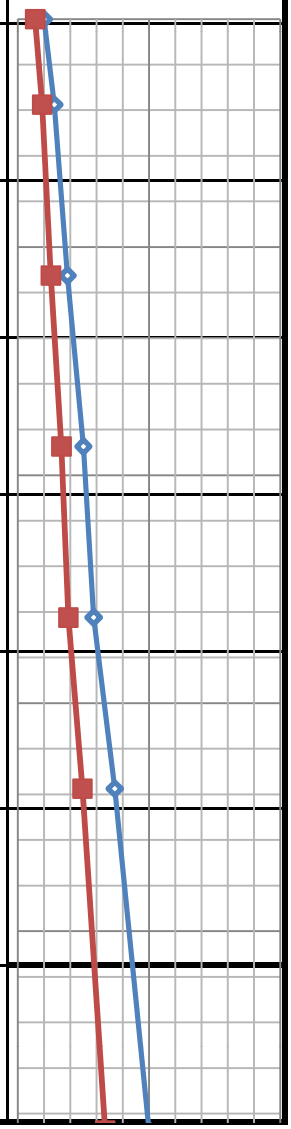
Bore Hole - 3

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		6.00	DCPT	DCPT 3/1	10.0	6.7	
2	**1.50**					DCPT	DCPT 3/2	14.0	9.3	
3	**3.00**					DCPT	DCPT 3/3	19.0	12.7	
4	**4.50**					DCPT	DCPT 3/4	25.0	16.7	
5	**6.00**					DCPT	DCPT 3/5	29.0	19.3	
6	**7.50**	Dense Poorly Grade Red Gravelly Soil			4.50	DCPT	DCPT 3/6	37.0	24.7	
7	**10.50**					DCPT	DCPT 3/7	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

Bore Hole - 4

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 4/1	12.0	8.0	
2	**1.50**					DCPT	DCPT 4/2	16.0	10.7	
3	**3.00**					DCPT	DCPT 4/3	20.0	13.3	
4	**4.50**					DCPT	DCPT 4/4	27.0	18.0	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 4/5	34.0	22.7	
6	**7.50**					DCPT	DCPT 4/6	41.0	27.3	
7	**9.00**					DCPT	DCPT 4/7	47.0	31.3	
8	**10.50**					DCPT	DCPT 4/8	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

Bore Hole - 5

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 5/1	11.0	7.3	
2	**1.50**					DCPT	DCPT 5/2	17.0	11.3	
3	**3.00**					DCPT	DCPT 5/3	21.0	14.0	
4	**4.50**					DCPT	DCPT 5/4	28.0	18.7	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 5/5	35.0	23.3	
6	**7.50**					DCPT	DCPT 5/6	42.0	28.0	
7	**9.00**					DCPT	DCPT 5/7	48.0	32.0	
8	**10.50**					DCPT	DCPT 5/8	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

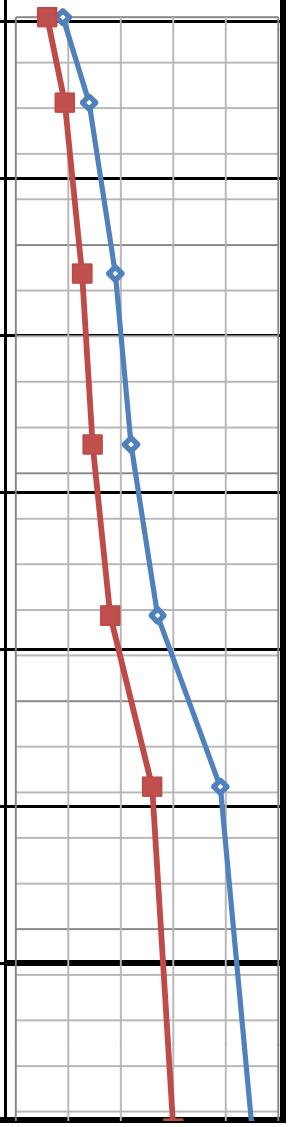
Bore Hole - 6

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		6.00	DCPT	DCPT 6/1	9.0	6.0	
2	**1.50**					DCPT	DCPT 6/2	14.0	9.3	
3	**3.00**					DCPT	DCPT 6/3	19.0	12.7	
4	**4.50**					DCPT	DCPT 6/4	22.0	14.7	
5	**6.00**					DCPT	DCPT 6/5	27.0	18.0	
6	**7.50**	Dense Poorly Grade Red Gravelly Soil			4.50	DCPT	DCPT 6/6	39.0	26.0	
7	**10.50**					DCPT	DCPT 6/7	45.0	30.0	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

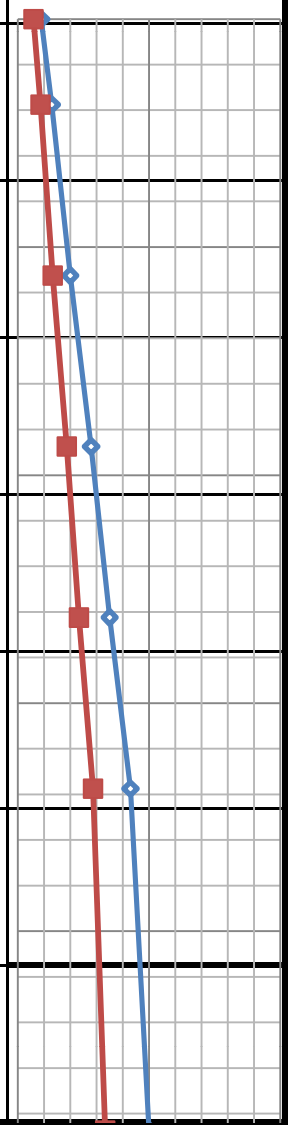
Bore Hole - 7

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 7/1	9.0	6.0	
2	**1.50**					DCPT	DCPT 7/2	13.0	8.7	
3	**3.00**					DCPT	DCPT 7/3	20.0	13.3	
4	**4.50**					DCPT	DCPT 7/4	28.0	18.7	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 7/5	35.0	23.3	
6	**7.50**					DCPT	DCPT 7/6	43.0	28.7	
7	**10.50**					DCPT	DCPT 7/7	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

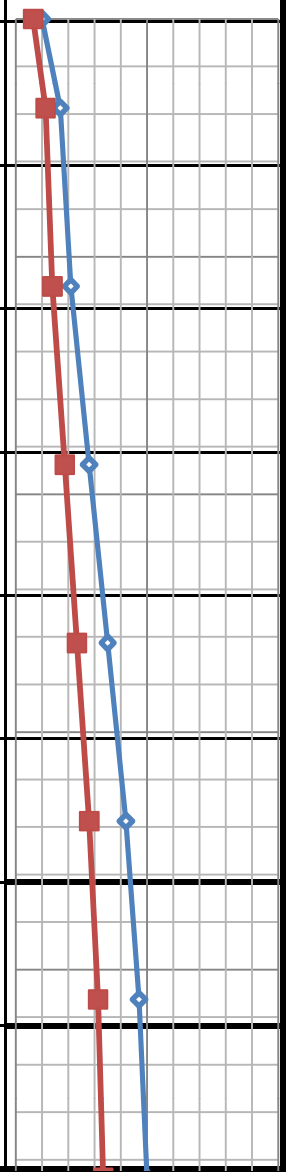
Bore Hole - 8

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 8/1	10.0	6.7	
2	**1.50**					DCPT	DCPT 8/2	17.0	11.3	
3	**3.00**					DCPT	DCPT 8/3	21.0	14.0	
4	**4.50**					DCPT	DCPT 8/4	28.0	18.7	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 8/5	35.0	23.3	
6	**7.50**					DCPT	DCPT 8/6	42.0	28.0	
7	**9.00**					DCPT	DCPT 8/7	47.0	31.3	
8	**10.50**					DCPT	DCPT 8/8	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

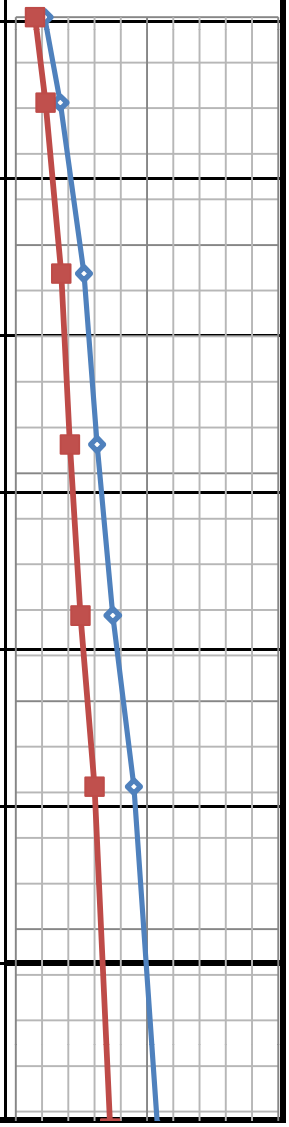
Bore Hole - 9

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		3.00	DCPT	DCPT 9/1	11.0	7.3	
2	**1.50**					DCPT	DCPT 9/2	17.0	11.3	
3	**3.00**					DCPT	DCPT 9/3	26.0	17.3	
4	**4.50**	Dense Poorly Grade Red Gravelly Soil			7.50	DCPT	DCPT 9/4	31.0	20.7	
5	**6.00**					DCPT	DCPT 9/5	37.0	24.7	
6	**7.50**					DCPT	DCPT 9/6	45.0	30.0	
7	**10.50**					DCPT	DCPT 9/7	54.0	36.0	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

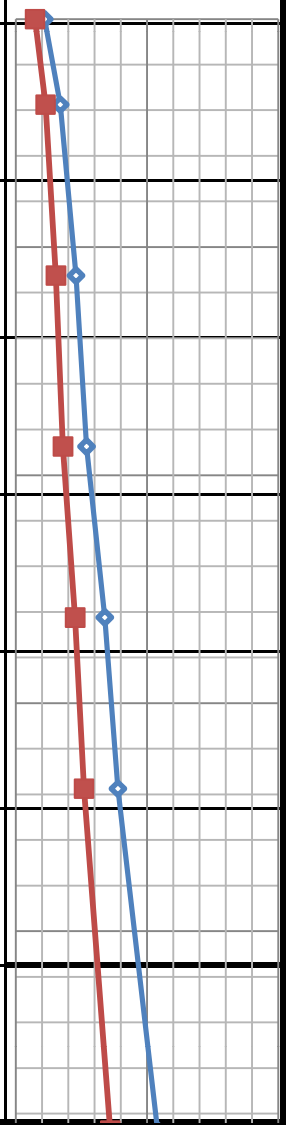
Bore Hole - 10

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 10/1	11.0	7.3	
2	**1.50**					DCPT	DCPT 10/2	17.0	11.3	
3	**3.00**					DCPT	DCPT 10/3	23.0	15.3	
4	**4.50**					DCPT	DCPT 10/4	27.0	18.0	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 10/5	34.0	22.7	
6	**7.50**					DCPT	DCPT 10/6	39.0	26.0	
7	**10.50**					DCPT	DCPT 10/7	54.0	36.0	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

Bore Hole - 11

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		6.00	DCPT	DCPT 11/1	13.0	8.7	
2	**1.50**					DCPT	DCPT 11/2	18.0	12.0	
3	**3.00**					DCPT	DCPT 11/3	15.0	10.0	
4	**4.50**					DCPT	DCPT 11/4	24.0	16.0	
5	**6.00**					DCPT	DCPT 11/5	29.0	19.3	
6	**7.50**	Dense Poorly Grade Red Gravelly Soil			4.50	DCPT	DCPT 11/6	37.0	24.7	
7	**9.00**					DCPT	DCPT 11/7	47.0	31.3	
8	**10.50**					DCPT	DCPT 11/8	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

JOB NO. - GT-1764

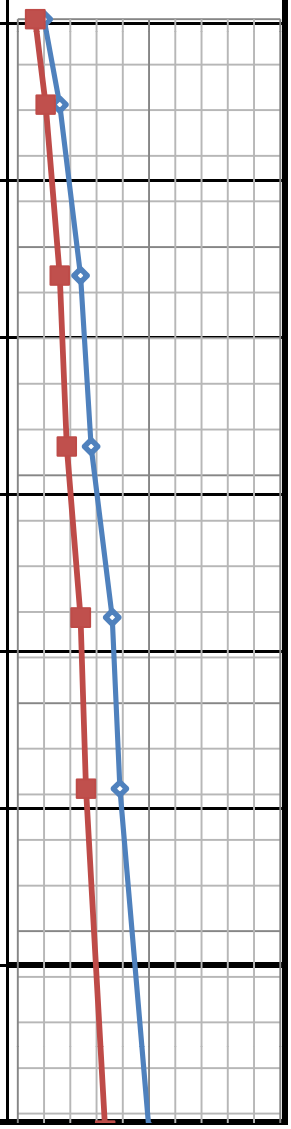
Bore Hole - 12

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

BORE LOG SHEET (as per IS 1892:1979)

Location :	As per Location Map	**Starting Depth**	0.0 m from EGL
Ground Water Level :	Nill	**Termination Depth**	10.5 m
Type of Boring :	MECHANICAL/AUGER DRILLING	**Diameter of Boring :**	100 mm

S.No.	Depth from EGL (m)	Soil Type				Sample		Penetration Value		SPT 'N' PROFILE
		Description of Strata	Soil Legend	Symbolic Representation	Thickness of Strata	Type	Sample No.	OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	Depth v/s SPT N-value Graph
1	**0.75**	Medium Dense Poorly Graded Red Gravelly Soil	SP		4.50	DCPT	DCPT 12/1	10.0	6.7	
2	**1.50**					DCPT	DCPT 12/2	16.0	10.7	
3	**3.00**					DCPT	DCPT 12/3	24.0	16.0	
4	**4.50**					DCPT	DCPT 12/4	28.0	18.7	
5	**6.00**	Dense Poorly Grade Red Gravelly Soil			6.00	DCPT	DCPT 12/5	36.0	24.0	
6	**7.50**					DCPT	DCPT 12/6	39.0	26.0	
7	**10.50**					DCPT	DCPT 12/7	50.0	33.3	

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 1

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	-	97.2	87.6	67.6	27.4	4.4	SP		12.4	83.2	4.4	NP	NP	NP	2.11	2.02	4.1	-	-	2.56
2	**1.50**	-	95.4	90.2	84.3	65.7	24.7	6.6	SP		15.7	77.7	6.6	NP	NP	NP	-	-	4.5	29.5	-	-
3	**3.00**	-	96.2	89.2	82.4	62.3	24.2	6.7	SP		17.6	75.7	6.7	NP	NP	NP	2.09	1.99	4.9	-	-	2.53
4	**4.50**	-	95.2	87.7	80.8	60.2	21.3	7.7	SP		19.2	73.1	7.7	NP	NP	NP	-	-	5.5	32.0	-	-
5	**6.00**	-	93.7	85.7	76.6	59.7	22.9	5.7	SP		23.4	70.9	5.7	NP	NP	NP	2.12	2	5.9	-	-	2.51
6	**7.50**	-	95.2	89.2	74.6	55.7	20.2	4.4	SP		25.4	70.2	4.4	NP	NP	NP	-	-	6.7	-	-	-
7	**10.00**	-	96.7	91.2	73.8	57.2	23.4	4.2	SP		26.2	69.6	4.2	NP	NP	NP	2.10	1.96	6.9	-	-	2.5

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 2

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT			
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)		Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
1	**0.75**	-	-	94.9	84.8	62.7	25.9	4.7	SP		15.2	80.1	4.7	NP	NP	NP	2.05	1.96	4.1	-	-	2.51
2	**1.50**	-	-	92.9	82.7	66.7	27.4	5.7	SP		17.3	77.0	5.7	NP	NP	NP	-	-	4.7	-	-	-
3	**3.00**	-	97.2	93.4	86.3	60.3	24.9	7.3	SP		13.7	79.0	7.3	NP	NP	NP	2.01	1.91	4.9	31.50	-	2.55
4	**4.50**	-	95.4	89.2	81.6	65.2	29.2	6.7	SP		18.4	74.9	6.7	NP	NP	NP	-	-	5.1	-	-	-
5	**6.00**	-	96.6	90.3	84.5	59.9	24.3	7.7	SP		15.5	76.8	7.7	NP	NP	NP	2.03	1.92	5.7	33.90	-	2.53
6	**7.50**	-	94.2	85.7	79.2	57.2	26.4	8.5	SP		20.2	71.3	8.5	NP	NP	NP	-	-	5.9	-	-	-
7	**10.00**	-	96.7	91.7	81.1	59.2	28.7	8.3	SP		18.9	72.8	8.3	NP	NP	NP	2.03	1.91	6.2	-	-	2.53

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 3

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	-	94.7	84.7	63.7	26.7	5.2	SP		15.3	79.5	5.2	NP	NP	NP	2.07	1.97	4.6	-	-	2.57
2	**1.50**	-	-	97.4	89.8	65.8	28.9	2.6	SP		10.2	87.2	2.6	NP	NP	NP	-	-	5.0	30.1	-	-
3	**3.00**	-	98.2	92.4	86.3	61.6	27.2	6.7	SP		13.7	79.6	6.7	NP	NP	NP	2.05	1.94	5.5	-	-	2.55
4	**4.50**	-	97.6	94.6	82.3	58.7	25.2	4.9	SP		17.7	77.4	4.9	NP	NP	NP	-	-	5.9	32.5	-	-
5	**6.00**	-	94.7	90.2	80.8	62.4	26.7	6.4	SP		19.2	74.4	6.4	NP	NP	NP	2.08	1.95	6.2	-	-	2.53
6	**7.50**	-	96.7	89.7	78.8	57.7	22.7	5.5	SP		21.2	73.3	5.5	NP	NP	NP	-	-	6.7	-	-	-
7	**10.00**	-	96.1	90.1	78.5	59.7	24.6	6.8	SP		21.5	71.7	6.8	NP	NP	NP	2.10	1.96	7.0	-	-	2.53

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 4

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	97.4	85.1	77.6	50.2	23.4	4.2	SP		22.4	73.4	4.2	NP	NP	NP	2.15	2.05	4.4	-	-	2.53
2	**1.50**	-	95.2	82.7	73.3	47.4	21.6	6.7	SP		26.7	66.6	6.7	NP	NP	NP	-	-	4.7	30.5	-	-
3	**3.00**	-	91.4	84.2	70.4	45.7	19.2	7.7	SP		29.6	62.7	7.7	NP	NP	NP	-	-	5.0	-	-	-
4	**4.50**	-	90.2	80.2	68.3	49.7	22.4	4.2	SP		31.7	64.1	4.2	NP	NP	NP	2.17	2.05	5.5	-	-	2.51
5	**6.00**	-	95.2	83.4	71.1	44.7	20.6	3.7	SP		28.9	67.4	3.7	NP	NP	NP	-	-	5.7	34.6	-	-
6	**7.50**	-	89.2	79.4	67.6	46.7	23.7	3.6	SP		32.4	64.0	3.7	NP	NP	NP	2.20	2.07	6.0	-	-	2.49
7	**9.00**	-	90.2	78.9	67.3	44.2	21.7	4.0	SP		32.7	63.3	4.0	NP	NP	NP	-	-	6.1	-	-	-
8	**10.50**	-	92.4	80.2	68.3	47.2	25.2	3.0	SP		31.7	65.3	3.0	NP	NP	NP	2.23	2.09	6.4	-	-	2.49

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 5

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	97.2	92.4	87.6	69.2	29.7	6.6	SP		12.4	81.0	6.6	NP	NP	NP	2.13	2.05	3.9	-	-	2.56
2	**1.50**	-	95.2	90.2	84.6	65.4	25.5	7.7	SP		15.4	76.9	7.7	NP	NP	NP	-	-	4.5	30.20	-	-
3	**3.00**	-	89.7	75.7	61.1	49.7	21.9	5.5	SP		38.9	55.6	5.5	NP	NP	NP	2.17	2.06	4.9	-	-	2.5
4	**4.50**	-	90.2	73.4	56.6	42.4	17.2	3.9	SP		43.4	52.7	3.9	NP	NP	NP	-	-	5.1	33.12	-	-
5	**6.00**	-	92.4	79.3	64.3	45.2	19.5	3.2	SP		35.7	61.1	3.2	NP	NP	NP	2.20	2.08	5.7	-	-	2.48
6	**7.50**	-	88.9	75.2	60.6	40.9	15.7	4.4	SP		39.4	56.2	4.4	NP	NP	NP	-	-	6.1	-	-	-
7	**9.00**	-	93.4	77.7	57.6	43.7	17.2	4.7	SP		42.4	52.9	4.7	NP	NP	NP	2.22	2.08	6.7	-	-	2.48
8	**10.50**	-	90.2	74.7	55.3	41.3	15.4	4.0	SP		44.7	51.3	4.0	NP	NP	NP	-	-	7.0	-	-	-

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 6

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	0.75	-	94.9	92.2	86.6	60.2	22.4	6.6	SP		13.4	80.0	6.6	NP	NP	NP	2.09	2.02	3.4	-	-	2.57
2	1.50	-	99.2	94.2	89.8	62.4	24.4	8.4	SP		10.2	81.4	8.4	NP	NP	NP	-	-	3.7	-	-	-
3	3.00	-	96.2	92.4	87.6	59.2	20.2	7.3	SP		12.4	80.3	7.3	NP	NP	NP	2.12	2.03	4.0	31.50	-	2.54
4	4.50	-	-	98.2	86.6	66.7	24.7	3.4	SP		14.2	82.4	3.4	NP	NP	NP	-	-	4.7	-	-	-
5	6.00	-	97.2	93.4	82.8	61.7	21.7	6.0	SP		17.2	76.8	6.0	NP	NP	NP	2.15	2.04	5.0	32.80	-	2.52
6	7.50	-	94.5	87.2	79.6	57.9	20.2	2.9	SP		20.4	76.7	2.9	NP	NP	NP	-	-	5.5	-	-	-
7	9.00	-	96.2	89.2	75.3	56.8	19.7	3.4	SP		24.7	71.9	3.4	NP	NP	NP	2.16	2.03	6.0	-	-	2.50

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 7

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT			
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)		Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
1	**0.75**	-	95.2	89.2	84.3	66.2	28.4	6.7	SP		15.7	77.6	6.7	NP	NP	NP	2.07	1.99	3.7	-	-	2.56
2	**1.50**	-	-	93.7	88.8	68.2	25.2	4.4	SP		11.2	84.4	4.4	NP	NP	NP	-	-	4.2	29.83	-	-
3	**3.00**	-	97.2	90.2	82.8	62.7	23.7	7.5	SP		17.2	75.3	7.5	NP	NP	NP	2.10	2.00	4.8	-	-	2.53
4	**4.50**	-	95.7	91.2	80.5	60.4	25.3	5.9	SP		19.5	74.6	5.9	NP	NP	NP	-	-	5.4	32.43	-	-
5	**6.00**	-	96.3	89.7	78.8	57.9	20.7	6.8	SP		21.2	72.0	6.8	NP	NP	NP	2.12	2.00	5.9	-	-	2.51
6	**7.50**	-	96.7	90.5	78.5	59.3	22.5	6.9	SP		21.5	71.6	6.9	NP	NP	NP	-	-	6.4	-	-	-
7	**10.00**	-	94.9	88.7	79.3	61.7	26.3	7.2	SP		20.7	72.1	7.2	NP	NP	NP	2.09	1.95	6.7	-	-	2.51

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 8

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	94.9	90.2	64.7	64.7	23.4	7.7	SP		20.2	72.1	7.7	NP	NP	NP	2.15	2.07	3.9	-	-	2.53
2	**1.50**	-	95.5	88.2	60.4	60.4	21.7	6.9	SP		25.4	67.7	6.9	NP	NP	NP	-	-	4.0	-	-	-
3	**3.00**	-	88.9	75.9	50.2	50.2	18.7	4.8	SP		36.4	58.8	4.8	NP	NP	NP	-	-	4.7	31.40	-	-
4	**4.50**	-	84.7	72.4	48.2	48.2	16.9	4.7	SP		40.2	55.1	4.7	NP	NP	NP	2.2	2.12	4.9	32.77	-	2.48
5	**6.00**	-	87.7	70.7	45.3	45.3	15.6	3.9	SP		44.2	51.9	3.9	NP	NP	NP	-	-	5.7	-	-	-
6	**7.50**	-	92.4	72.9	47.7	47.7	17.7	3.3	SP		42.4	54.3	3.3	NP	NP	NP	-	-	5.5	-	-	-
7	**9.00**	-	90.2	70.8	44.6	44.6	15.9	3.7	SP		44.7	51.6	3.7	NP	NP	NP	2.25	2.12	6.0	-	-	2.45
8	**10.50**	-	89.9	68.7	46.7	46.7	17.2	3.0	SP		42.5	57.2	3.0	NP	NP	NP	-	-	6.5	-	-	-

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 9

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	93.1	80.0	71.8	55.7	20.2	4.4	SP		28.2	67.4	4.4	NP	NP	NP	2.12	2.02	4.7	-	-	2.56
2	**1.50**	-	95.7	87.7	76.6	59.2	23.4	6.0	SP		23.4	70.6	6.0	NP	NP	NP	-	-	4.9	30.16	-	-
3	**3.00**	-	93.2	85.7	83.3	62.4	26.7	5.5	SP		16.7	77.8	5.5	NP	NP	NP	2.15	2.04	5.1	-	-	2.54
4	**4.50**	-	96.7	89.7	80.6	60.7	25.9	4.7	SP		19.4	75.9	4.7	NP	NP	NP	-	-	5.7	33.48	-	-
5	**6.00**	-	97.7	86.7	78.4	57.6	21.7	4.2	SP		21.6	74.2	4.2	NP	NP	NP	2.09	1.96	6.1	-	-	2.52
6	**7.50**	-	94.7	87.2	76.6	56.7	21.5	5.7	SP		23.4	70.9	5.7	NP	NP	NP	-	-	6.4	-	-	-
7	**10.00**	-	96.5	85.9	76.3	54.7	29.7	6.1	SP		23.7	70.2	6.1	NP	NP	NP	2.11	1.97	6.9	-	-	2.52

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 10

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	94.2	90.2	86.3	66.7	27.4	6.7	SP		13.7	79.6	6.7	NP	NP	NP	2.07	1.99	4.0	-	-	2.56
2	**1.50**	-	97.2	89.2	83.8	64.2	25.7	5.9	SP		16.2	77.9	5.9	NP	NP	NP	-	-	4.4	-	-	-
3	**3.00**	-	96.2	92.4	87.6	67.2	29.2	7.2	SP		12.4	80.4	7.2	NP	NP	NP	2.04	1.94	4.7	31.3	-	2.56
4	**4.50**	-	94.2	88.7	81.8	64.2	24.9	7.5	SP		18.2	74.3	7.5	NP	NP	NP	-	-	5.0	-	-	-
5	**6.00**	-	95.2	89.2	79.8	60.2	26.2	7.5	SP		20.2	72.3	7.5	NP	NP	NP	2.09	1.97	5.7	33.12	-	2.54
6	**7.50**	-	97.2	90.9	80.3	59.2	24.8	8.8	SP		19.7	71.5	8.8	NP	NP	NP	-	-	6.0	-	-	-
7	**10.00**	-	93.7	87.2	78.8	62.4	22.9	6.9	SP		21.2	71.9	6.9	NP	NP	NP	2.06	1.93	6.7	-	-	2.52

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 11

Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	84.9	75.2	60.8	34.2	15.2	4.2	SP		39.2	56.6	4.2	NP	NP	NP	2.22	2.07	4.7	-	-	2.53
2	**1.50**	-	87.2	79.4	57.6	30.4	12.9	3.7	SP		42.4	53.9	3.7	NP	NP	NP	-	-	5.0	30.72	-	-
3	**3.00**	-	92.4	89.7	77.6	56.7	20.2	5.7	SP		22.4	71.9	5.7	NP	NP	NP	2.12	2.01	5.2	-	-	2.56
4	**4.50**	-	95.4	90.4	82.1	59.8	22.4	4.2	SP		17.9	77.9	4.2	NP	NP	NP	-	-	6.0	32.50	-	-
5	**6.00**	-	94.5	88.7	79.8	57.2	24.6	6.6	SP		20.2	73.2	6.6	NP	NP	NP	2.15	2.02	6.4	-	-	2.54
6	**7.50**	-	92.9	89.7	75.5	55.7	21.9	6.0	SP		24.5	69.5	6.0	NP	NP	NP	-	-	6.7	-	-	-
7	**9.00**	-	97.2	91.4	70.8	55.5	23.5	5.5	SP		29.2	65.3	5.5	NP	NP	NP	2.2	2.02	6.9	-	-	2.51
8	**10.50**	-	91.9	85.4	68.6	52.4	12.8	4.7	SP		31.4	63.9	4.7	NP	NP	NP	-	-	7.2	-	-	-

SOIGNÉ ENGINEERING CONSULTANTS

LOCATION As per location Map

Job No. GT-1764

Page No.

PROJECT :-Construction of AIIMS at Guntur, Andhra Pradesh

Bore Hole No - 12

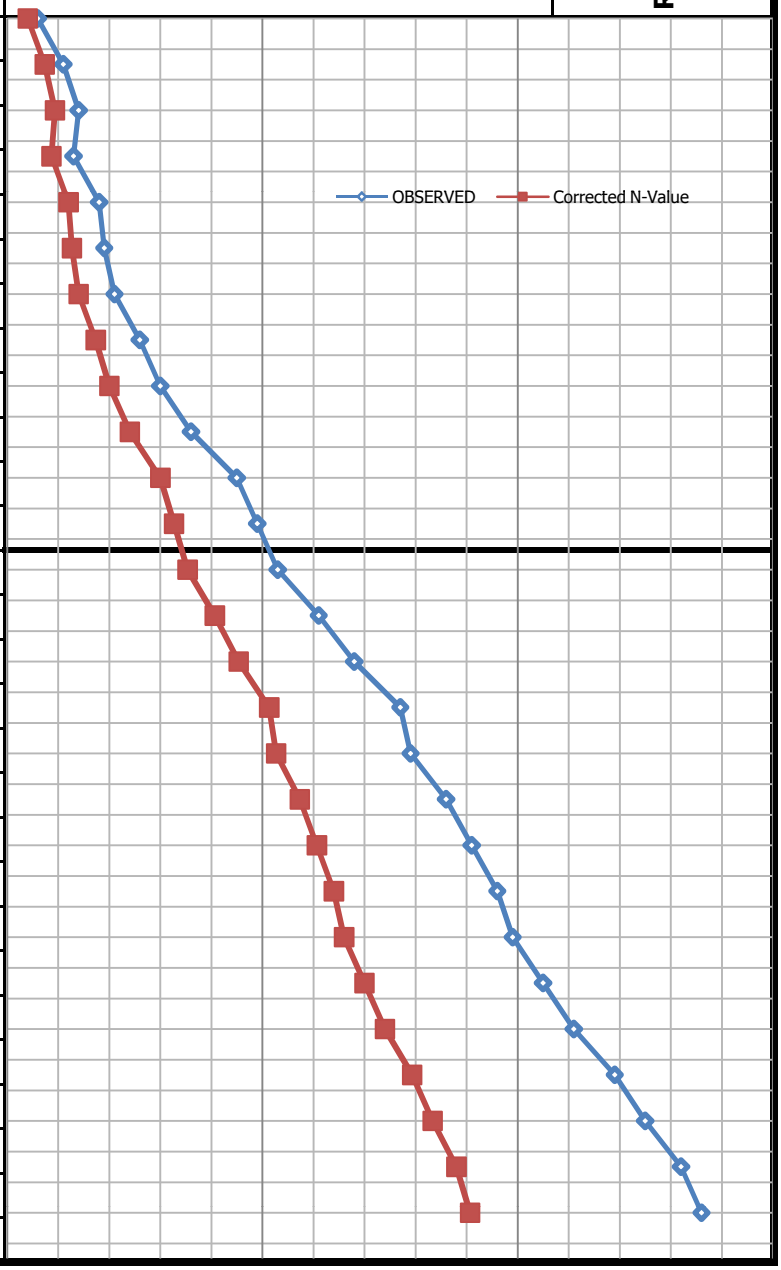
Client :- Deputy General Manager (Civil), HSCC (I) Ltd

Water table depth - Not Encountered

Sample		Sieve Analysis							Soil Type		Grain Size Analysis			Atterbergs Limit			Density		% MOISTURE CONTENT	Angle of Internal Friction, ø	Cohesion, C(t/m^2)	Sp. GRAVITY
S.NO	DEPTH FROM N.S.L. (m)	75 mm	20 mm	10 mm	4.75 mm	2.36 mm	425 u	75 u	SOIL CLASSIFICATION	SYMBOLIC REPRESENTATION	% GRAVEL	% SAND	% SILT & CLAY	% LIQUID LIMIT	% PLASTIC LIMIT	% PLASTIC INDEX	BULK DENSITY (gms/cc)	DRY DENSITY (g/cc)				
1	**0.75**	-	96.4	91.4	84.3	67.4	24.7	4.4	SP		15.7	79.9	4.4	NP	NP	NP	2.13	2.04	4.4	-	-	2.55
2	**1.50**	-	97.4	89.7	82.6	65.4	22.5	5.7	SP		17.4	76.9	5.7	NP	NP	NP	-	-	4.7	29.61	-	-
3	**3.00**	-	98.7	93.4	89.3	69.2	27.8	6.7	SP		10.7	82.6	6.7	NP	NP	NP	2.10	1.99	5.1	-	-	2.53
4	**4.50**	-	-	94.0	87.5	66.7	25.9	4.2	SP		12.5	83.3	4.2	NP	NP	NP	-	-	5.5	32.77	-	-
5	**6.00**	-	95.4	90.2	83.1	82.1	21.6	6.1	SP		16.9	77.0	6.1	NP	NP	NP	2.12	2.00	5.9	-	-	2.51
6	**7.50**	-	94.7	85.7	79.8	60.7	20.5	3.4	SP		20.2	76.4	3.4	NP	NP	NP	-	-	6.1	-	-	-
7	**9.00**	-	97.4	87.4	75.6	57.4	19.7	3.0	SP		24.4	72.6	3.0	NP	NP	NP	2.15	2.01	6.6	-	-	2.50
8	**10.50**	-	94.7	84.9	73.6	55.7	17.9	5.4	SP		26.4	68.2	5.4	NP	NP	NP	-	-	6.4	-	-	-

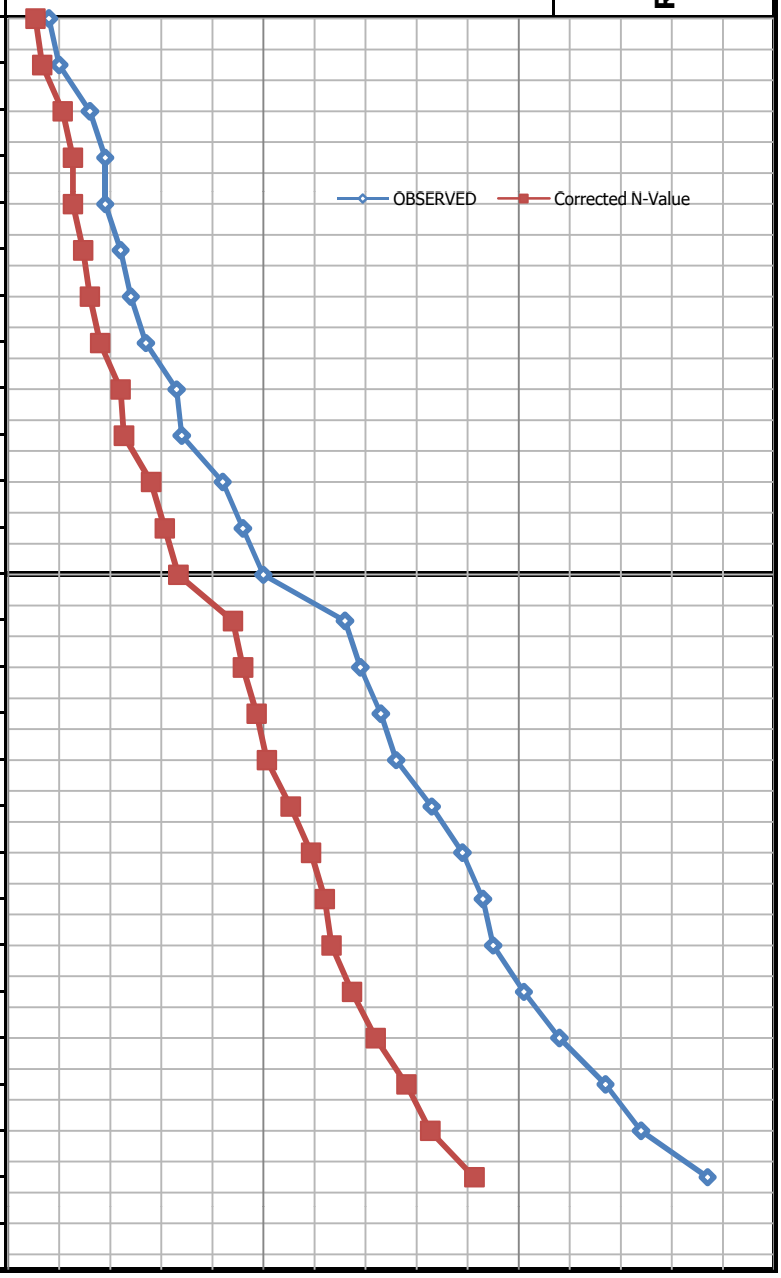
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**1**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	8.10 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	6.0	4.0		
2	**0.30**	11.0	7.3		
3	**0.60**	14.0	9.3		
4	**0.90**	13.0	8.7		
5	**1.20**	18.0	12.0		
6	**1.50**	19.0	12.7		
7	**1.80**	21.0	14.0		
8	**2.10**	26.0	17.3		
9	**2.40**	30.0	20.0		
10	**2.70**	36.0	24.0		
11	**3.00**	45.0	30.0		
12	**3.30**	49.0	32.7		
13	**3.60**	53.0	35.3		
14	**3.90**	61.0	40.7		
15	**4.20**	68.0	45.3		
16	**4.50**	77.0	51.3		
17	**4.80**	79.0	52.7		
18	**5.10**	86.0	57.3		
19	**5.40**	91.0	60.7		
20	**5.70**	96.0	64.0		
21	**6.00**	99.0	66.0		
22	**6.30**	105.0	70.0		
23	**6.60**	111.0	74.0		
24	**6.90**	119.0	79.3		
25	**7.20**	125.0	83.3		
26	**7.50**	132.0	88.0		
27	**7.80**	136.0	90.7		
28	**8.10**	R	R		



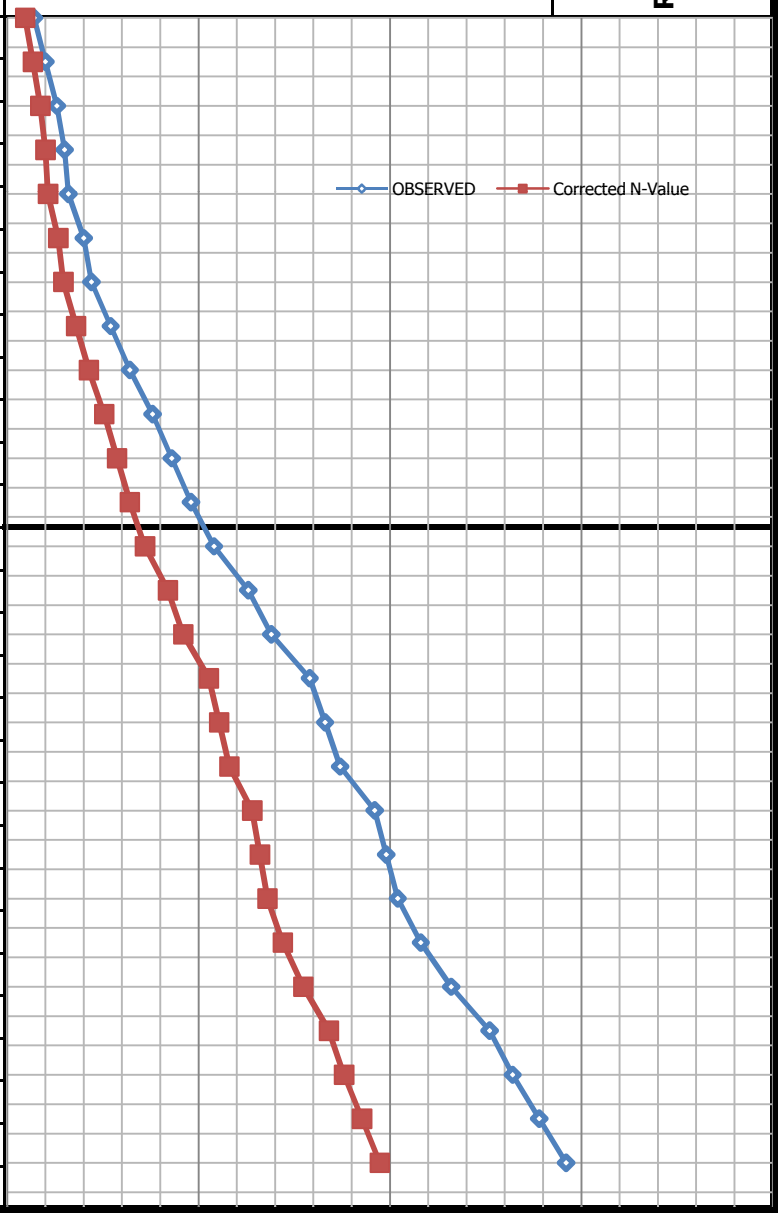
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**2**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.80 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	10.0	6.7		
3	**0.60**	16.0	10.7		
4	**0.90**	19.0	12.7		
5	**1.20**	19.0	12.7		
6	**1.50**	22.0	14.7		
7	**1.80**	24.0	16.0		
8	**2.10**	27.0	18.0		
9	**2.40**	33.0	22.0		
10	**2.70**	34.0	22.7		
11	**3.00**	42.0	28.0		
12	**3.30**	46.0	30.7		
13	**3.60**	50.0	33.3		
14	**3.90**	66.0	44.0		
15	**4.20**	69.0	46.0		
16	**4.50**	73.0	48.7		
17	**4.80**	76.0	50.7		
18	**5.10**	83.0	55.3		
19	**5.40**	89.0	59.3		
20	**5.70**	93.0	62.0		
21	**6.00**	95.0	63.3		
22	**6.30**	101.0	67.3		
23	**6.60**	108.0	72.0		
24	**6.90**	117.0	78.0		
25	**7.20**	124.0	82.7		
26	**7.50**	137.0	91.3		
27	**7.80**	R	R		



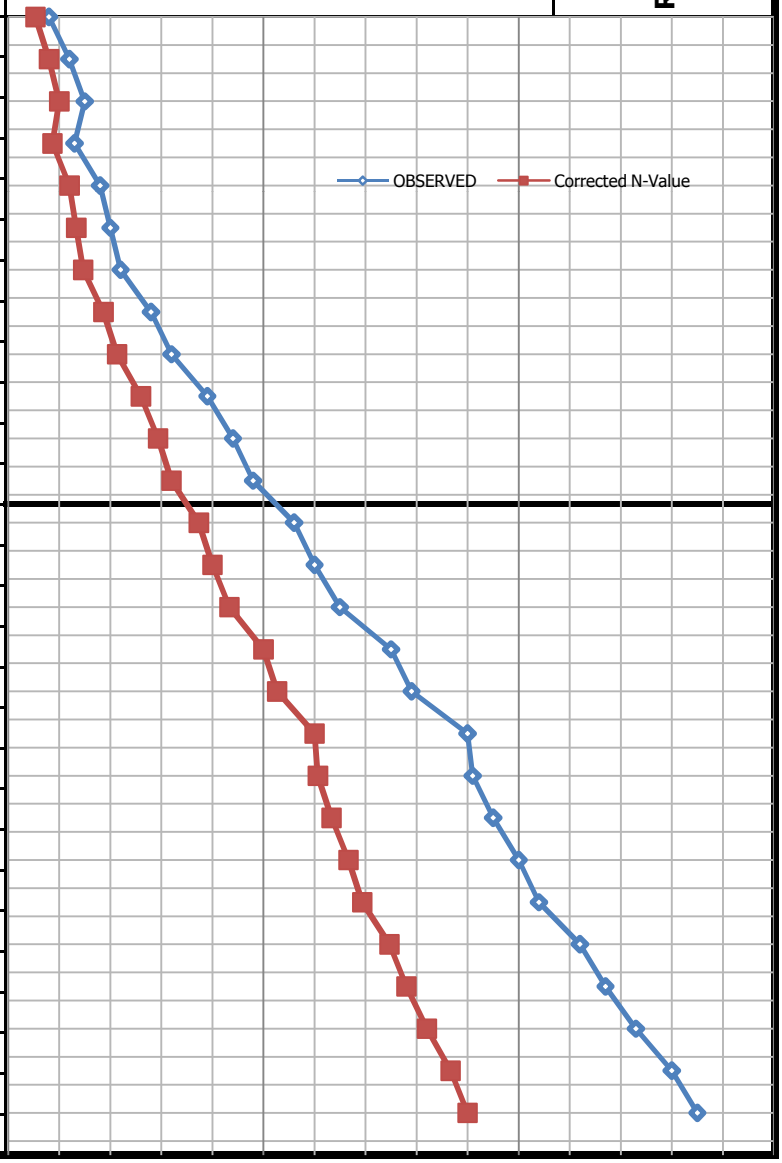
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**3**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	8.10 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	7.0	4.7		
2	**0.30**	10.0	6.7		
3	**0.60**	13.0	8.7		
4	**0.90**	15.0	10.0		
5	**1.20**	16.0	10.7		
6	**1.50**	20.0	13.3		
7	**1.80**	22.0	14.7		
8	**2.10**	27.0	18.0		
9	**2.40**	32.0	21.3		
10	**2.70**	38.0	25.3		
11	**3.00**	43.0	28.7		
12	**3.30**	48.0	32.0		
13	**3.60**	54.0	36.0		
14	**3.90**	63.0	42.0		
15	**4.20**	69.0	46.0		
16	**4.50**	79.0	52.7		
17	**4.80**	83.0	55.3		
18	**5.10**	87.0	58.0		
19	**5.40**	96.0	64.0		
20	**5.70**	99.0	66.0		
21	**6.00**	102.0	68.0		
22	**6.30**	108.0	72.0		
23	**6.60**	116.0	77.3		
24	**6.90**	126.0	84.0		
25	**7.20**	132.0	88.0		
26	**7.50**	139.0	92.7		
27	**7.80**	146.0	97.3		
28	**7.90**	R	R		



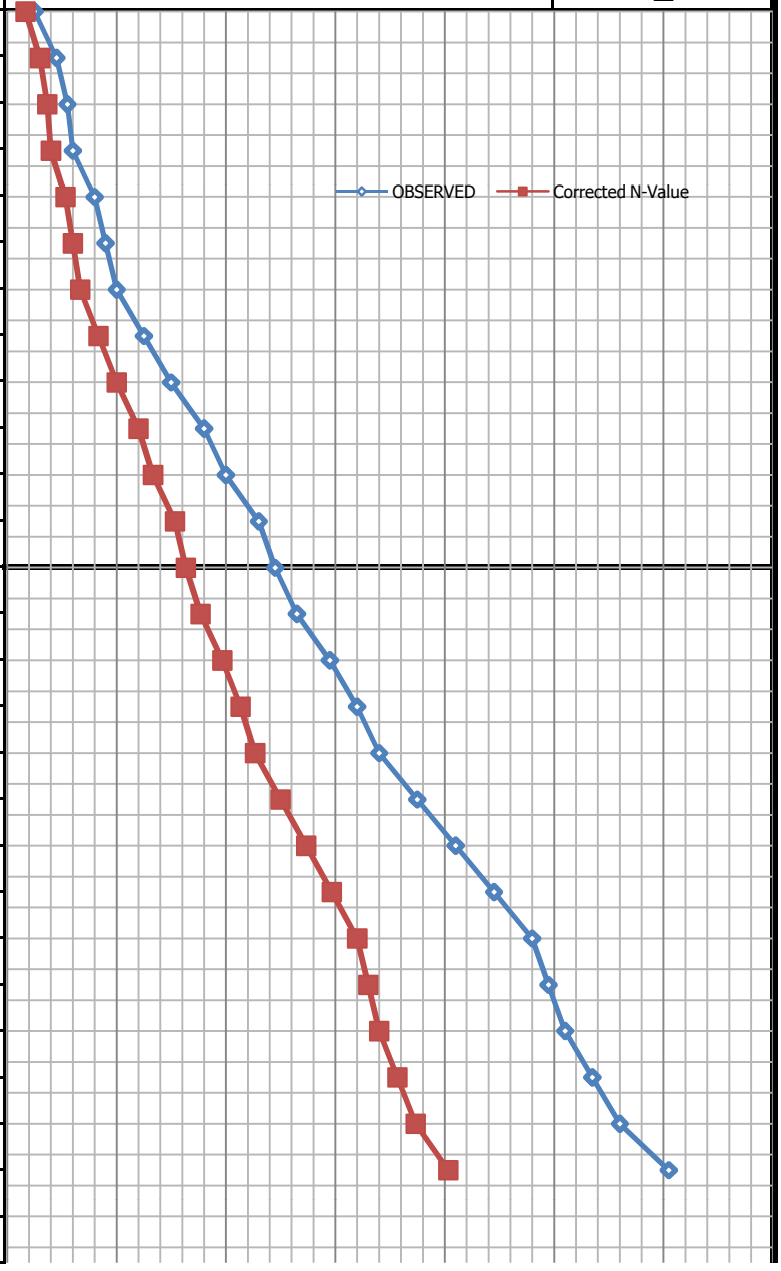
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**4**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	8.0 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	12.0	8.0		
3	**0.60**	15.0	10.0		
4	**0.90**	13.0	8.7		
5	**1.20**	18.0	12.0		
6	**1.50**	20.0	13.3		
7	**1.80**	22.0	14.7		
8	**2.10**	28.0	18.7		
9	**2.40**	32.0	21.3		
10	**2.70**	39.0	26.0		
11	**3.00**	44.0	29.3		
12	**3.30**	48.0	32.0		
13	**3.60**	56.0	37.3		
14	**3.90**	60.0	40.0		
15	**4.20**	65.0	43.3		
16	**4.50**	75.0	50.0		
17	**4.80**	79.0	52.7		
18	**5.10**	90.0	60.0		
19	**5.40**	91.0	60.7		
20	**5.70**	95.0	63.3		
21	**6.00**	100.0	66.7		
22	**6.30**	104.0	69.3		
23	**6.60**	112.0	74.7		
24	**6.90**	117.0	78.0		
25	**7.20**	123.0	82.0		
26	**7.50**	130.0	86.7		
27	**7.80**	135.0	90.0		
28	**8.00**	R	R		



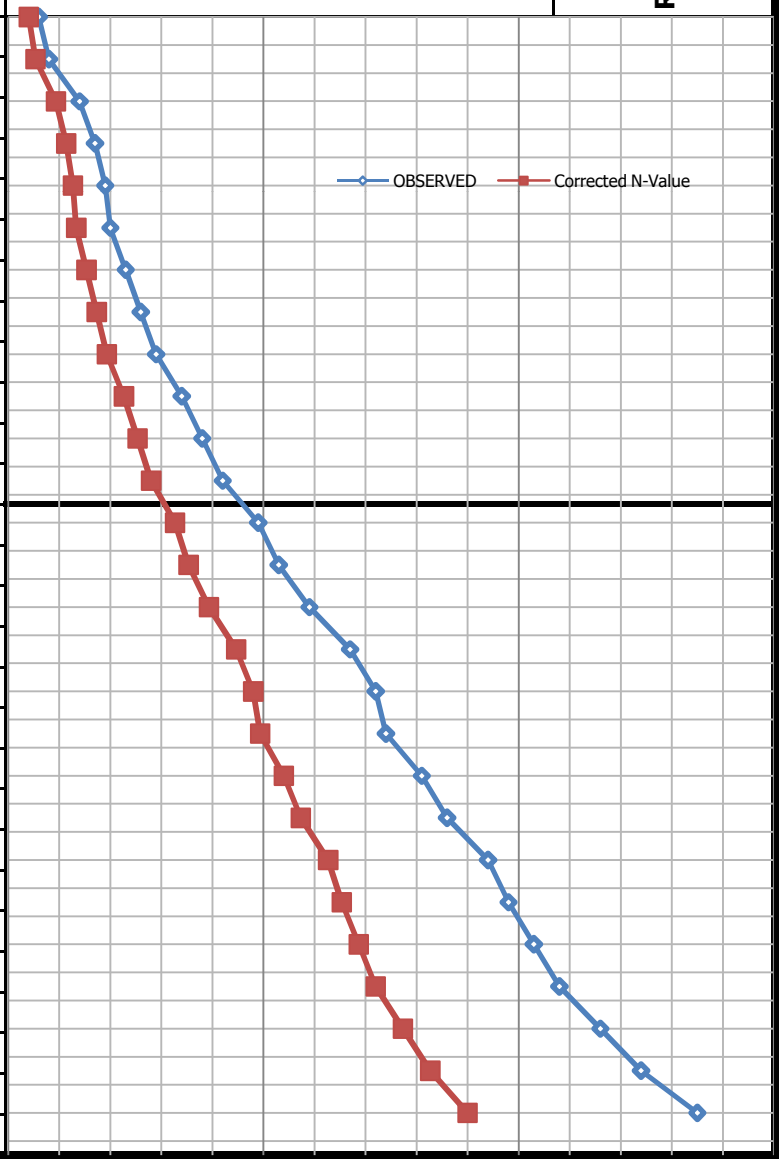
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**5**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.60 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	5.0	3.3		
2	**0.30**	9.0	6.0		
3	**0.60**	11.0	7.3		
4	**0.90**	12.0	8.0		
5	**1.20**	16.0	10.7		
6	**1.50**	18.0	12.0		
7	**1.80**	20.0	13.3		
8	**2.10**	25.0	16.7		
9	**2.40**	30.0	20.0		
10	**2.70**	36.0	24.0		
11	**3.00**	40.0	26.7		
12	**3.30**	46.0	30.7		
13	**3.60**	49.0	32.7		
14	**3.90**	53.0	35.3		
15	**4.20**	59.0	39.3		
16	**4.50**	64.0	42.7		
17	**4.80**	68.0	45.3		
18	**5.10**	75.0	50.0		
19	**5.40**	82.0	54.7		
20	**5.70**	89.0	59.3		
21	**6.00**	96.0	64.0		
22	**6.30**	99.0	66.0		
23	**6.60**	102.0	68.0		
24	**6.90**	107.0	71.3		
25	**7.20**	112.0	74.7		
26	**7.50**	121.0	80.7		
27	**7.60**	R	R		



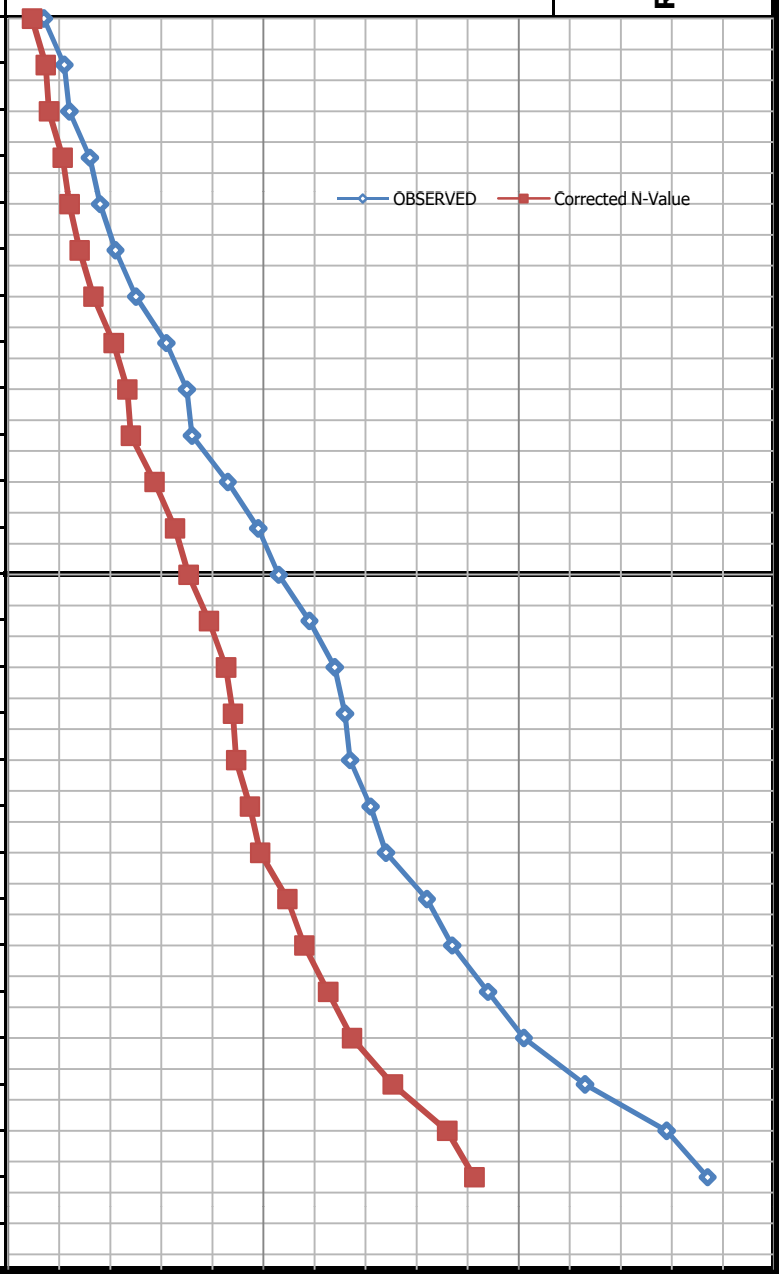
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**6**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.90 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	6.0	4.0		
2	**0.30**	8.0	5.3		
3	**0.60**	14.0	9.3		
4	**0.90**	17.0	11.3		
5	**1.20**	19.0	12.7		
6	**1.50**	20.0	13.3		
7	**1.80**	23.0	15.3		
8	**2.10**	26.0	17.3		
9	**2.40**	29.0	19.3		
10	**2.70**	34.0	22.7		
11	**3.00**	38.0	25.3		
12	**3.30**	42.0	28.0		
13	**3.60**	49.0	32.7		
14	**3.90**	53.0	35.3		
15	**4.20**	59.0	39.3		
16	**4.50**	67.0	44.7		
17	**4.80**	72.0	48.0		
18	**5.10**	74.0	49.3		
19	**5.40**	81.0	54.0		
20	**5.70**	86.0	57.3		
21	**6.00**	94.0	62.7		
22	**6.30**	98.0	65.3		
23	**6.60**	103.0	68.7		
24	**6.90**	108.0	72.0		
25	**7.20**	116.0	77.3		
26	**7.50**	124.0	82.7		
27	**7.80**	135.0	90.0		
28	**7.90**	R	R		



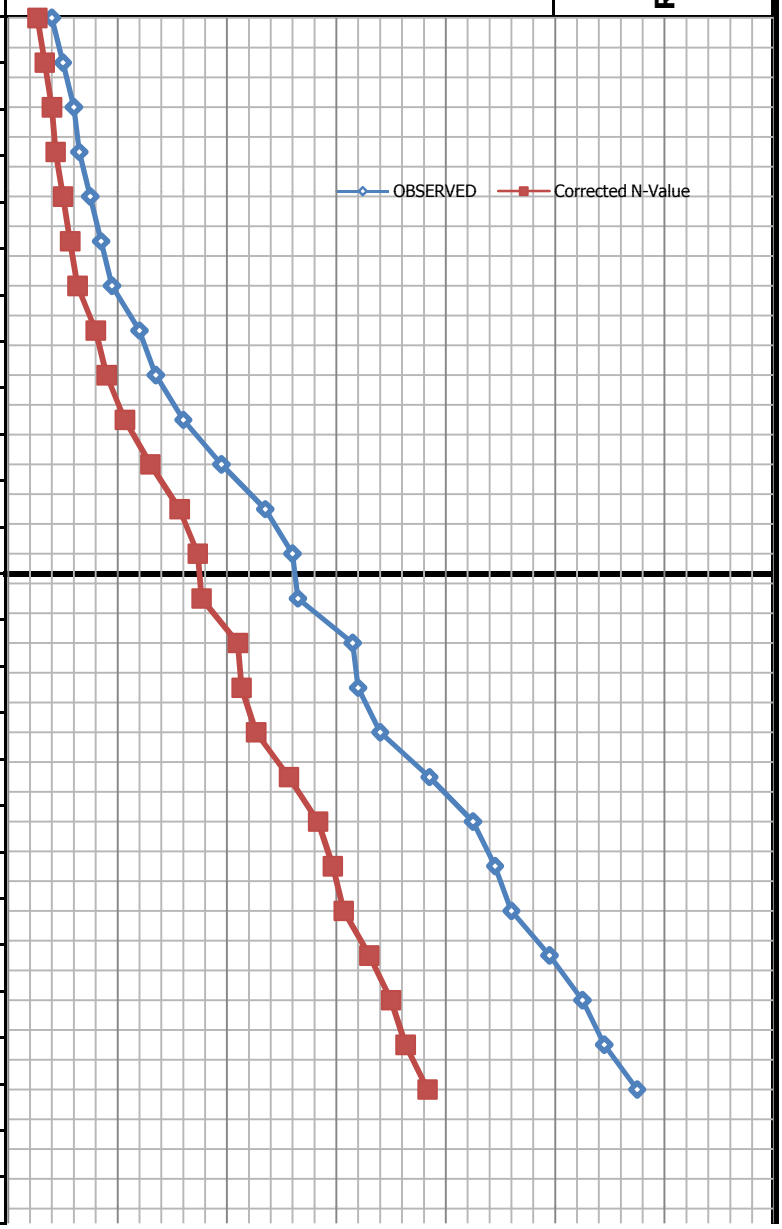
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**7**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.70 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	7.0	4.7		
2	**0.30**	11.0	7.3		
3	**0.60**	12.0	8.0		
4	**0.90**	16.0	10.7		
5	**1.20**	18.0	12.0		
6	**1.50**	21.0	14.0		
7	**1.80**	25.0	16.7		
8	**2.10**	31.0	20.7		
9	**2.40**	35.0	23.3		
10	**2.70**	36.0	24.0		
11	**3.00**	43.0	28.7		
12	**3.30**	49.0	32.7		
13	**3.60**	53.0	35.3		
14	**3.90**	59.0	39.3		
15	**4.20**	64.0	42.7		
16	**4.50**	66.0	44.0		
17	**4.80**	67.0	44.7		
18	**5.10**	71.0	47.3		
19	**5.40**	74.0	49.3		
20	**5.70**	82.0	54.7		
21	**6.00**	87.0	58.0		
22	**6.30**	94.0	62.7		
23	**6.60**	101.0	67.3		
24	**6.90**	113.0	75.3		
25	**7.20**	129.0	86.0		
26	**7.50**	137.0	91.3		
27	**7.70**	R	R		



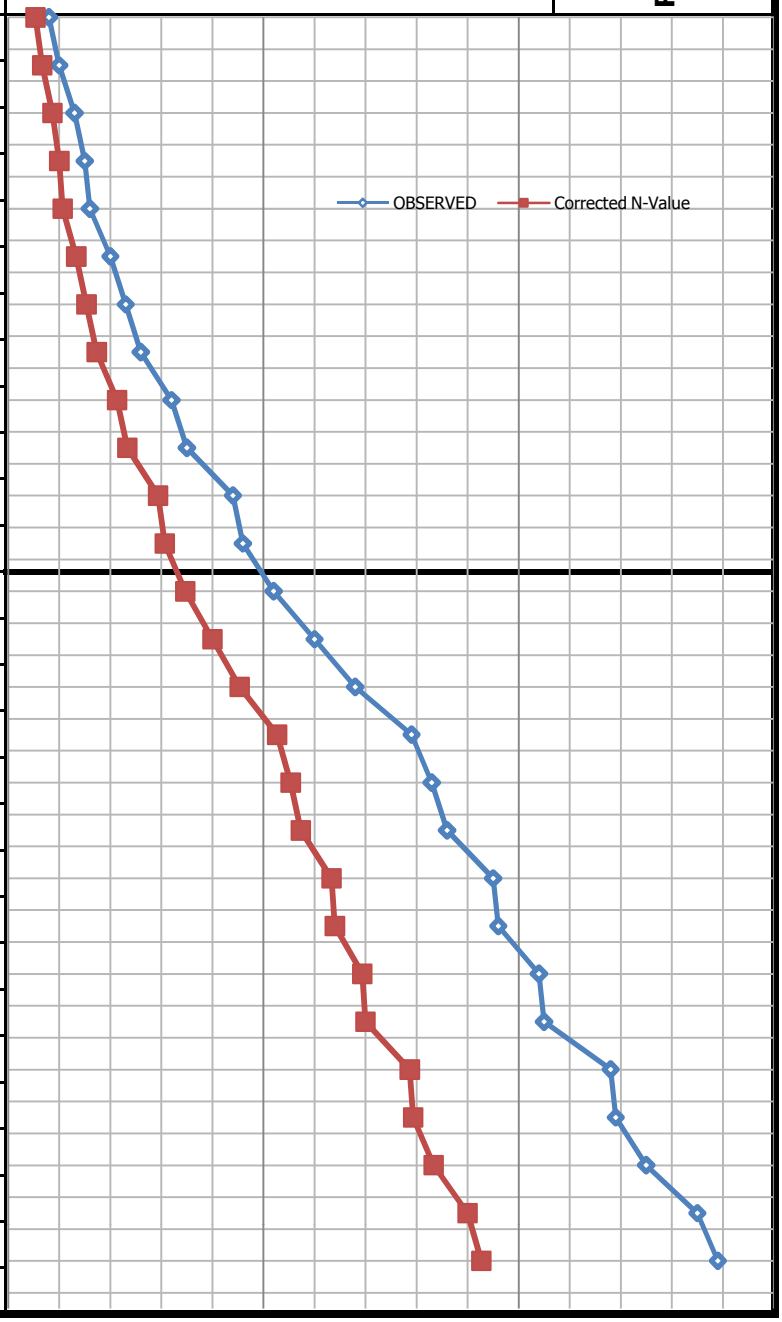
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**8**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.30 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	10.0	6.7		
3	**0.60**	12.0	8.0		
4	**0.90**	13.0	8.7		
5	**1.20**	15.0	10.0		
6	**1.50**	17.0	11.3		
7	**1.80**	19.0	12.7		
8	**2.10**	24.0	16.0		
9	**2.40**	27.0	18.0		
10	**2.70**	32.0	21.3		
11	**3.00**	39.0	26.0		
12	**3.30**	47.0	31.3		
13	**3.60**	52.0	34.7		
14	**3.90**	53.0	35.3		
15	**4.20**	63.0	42.0		
16	**4.50**	64.0	42.7		
17	**4.80**	68.0	45.3		
18	**5.10**	77.0	51.3		
19	**5.40**	85.0	56.7		
20	**5.70**	89.0	59.3		
21	**6.00**	92.0	61.3		
22	**6.30**	99.0	66.0		
23	**6.60**	105.0	70.0		
24	**6.90**	109.0	72.7		
25	**7.20**	115.0	76.7		
26	**7.30**	R	R		



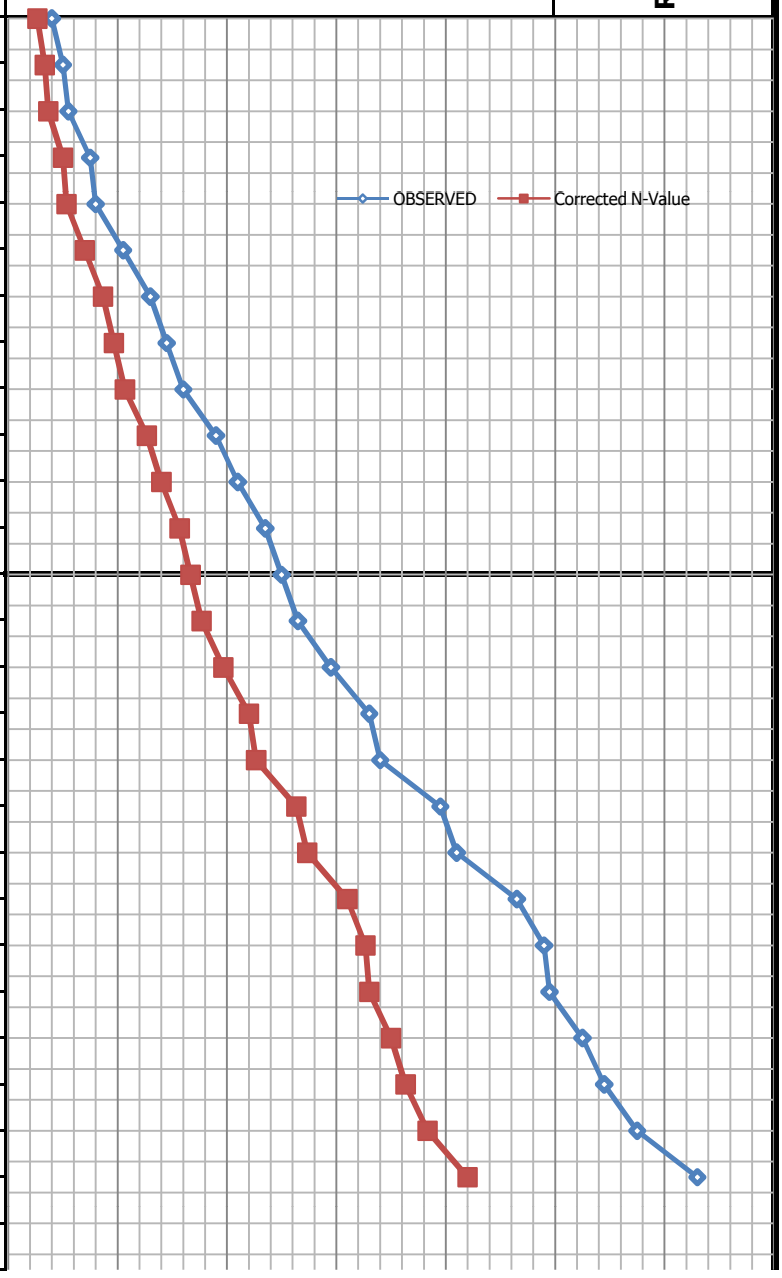
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**9**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	8.10 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	10.0	6.7		
3	**0.60**	13.0	8.7		
4	**0.90**	15.0	10.0		
5	**1.20**	16.0	10.7		
6	**1.50**	20.0	13.3		
7	**1.80**	23.0	15.3		
8	**2.10**	26.0	17.3		
9	**2.40**	32.0	21.3		
10	**2.70**	35.0	23.3		
11	**3.00**	44.0	29.3		
12	**3.30**	46.0	30.7		
13	**3.60**	52.0	34.7		
14	**3.90**	60.0	40.0		
15	**4.20**	68.0	45.3		
16	**4.50**	79.0	52.7		
17	**4.80**	83.0	55.3		
18	**5.10**	86.0	57.3		
19	**5.40**	95.0	63.3		
20	**5.70**	96.0	64.0		
21	**6.00**	104.0	69.3		
22	**6.30**	105.0	70.0		
23	**6.60**	118.0	78.7		
24	**6.90**	119.0	79.3		
25	**7.20**	125.0	83.3		
26	**7.50**	135.0	90.0		
27	**7.80**	139.0	92.7		
28	**8.10**	R	R		



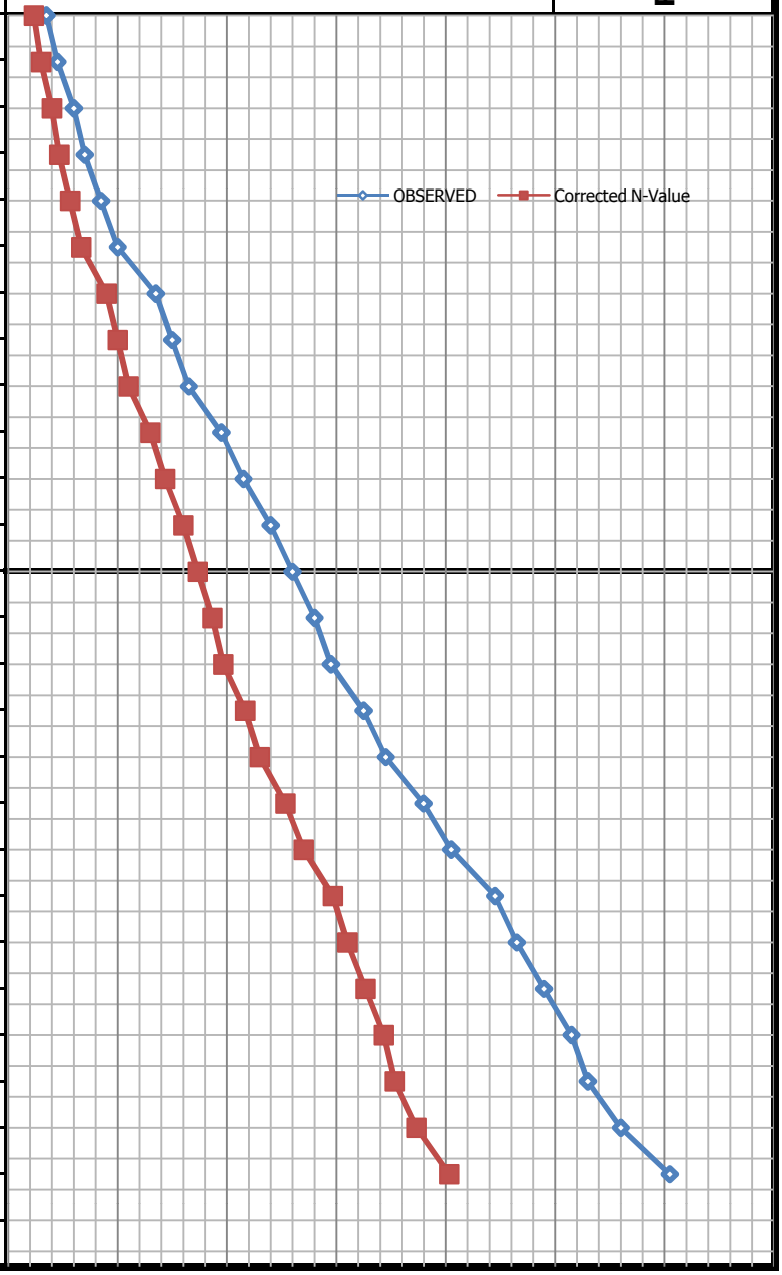
SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**10**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.60 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	10.0	6.7		
3	**0.60**	11.0	7.3		
4	**0.90**	15.0	10.0		
5	**1.20**	16.0	10.7		
6	**1.50**	21.0	14.0		
7	**1.80**	26.0	17.3		
8	**2.10**	29.0	19.3		
9	**2.40**	32.0	21.3		
10	**2.70**	38.0	25.3		
11	**3.00**	42.0	28.0		
12	**3.30**	47.0	31.3		
13	**3.60**	50.0	33.3		
14	**3.90**	53.0	35.3		
15	**4.20**	59.0	39.3		
16	**4.50**	66.0	44.0		
17	**4.80**	68.0	45.3		
18	**5.10**	79.0	52.7		
19	**5.40**	82.0	54.7		
20	**5.70**	93.0	62.0		
21	**6.00**	98.0	65.3		
22	**6.30**	99.0	66.0		
23	**6.60**	105.0	70.0		
24	**6.90**	109.0	72.7		
25	**7.20**	115.0	76.7		
26	**7.50**	126.0	84.0		
27	**7.60**	R	R		



SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**11**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	7.60 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	7.0	4.7		
2	**0.30**	9.0	6.0		
3	**0.60**	12.0	8.0		
4	**0.90**	14.0	9.3		
5	**1.20**	17.0	11.3		
6	**1.50**	20.0	13.3		
7	**1.80**	27.0	18.0		
8	**2.10**	30.0	20.0		
9	**2.40**	33.0	22.0		
10	**2.70**	39.0	26.0		
11	**3.00**	43.0	28.7		
12	**3.30**	48.0	32.0		
13	**3.60**	52.0	34.7		
14	**3.90**	56.0	37.3		
15	**4.20**	59.0	39.3		
16	**4.50**	65.0	43.3		
17	**4.80**	69.0	46.0		
18	**5.10**	76.0	50.7		
19	**5.40**	81.0	54.0		
20	**5.70**	89.0	59.3		
21	**6.00**	93.0	62.0		
22	**6.30**	98.0	65.3		
23	**6.60**	103.0	68.7		
24	**6.90**	106.0	70.7		
25	**7.20**	112.0	74.7		
26	**7.50**	121.0	80.7		
27	**7.60**	R	R		



SOIGNÉ ENGINEERING CONSULTANTS		Job No	Page No.
		GT-1764	
PROJECT :- Construction of AIIMS at Guntur, Andhra Pradesh		**DCPT NO.**	**12**
Client :- Deputy General Manager (Civil), HSCC (I) Ltd			
Location :	As per location map	**Starting Depth**	E.G.L.
		Termination Depth	8.10 m

S.No.	Depth from EGL (m)	Penetration Value		DCPT 'N' PROFILE	Remarks
		OBSERVED SPT N-VALUE	CORRECTED SPT N-VALUE	DCPT v/s SPT N-value Graph	
1	**0.00**	8.0	5.3		
2	**0.30**	11.0	7.3		
3	**0.60**	12.0	8.0		
4	**0.90**	16.0	10.7		
5	**1.20**	16.0	10.7		
6	**1.50**	19.0	12.7		
7	**1.80**	25.0	16.7		
8	**2.10**	29.0	19.3		
9	**2.40**	33.0	22.0		
10	**2.70**	36.0	24.0		
11	**3.00**	46.0	30.7		
12	**3.30**	49.0	32.7		
13	**3.60**	56.0	37.3		
14	**3.90**	59.0	39.3		
15	**4.20**	69.0	46.0		
16	**4.50**	82.0	54.7		
17	**4.80**	86.0	57.3		
18	**5.10**	89.0	59.3		
19	**5.40**	96.0	64.0		
20	**5.70**	101.0	67.3		
21	**6.00**	105.0	70.0		
22	**6.30**	109.0	72.7		
23	**6.60**	115.0	76.7		
24	**6.90**	120.0	80.0		
25	**7.20**	129.0	86.0		
26	**7.50**	136.0	90.7		
27	**7.80**	142.0	94.7		
28	**7.90**	R	R