FINAL REPORT

SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

JOB NO.: MK/15/04-2023
MONTH & YEAR : APRIL-2023

FORWARDED TO,

SURESH GOEL & ASSOCIATES.,
NEW DELHI.

M K SOIL TESTING LABORATORY PRIVATE LIMITED.

SURVEY NO. 4/4, BHARTI HOUSE,
NEAR CHANCHALBAUG PARTY PLOT,
OPPOSITE JHANVI BUNGALOWS, BODAKDEV,
AHMEDABAD – 380 054,
PHONE NO.: +91-79-2970-2174 / 75, 9624097903

CONTENTS

1.0 INTRODUCTION:

Suresh Goel & Associates., New Delhi. Proposes Soil Investigation work for construction of Hostel and Housing Building (1 Basement + Ground Floor + 11 Floor) at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

The purpose of the investigations was to determine the sub soil stratification, geotechnical information & safe bearing capacity, so as to provide information that will assist the structural engineers in the design of the foundations and the relevant works.

The Job was carried out Vide Your Work Order No.: MK/2023/2956 Dated 13.03.2023 under the guidance and supervision of the soil personnel of **M K Soil Testing Laboratory Private Limited** and client's engineer.

2.0 FIELD WORK:

2.1 Borehole

Four boreholes having 150mm diameter were drilled using rotary drilling method upto 25.0m/10.0m depth below existing ground level (EGL).

The locations of the boreholes were decided with due consideration of client /consultant of the project. The locations of the boreholes shown in location plan in drawing part of report.

Location Detail

Sr. No.	Test Location	Co-ordinates (m)		RL (m)	Termination depth below EGL (m)	Ground Water Table below EGL (m)
		Northing	Easting			
1	BH-1	2563930.68	262064.90	60.601	25.0	Not Met
2	BH-2	2563899.46	262092.86	64.263	25.0	Not Met
3	BH-3	2563991.31	262122.78	60.458	25.0	Not Met
4	BH-4	2564114.38	262124.74	64.024	10.0	Not Met

2.1.1 Disturbed Samples

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

2.1.2 Undisturbed Samples

Undisturbed soil samples are collected in 100 mm diameter thin walled samplers (Shelby tube). The sampler used for the sampling had smooth surface and appropriate area ratio and cutting-edge angle thereby minimizing disturbance during sampling.

2.1.3 Method of Sampling

Sampler is coupled together with a sampler head to form a sampling assembly. The sampler head provides a non-flexible connection between the sampling tube and the drill rods. Vent holes are provided in the sampler head to allow escape of water/air from the top of sampler tube during penetration. The sampling tubes are made free from dust and rust. Coating of oil is applied on both sides to obtain the undisturbed samples in best possible manner. The sampler is then lowered inside the bore hole on a string of rods and driven to a pre-determined level. The identification mark is then made on each sample.

2.2 Standard Penetration Test

The standard penetration tests are conducted in bore as per IS: 2131: 1981 (Reaffirmed 1987). The split spoon sampler resting on the bottom of bore hole is allowed to sink under its own weight, then the split spoon sampler is seated 15cm with the blows of hammer falling through 750mm. The driving assembly consists of a driving head and a 63.5 kg weight. It is ensured that the energy of the falling weight is not reduced by friction between the drive weight and the guides or between ropes. The rods to which the sampler is attached for driving are straight, tightly coupled and straight in alignment. Thereafter the split spoon sampler is further driven by 30cm. The number of blows required to drive each 15cm penetration is recorded. The first 15cm of drive considered as seating drive. The total blows required for the second and third 15cm penetration is termed as a penetration resistance - N value.

2.3 Electrical Resistivity Test:

Aim & Scope of Investigation:

The main objectives of the Resistivity Survey and Investigation are as under.

- To collect the basic data on sub-surface geological formation.
- To study the sub-surface resistivity vertically at various depths for designing of electrical earthing system.

Resistivity Survey:

Total 02 No. of Earth Resistivity test is conducted at pre mark locations in the plot area. In the geophysical resistivity survey Wenner configuration method is used. The main aim of the present survey is to know engineering properties of the formation and its resistivity at different depth.

In the Wenner four pin method, four electrodes are driven into the earth along a straight line at equal interval. Current 'I' is passed through the two outer electrodes and the voltage difference 'V' is observed between the two inner electrodes. The current 'I' flowing into the earth produces an electric proportional to its density and to the resistivity of the soil. The voltage 'V' measured between the inner electrodes is therefore, proportional to the field condition. Resistivity thus will be proportional to the ratio of the voltage to the current.

$$Pa = 2 \pi a \frac{V}{I} \text{ Ohm.m}$$

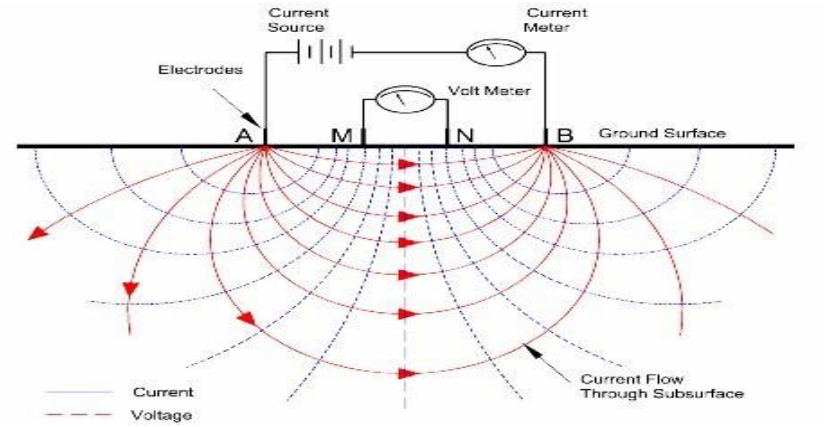
Where Pa = Apparent Resistivity of the formation / Soil (Ohm.m.)

a = Distance between two electrodes (m.)

V = Voltage (milli volt.)

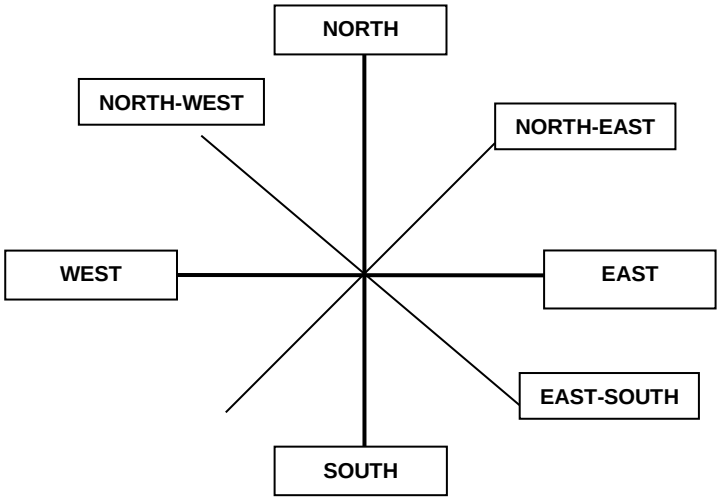
I = Current (milli Ampere.), (V/I = Measured Resistance in Ohm.)

RESISTIVITY SET UP.
ELECTRICAL CIRCUIT FOR RESISTIVITY SURVEY.



At the selected point in the eight direction i.e. North – South, East – West, North East-West South and East south-North west. Four electrodes are driven into the earth up to required depth along a straight line at equal intervals. The D.C. resistivity meter is placed in the steady and level base. The current and potential electrodes are connected to the instrument terminals. By passing current from the battery box, readings are taken and tabulated in the table.

SPREADING DIRECTION.



In the investigated area total 02 No of Earth Resistivity Test (E.R.T.) is conducted at each construction areas in the pre marked locations, in this way total 02 E.R.T. is conducted. The resistivity data of the sub-surface layers at different depth are calculated and tabulated in the Table no. 2.

3.0 LABORATORY TEST:

The laboratory tests on soil samples were started immediately after the receipt of the same in the laboratory. All laboratory tests are carried out as per the respective Indian Standards. The results of the laboratory tests were performed on various samples are presented in the form of Table No. 3 and drawing part end of report.

4.0 SOIL STRATIFICATIONS:

Field and laboratory test data reveal the borehole vise stratification as under:

Soil Stratification of borehole

BH No	Depth (m)	Stratification	Observed SPT value
BH-1	0.0-6.0	Yellowish brown non plastic gravelly silty sand (SM) with top layer of clayey sand with gravels (SC)	14-26
	6.0-8.5	Yellowish brown silty clay having medium plasticity (CI)	51
	8.5-22.0	Yellowish brown non plastic silty sand with gravels (SM/SP-SM) with pocket layer of clayey sand (SC)	54-Refusal
	22.0-25.0	Yellowish brown silty clay having medium plasticity (CI)	Refusal

Soil Stratification of borehole

BH No	Depth (m)	Stratification	Observed SPT value
BH-2	0.0-6.0	Yellowish brown clayey sand with gravels (SC) with top layer of non plastic silty sand (SM)	14-27
	6.0-8.5	Yellowish brown non plastic sandy silt (ML)	43
	11.5-23.5	Yellowish brown non plastic poorly graded silty sand with gravels (SP-SM)	Refusal
	23.5-25.0	Yellowish brown silty clay having medium plasticity (CI)	Refusal
BH-3	0.0-6.0	Yellowish brown clayey sand with gravels (SC) with top layer of non plastic silty sand (SM)	14-27
	6.0-8.5	Yellowish brown non plastic sandy silt (ML)	43
	8.5-11.5	Yellowish brown silty clay having medium plasticity (CI)	50-92
	11.5-23.5	Yellowish brown non plastic poorly graded silty sand with gravels (SP-SM)	Refusal
	23.5-25.0	Yellowish brown silty clay having medium plasticity (CI)	Refusal
BH-4	0.0-7.0	Yellowish brown non plastic gravelly silty sand (SM)	18-42
	7.0-9.0	Yellowish brown clayey sand with gravels (SC)	58
	9.0-10.0	Yellowish brown non plastic silty sand (SM)	66

5.0 GROUND WATER TABLE:

The Ground water table was not encountered in the boreholes upto 25.0m depth below EGL at the time of investigation (March - 2023)

6.0 TYPICAL CALCULATIONS FOR SAFE BEARING CAPACITY:

6.1 Assumption / Data: (BH-1 to BH-3)

i. Type of foundation considered : Raft

ii. Total Permissible settlement : 75mm for Foundation (Ref.: IS: 1904-1986)

iii. Depth of foundation below EGL : 7.0m

iv. Depth of foundation below Basement : 1.50m

v. Size of foundation : 6.00m x 6.00m

vi. Water Table : Not met with

6.1.2 Bearing Pressure Based on C & ϕ Values: - (Shear Criterion)

For computing bearing capacity at 7.0m depth below EGL following parameters are adopted.

Cu = 0.225 kg/cm^2

∅ = 25.0• (Considering general shear failure)

The ultimate net bearing capacity for square foundation for general shear failure is given by equation,

Qnd = C Nc Sc dc ic + q (Nq-1) sq dq iq + 0.5 B γ Nr Sr dr ir

Where ,

Qnd = Net ultimate bearing capacity of foundation

C = Cohesion = 0.2255 kg/cm^2

D = Effective Depth of foundation = 150 cm

B = Width of foundation = 600 cm

q = Effective surcharge at base level of foundation

Sc, Sq, Sr are shape factor for square footing.

Sc = 1.30, Sq = 1.20, Sr = 0.8

dc, dq, dr, are depth factors,

(Assuming that overburden soil is not compacted properly)

dc = 1.0, dq = 1.0, dr = 1.0

ic, iq, ir are inclination factors.

ic = iq = ir = 1.0 (Since load is vertical)

Adopting Nc, Nq, Nr factors as per IS: 6403 as below:

For ∅ = 25.0• and general shear failure

Nc = 20.72, Nq = 10.66, Nr = 10.88

Qnd = [0.225 x 20.72 x 1.3 x 1.0 x 1.0] +
[0.2625 x (10.66 - 1) x 1.2 x 1.0 x 1.0] +
[0.5 x 600 x 0.00175 x 10.88 x 0.8 x 1.0 x 1.0]

= 13.7 kg/cm^2

Where,

Qnd is net ultimate bearing capacity,

Adopting factor of safety as 2.5

$$qs = \frac{Qnd}{FS} = \frac{13.7}{2.5}$$

= 5.479 kg/cm^2

= 54.8 t/m^2

6.2 Safe Bearing Pressure Based on Settlement Criterion:

Pressure bulb shall be taken as,

1.5 x B = 1.5 x 6.0 = 9.0m below foundation level,

Assuming pressure distribution as 2(vertical) : 1(Horizontal)
Now,

Considering Clay as Over consolidated (As SPT value in pressure bulb >30)

For Over Consolidated Clays / Hard Clays,

$$Sc = \sum m_v.H.\delta p$$

Where, H = thickness of soil layer (m) = 1.5m (compressible layer from 7.0m to 8.50m)

mv = Coefficient of Volume Change

δp = Increase in pressure at middle cohesive soil layer = 0.98 x P (As per Fig 18)

Coefficient of Volume Change (mv) may be determined by empirical correlations given below:

mv = 1 / (50 x N) (m^2/T).

(Ref.: Foundation design and Construction by M.J. Tomlinson – 5th Edition Fig. 1.11)

For N = 51

mv = 0.00039 m^2/T

For P = 63 t/m^2

Sc = 0.00039 x 1.5 x 0.98 x 63

= 0.0363m

= 3.63 cm

Immediate Settlement,

$$Si = \frac{q \times B' \times (1-\mu^2) \times I}{Es}$$

Where

μ = 0.35

I = 0.38 x 4 = 1.52 (As per IS: 8009 (Part I) fig 11)

As per Ref.: Foundation analysis and design by Joseph E. Bowles (table: 2.8 & 5.6))

Es1 = 500 x Cu = 225 kg/cm^2 (7.0m to 8.5m depth cu = 0.45 kg/cm^2)

Es2 = 500 x (N + 15) x 0.102 = 433.5 kg/cm^2 (below 8.5m depth for N = 70)

Weighted average

Es = ((225 x (8.5-7.0) + 433.5 x (16.0-8.5))/(16.0-7.0)

= 398.75 kg/cm^2

$$Si = \frac{6.3 \times 600/2 \times (1 - 0.35^2) \times 1.52}{398.75}$$

= 6.32 cm

Total settlement = Sc + Si

= 9.95 cm

For L/B = 1.0 and D/√LB = 0.25, depth factor Df = 0.94

Appling depth factor and Rigidity factor =0.8

Corrected settlement = 9.95 x 0.94 x 0.8

= 7.48 cm

= 74.8 mm

Hence bearing pressure = 63 t/m^2 for permissible settlement of 75mm.

Hence recommended net SBC is 50 t/m^2

7.0 SUMMARY:

Summary of Allowable Bearing Capacity (BH-1 to BH-3)

Type & Size of Foundation	Depth Below EGL (m)	Depth Below Basement (m)	NET SAFE BEARING CAPACITY (t/m^2)		Recommended Net Safe Bearing Capacity (t/m^2) (For permissible settlement of 50mm)
			Shear Criterion C & ϕ Value	Settlement Criterion (For permissible settlement of 50mm)	
Square Foundation 3.00m x 3.00m	7.0	1.50	46	>55	40
	8.0	2.50	76	>55	45
Square Foundation 4.00m x 4.00m	7.0	1.50	49	55	40
	8.0	2.50	85	>55	45
Rectangular Foundation 3.00m x 6.00m	7.0	1.50	41	>55	40
	8.0	2.50	72	>55	45
				For permissible settlement of: 75mm	For permissible settlement of: 75mm
Raft 6.0m x 6.0m	7.0	1.50	54.5	63	40
	8.0	2.50	>60	90	45
Raft 10.0m x 10.0m	7.0	1.50	>60	43	40
	8.0	2.50	>60	55	45

Note: Depth and size mentioned in the above table is guideline for design of foundation, the foundation may be laid at depth as per structural stability requirement.

Since the Water Table is not encountered upto 25.0m depth below EGL in the borehole during investigation, its effect is not considered in SBC calculations. SBC based on data obtain at specific location as mention in borelog, during execution the strata found at the site should be verified by a competent Engineer.

Considering subsoil strata and presumptive value in standard reference book reduce value of SBC is recommended.

Summary of Allowable Bearing capacity (BH-4)

Type & Size of Footing	Depth Below EGL (m)	NET SAFE BEARING CAPACITY (t/m^2)		Recommended Net Safe Bearing Capacity (t/m^2) (For permissible settlement of 50mm)
		Shear Criterion C & ϕ Value	Settlement Criterion	
Square footing 1.50m x 1.50m	1.5	27	63	25
	2.0	33	63	30
	2.5	39.5	63	30
Square footing 2.00m x 2.00m	1.5	29.5	56.5	25
	2.0	36	56.5	30
	2.5	42	56.5	30
Square footing 2.50m x 2.50m	1.5	32.5	52	25
	2.0	38	52	30
	2.5	45	52	30
Rectangular footing 1.50m x 3.00m	1.5	25.5	63	25
	2.0	31	63	30
	2.5	37	63	30
1.50m wide strip footing	1.5	26	63	25
	2.0	31	63	30
	2.5	36.5	63	30

Note: Depth and size mentioned in the above table is guideline for design of foundation, the foundation may be laid at depth as per structural stability requirement.

Since the Water Table is not encountered upto 10.0m depth below EGL in the borehole during investigation, its effect is not considered in SBC calculations. SBC based on data obtain at specific location as mention in borelog, during execution the strata found at the site should be verified by a competent Engineer.

Considering subsoil strata and presumptive value in standard reference book reduce value of SBC is recommended.

8.0 CONCLUSIONS & RECOMMENDATIONS:

(8.1) The site for construction of Hostel and Housing Building (1 Basement + Ground Floor + 11 Floor) at Gift City Gandhinagar is observed to be consist of silty sand or clayey sand with layer of silty clay having medium plasticity upto termination below EGL.

(8.2) The Ground water table was not encountered in the boreholes upto 25.0m depth below EGL at the time of investigation (March - 2023)

(8.3) The net safe bearing capacity of different size of foundation at 7.0m to 8.0m depth below EGL (Considering basement height of 5.5m) at BH-1 to BH-3 location is recommended in para 7 with permissible settlement of 50mm for isolated foundation and 75mm for Raft in natural condition of soil.

(8.4) The net safe bearing capacity of different size of foundation at 1.5m to 2.5m depth below EGL at BH-4 location is recommended in para 7 with permissible settlement of 50mm for isolated foundation in natural condition of soil.

(8.5) During deep excavation care shall be taken for protection of the foundation of surrounding structures situated/placed above the excavation level and also the person working in excavation pit. The side slope shall be protected from caving in by proving shoring and strutting strong enough to resist the lateral earth pressure due to soil and surcharge created due to existing foundation of surrounding structure. Alternatively soil nailing system shall be designed and provided such that it is sufficient to resist lateral pressure due to earth and surcharge load due to foundation of existing structure.

(8.6) The soil is having non to low swelling properties hence it is suitable to use for back/plinth filling purpose with proper compaction.

(8.7) The results of the laboratory tests are incorporated in the form of table at the later part of the report.

For, M K SOIL TESTING LABORATORY PRIVATE LIMITED

Site Incharge	**Lab Incharge**	**Approved By**
(Rounak Jain)	(Drashti Sheth)	(Parag Dave)

Table No. 1/1

Observed & Corrected N-Values

Bore Hole No.	Depth (m)	Nos. of blow to drive sampler for penetration of 0–150 (mm)	150-300 (mm)	300-450 (mm)	N-Value for last 300 (mm)	Effective OBP Po (t/m^2)	Correction Factor C_N	Corrected N-value OBP
BH-1	1.5	4	6	8	14	2.63	1.45	20
	4.0	10	12	14	26	7.00	1.12	29
	6.0	20	22	29	51	-	-	51
	8.5	20	24	30	54	14.88	0.87	47
	11.5	22	24	36	60	20.13	0.77	46
	14.5	36	50(10cm)	-	Refusal	-	-	Refusal
	16.0	40	50(12cm)	-	Refusal	-	-	Refusal
	17.5	46	50(10cm)	-	Refusal	-	-	Refusal
	19.0	48	50(9cm)	-	Refusal	-	-	Refusal
	20.5	39	50(6cm)	-	Refusal	-	-	Refusal
	22.0	39	50(8cm)	-	Refusal	-	-	Refusal
	23.5	42	50(7cm)	-	Refusal	-	-	Refusal
	25.0	50(8cm)	-	-	Refusal	-	-	Refusal
BH-2	1.5	3	5	9	14	-	-	14
	4.0	9	10	12	22	7.00	1.12	25
	6.0	10	12	15	27	10.50	0.99	27
	8.5	17	20	22	42	-	-	42
	11.5	36	50(14cm)	-	Refusal	-	-	Refusal
	13.0	39	50(10cm)	-	Refusal	-	-	Refusal
	14.5	50(14cm)	-	-	Refusal	-	-	Refusal
	16.0	50(13cm)	-	-	Refusal	-	-	Refusal
	17.5	50(11cm)	-	-	Refusal	-	-	Refusal
	19.0	50(9cm)	-	-	Refusal	-	-	Refusal
	20.5	42	50(8cm)	-	Refusal	-	-	Refusal
	23.5	50(10cm)	-	-	Refusal	-	-	Refusal
	25.0	50(8cm)	-	-	Refusal	-	-	Refusal

Table No. 1/2

Observed & Corrected N-Values

Bore Hole No.	Depth (m)	Nos. of blow to drive sampler for penetration of 0–150 (mm)	150-300 (mm)	300-450 (mm)	N-Value for last 300 (mm)	Effective OBP Po (t/m^2)	Correction Factor C_N	Corrected N-value OBP
BH-3	1.5	4	6	8	14	-	-	14
	4.0	10	12	15	27	-	-	27
	6.0	18	20	23	43	10.50	0.99	42
	8.5	19	22	28	50	-	-	50
	10.0	30	44	48	92	-	-	92
	11.5	26	50(10cm)	-	Refusal	-	-	Refusal
	13.0	30	50(8cm)	-	Refusal	-	-	Refusal
	14.5	37	50(11cm)	-	Refusal	-	-	Refusal
	16.0	42	50(7cm)	-	Refusal	-	-	Refusal
	17.5	46	50(6cm)	-	Refusal	-	-	Refusal
	19.0	50(8cm)	-	-	Refusal	-	-	Refusal
	20.5	50(13cm)	-	-	Refusal	-	-	Refusal
	22.0	50(7cm)	-	-	Refusal	-	-	Refusal
	23.5	38	50(9cm)	-	Refusal	-	-	Refusal
	25.0	40	50(6cm)	-	Refusal	-	-	Refusal
BH-4	1.5	4	8	10	18	2.63	1.45	26
	4.0	10	12	15	27	7.00	1.12	30
	6.0	15	20	22	42	10.50	0.99	41
	8.5	20	28	30	58	-	-	58
	10.0	26	30	36	66	17.50	0.81	54

OBP: Over burden pressure,
Correction is not applied to cohesive soil

Table No. 2/1
Electrical Resistivity Test

APPARENT RESISTIVITY OF ALL DIRECTION.							
WENNER FOUR PIN METHOD.							
ERT – 1		LOCATION: Near BH-2					
VILLAGE: GIFT CITY		APPARENT RESISTIVITY (Ohm.m.)					
Sr.No.	a (m.)	K=2.π.a	NORTH SOUTH	EAST WEST	North East West South	East south North west	Average Resistivity (Ohm.m.)
1	1	6.28	42.7672	42.6850	36.9242	36.9235	39.825
2	2	12.56	47.9607	47.0360	42.9167	42.8014	45.179
3	3	18.84	49.3871	49.2777	47.7973	45.8115	48.068
4	4	25.12	52.3939	52.0110	47.9081	45.8305	49.536
5	5	31.40	48.0609	48.0645	49.1638	48.4791	48.442
6	6	37.68	43.2770	43.1840	44.1829	43.7328	43.594
7	7	43.96	41.6140	41.6334	40.7916	40.7082	41.187
8	8	50.24	39.3245	39.1752	43.4646	43.2671	41.308
9	9	56.52	39.7704	39.8883	45.6313	45.4531	42.686
10	10	62.80	44.5906	44.0585	43.3075	43.1602	43.779

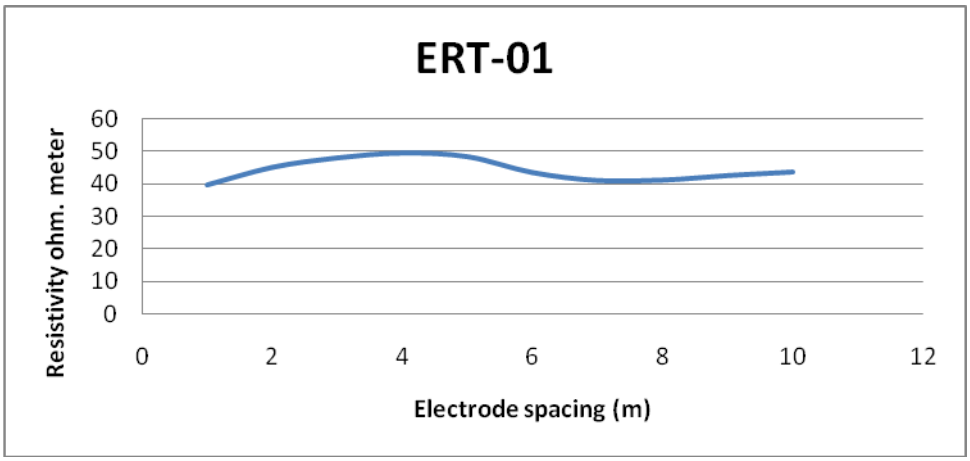
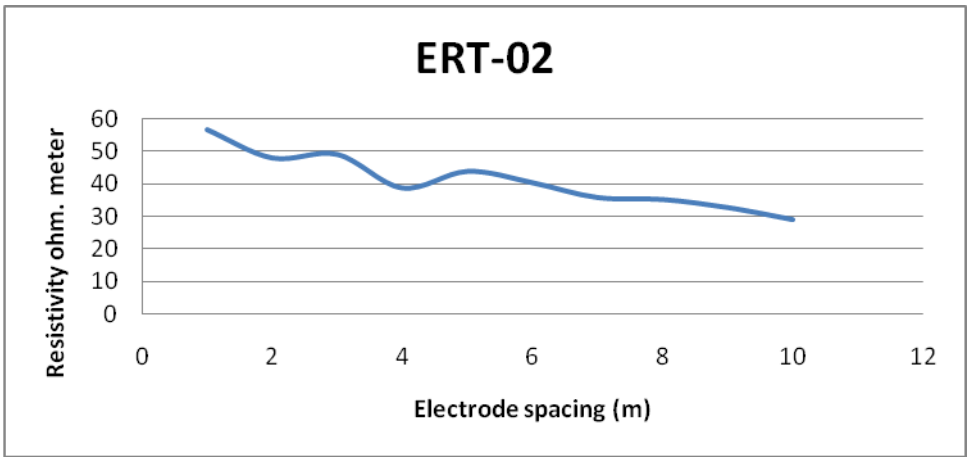


Table No. 2/2
Electrical Resistivity Test

APPARENT RESISTIVITY OF ALL DIRECTION.							
WENNER FOUR PIN METHOD.							
ERT – 2		LOCATION: Near BH-3					
VILLAGE: GIFT CITY		APPARENT RESISTIVITY (Ohm.m.)					
Sr.No.	a (m.)	K=2.π.a	NORTH SOUTH	EAST WEST	North East West South	East south North west	Average Resistivity (Ohm.m.)
1	1	6.28	49.0796	49.0311	64.6823	64.7050	56.875
2	2	12.56	50.9318	50.9944	38.4316	52.1172	48.119
3	3	18.84	52.8041	57.8161	43.1736	43.0948	49.222
4	4	25.12	37.8616	37.7800	39.5971	39.8919	38.783
5	5	31.40	49.0347	48.9453	38.8967	38.9277	43.951
6	6	37.68	38.6112	38.5099	42.3536	42.2169	40.423
7	7	43.96	35.5845	35.3150	36.0450	36.3224	35.817
8	8	50.24	34.7313	34.5332	35.5482	36.0482	35.215
9	9	56.52	32.2747	32.1292	33.9598	32.4883	32.713
10	10	62.80	29.2040	29.0974	28.7842	28.7539	28.960



JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/1 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 1

Project: Soil Investigation work for construction of Hostel Building at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

W.T. below G.L. (m): Not Met With
Termination depth (m): 25.0

Name of Customer: Suresh Goel & Associates., New Delhi.

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)										
								COARSE	MED.	FINE														
0.00	DS	-	-	-	-	-	7	5	12	28	48	29	14	15	SC	-	-	-	-	-	10	-	-
1.50	SPT	14	-	-	-	-	13	9	32	33	13	-	-	NP	SM	-	-	-	-	-	-	-	-
3.00	UDS	-	-	1.72	1.62	6	16	11	22	33	18	-	-	NP	SM	DUU	0.0	30.5	-	-	-	-	-
4.00	SPT	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.00	UDS	-	-	1.72	1.66	3.8	22	9	6	26	37	-	-	NP	SM	DUU	0.0	31	-	-	-	-	-
6.00	SPT	51	2.64	-	-	-	14	6	5	12	63 H(49)(14)	38	18	20	CI	-	-	-	-	10.8	25	-	-
7.00	UDS	-	-	1.89	1.72	10	18	8	4	9	61	37	17	20	CI	TUU	0.45	18	0.065	-	-	-	-
8.50	SPT	54	-	-	-	-	3	2	3	48	44	-	-	NP	SM	-	-	-	-	-	-	-	-
10.0	UDS	-	2.65	1.87	1.76	6.2	20	8	2	22	48	-	-	NP	SM	DUU	0.0	32.0	-	-	-	-	-
11.5	SPT	60	-	-	-	-	4	4	4	45	43	-	-	NP	SM	-	-	-	-	-	-	-	-
13.0	UDS	-	2.66	1.95	1.81	8	19	10	2	21	48	32	15	17	SC	DUU	0.20	28	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/1 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 1

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)										
								COARSE	MED.	FINE														
14.5	SPT	REF	-	-	-	-	0	1	48	43	8	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
16.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.5	SPT	REF	-	-	-	-	0	3	46	44	7	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
19.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.5	SPT	REF	-	-	-	-	0	2	47	44	7	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
22.0	SPT	REF	-	-	-	-	3	2	4	28	63	40	20	20	CI	-	-	-	-	-	-	-	-	-
23.5	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.0	SPT	REF	-	-	-	-	0	0	2	30	68	37	19	18	CI	-	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/2 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 2

Project: Soil Investigation work for construction of Hostel Building at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

W.T. below G.L. (m): Not Met With
Termination depth (m): 25.0

Name of Customer: Suresh Goel & Associates., New Delhi.

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2))	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5))			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)									
								COARSE	MED.	FINE													
0.00	DS	-	2.66	-	-	-	10	6	12	30	42 H(27)(15)	41	22	19	SC	-	-	-	-	10.2	30	-	-
1.50	SPT	14	-	-	-	-	20	13	14	26	27	28	15	13	SC	-	-	-	-	-	10	-	-
3.00	UDS	-	2.63	1.68	1.65	3	10	8	19	30	33	27	13	14	SC	DUU	0.08	25	-	-	-	-	-
4.00	SPT	22	-	-	-	-	13	7	8	43	29	-	-	NP	SM	-	-	-	-	-	-	-	-
5.00	UDS	-	-	1.75	1.68	4.1	14	6	7	45	28	-	-	NP	SM	DUU	0.0	31.0	-	-	-	-	-
6.00	SPT	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.00	UDS	-	2.64	1.88	1.73	8.7	10	5	7	40	38	29	-	NP	SM	DUU	0.0	31.5	-	-	-	-	-
8.50	SPT	42	-	-	-	-	11	7	5	42	35	31	16	15	SC	-	-	-	-	-	-	-	-
10.0	UDS	-	-	1.9	1.77	7.2	6	4	8	43	39	27	-	NP	SM	DUU	0	32.0	-	-	-	-	-
11.5	SPT	REF	-	-	-	-	0	1	30	62	7	-	-	NP	SP-SM	-	-	-	-	-	-	-	-
13.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/2 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 2

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)										
								COARSE	MED.	FINE														
14.5	SPT	REF	2.62	-	-	-	0	2	28	64	6	-	-	NP	SP-SM	-	-	-	-	-	-	-	-
16.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.5	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.0	SPT	REF	-	-	-	-	0	1	29	63	7	-	-	NP	SP-SM	-	-	-	-	-	-	-	-
20.5	SPT	REF	-	-	-	-	7	5	4	18	66	40	16	24	CI	-	-	-	-	-	-	-	-
22.0	UDS	-	2.67	2.04	1.76	15.7	4	3	6	18	69	40	14	26	CI	TUU	1.75	12	-	-	-	-	-
23.5	SPT	REF	-	-	-	-	10	6	6	20	58	46	18	28	CI	-	-	-	-	-	-	-	-
25.0	SPT	REF	-	-	-	-	0	14	46	35	5	-	-	NP	SP-SM	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/3 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 3

Project: Soil Investigation work for construction of Housing Building at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

W.T. below G.L. (m): Not Met With
Termination depth (m): 25.0

Name of Customer: Suresh Goel & Associates., New Delhi.

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)										
								COARSE	MED.	FINE														
0.00	DS	-	-	-	-	-	9	4	12	60	15	-	-	NP	SM	-	-	-	-	-	-	-	-
1.50	SPT	14	-	-	-	-	2	2	5	52	39	29	14	15	SC	-	-	-	-	-	10	-	-
3.00	UDS	-	2.64	1.75	1.65	6.2	24	10	8	30	28 H(20)(8)	28	14	14	SC	DUU	0.10	26	0.058	-	-	-	-
4.00	SPT	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.00	UDS	-	-	1.89	1.71	10.6	17	7	8	34	34	27	14	13	SC	DUU	0.18	25	-	-	-	-	-
6.00	SPT	43	-	-	-	-	2	2	8	31	57	-	-	NP	ML	-	-	-	-	-	-	-	-
7.00	UDS	-	2.63	1.9	1.76	7.8	2	2	7	30	59	-	-	NP	ML	DUU	0	32	-	-	-	-	-
8.50	SPT	50	2.65	-	-	-	6	4	6	17	67 H(52)(15)	40	16	24	CI	-	-	-	-	-	-	-	-
10.0	SPT	92	-	-	-	-	8	8	7	15	62	41	19	22	CI	-	-	-	-	-	-	-	-
11.5	SPT	REF	-	-	-	-	0	1	35	54	10	-	-	NP	SP-SM	-	-	-	-	-	-	-	-
13.0	SPT	REF	-	-	-	-	0	1	35	54	10	-	-	NP	SP-SM	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/3 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 3

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)										
								COARSE	MED.	FINE														
14.5	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.5	SPT	REF	-	-	-	-	0	3	35	55	7	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
19.0	SPT	REF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.5	SPT	REF	-	-	-	-	0	2	17	71	10	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
22.0	SPT	REF	-	-	-	-	0	3	15	73	9	-	-	NP	SP-SM	-	-	-	-	-	-	-	-	-
23.5	SPT	REF	-	-	-	-	5	4	4	28	59	38	16	22	CI	-	-	-	-	-	-	-	-	-
25.0	SPT	REF	-	-	-	-	4	2	3	31	60	38	17	21	CI	-	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3/4 SOIL CHARACTERISTICS FOR BOREHOLE NO.: – BH – 4

Project: Soil Investigation work for construction of Director's Residence at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

W.T. below G.L. (m): Not Met With
Termination depth (m): 10.0

Name of Customer: Suresh Goel & Associates., New Delhi.

DEPTH (m)	SAMPLE TYPE	SPT – N Value	SPECIFIC GRAVITY (IS: 2720(P:3-1/2)	INSITU BULK UNIT WT (gm/cm³)	INSITU DRY UNIT WEIGHT (gm/cm³) (IS: 2720(P:29)	INSITU WATER CONTENT (%) (IS: 2720(P:2)	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	TYPE OF SHEAR TEST (IS: 2720(P/11/13)	COHESION C, kg/cm²	ANGLE OF INT. FRICTION, Φ (°)	COMPRESSION INDEX, Cc (IS: 2720(P:15)	SHRINKAGE LIMIT(%) (IS: 2720(P:6)	FREE SWELL INDEX (%) (IS: 2720(P:40)	SWELLING PRESSURE (kg/cm²) (IS: 2720(P:41)	UNCONFINED COMPRESSIVE STRENGTH (kg/cm²) (IS: 2720(P:10)
							GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)									
								COARSE	MED.	FINE													
0.00	DS	-	-	-	-	-	13	7	8	50	22	-	-	NP	SM	-	-	-	-	-	-	-	-
1.50	SPT	18	-	-	-	-	16	6	7	48	23	-	-	NP	SM	-	-	-	-	-	-	-	-
3.00	UDS	-	2.63	1.72	1.65	4.5	14	7	4	54	21	-	-	NP	SM	DUU	0.0	30.5	-	-	-	-	-
4.00	SPT	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.00	UDS	-	-	1.8	1.70	6	20	9	4	48	19	-	-	NP	SM	DUU	0.0	31.5	-	-	-	-	-
6.00	SPT	42	-	-	-	-	18	10	5	46	21	-	-	NP	SM	-	-	-	-	-	-	-	-
7.00	UDS	-	2.62	1.95	1.83	6.5	9	5	8	36	42 H(32)(10)	30	15	15	SC	DUU	0.20	27	-	-	-	-	-
8.50	SPT	58	-	-	-	-	5	3	5	40	47	29	14	15	SC	-	-	-	-	-	-	-	-
10.0	SPT	66	-	-	-	-	2	2	10	42	44	-	-	NP	SM	-	-	-	-	-	-	-	-

JOB NO.: MK/15/04-23 M K Soil Testing Laboratory Private Limited., New Delhi - 380054

Table No: 3 SOIL CHARACTERISTICS FOR CBR

Project: Soil Investigation work for construction of Hostel and Housing Building (1 Basement + Ground Floor + 11 Floor) at Gujarat Biotechnology University, Nr. GIFT city. Tal & Dist.: Gandhinagar. State: Gujarat.

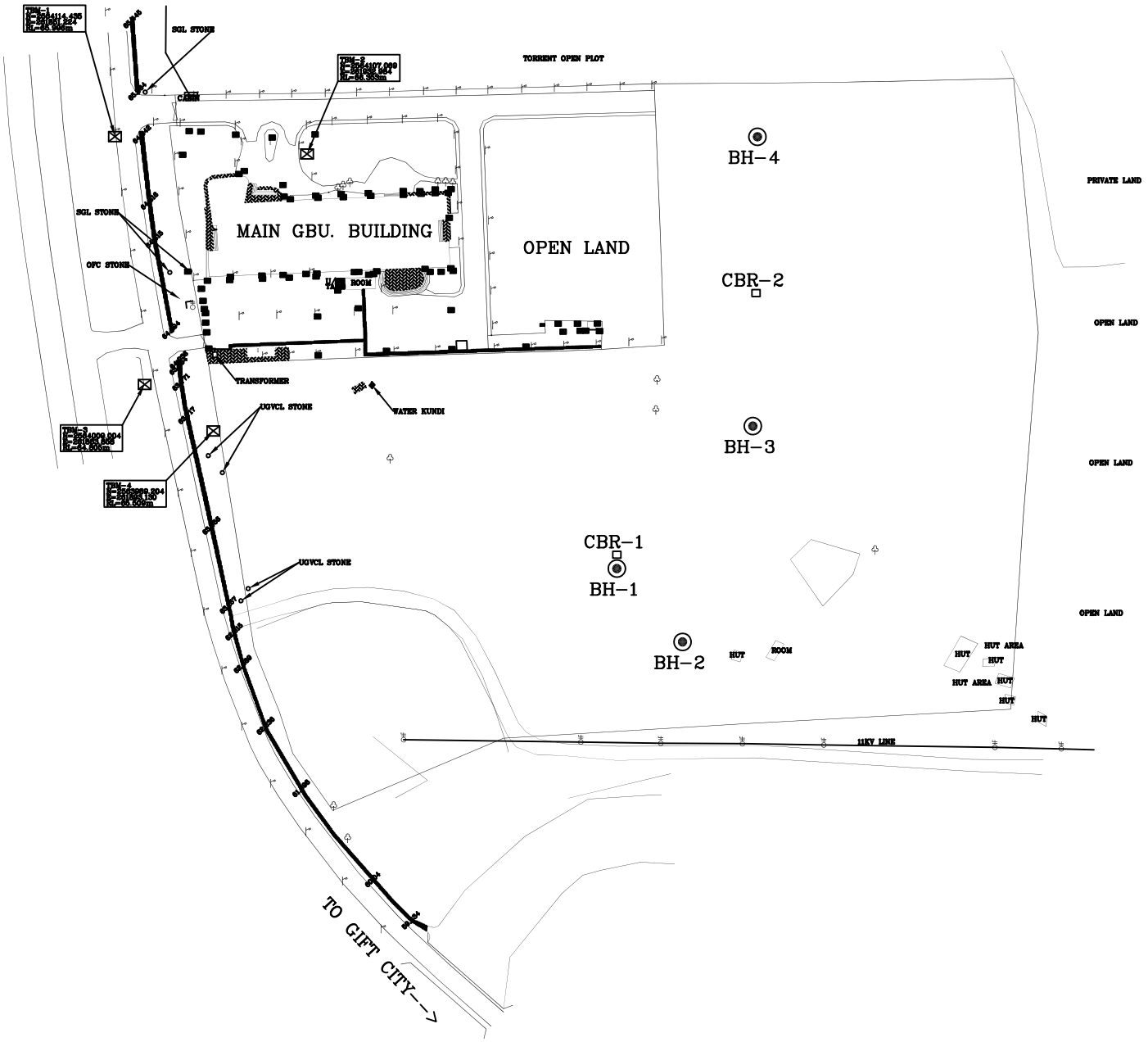
Name of Customer: Suresh Goel & Associates., New Delhi.

CBR NO.	TYPE OF SAMPLE	SIEVE ANALYSIS 2720(P:4)					ATTERBERGS LIMITS (IS: 2720(P:5)			I.S. CLASSIFICATION (IS: 1498)	MODIFIED PROCTOR TEST RESULTS		CBR (AT 95% OF MDD)
		GRAVEL (%)	% SAND			SILT & CLAY (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX, IP (%)		MAXIMUM DRY DENSITY (MDD) (gm/cc)	OPTIMUM MOISTURE CONTENT (OMD) (%)	SOAKED (%)
			COARSE	MED.	FINE								
CBR-1	DS	4	3	17	36	40	-	-	NP	SM	1.96	7.8	10.1
CBR-2	DS	10	6	11	50	23	-	-	NP	SM	2.03	7.3	11.7

ABBREVIATION

DS	Disturbed Sample
UDS	Undisturbed Sample
SPT	Standard Penetration Test
REF	Refusal
NP	Non-Plastic
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
DUU	Direct shear test unconsolidated undrain
TUU	Triaxial shear test unconsolidated undrain
UCS	Unconfined compressive strength
FS	Filled up soil
SM	Silty sand
SP	Poorly graded sand
SC	Clayey sand
CL	Silty clay having low plasticity
CI	Silty clay having medium plasticity
CH	Silty clay having high plasticity
ML	Sandy silt
BH	Borehole

LOCATION PLAN



CLIENT:-

SURESH GOEL & ASSOCIATES.,
NEW DELHI.

PROJECT:-

SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

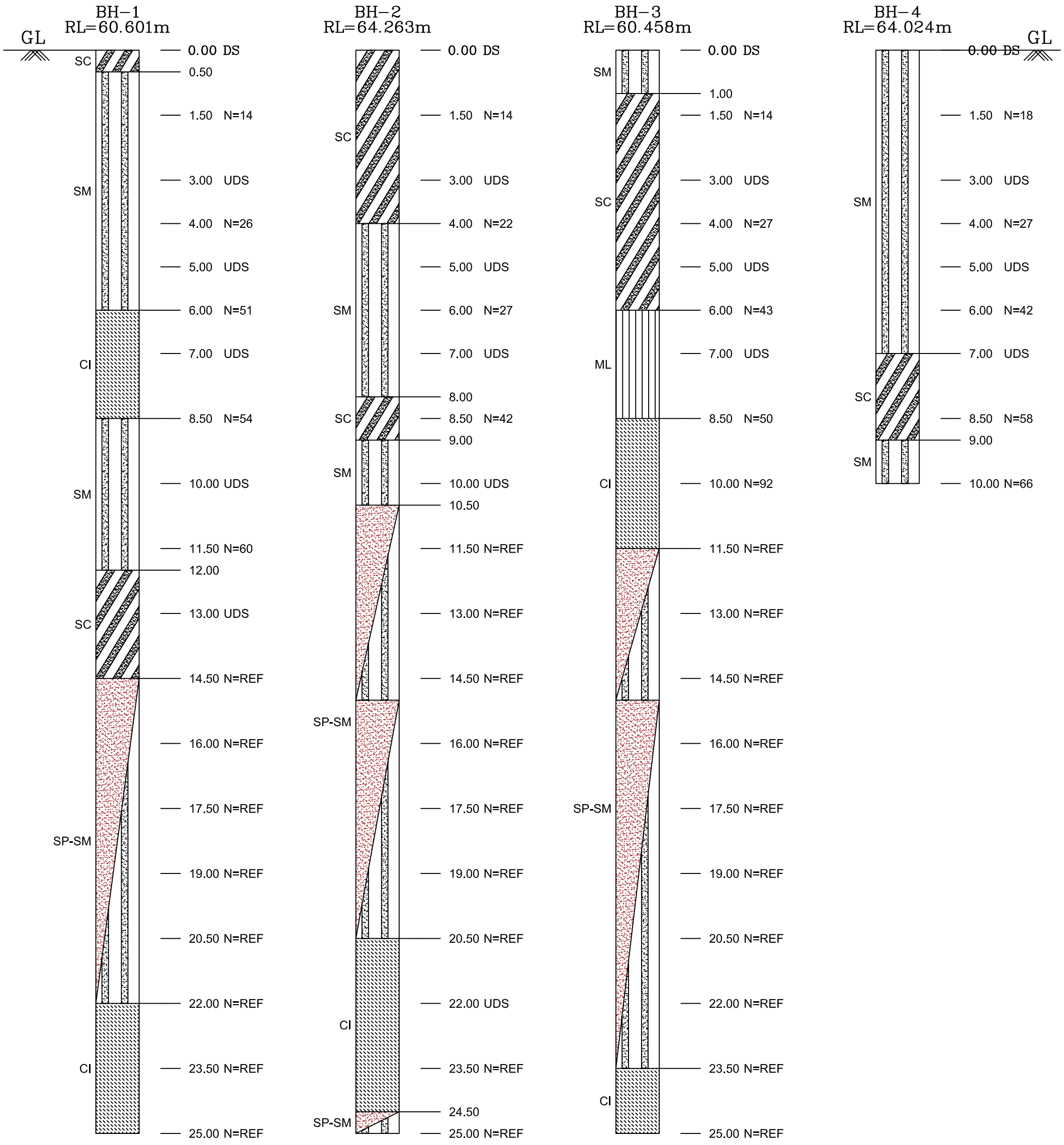
DRAWN BY:-

M K SOIL TESTING LABORATORY PRIVATE LIMITED

SURVEY NO.4/4, BHARTI HOUSE, NEAR CHANCHALBAG PARTY PLOT, OPPOSITE JAHNVI BUNGALOWS, BODAKDEV, AHMEDABAD – 380 054,
GUJARAT.

JOB. NO.:-	PAGE. NO.:-	SCALE:-
MK-15-04-23	1	NOT TO SCALE

CROSS SECTIONAL DETAILS OF BOREHOLES



LEGEND

SM	=	SILTY SAND
SC	=	CLAYEY SAND
ML	=	SANDY SILT
SP-SM	=	POORLY GRADED SILTY SAND
CI	=	SILTY CLAY HAVING MEDIUM PLASTICITY
CL	=	SILTY CLAY WITH LOW PLASTICITY
DS	=	DISTURBED SAMPLE
UDS	=	UNDISTURBED SAMPLE
N	=	S.P.T. VALUE
SPT	=	STANDARD PENETRATION TEST
GL	=	GROUND LEVEL
▼ WT	=	WATER TABLE

CLIENT:–

SURESH GOEL & ASSOCIATES.,
NEW DELHI.

PROJECT:–

SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

DRAWN BY:–

M K SOIL TESTING LABORATORY PRIVATE LIMITED

SURVEY NO.4/4, BHARTI HOUSE, NEAR CHANCHALBAG PARTY PLOT, OPPOSITE JAHNVI BUNGALOWS, BODAKDEV, AHMEDABAD – 380 054,
GUJARAT.

JOB. NO.:–	PAGE. NO.:–	SCALE:–
MK–15–04–23	2	NOT TO SCALE

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

CLIENT: SURESH GOEL & ASSOCIATES., NEW DELHI.

METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-1
E=262064.90 N=2563930.68 RL=60.601m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-	SC		YELLOWISH BROWN COLOUR CLAYEY SAND	0.50	0.50
1.50	SPT	4	6	8	14	SM		YELLOWISH BROWN COLOUR SILTY SAND		
3.00	UDS	-	-	-	-					
4.00	SPT	10	12	14	26					5.50
5.00	UDS	-	-	-	-					
6.00	SPT	20	22	29	51				6.00	
7.00	UDS	-	-	-	-	CI		YELLOWISH BROWN COLOUR SILTY CLAY HAVING MEDIUM PLASTICITY		
8.50	SPT	20	24	30	54				8.50	2.50
10.00	UDS	-	-	-	-	SM		YELLOWISH BROWN COLOUR SILTY SAND		
11.50	SPT	22	24	36	60					3.50
13.00	UDS	-	-	-	-	SC		YELLOWISH BROWN COLOUR CLAYEY SAND	12.00	
14.50	SPT	36	(10cm)	-	REF					2.50
15.00	-	-	-	-	-	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND	14.50 15.00	0.50

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

CLIENT: SURESH GOEL & ASSOCIATES., NEW DELHI.

METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-1
E=262064.90 N=2563930.68 RL=60.601m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
16.00	SPT	40	(12cm)	-	REF	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND		
17.50	SPT	46	(10cm)	-	REF					
19.00	SPT	48	(9cm)	-	REF					7.00
20.50	SPT	39	(6cm)	-	REF					
22.00	SPT	39	(8cm)	-	REF				22.00	
23.50	SPT	42	(7cm)	-	REF	CI		YELLOWISH BROWN COLOUR SILTY CLAY HAVING MEDIUM PLASTICITY		3.00
25.00	SPT	(8cm)	-	-	REF				25.00	

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

CLIENT: SURESH GOEL & ASSOCIATES., NEW DELHI.

METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-2
E=262092.86 N=2563899.46 RL=64.263m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-	SC		BLACKISH BROWN COLOUR CLAYEY SAND		
1.50	SPT	3	5	9	14					
3.00	UDS	-	-	-	-					4.00
4.00	SPT	9	10	12	22				4.00	
5.00	UDS	-	-	-	-	SM		YELLOWISH BROWN COLOUR SILTY SAND		
6.00	SPT	10	12	15	27					4.00
7.00	UDS	-	-	-	-					
8.50	SPT	17	20	22	42				8.00	
10.00	UDS	-	-	-	-	SC		YELLOWISH BROWN COLOUR CLAYEY SAND	9.00	1.00
11.50	SPT	36	(14cm)	-	REF	SM		YELLOWISH BROWN COLOUR SILTY SAND	10.50	1.50
13.00	SPT	39	(10cm)	-	REF	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND		4.50
14.50	SPT	(14cm)	-	-	REF					
15.00	-	-	-	-	-				15.00	

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

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METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-2
E=262092.86 N=2563899.46 RL=64.263m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
16.00	SPT	(13cm)	-	-	REF	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND		
17.50	SPT	(11cm)	-	-	REF					
19.00	SPT	(9cm)	-	-	REF					5.50
20.50	SPT	42	(8cm)	-	REF				20.50	
22.00	UDS	-	-	-	-	CI		YELLOWISH BROWN COLOUR SILTY CLAY HAVING MEDIUM PLASTICITY		
23.50	SPT	(10cm)	-	-	REF					4.00
25.00	SPT	(8cm)	-	-	REF				24.50	
						SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND	25.00	0.50

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

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METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-3
E=262122.78 N=2563991.31 RL=60.458m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-	SM		BLACKISH BROWN COLOUR SILTY SAND	1.00	1.00
1.50	SPT	4	6	8	14	SC		YELLOWISH BROWN COLOUR CLAYEY SAND		
3.00	UDS	-	-	-	-					
4.00	SPT	10	12	15	27					5.00
5.00	UDS	-	-	-	-					
6.00	SPT	18	20	23	43				6.00	
7.00	UDS	-	-	-	-	ML		YELLOWISH BROWN COLOUR SANDY SILT		
8.50	SPT	19	22	28	50				8.50	2.50
10.00	SPT	30	44	48	92	CI		YELLOWISH BROWN COLOUR SILTY CLAY HAVING MEDIUM PLASTICITY		3.00
11.50	SPT	26	(10cm)	-	REF				11.50	
13.00	SPT	30	(8cm)	-	REF	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND		3.50
14.50	SPT	37	(11cm)	-	REF					
15.00	-	-	-	-	-				15.00	

PROJECT: SOIL INVESTIGATION WORK FOR CONSTRUCTION OF HOSTEL AND HOUSING BUILDING (1 BASEMENT + GROUND FLOOR + 11 FLOOR) AT GUJARAT BIOTECHNOLOGY UNIVERSITY, NR. GIFT CITY. TAL & DIST.: GANDHINAGAR. STATE: GUJARAT.

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METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-3
E=262122.78 N=2563991.31 RL=60.458m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	25.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
16.00	SPT	42	(7cm)	-	REF	SP-SM		YELLOWISH BROWN COLOUR POORLY GRADED SILTY SAND		
17.50	SPT	46	(6cm)	-	REF					
19.00	SPT	(8cm)	-	-	REF					
20.50	SPT	(13cm)	-	-	REF					8.50
22.00	SPT	(7cm)	-	-	REF					
23.50	SPT	38	(9cm)	-	REF				23.50	
25.00	SPT	40	(6cm)	-	REF	CI		YELLOWISH BROWN COLOUR SILTY CLAY HAVING MEDIUM PLASTICITY	25.00	1.50

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CLIENT: SURESH GOEL & ASSOCIATES., NEW DELHI.

METHOD OF BORING	ROTARY
DIA. OF BORE	150MM
BORE HOLE NO.	BH-4
E=262124.74 N=2564114.38 RL=64.024m	

G.W.T. BELOW EXISTING G.L. (m)	NOT MET WITH
TERMINATION DEPTH (m)	10.00
JOB NO.	MK-15-04-23

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-	SM		YELLOWISH BROWN COLOUR SILTY SAND		
1.50	SPT	4	8	10	18					
3.00	UDS	-	-	-	-					
4.00	SPT	10	12	15	27					7.00
5.00	UDS	-	-	-	-					
6.00	SPT	15	20	22	42					
7.00	UDS	-	-	-	-				7.00	
8.50	SPT	20	28	30	58	SC		YELLOWISH BROWN COLOUR CLAYEY SAND		2.00
10.00	SPT	26	30	36	66	SM		YELLOWISH BROWN COLOUR SILTY SAND	9.00 10.00	1.00

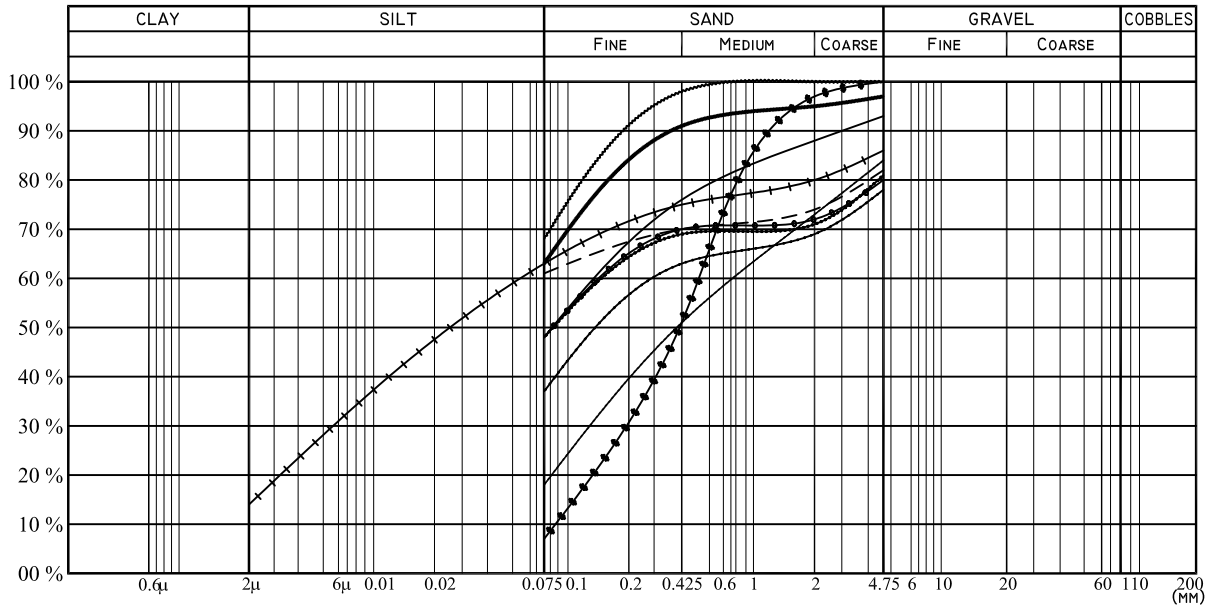
M K SOIL TESTING LABORATORY PRIVATE LIMITED

SECTION:-

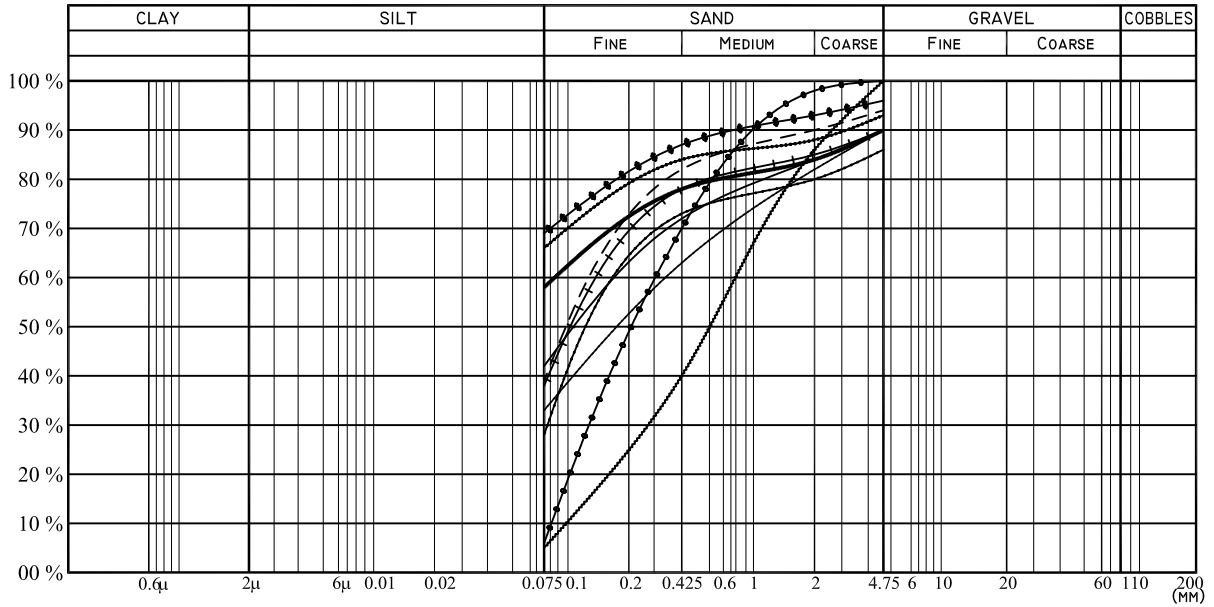
GRAIN SIZE DISTRIBUTION

JOB NO.:- MK-15-04-23

SIGN	BH.NO.	DEPTH (m)	SOIL GROUP	CLAY+SILT (%)	SAND %			G %
					F	M	C	
——	BH-1	0.00	SC	48	28	12	5	7
-·-·-		3.00	SM	18	33	22	11	16
—o—		5.00	SM	37	26	6	9	22
—+—		6.00	CI	63 H(49)(14)	12	5	6	14
— —		7.00	CI	61	9	4	8	18
—•—		10.00	SM	48	22	2	8	20
—x—x—		13.00	SC	48	21	2	10	19
——		17.50	SP-SM	7	44	46	3	0
|||||||		22.00	CI	63	28	4	2	3
~~		25.00	CI	68	30	2	0	0



SIGN	BH.NO.	DEPTH (m)	SOIL GROUP	CLAY+SILT (%)	SAND %			G %
					F	M	C	
——	BH-2	0.00	SC	42	30	12	6	10
-·-·-		3.00	SC	33	30	19	8	10
—o—		5.00	SM	28	45	7	6	14
—+—		7.00	SM	38	40	7	5	10
— —		10.00	SM	39	43	8	4	6
—•—		14.50	SP-SM	6	64	28	2	0
—x—x—		20.50	CI	66	18	4	5	7
——		22.00	CI	69	18	6	3	4
|||||||		23.50	CI	58	20	6	6	10
~~		25.00	SP-SM	5	35	46	14	0



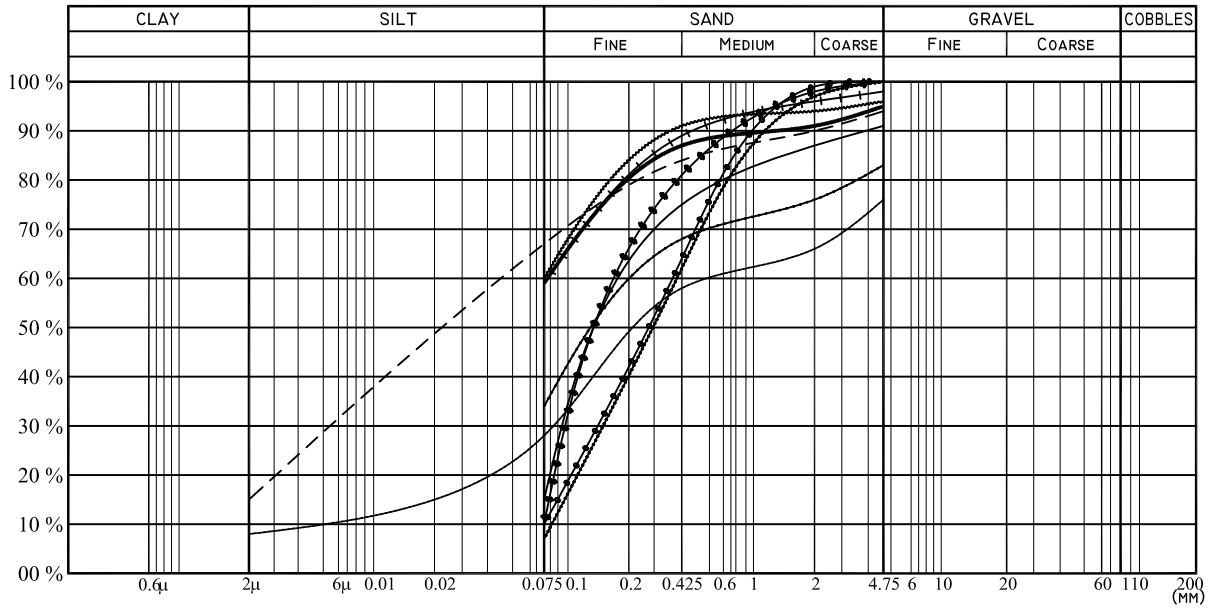
M K SOIL TESTING LABORATORY PRIVATE LIMITED

SECTION:-

GRAIN SIZE DISTRIBUTION

JOB NO.:- MK-15-04-23

SIGN	BH.NO.	DEPTH (m)	SOIL GROUP	CLAY+SILT (%)	SAND %			G %
					F	M	C	
——	BH-3	0.00	SM	15	60	12	4	9
-·-·-·-		3.00	SC	28 H(20)(8)	30	8	10	24
—o—		5.00	SC	34	34	8	7	17
—+—		7.00	ML	59	30	7	2	2
— —		8.50	CI	67 H(52)(15)	17	6	4	6
—•—		11.50	SP-SM	10	54	35	1	0
—x—x—		17.50	SP-SM	7	55	35	3	0
——		20.50	SP-SM	10	71	17	2	0
++++++		23.50	CI	59	28	4	4	5
~~		25.00	CI	60	31	3	2	4



SIGN	BH.NO.	DEPTH (m)	SOIL GROUP	CLAY+SILT (%)	SAND %			G %
					F	M	C	
——	BH-4	0.00	SM	22	50	8	7	13
-·-·-·-		1.50	SM	23	48	7	6	16
—o—		3.00	SM	21	54	4	7	14
—+—		5.00	SM	19	48	4	9	20
— —		6.00	SM	21	46	5	10	18
—•—		7.00	SC	42 H(32)(10)	36	8	5	9
—x—x—		8.50	SC	47	40	5	3	5
——		10.00	SM	44	42	10	2	2
++++++	CBR-1		SM	40	36	17	3	4
~~	CBR-2		SM	23	50	11	6	10