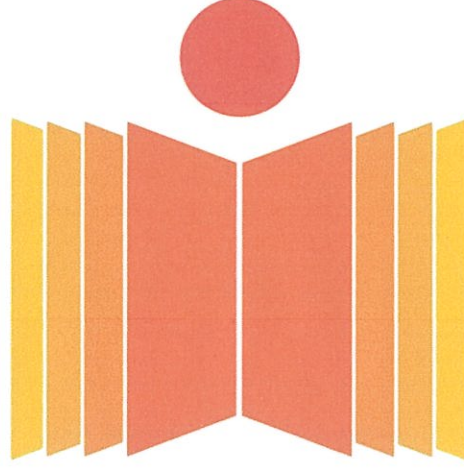


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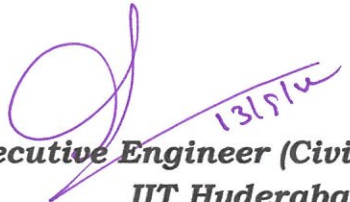


भारतीय प्रौद्योगिकी संस्थान हैदराबाद  
Indian Institute of Technology Hyderabad

## Volume - 5

# CONCEPTUAL DRAWINGS & SUB SOIL INVESTIGATION REPORT

*Name of the work: Construction of Precast 2Nos Faculty Housing Towers (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandi, Sangareddy.*

  
*Executive Engineer (Civil)*  
IIT Hyderabad

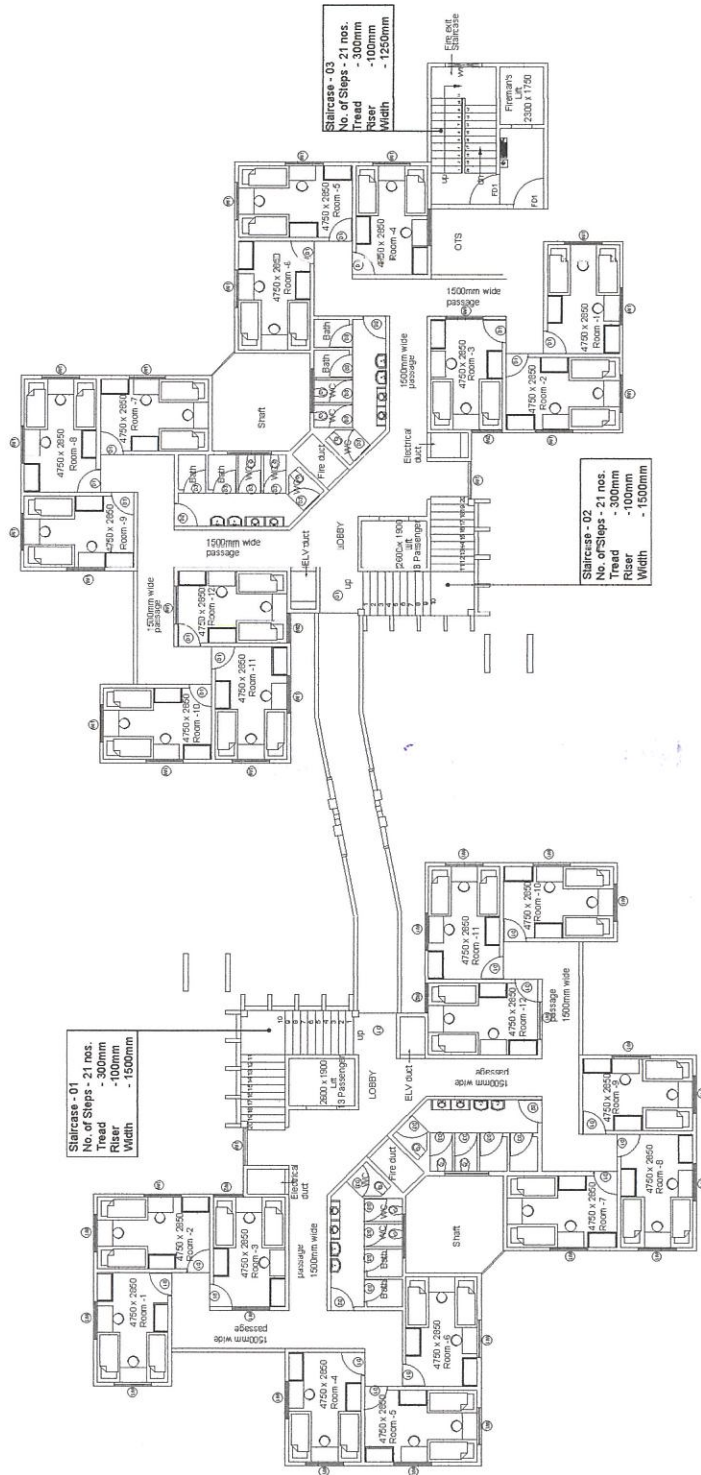
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PROPOSED PRECAST HOSTELS FLOOR PLAN

Name of the work: Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandi, Sangareddy.

GENERAL NOTES  
- All Dimensions are not to be Scaled  
- All Dimensions are in Meters

*(Signature)*  
EXECUTIVE ENGINEER (CIVIL)

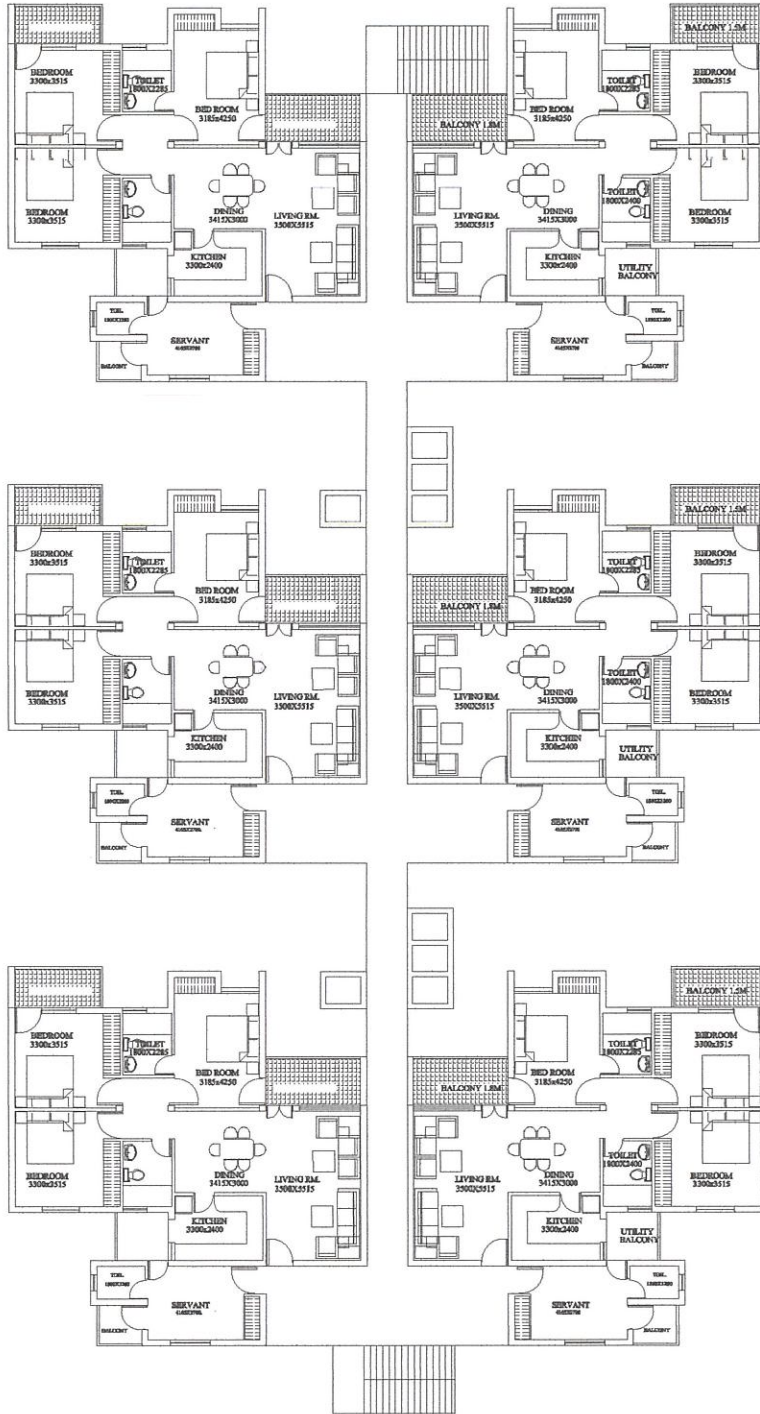
AE (CIVIL)

JUNIOR ENGINEER (CIVIL)

AE (CIVIL)

DRAWN BY: SYED OMER ALI





PROPOSED PRECAST FACULTY HOUSING TOWERS (FT 1A & 1B) FLOOR PLAN

Name of the work: Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandli, Sangareddy.

GENERAL NOTES  
\*All Dimensions (NTS)

DRAWN BY: SYED OMER ALI

JUNIOR ENGINEER (CIVIL)

AE (CIVIL)

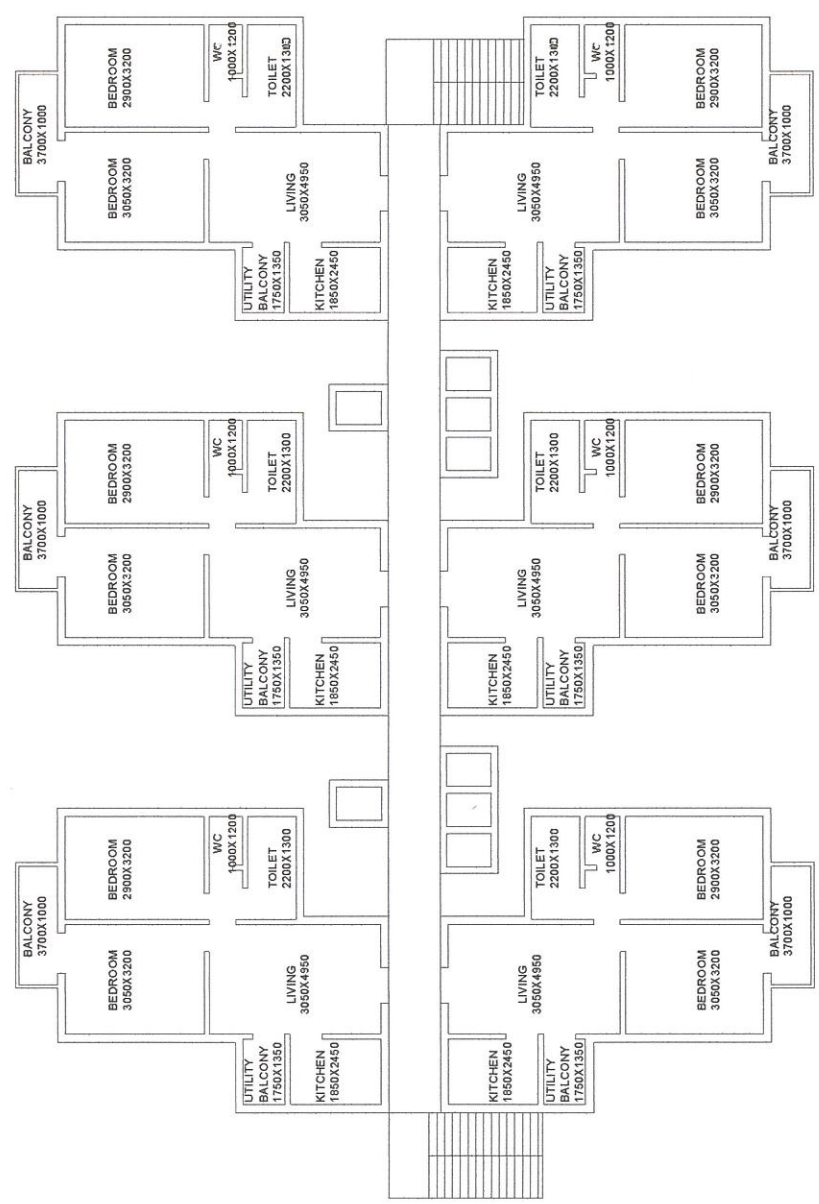
AEE (CIVIL)

EXECUTIVE ENGINEER (CIVIL)

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INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD.

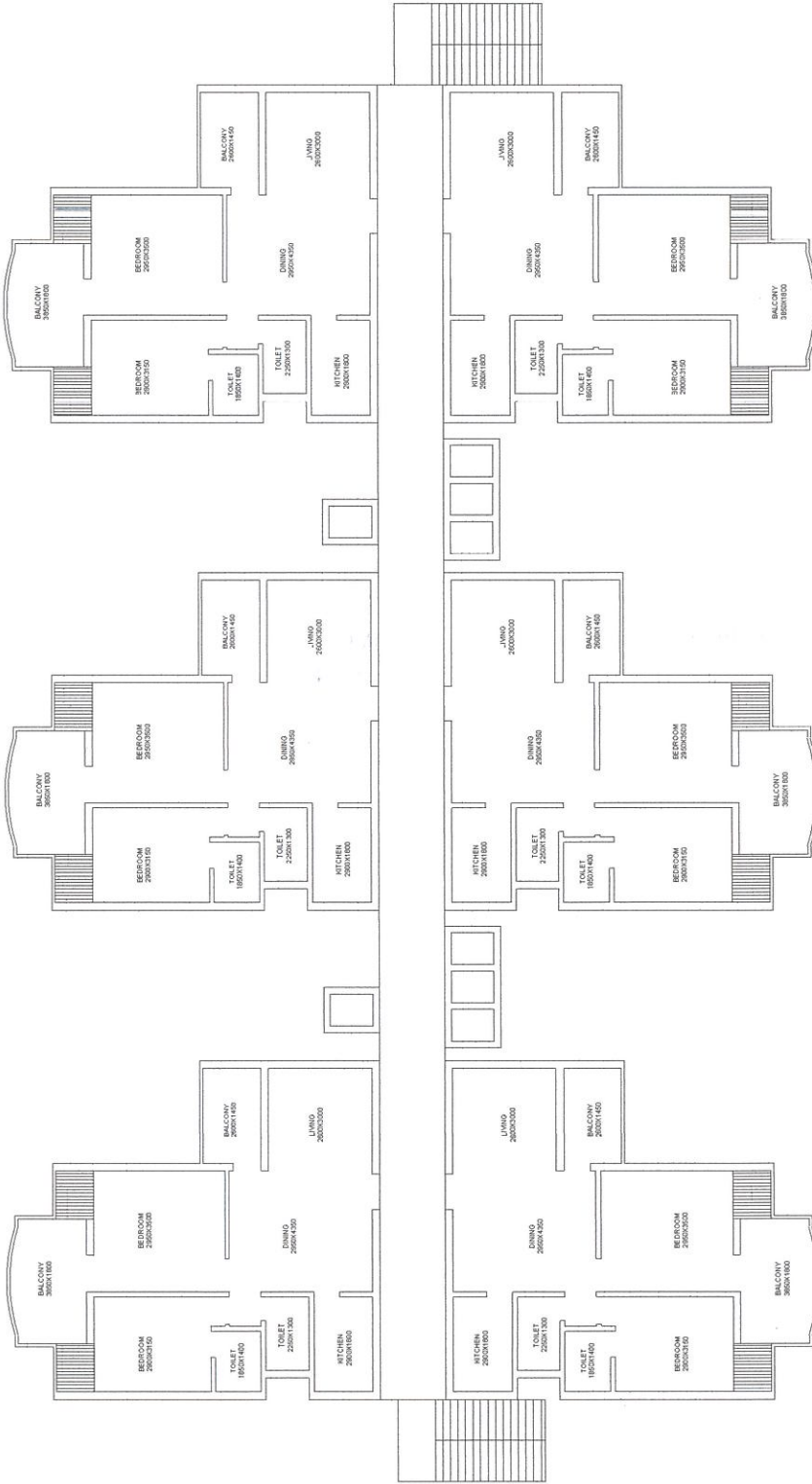


PROPOSED PRECAST STAFF HOUSING ST 2A & 23 FLOOR PLAN

GENERAL NOTES  
\*All Dimensions (NTS)

Name of the work: **Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandi, Sangareddy.**

DRAWN BY: SYED OMER ALI	JUNIOR ENGINEER (CIVIL)	AE (CIVIL)	EXECUTIVE ENGINEER (CIVIL)
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PROPOSED PRECAST STAFF HOUSING ST 1A FLOOR PLAN

Name of the work: Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandli, Sangareddy.

GENERAL NOTES  
 :-All Dimensions (NTS)

*(Signature)*  
 EXECUTIVE ENGINEER (CIVIL)

AE (CIVIL)

AE (CIVIL)

JUNIOR ENGINEER (CIVIL)

DRAWN BY: SYED OMER ALI





INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD.



LAYOUT - HOSTEL

Name of the work: Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandi, Sangareddy.

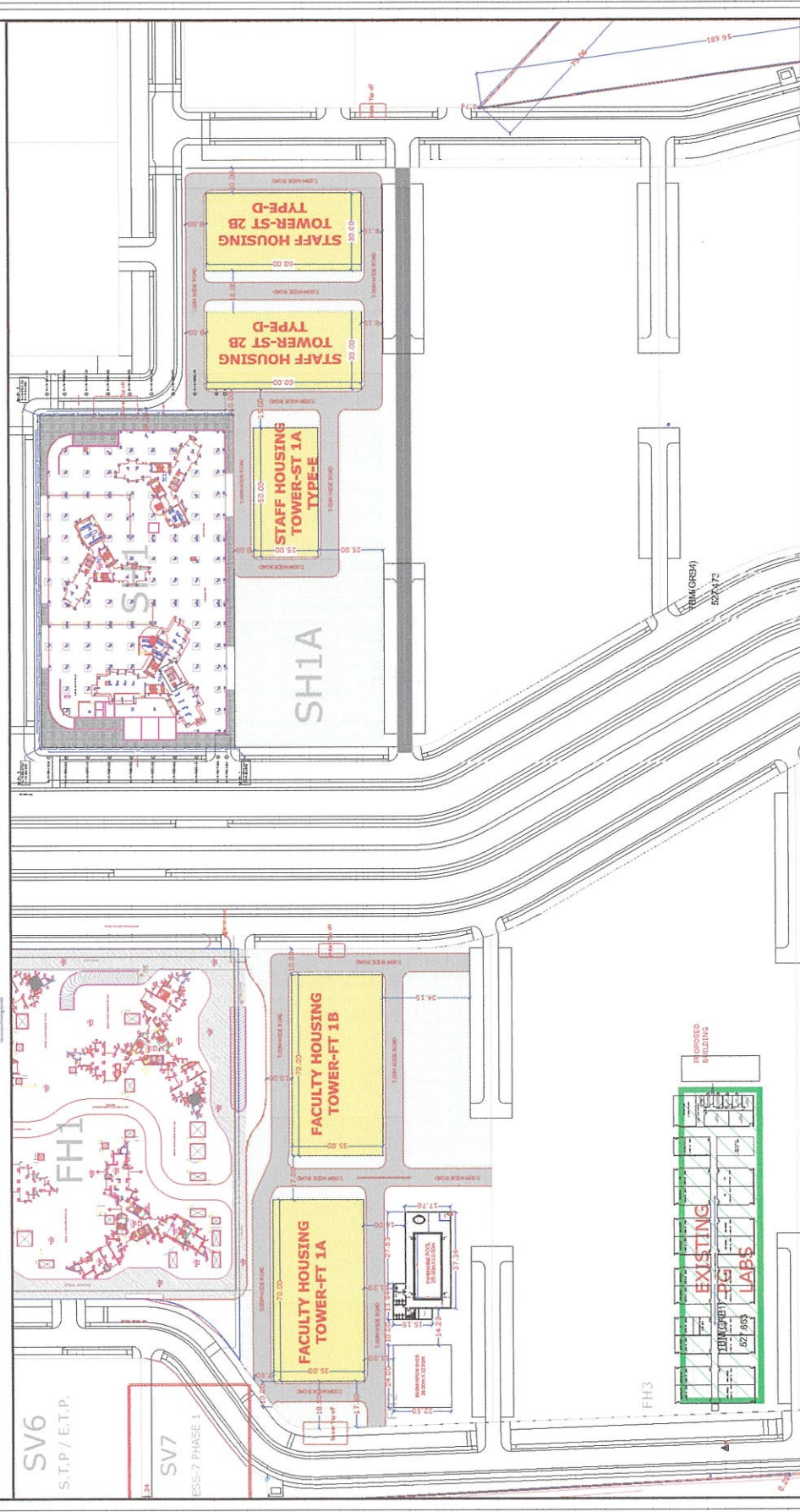
GENERAL NOTES

- All Dimensions are not to be Scaled
- All Dimensions are in Meters

DRAWN BY: SYED OMER ALI	JUNIOR ENGINEER (CIVIL)	AE (CIVIL)	AEE (CIVIL)	EXECUTIVE ENGINEER (CIVIL)
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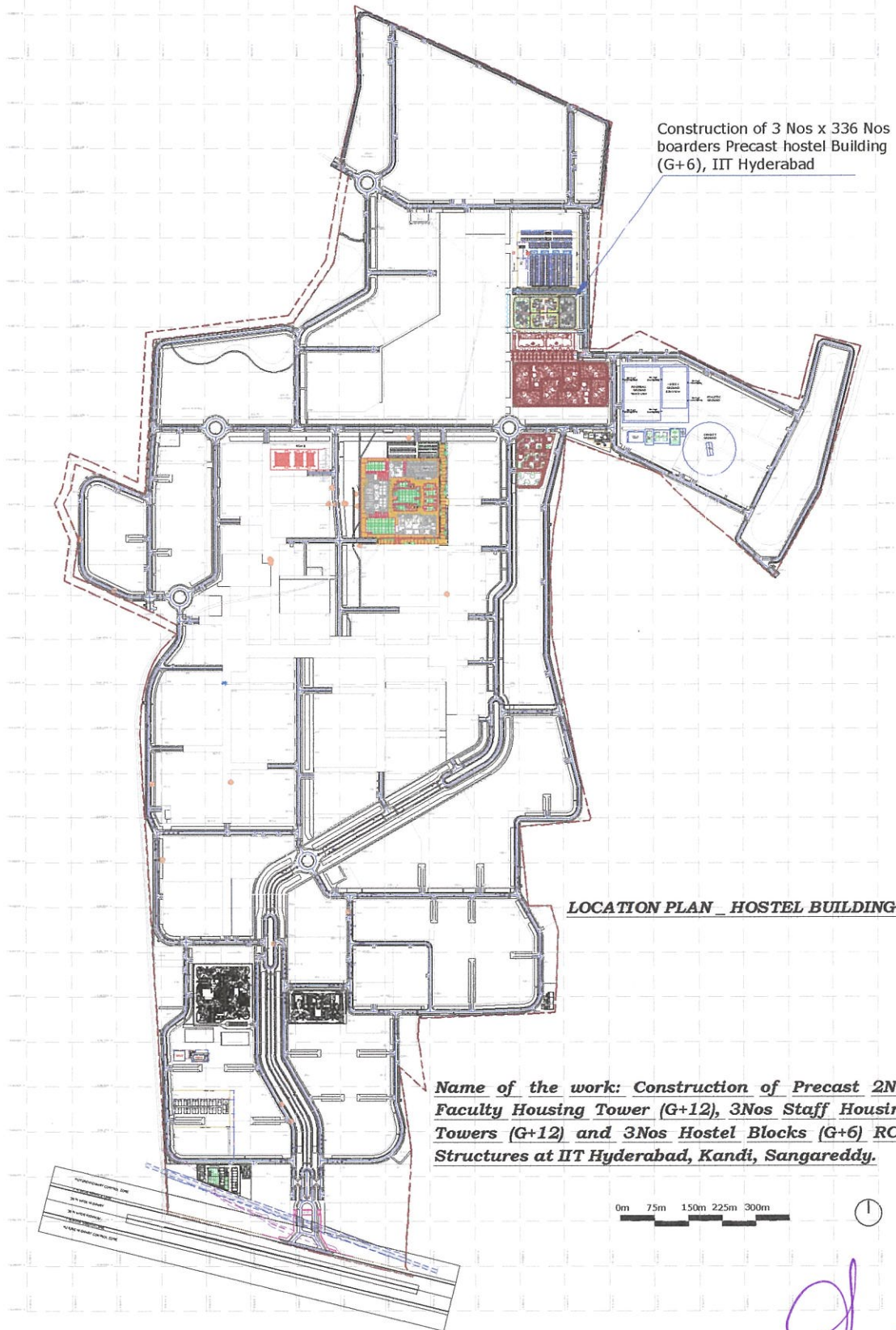
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GENERAL NOTES  
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 - All Dimensions are in Meters

LOCATION MAP FOR PROPOSED PRECAST FACULTY AND STAFF HOUSING TOWERS

DRAWN BY: SYED OMER ALI      JUNIOR ENGINEER (CIVIL)      AE (CIVIL)      AEE (CIVIL)      EXECUTIVE ENGINEER (CIVIL)

*(Signature)*  
 EXECUTIVE ENGINEER (CIVIL)



Construction of 3 Nos x 336 Nos  
boarders Precast hostel Building  
(G+6), IIT Hyderabad

**LOCATION PLAN \_ HOSTEL BUILDINGS**

***Name of the work: Construction of Precast 2Nos  
Faculty Housing Tower (G+12), 3Nos Staff Housing  
Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC  
Structures at IIT Hyderabad, Kandi, Sangareddy.***

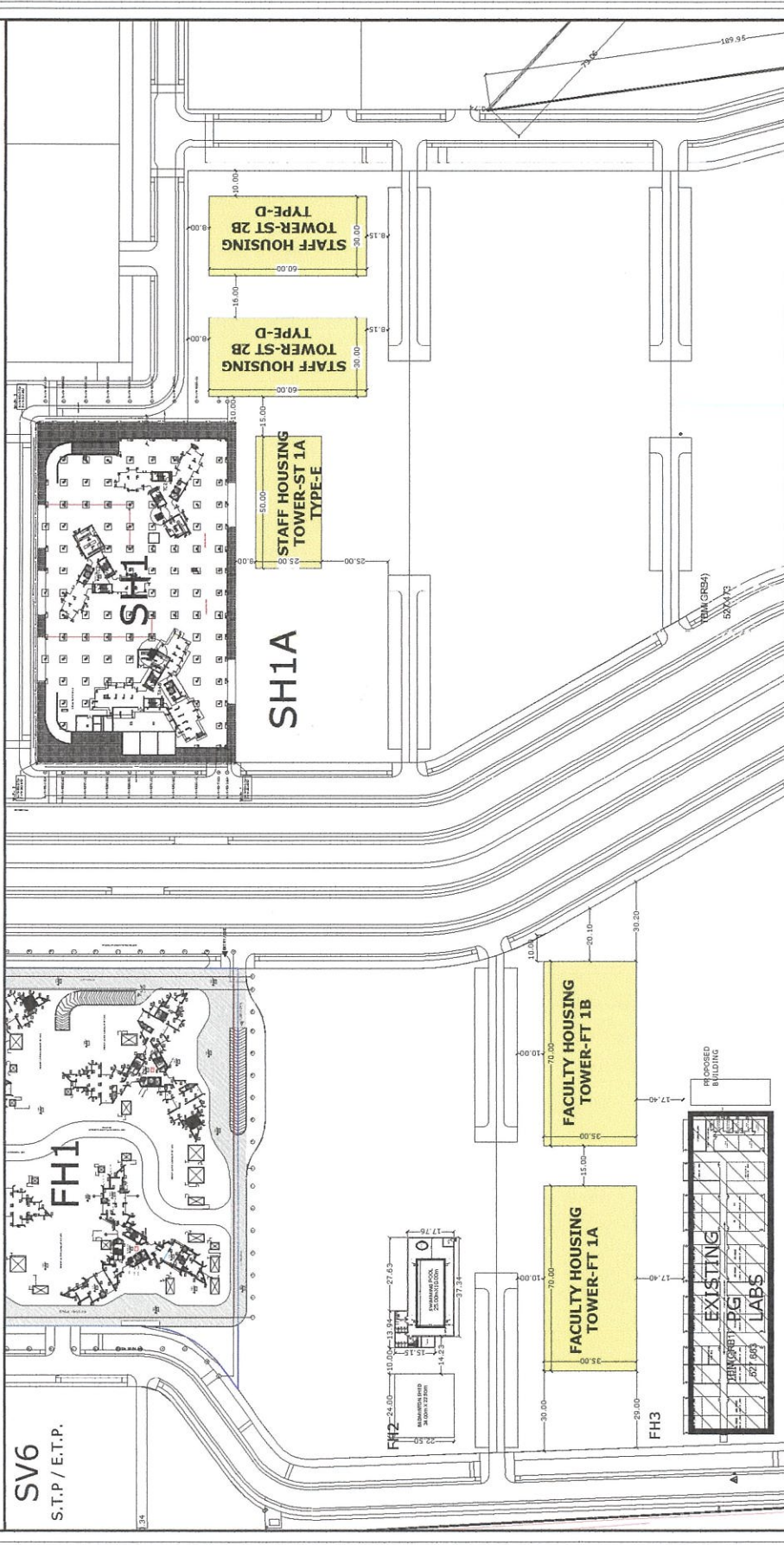
0m 75m 150m 225m 300m



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13/1/16



INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD.

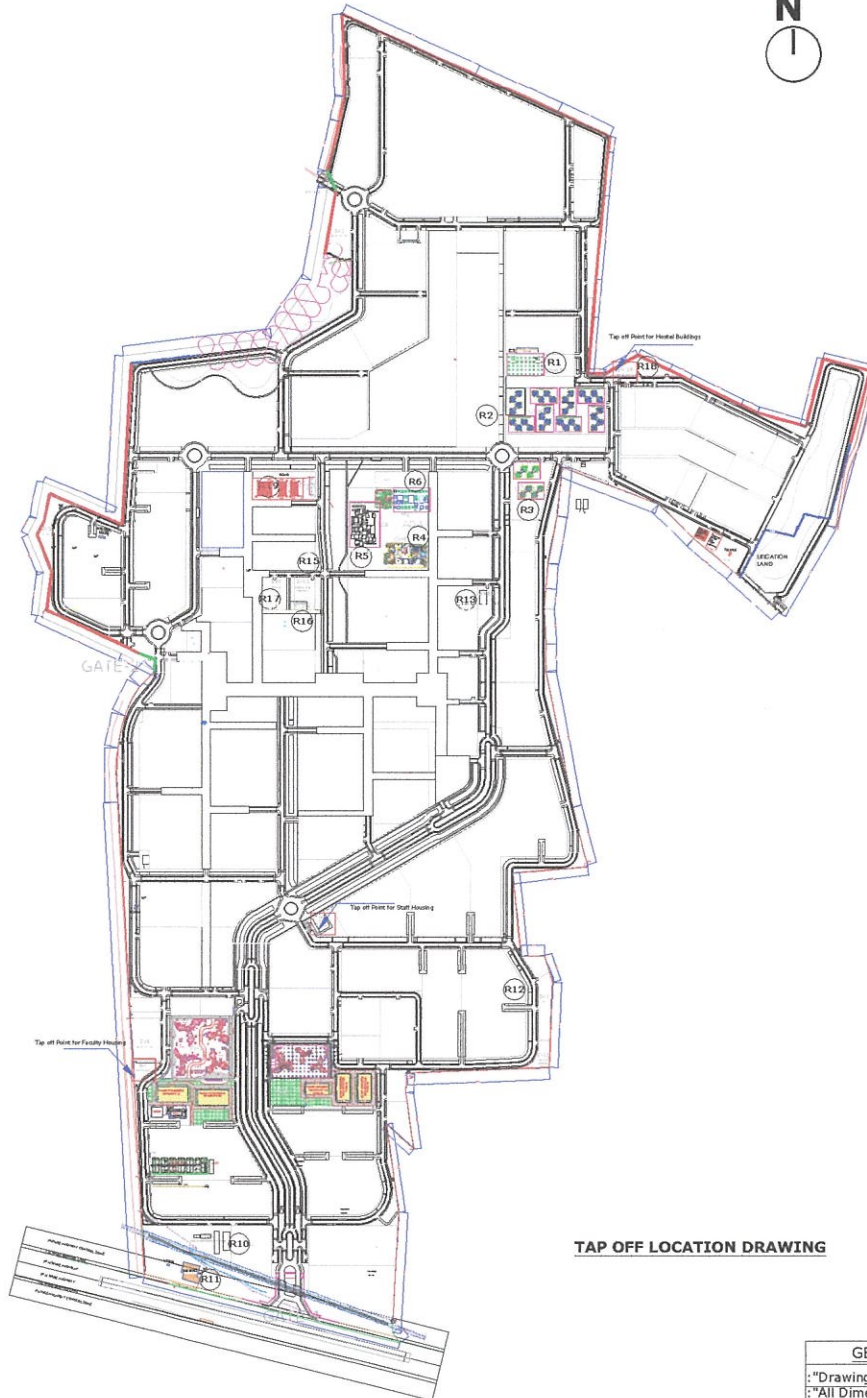


LOCATION PLAN - FACULTY & STAFF HOUSING

Name of the work: Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandli, Sangareddy.

GENERAL NOTES  
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 - All Dimensions are in Meters

EXECUTIVE ENGINEER (CIVIL)	AE (CIVIL)	JUNIOR ENGINEER (CIVIL)	AE (CIVIL)	AE (CIVIL)
<i>(Signature)</i>				
DRAWN BY: SYED OMER ALI				



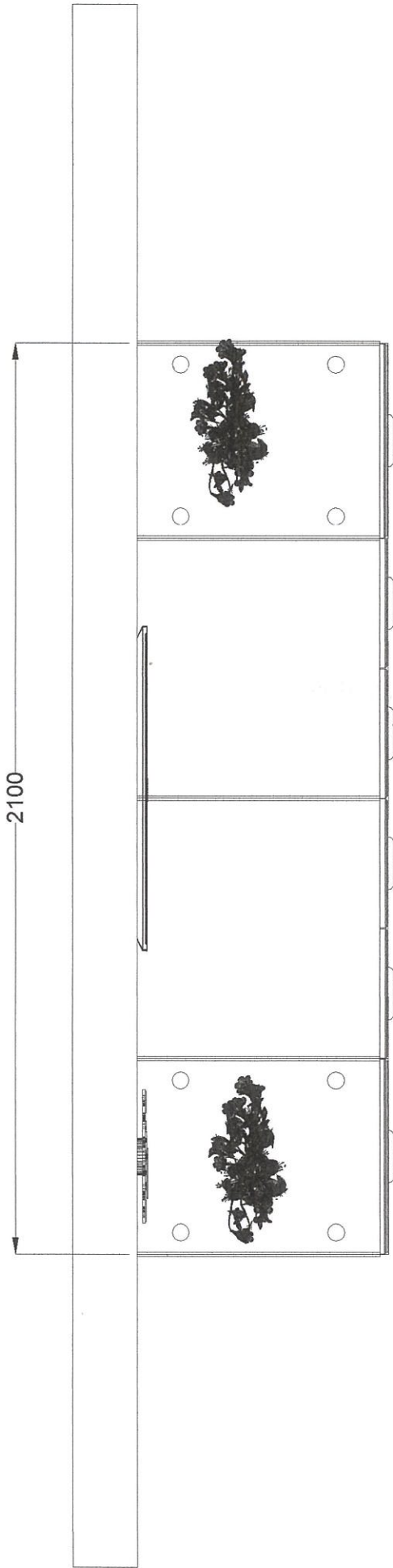
TAP OFF LOCATION DRAWING

GENERAL NOTES
: "Drawing Not to Scale
: "All Dimensions are in Meters

Name of Work: " *Construction of Precast 2Nos Faculty Housing Tower (G+12), 3Nos Staff Housing Towers (G+12) and 3Nos Hostel Blocks (G+6) RCC Structures at IIT Hyderabad, Kandi, Sangareddy.*

DRAWN BY: SYED OMER ALI	JUNIOR ENGINEER (CIVIL)	AE (CIVIL)	AEE (CIVIL)	EXECUTIVE ENGINEER (CIVIL)
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*[Handwritten Signature]*  
CS/17/16



787

LIST OF COMPONENTS		
NUMBER	DESCRIPTION	SIZE
1	MULTI UTILITY UNIT	450 mm
2	MULTI UTILITY UNIT	450 mm
A	FRIDGE TOP UNIT	600 mm
B	FRIDGE TOP UNIT	600 mm

Drawing Not to Scale

PROPOSED METAL MODULAR TV UNIT IN FT1-2BHK

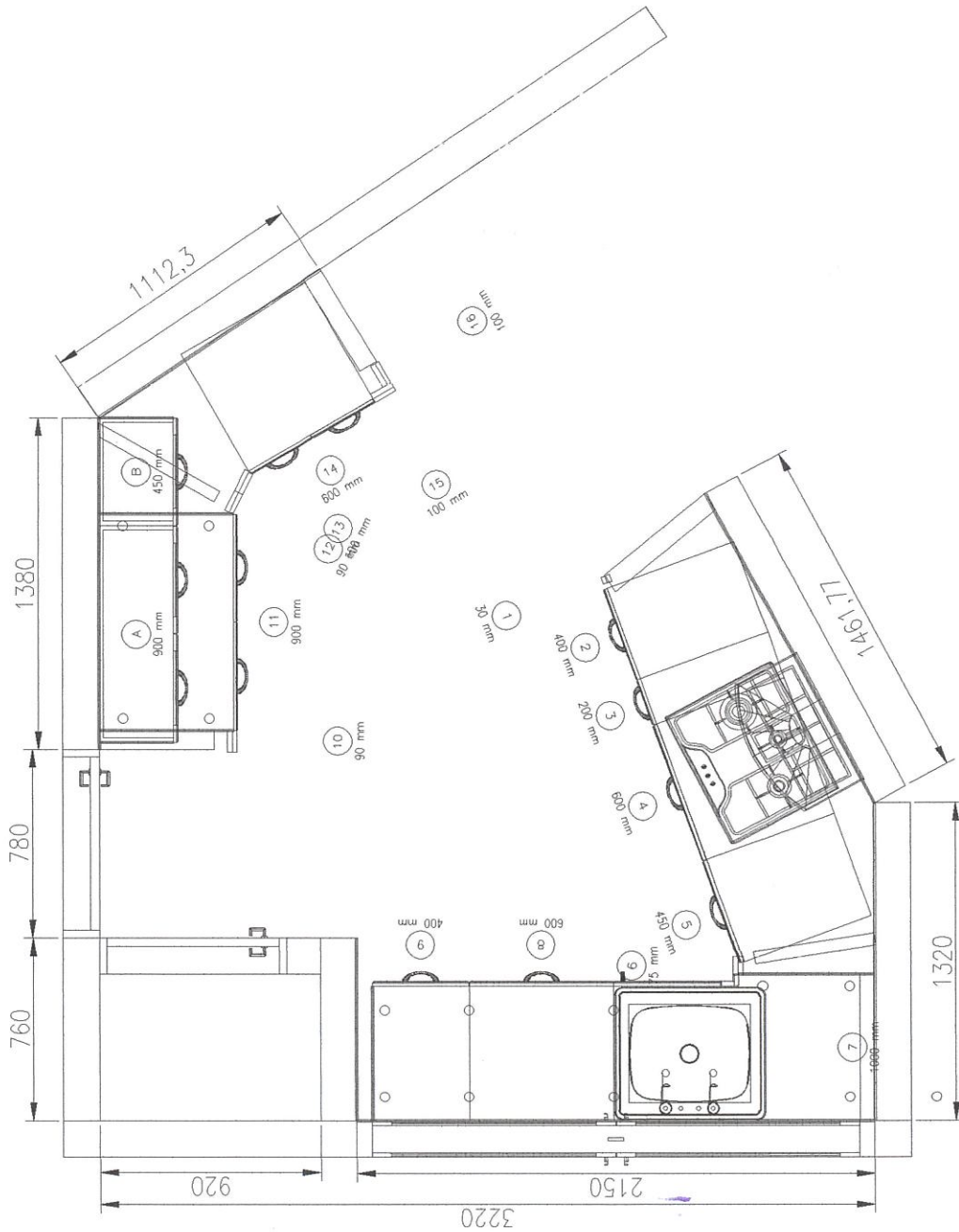
DRAWN BY: SYED OMER ALI

JUNIOR ENGINEER (CIVIL)

ASSISTANT ENGINEER (CIVIL)

  
 EXECUTIVE ENGINEER (CIVIL)





List of components		
Number	Description	Size
1	Filler	30 mm
2	Plain Shelf Unit	400 mm
3	Bottle Pullout Unit - Cargo	200 mm
4	Cooking Unit - Quadro	600 mm
5	Gas Cylinder Unit	450 mm
6	Filler	75 mm
7	Corner Sink Unit	1000 mm
8	Thali Unit - Quadro	600 mm
9	Plain Shelf Unit	400 mm
10	Filler	90 mm
11	Plain Shelf Unit	900 mm
12	Filler	90 mm
13	Filler	100 mm
14	Plain Shelf Unit	600 mm
15	Filler	100 mm
16	Filler	100 mm
A	Top Plain Shelf Unit with Glass Shutter	900 mm
B	Top Plain Shelf Unit with Glass Shutter	450 mm

Drawing Not to Scale

PROPOSED METAL MODULAR KITCHEN UNIT IN FT1-2BHK

DRAWN BY: SYED OMER ALI JUNIOR ENGINEER (CIVIL)

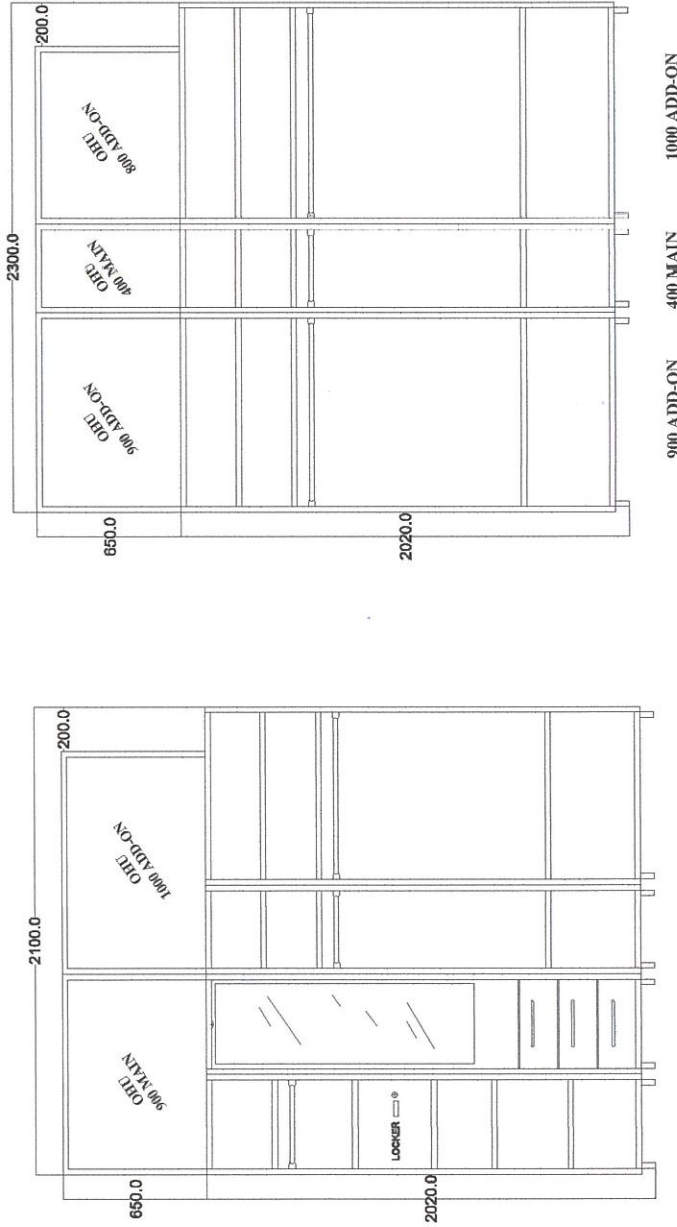
ASSISTANT ENGINEER (CIVIL)

EXECUTIVE ENGINEER (CIVIL)



IITH  
FLAT FT1- 2BHK

MASTER BEDROOM



- \* Colour: Shell Wine Red
- \* Handle: Aluminium Handle
- \* Three Dresser
- \* Two Locker
- \* OHU No Handle (Push Buttons)
- \* PVC Legs 50mm (2")

Drawing Not to Scale

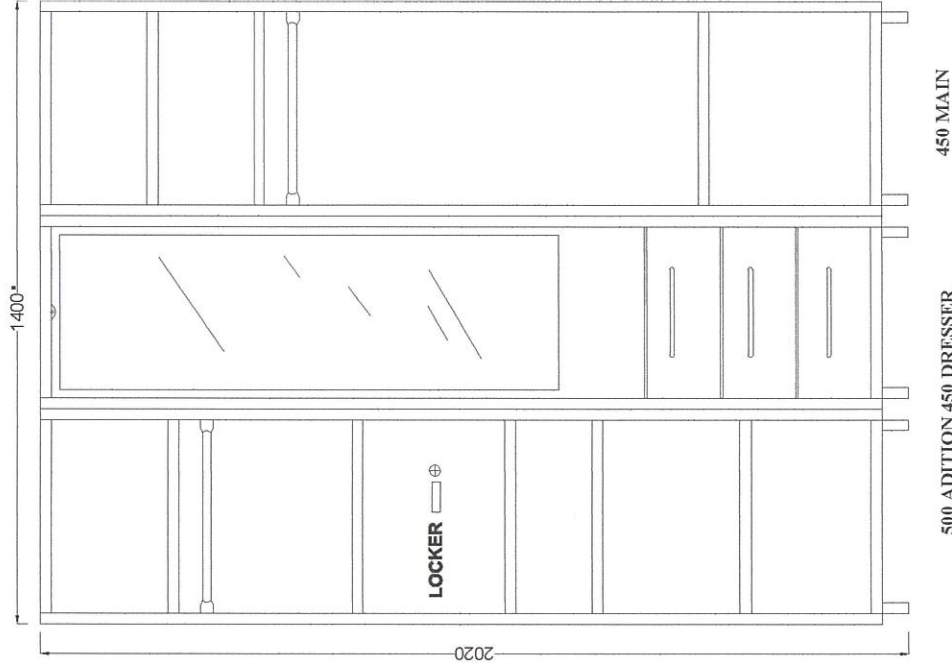
METAL MODULAR WARDROBE UNIT IN FT1- 2BHK

DRAWN BY: SYED OMER ALI JUNIOR ENGINEER (CIVIL) ASSISTANT ENGINEER (CIVIL) EXECUTIVE ENGINEER (CIVIL)



IITH  
TOWER ST2-  
TYPE C1

MASTER BEDROOM



- \* Colour: Shell Wine Red
- \* Handle: Aluminium Handle
- \* One Dresser
- \* One Locker
- \* OHU No Handle (Push Buttons)
- \* PVC Legs 50mm (2")

Drawing Not to Scale

METAL MODULAR WARDROBE UNIT IN STAFF HOUSING TOWER (ST2- TYPE-C)

DRAWING NO.  
ST2-TYPE-C-WD.

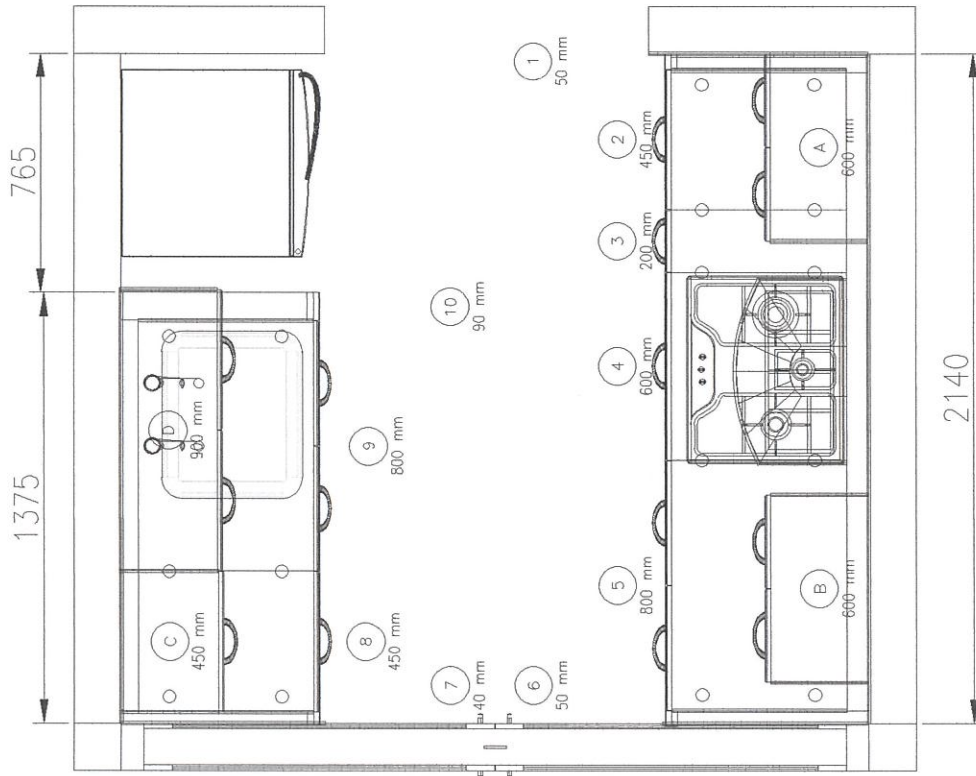
DRAWN BY: SYED OMER ALI

JUN:CR ENGINEER (CIVIL)

ASSISTANT ENGINEER (CIVIL)

*(Signature)*  
EXECUTIVE ENGINEER (CIVIL)





List of components		
Number	Description	Size
1	Filler	50 mm
2	Gas Cylinder Unit	450 mm
3	Bottle Pullout Unit – Cargo	200 mm
4	Cooking Unit – Quadro	600 mm
5	Plain Shelf Unit	800 mm
6	Filler	50 mm
7	Filler	40 mm
8	Plain Shelf Unit	450 mm
9	Hinged Unit below Sink	800 mm
10	Filler	90 mm
A	Top Plain Shelf Unit	600 mm
B	Top Plain Shelf Unit	600 mm
C	Top Plain Shelf Unit	450 mm
D	Top Plain Shelf Unit	900 mm

Drawing Not to Scale

PROPOSED METAL MODULAR KITCHEN UNIT IN STAFF HOUSING TOWER (ST2-TYPE-C)

DRAWING NO.  
ST2-TYPE-C-  
KITCHEN-2D.

DRAWN BY: SYED OMER ALI

JUNIOR ENGINEER (CIVIL)

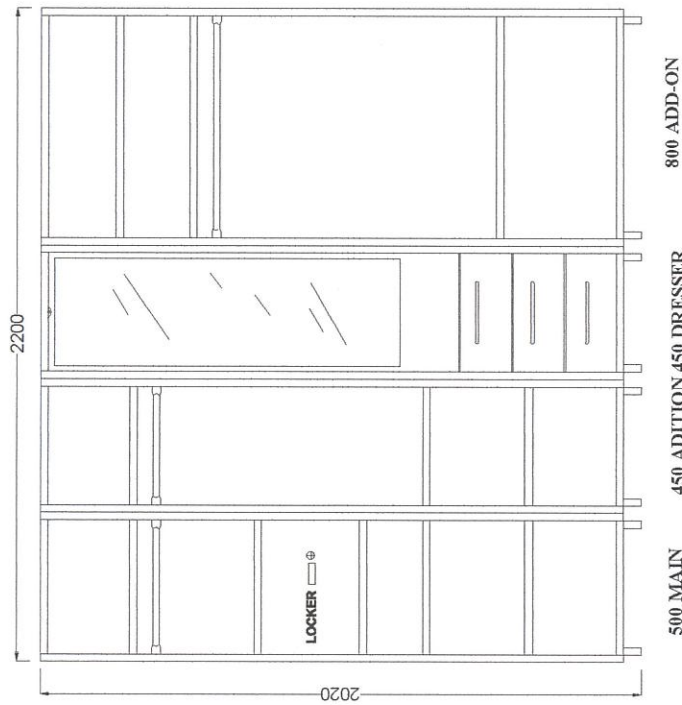
ASSISTANT ENGINEER (CIVIL)

*(Signature)*  
EXECUTIVE ENGINEER (CIVIL)

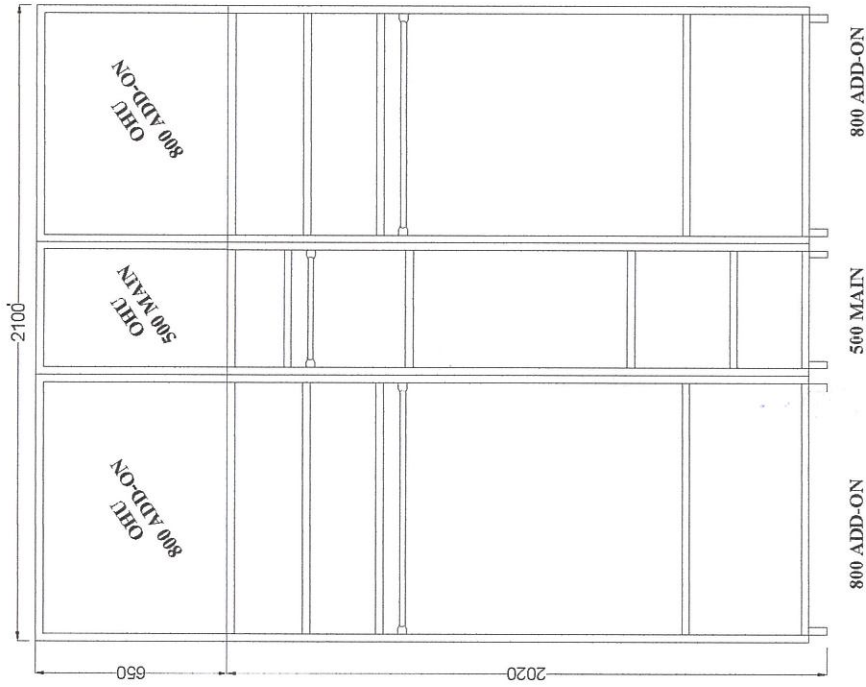


IITH  
TOWER ST1-  
TYPE B1

MASTER BEDROOM



BEDROOM 1



- \* Colour: Shell Wine Red
- \* Handle: Aluminium Handle
- \* One Dresser
- \* One Locker
- \* OHU No Handle (Push Buttons)
- \* PVC Legs 50mm (2")

Drawing Not to Scale

METAL MODULAR WARDROBE UNIT IN STAFF HOUSING TOWER (ST1 - TYPE-B1)

DRAWING NO.  
ST1-TYPE-B1-WD.

DRAWN BY: SYED OMER ALI

JUNIOR ENGINEER (CIVIL)

ASSISTANT ENGINEER (CIVIL)



EXECUTIVE ENGINEER (CIVIL)





# **GEO TECHNICAL INVESTIGATION REPORT**

**Project:**  
**Construction of Indian Institute of Technology  
Hyderabad Campus at Kandi (v), near Sangareddy  
Town, Medak District A.P.**

**Client:**  
**Arcop Associates Private Limited  
New Delhi**

**FEBRUARY- 2012**

**Prepared by:**



**GEO TECHNOLOGIES**  
ISO 9001:2008 COMPANY  
# 5-83/ B, V.V Nagar Street No 8, Habsiguda  
Hyderabad-500 007  
Tel: 42217757, Cell: 9347275255  
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Website: www.geotechnologies.co.in

GT / 0509 / 2011-12



**GEO TECHNICAL INVESTIGATION REPORT**

REPORT No.: GT /0508/2011-12

PROJECT: **Construction of Indian Institute of Technology  
Hyderabad Campus at Kandi (v), near Sangareddy  
Town, Medak District**

CLIENT: **Arcop Associates Private Limited**

DURATION: February 2012

GEOTECHNICAL  
CONSULTANTS:



**GEO TECHNOLOGIES**

**ISO 9001:2008 Company**

# 5-83/B, V. V. NAGAR

HABSIGUDA, STREET No. 8

HYDERABAD - 500 007

Tele/Fax: 040 - 42217757

Email: [info@geotechnologies.co.in](mailto:info@geotechnologies.co.in)

[geo.technologies@yahoo.com](mailto:geo.technologies@yahoo.com)

Website: [www.geotechnologies.co.in](http://www.geotechnologies.co.in)

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## 1. INTRODUCTION

Arcop Associates Pvt. Ltd., are proposing to construct Indian Institute of Technology ,Hyderabad Campus at Kandi Village, near Sangareddy Town, Medak District, AP.

M/s Geo Technologies, Hyderabad, have been awarded the work of Geo Technical Investigations

Geotechnical investigations were carried out by drilling Fifty (50) bore holes, conducting Standard Penetration Tests, collecting soil / rock samples and conducting relevant laboratory tests. All the investigations are carried out in accordance with the relevant BIS (IS) Codes.

Fig.1 gives the Site Plan of the proposed project, showing the locations of bore holes.

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

The aim of this Report is to determine the depth of foundations and the Safe Bearing Capacity based on Field and Laboratory Investigations.



## 2. GEOLOGICAL SET UP

### Regional Geology

The regional geology of Hyderabad, Ranga Reddy and Medak Districts can be represented by the following geochronological succession:

#### The Geochronological Succession of Hyderabad & Ranga Reddy Districts

Age	Rock Formation
Sub-recent to Recent	Alluvium, colluvium and valley fills
Lower Eocene to Upper Cretaceous	Deccan traps; Laterites & Basalts
Pre-Cambrians (Bhimas)	Sandstones, limestones and shales
Archeans	Granites, gneisses, migmatites, pegmatites, quartz veins and dolerite dykes

A major part of the region is underlain by the Peninsular gneissic complex of the Archean age, consisting of pink and grey granites, granitic gneisses, migmatites, pegmatites, quartz veins and dolerite dykes, occurring in the form of domes, scarps, massive columnar blocks and 'tors', scattered over a partly flat and partly undulating country. EW & NS trending dolerite dykes and quartz & pegmatite reefs and veins are intruded into granites and gneisses.



A small eastern extension of the Bhima basin of the Upper Proterozoic age is exposed in the Tandur area in R.R. District. These formations consist of sandstones, shales and limestones. They rest unconformably on the Archean granitic basement.

The Deccan Trap basalts, known as "Plateau basalts", occur in some parts of Ranga Reddy and Medak Districts. They constitute a number of layers of varying texture and thickness and are weathered and vesicular. There are small areas of basaltic strata present as "outliers" in granitic terrain.

**Weathered Zone:**

As a result of natural weathering processes, granites and gneisses are broken and fractured, giving rise to inter-connected fissures, which permit percolation of water through the rock. The percolating water promotes further disintegration and decomposition of the rock. Ultimately, the rock is converted to soil, made up of a coarse granular material, which consists of gravel, sand, silt and clay fractions in its constitution. This soil is locally referred to as morum. Thus, a typical geological section in granitic terrains consists of a top surface soil layer, followed by weathered granite layer (morum & soft disintegrated rock). This is normally underlain by semi-weathered layer / fractured granite, followed by hard un-weathered granite.



**Soils:**

The soils in the granitic terrain thus are mainly derived from residual or 'in-situ' weathering of the parent bed rock. The weathered layer in upland areas and valley sides varies in thickness from a few centimeters to about 15 m. The weathered layer along flood plains of stream courses is overlain by transported sediments, the combined thickness of which range up to 30 m, with an average thickness of about 18 m.

In the basaltic terrain, unconsolidated materials comprise lateritized clay, weathered basalt, inter-trappean clays and alluvial sediments. Laterites are found capping the weathered basalts. The thickness of the latter range up to 30 m and the thickness of the weathered basalts exposed at the ground surface is about 6 m.

Alluvium is of limited extent in this region, and is of limited thickness along the courses of the streams. It generally consists of coarse-to-fine grained sands and clays.

Red soils, comprising loamy-sand, sand, sandy clay, loams and gravel, derived from granites and gneisses, are the predominant types of soils in this region. Red laterite soil, characteristic of basaltic terrains, is predominant. Regar or black cotton soils comprising clay loams, clays and silty clays are found in the low lying areas. The red soils are generally non-alkaline and excessively drained, while black cotton soils are moderately alkaline with high soluble salt content. While alluvial black cotton soils are found along the stream courses and flood plains, residual black cotton soils are present in the upland areas in basaltic terrain.

### 3. FIELD INVESTIGATIONS

#### **BORE HOLES:**

Fifty (50) bore holes were drilled at the specified locations shown in the Site Plan (Fig.1). These are designated as BH-1 to BH-50.

Table-1 gives the details of all the boreholes, showing the location, depth drilled and depth of water table. & Ground levels

#### **DRILLING:**

Rotary Drilling was performed as per IS: 1892. The size of the casing used was 125 to 75 mm yielding samples of NX size.

The following information was collected during the drilling operations:

- Depth-wise soil profile
- Depth and results of SPT
- Details of samples collected
- Colour of return water

#### **SAMPLES:**

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

#### **STANDARD PENETRATION TEST (SPT):**

Standard Penetration Tests were conducted at frequent intervals in the bore holes. These tests were performed as specified in IS: 2131-1981. In this test, a standard weight is dropped through 75 cm height to drive the split-spoon sampler, and the number of blows required to effect three consecutive 15 cm



penetrations is recorded. The first 15 cm penetration is considered as seating drive and neglected. Thereafter, the split-spoon sampler is further driven for 30 cm penetration or 50 blows, whichever is reached earlier. The total number of blows for the second and third 15 cm penetrations is designated as penetration resistance N. If less than 30 cm is penetrated, the number of blows and the depth penetrated are recorded. If the number of blows exceeds 50, Refusal is said to have been reached and further testing is discontinued.

**FIELD BORE LOGS:**

All the details collected from the field operations are presented in Logs of Bore holes in Annexure-1 at the end of this Report. These logs contain depth wise strata details, sample details, results of Standard Penetration Tests and colour of water etc.

#### **4. LABORATORY TESTING**

The samples were tested at our Geo Technical Laboratory of GEO TECHNOLOGIES at Hyderabad.

The following tests were performed on the Soil samples:

- Specific gravity
- Density
- Grain size distribution
- Atterberg's Limits
- Shear tests

All the tests were conducted in accordance with IS: 2720 (Methods of Tests for Soils).



The following tests were conducted on rock samples:

- Specific Gravity
- Porosity
- Water absorption
- Unconfined compressive test

The tests were performed as per IS: 1124 and IS: 9143

## 5. RESULTS

Fig. 2 gives the Logs of bore holes.

Table 2 gives the results of tests on soil samples

Table 3 gives the results of tests on rock samples.

Table 4 gives the results of chemical tests. on soil / water samples.

## 6. SUB-SOIL PROFILE

Based on the detailed soil profiles given above, the generalized sub-soil profile is evolved as follows .:

Depth below GL	Strata	N value
0 – 1.5 m	Silty sand	10 – 25
1.5 – 3 m	Silty garvel	28 – 50
3 – 10 m	Soft Disintegrated Rock (SDR)	>50

Few Bore holes were drilled to 20 m depth, and some were carried to a depth of 30 m below the GL. In these deep bore holes SDR and weathered rock continued till 30 m depth.

Hard rock ( Granite ) was seen in the BH 4.13 and 35 at a depth of 27 m below the GL.,

SPT results in SDR strata indicate that penetration for 50 blows is less than 30 cm, and varies from 2 cm to 20 cm only. Thus, N values consistently exceed 50, showing *refusal*.

The Soft Disintegrated Rock (SDR) is a weathered product of granite, which is the typical rock type in this region. Significant portions of the rock show discolouration and weathering effects. Feldspar grains are dull. The rock has dull sound under hammer and shows significant loss of Strength as compared with fresh rock.

No cores were obtained in SDR strata due to highly weathered nature of strata. Core recovery and RQD are zero.

Core recovery in weathered rock below 25 m depth is low. However, rock cores of more than 10-cm length are not generally obtained, and only small core pieces (2 to 6 cm long) are recovered. Hence, RQD of the rock is generally zero.

Based on Rock Mass Rating (RMR), SDR / weathered rock strata are classified as 'Very poor' rock (Classification No. V) as per IS: 12070.

Water table is seen in some of the boreholes .below 20 m depth.

Open foundations are recommended . Table 5 presents the SBC for each Bore hole.

Appendix gives the calculations for SBC.

## 7. RECOMMENDATIONS

The following recommendations are made for the proposed construction of Indian Institute of Technology Hyderabad Campus at Kandi Village, near Sangareddy Town, Medak district, AP.

These recommendations are based on Field investigations and Laboratory Tests on samples from Fifty (50) Bore Holes.

a) The generalized sub-soil profile is evolved as follows :

Depth below GL	Strata	N value
0 – 1.5 m	Silty sand	10 – 25
1.5 – 3 m	Silty gravel	28 – 50
3 – 10 m	Soft Disintegrated Rock (SDR)	>50

b) Few Bore holes were drilled to 20 m depth, and some were carried to a depth of 30 m below the GL. In these deep bore holes SDR and weathered rock continued till 30 m depth.

c) In SDR strata, N values consistently exceed 50, indicating *refusal*. No cores were obtained in SDR strata due to highly weathered nature of strata. Core recovery and RQD are zero.

d) Core recovery in weathered rock below 25 m depth is low. However, rock cores of more than 10-cm length are not generally obtained, and only small





core pieces (2 to 6 cm long) are recovered. Hence, RQD of the rock is generally zero.

e) Based on Rock Mass Rating (RMR), SDR / weathered rock strata are classified as 'Very poor' rock (Classification No. V) as per IS: 12070.

f) Open foundations are recommended . **Recommended SBC, bore hole – wise, is given in Table 5.** In general, SBC is recommended as follows :

Stratum	Recommended SBC, t /sq m
Soft morum ( Silty sand)	20
Hard morum ( Silty gravel	30
Soft Disintegrated Rock ( SDR)	45

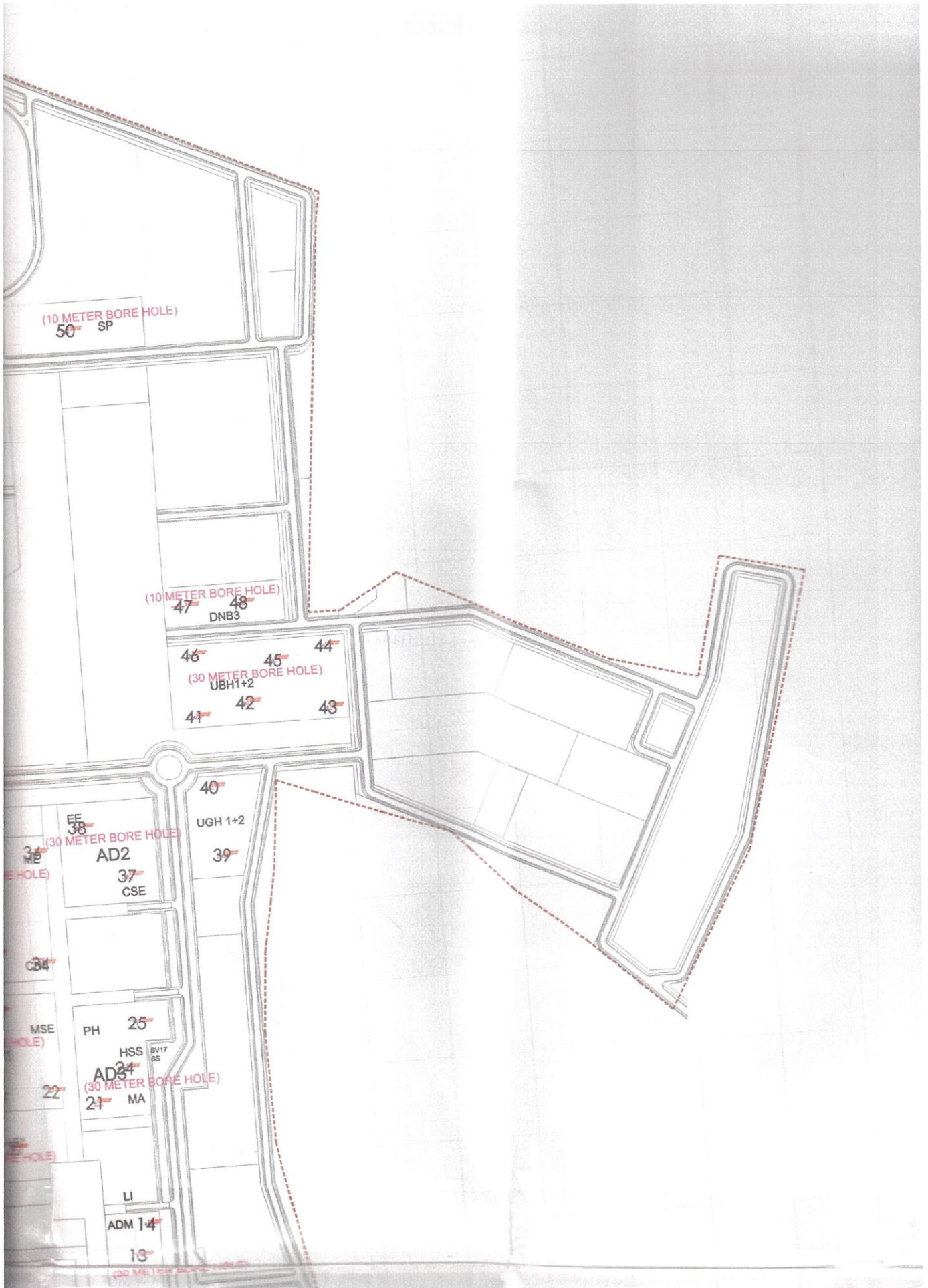
g) Chemical tests on soil / rock show the parameters within permissible limits.



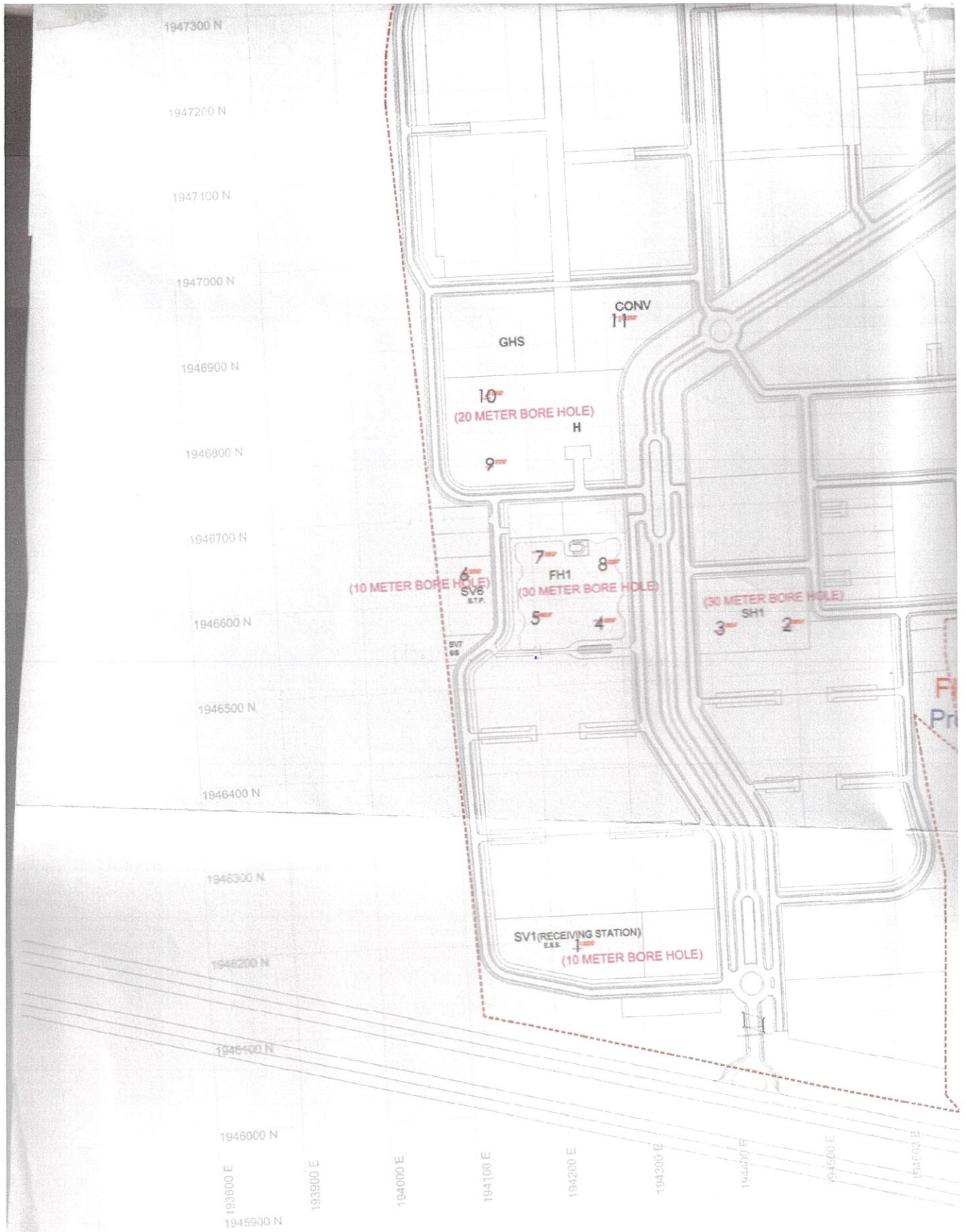
For GEO TECHNOLOGIES

ISO 9001-2008 Company

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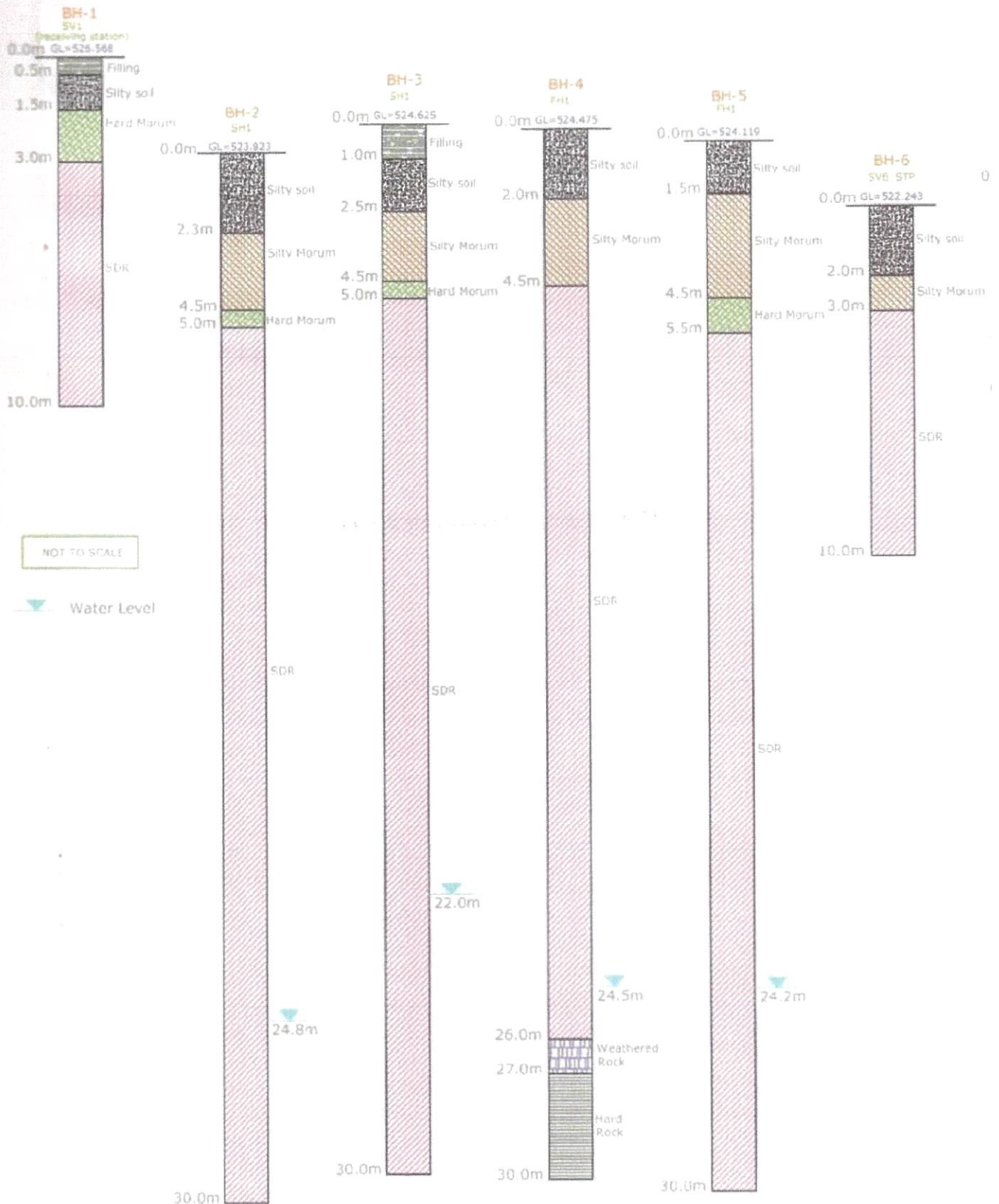




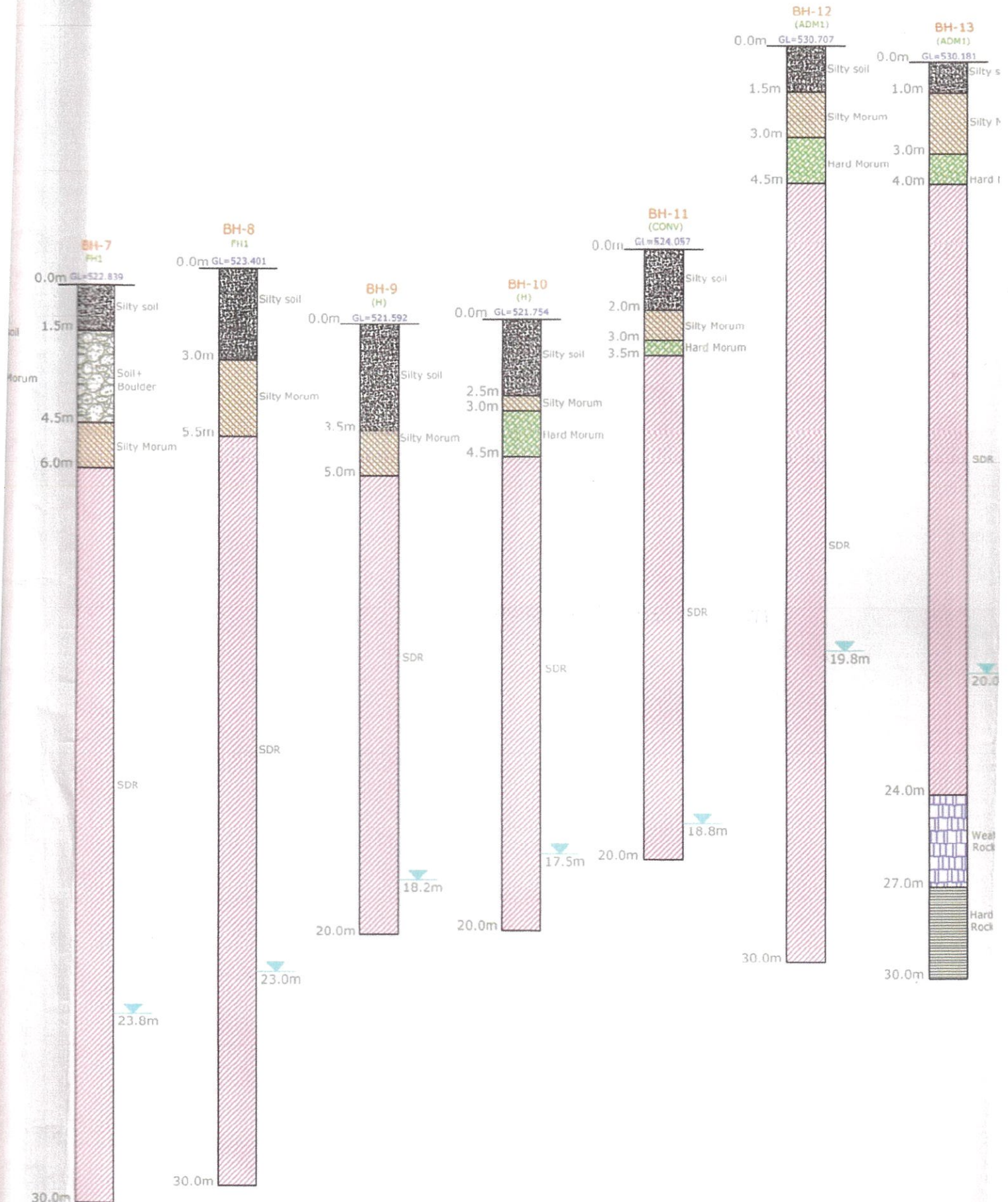


# FIG:2 LOG OF BORE HOLES

Project: Construction of Indian Institute of



of Technology Hyderabad Campus at Kandi (v), near Sang





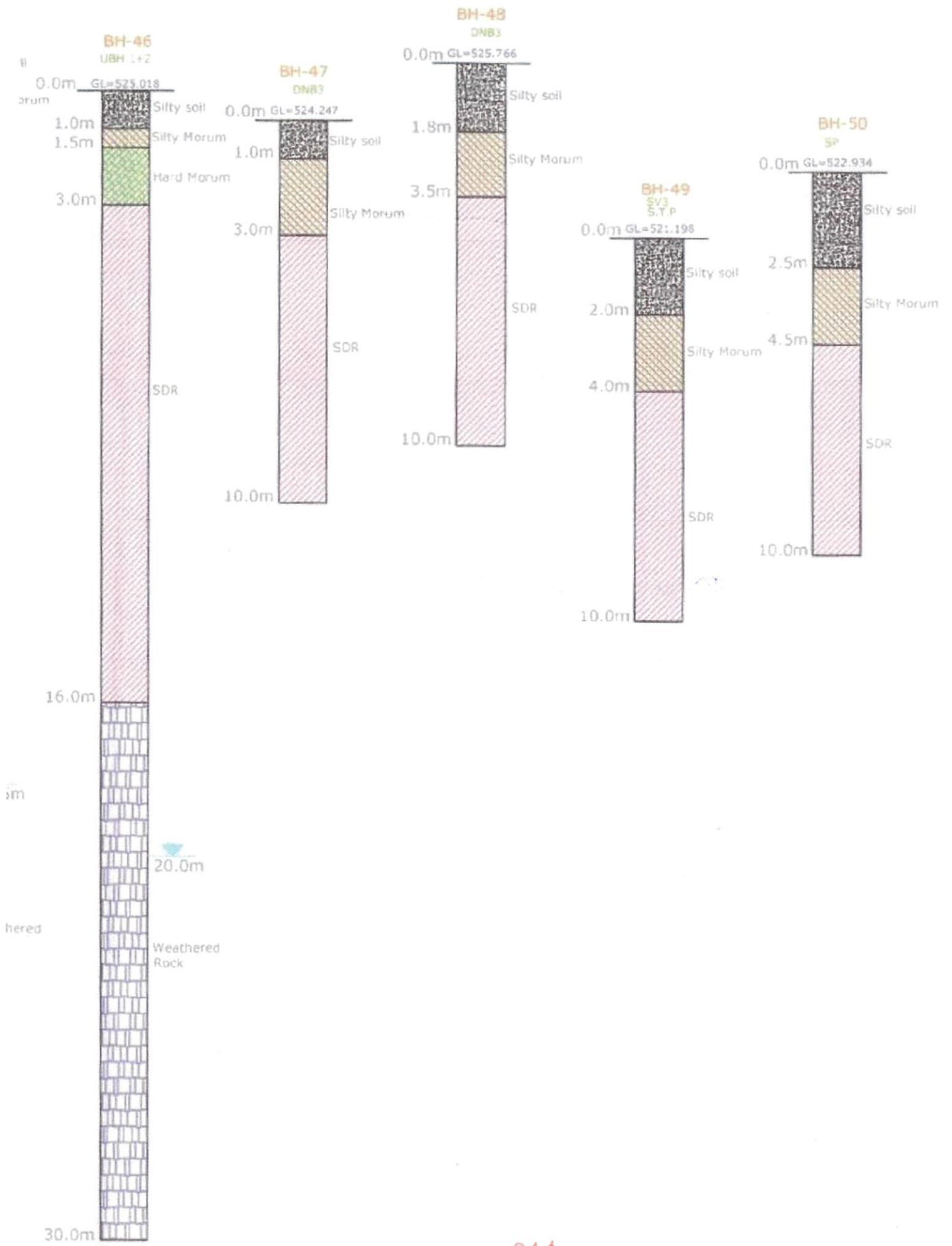




TABLE - 1(a)

## SUMMARY OF DRILLING

Project: Indian Institute of Technology Hyderabad Campus  
at kandi (v), near Sangareddy Town, Medak Dist.

S No.	Block	BH.No.	EGL	Depth drilled, m	Water Table
1	SV-1	BH-1	526.568	10.00	-
2	SH-1	BH-2	523.823	30.00	24.80
3	SH-1	BH-3	524.625	30.00	22.00
4	FH-1	BH-4	524.475	30.00	24.50
5	FH-1	BH-5	524.119	30.00	24.20
6	SV-6	BH-6	522.243	10.00	-
7	FH-1	BH-7	522.839	30.00	23.80
8	FH-1	BH-8	523.401	30.00	23.00
9	H	BH-9	521.592	20.00	18.20
10	H	BH-10	521.754	20.00	18.50
11	CONV	BH-11	524.057	20.00	18.80
12	ADM1	BH-12	530.707	30.00	19.80
13	ADM1	BH-13	530.181	30.00	20.00
14	ADM1	BH-14	529.501	30.00	19.50
15	AV1	BH-15	528.029	10.00	-
16	TC	BH-16	527.951	10.00	-
17	TC	BH-17	528.848	10.00	-
18	LE1A	BH-18	528.939	20.00	-
19	LE1	BH-19	529.860	20.00	19.20
20	LE1	BH-20	530.066	20.00	-

TABLE - 1(c)

<b>SUMMARY OF DRILLING</b>
----------------------------

<b>Project: Indian Institute of Technology Hyderabad Campus at kandi (v), near Sangareddy Town, Medak Dist.</b>
---

S No.	Block	BH.No.	EGL	Depth drilled, m	Water Table
41	UBH 1+2	BH-41	525.787	30.00	19.00
42	UBH 1+2	BH-42	526.822	30.00	20.50
43	UBH 1+2	BH-43	526.451	30.00	19.50
44	UBH 1+2	BH-44	526.588	30.00	21.70
45	UBH 1+2	BH-45	526.368	30.00	19.50
46	UBH 1+2	BH-46	525.018	30.00	20.00
47	DNB3	BH-47	524.247	10.00	—
48	DNB3	BH-48	525.766	10.00	—
49	SV3 STP	BH-49	521.198	10.00	—
50	SP	BH-50	522.934	10.00	—



Table-2  
SUMMARY OF SOIL PROPERTIES

Project: Indian Institute of Technology Hyderabad Campus at kandi (v), near Sangareddy Town, Medak Dist.

BH No	Depth of Sample (m)	Soil Description	Specific Gravity	w.c. %	$\gamma$ kN / cu m	Grain Size, %			Atterberg		Shear Parameters		
						Gravel	Sand	Silt	Clay	LL %	PL %	C kN/m <sup>2</sup>	$\phi$ deg
BH1	1.50	Silty sand	2.69		18.5	12	49	30	9	NP	-	12	33
	3.00	Silty gravel	2.71		18.7	33	12	40	15	32	11.3	33	34
BH-10	1.50	Silty sand	2.68		19.7	-	-	-	-	NP	-	10	33
BH-29	1.50	Do	2.67		18.9	-	-	-	-	NP	-	12	34
BH 34	1.50	Silty sand	2.69		18.7	-	-	-	-	NP	-	15	33
BH 37	1.50	Silty sand	2.69		18.5	15	47	25	13	29	13	16	34
	3.00	Silty gravel	2.66		18.7	34	20	40	6	NP	-	33	35
BH 40	1.50	Silty sand	2.68		19.7	-	-	-	-	NP	-	10	30
	3.00	SDR	2.72		21.3	-	-	-	-	NP	-	-	-
BH 48	3.00	Silty gravel	2.69		18.1	-	-	-	-	NP	-	29	32



TABLE - 3

<b>RESULTS OF TESTS ON ROCK CORES</b>
---------------------------------------

Project: Indian Institute of Technology Hyderabad Campus at kandi (v), near Sangareddy Town, Medak Dist.
---

Rock : Granite

BH No.	DEPTH OF SAMPLE (m)	SPECIFIC GRAVITY	POROSITY (%)	WATER ABSORPTION (%)	UCS kg/cm <sup>2</sup>
BH-4	27.3	2.71	2.95	1.40	340.0
	28.6	2.73	2.86	2.15	235.6
BH-13	27.2	2.73	1.76	1.10	437.2
	28.1	2.75	1.93	0.85	334.1
BH-32	28.9	2.72	2.35	0.95	223.0
BH-35	28.3	2.73	1.86	1.20	349.0
	29.2	2.72	3.12	1.00	239.0

TABLE - 4(a)

## RESULTS OF CHEMICAL ANALYSIS OF WATER

Project: Indian Institute of Technology Hyderabad Campus at  
kandi (v), near Sangareddy Town, Medak Dist.

SL.NO	DESCRIPTION	UNIT	VALUE
1.	pH		6.71
2	Chloride as Cl	mg/l	82
3	Sulfate as So <sub>4</sub>	mg/l	73.20
4	Nitrate as No <sub>3</sub>	mg/l	3.5
5	Sodium as Na	mg/l	44.20

TABLE - 4(b)

## RESULTS OF CHEMICAL ANALYSIS OF SOIL

Project: Indian Institute of Technology Hyderabad Campus at  
kandi (v), near Sangareddy Town, Medak Dist.

SL.NO	DESCRIPTION	UNIT	VALUE
1.	pH		6.73
2	Chloride as Cl	mg/l	71
3	Sulfate as So4	mg/l	66.64
4	Nitrate as No3	mg/l	2.0
5	Sodium as Na	mg/l	50 60



## APPENDIX-1

## TYPICAL CALCULATION OF SAFE BEARING CAPACITY

Project: Indian Institute of Technology Hyderabad Campus at kandi (v), near Sangareddy Town, Medak Dist.

**Foundations resting in silty sand:**

a) Shear Criterion:

Assumed depth of foundation... 2.0 m

Assumed width of foundation... 2.0 m

Unit wt.  $r = 18.5 \text{ KN / cu m}$

Cohesion =  $10 \text{ KN / sq m}$  (Neglected); Angle of internal friction =  $33 \text{ deg.}$

Using IS Code 6403 – 1981 formula:

$N_c = 39.72$                        $N_q = 27.34$                        $N_r = 37.77$

Net, Ult B.C. =  $1.3 c N_c + r D (N_q - 1) + 0.4 r B N_r$

=  $1533 \text{ KN per sq m}$

With a F.S. of 3.0, SBC =  $511 \text{ KN per sq m}$

**b) Settlement Criterion:**

In frictional soils as these, settlement is a better criterion. Based on the results of SPT and direct shear test, corrected value of N is taken as 20. For a permissible settlement of 40 mm,

Allowable bearing capacity =  $12.25 N [(B + 0.3) / B]^2 R_d R_w$   
=  $323 \text{ kN/ sq m}$

For 25 mm settlement, allowable bearing capacity =  $202 \text{ kN/ sq m}$

**c) IS: 8009**

From Fig.9 of IS: 8009 (Part-I)-1976,

For  $N = 20$ ,  $B = 2 \text{ m}$ ,

Rate of Settlement =  $0.012 \text{ m / unit pressure (kg/ sq cm)}$ .

=  $12.0 \text{ mm / unit pressure (kg/ sq cm)}$

For a permissible settlement of 25 mm,

Allowable pressure =  $25/12 = 2.08 \text{ kg/ sq cm} = 20.8 \text{ tonnes per sq m}$

**Recommended Safe Bearing Capacity for foundations resting in silty sand at 2 m depth is 20 tonnes per sq m.**

## APPENDIX 2: CALCULATION OF SBC

Project: Indian Institute of Technology Hyderabad Campus at kandi (v), near Sangareddy  
Town, Medak Dist.

### Foundations resting in SDR (Based on N values)

#### a) Shear criterion:

Assumed width B = 2 m    Assumed Depth D = 3 m

For N = 40 (assumed), Allowable bearing pressure (with F.O.S of 3 ) is:

$$q \text{ (Allowable.)} = 1/18 [2 N^2 BRd + 6(100+N^2) D R_w ] \text{ (KN / sq m)} \quad [R_d = R_w = 1]$$

$$q \text{ (Allowable.)} = 1233 \text{ KN/sq m} = 103 \text{ t / sqm}$$

#### b) Settlement criterion:

(i) IS : 8009 (Part I) 1976 (reaffirmed 1998)

From IS Chart, for N = 40, B = 2 m, Settlement = 0.0058 m / unit pressure (kg/sq cm)

For a maximum settlement of 25 mm,

$$q \text{ (allowable)} = 25/5.8 = 4.31 \text{ kg/sq cm} = 43.1 \text{ t / sq m}$$

(ii) IS: 12070:

According to IS: 12070 (Table-3), Rock Mass Rating (RMR) for rock with RQD < 25% and low uniaxial compressive strength (less than 250 kg/cm<sup>2</sup>) is less than 20, and such rock is classified as 'Very poor' (Classification No. V). SBC recommended by the code for 'Very poor' rock is 40 - 55 t / sq m.

**Recommended SBC is 45 t / sq m,**

ANNEXURE - 1

**FIELD BORE LOGS**



**FIELD BORE LOG CHART**









Project: IIT Campus SV1 (receiving station)			BORE HOLE NO. 1			Ground Level: 526.568 Dia. Of Casing: NX												
Date : 08-01-2012			Water Table:															
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	Details of Rock core			Rate of Drill Min/m								
				Depth (m)	Type		No. of Penetration of (15-30-45)cm	N Value	>10cm core Pieces(cm)		Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour		
0.0	0.5	Filling																
0.5	1.0	Silty soil		1.00 D/S 1.50 SPT		17-19-28	47										Reddish	
1.5	1.5	Hard Morum		2.50 D/S 3.00 SPT		20cm/50blows	>50										Reddish	
3.0	1.5	SDR		4.00 D/S 4.50 SPT		15cm/50blows	>50										Brownish	
4.5	1.5			5.50 D/S 6.00 SPT		11cm/50blows	>50											Brownish
6.0	1.5			7.00 D/S 7.50 SPT		7cm/50blows	>50											Brownish
7.5	1.5			8.50 D/S 9.00 SPT		5cm/50blows	>50										Brownish	
9.0	1.0																Brownish	

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces

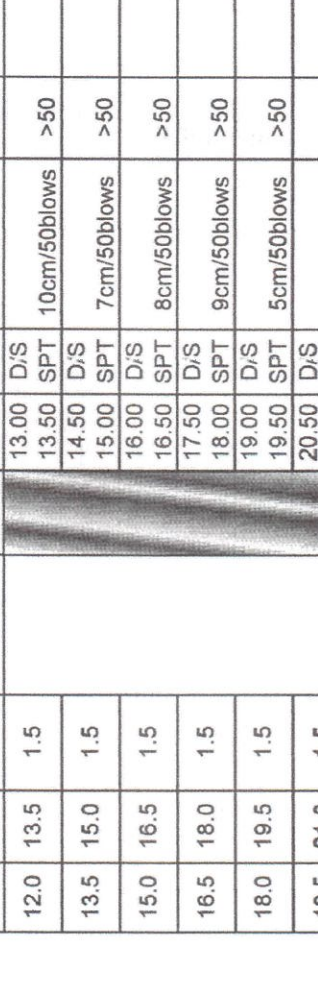
FIELD BORE LOG CHART

Project: IIT Campus (SH1)			BORE HOLE NO. 2			Ground Level: 523.823 Dia. Of Casing: NX Water Table: 24.80 m								
Date : 09-01-2012 to 10-01-2012			SPT			Details of Rock core								
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
				Depth (m)	Type									
0.0	1.5	Silty soil		1.00	D/S	7-8-13	21						Muddy	
1.5	0.8			1.50	SPT									
2.3	0.7	Silty Morum		2.50	D/S	11-12-16	28						Muddy	
3.0	1.5			3.00	SPT									
4.5	0.5	Hard Morum		4.00	D/S	19-23-31	24						Brownish	
5.0	0.5			4.50	SPT									
5.0	1.0	SDR		5.50	D/S	26cm/50blows	>50						Brownish	
6.0	1.5			6.00	SPT									
7.5	1.5	SDR		7.00	D/S	5cm/50blows	>50						Brownish	
9.0	1.5			7.50	SPT									
9.0	1.5	SDR		8.50	D/S	10cm/50blows	>50						Brownish	
10.5	1.5			9.00	SPT									
10.5	1.5	SDR		10.00	D/S	11cm/50blows	>50						Brownish	
12.0	1.5			10.50	SPT									
12.0	1.5	SDR		11.50	D/S	9cm/50blows	>50						Brownish	
				12.00	SPT									

SDR=Soft Disintegrated Rock  
cm/50= no. of blows  
sp=Small pieces vsp=Very Small Pieces  
BH-2 Cont.



**FIELD BORE LOG CHART**

Project: IIT Campus (SH1)		BORE HOLE NO. 2		Ground Level: 523.823		Dia. Of Casing: NX		Water Table: 24.80 m									
Date : 09-01-2012 to 10-01-2012		Details of Rock core															
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m		
				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm	
12.0	13.5	SDR		13.00	D/S	10cm/50blows	>50										
				13.50	SPT												
13.5	15.0			14.50	D/S	7cm/50blows	>50										
				15.00	SPT												
15.0	16.5			16.00	D/S	8cm/50blows	>50										
				16.50	SPT												
16.5	18.0			17.50	D/S	9cm/50blows	>50										
				18.00	SPT												
18.0	19.5			19.00	D/S	5cm/50blows	>50			36		Total sp	24%				
				19.50	SPT												
19.5	21.0			20.50	D/S	6cm/50blows	>50										
				21.00	SPT												
21.0	22.5			22.50	SPT	4cm/50blows	>50										
22.5	24.0			23.50	D/S	5cm/50blows	>50				56	Total sp	37%				
				24.00	SPT												
24.0	25.5	25.00	D/S	5cm/50blows	>50				72	Total sp	48%						
		25.50	SPT														
25.5	27.0	26.50	D/S	3cm/50blows	>50												
		27.00	SPT														
27.0	28.5	28.00	D/S	4cm/50blows	>50				43	Total sp	28.6%						
		28.50	SPT														
28.5	30.0	29.50	D/S	2cm/50blows	>50				60	Total sp	40%						
		30.00	SPT														

SDR=Soft Disintegrated Rock






cm/50= no. of blows

sp=Small pieces

vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: IIT Campus SH1			BORE HOLE NO. 3		Ground Level: 524.625 Dia. Of Casing: NX Water Table: 22.00 m											
Date : 08-01-2012 to 09-01-2012			Details of Rock core													
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m	
				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm
0.0	1.0	Filling														
1.0	0.5	Silty Soil		1.50	SPT	5-8-10	18							Muddy		
1.5	1.0			2.50	D/S										Muddy	
2.5	0.5	Silty Morum		3.00	SPT	16-18-27	45							Muddy		
3.0	1.5			4.00	D/S										Brownish	
4.5	0.5			4.50	SPT	21cm/50blows	>50								Brownish	
5.0	1.0	Hard Morum		5.50	D/S									Brownish		
6.0	1.0			6.00	SPT	18cm/50blows	>50								Brownish	
6.0	1.5	SDR		7.00	D/S									Brownish		
7.5	1.5			7.50	SPT	20cm/50blows	>50								Brownish	
7.5	1.5			8.50	D/S										Brownish	
9.0	1.5			9.00	SPT	17cm/50blows	>50							Brownish		
				10.00	D/S									Brownish		
				10.50	SPT	15cm/50blows	>50							Brownish		

SDR=Soft Disintegrated Rock  
 cm/50= no.of blows  
 sp=Small pieces vsp=Very Small Pieces  
 BH-3 Cont..

FIELD BORE LOG CHART

Project: IIT Campus SH1		BORE HOLE NO. 3		Ground Level: 524.625 Dia. Of Casing: NX													
Date : 08-01-2012 to 09-01-2012		Water Table: 22.00 m		Details of Rock core													
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m		
				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm	
10.5	1.5	SDR		11.50	D/S												
12.0	1.5			12.00	SPT	15cm/50blows	>50									brownish	
12.0	1.5			13.00	D/S												
13.5	1.5			13.50	SPT	17cm/50blows	>50										brownish
13.5	1.5			14.50	D/S												
15.0	1.5			15.00	SPT	19cm/50blows	>50										brownish
15.0	1.5			16.00	D/S												
16.5	1.5			16.50	SPT	14cm/50blows	>50										brownish
16.5	1.5			17.50	D/S												
18.0	1.5			18.00	SPT	11cm/50blows	>50										brownish
18.0	1.5			19.00	D/S												
19.5	1.5			19.50	SPT	11cm/50blows	>50										brownish
19.5	1.5			20.50	D/S												
21.0	1.5			21.00	SPT	9cm/50blows	>50										brownish
21.0	1.5			22.00	D/S												
22.5	1.5			22.50	SPT	9cm/50blows	>50										brownish
22.5	1.5	23.50	D/S														
24.0	1.5	24.00	SPT	7cm/50blows	>50										brownish		
24.0	1.5	25.00	D/S														
25.5	1.5	25.50	SPT	8cm/50blows	>50										brownish		
25.5	1.5	26.50	D/S														
27.0	1.5	27.00	SPT	5cm/50blows	>50										brownish		
27.0	1.5	28.00	D/S														
28.5	1.5	28.50	SPT	5cm/50blows	>50										brownish		
28.5	1.5	29.50	D/S														
30.0	1.5	30.00	SPT	4cm/50blows	>50										brownish		

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces

vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: IIT Campus FH1			BORE HOLE NO. 4			Ground Level: 524.475						
Date : 06-01-2012 to 07-01-2012			Dia. Of Casing: NX			Water Table: 24.50 m						
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		Details of Rock core			Rate of Drill Min/m			
				Depth (m)	Type	No. of >10cm core Pieces(cm)	Total Length (cm)	No. of Pieces		% of core Recovery	RQD Value %	Avg. RQD %
From	To			No. blows for Penetration of (15-30-45)cm	N Value							
0.0	1.5	Silty soil	1.00	D/S							Muddy	
1.5	2.0		1.50	U/S								Muddy
2.0	3.0	Silty Morum	2.50	D/S							Brownish	
3.0	4.5		3.00	SPT	17-18-19	37						Brownish
4.5	6.0	SDR	4.00	D/S							Brownish	
6.0	7.5		4.50	SPT	30cm/60blows	>50						Brownish
7.5	9.0		5.50	D/S								Brownish
9.0	10.5		6.00	SPT	25cm/50blows	>50						Brownish
10.5	12.0		7.00	D/S								Brownish
12.0	13.5		7.50	SPT	21cm/50blows	>50						Brownish
			8.50	D/S								Brownish
			9.00	SPT	20cm/50blows	>50						Brownish
			10.00	D/S								Brownish
			10.50	SPT	20cm/50blows	>50						Brownish
		11.50	D/S								Brownish	
		12.00	SPT	17cm/50blows	>50						Brownish	
		13.00	D/S								Brownish	
		13.50	SPT	15cm/50blows	>50						Brownish	

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces  
BH-4 Cont..



FIELD BORE LOG CHART

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N	>10cm core Pieces(cm)	Details of Rock core			Water colour	Rate of Drill Min/m
From	To				Depth (m)	Type				No. blows for Penetration of (15-30-45)cm	Total Length (cm)	No. of Pieces		
Project: IIT Campus FH1 Date : 06-01-2012 to 07-01-2012 Ground Level: 524.475 Dia. Of Casing: NX Water Table: 24.50 m BORE HOLE NO. 4														
13.5	15.0	1.5			14.50 C/S									
					15.00 SPT	16cm/50blows	>50						Brownish	
15.0	16.5	1.5			16.00 C/S									
					16.50 SPT	15cm/50blows	>50						Brownish	
16.5	18.0	1.5			17.50 C/S									
					18.00 SPT	13cm/50blows	>50						Brownish	
18.0	19.5	1.5			19.00 C/S									
					19.50 SPT	14cm/50blows	>50						Brownish	
19.5	21.0	1.5	SDR		20.50 C/S									
					21.00 SPT	11cm/50blows	>50						Brownish	
21.0	22.5	1.5			22.00 C/S									
					22.50 SPT	5cm/50blows	>50						Brownish	
22.5	24.0	1.5			23.50 C/S									
					24.00 SPT	5cm/50blows	>50						Brownish	
24.0	25.5	1.5			25.00 C/S									
					25.50 SPT	3cm/50blows	>50						Brownish	
25.5	26.0	0.5												
26.0	27.0	1.0	Weathered Rock			Core Sample		-	44	Total sp	44%	-	Milky	
27.0	28.0	1.0				Core Sample		15+32+13=60	60	3no only	60%	60%	Milky	
28.0	29.0	1.0	Hard Rock			Core Sample		40	68	1no+4 sp	68%	40%	Milky	
29.0	30.0	1.0				Core Sample		75	75	1no only	75%	75%	Milky	

sp=Small pieces vsp=Very Small Pieces

cm/50= no of blows

SDR=Soft Disintegrated Rock

FIELD BORE LOG CHART

Project: IIT Campus FH1			Ground Level: 524.119			BORE HOLE NO. 5			Dia. Of Casing: NX			Water Table: 24.20 m					
Date : 07-01-2012 to 08-01-2012			Log of Bore			Sampling			SPT			Details of Rock core					
Depth (m)	Length of Run (m)	Description	Log of Bore	Depth (m)	Type	No. blows for Penetration of (15-30-45)cm	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m		
																From	To
0.0	1.5	Silty soil		1.00	D/S	8-9-15	24										
	1.5			1.50	SPT												
1.5	3.0	Silty Morum		2.50	D/S	11-13-17	30										
	1.5			3.00	SPT												
3.0	4.5			4.00	D/S												
	1.5	Hard Morum	4.50	SPT	17-8-13	21											
4.5	5.5		5.50	D/S													
5.5	6.0	SDR		6.00	SPT	21cm/50blows	>50										
	0.5			7.00	D/S												
6.0	7.5			7.50	SPT	20cm/50blows	>50										
	1.5			8.50	D/S												
7.5	9.0			9.00	SPT	19cm/50blows	>50										
	1.5			10.00	D/S												
9.0	10.5			10.50	SPT	17cm/50blows	>50										
	1.5			11.50	D/S												
10.5	12.0			12.00	SPT	18cm/50blows	>50										
	1.5			13.00	D/S												
12.0	13.5	13.50	SPT	15cm/50blows	>50												

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces

BH-5 Cont..









FIELD BORE LOG CHART

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT		Details of Rock core			RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m		
From	To				Depth (m)	Type	No. blows for Penetration of (15-30-45)cm	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces					% of core Recovery	
13.5	15.0	1.5	SDR		14.50	D/S	17cm/50blows	>50						Milky			
					15.00	SPT											
15.0	16.5	1.5			16.00	D/S	14cm/50blows	>50								Milky	
					16.50	SPT											
16.5	18.0	1.5			17.50	D/S	13cm/50blows	>50								Milky	
					18.00	SPT											
18.0	19.5	1.5			19.00	D/S	14cm/50blows	>50								Milky	
					19.50	SPT											
19.5	21.0	1.5			20.50	D/S	14cm/50blows	>50								Milky	
					21.00	SPT											
21.0	22.5	1.5			22.00	D/S	15cm/50blows	>50								Milky	
					22.50	SPT											
22.5	24.0	1.5			23.50	D/S	11cm/50blows	>50								Milky	
					24.00	SPT											
24.0	25.5	1.5			25.00	D/S	10cm/50blows	>50								Milky	
			25.50	SPT													
25.5	27.0	1.5	26.50	D/S	11cm/50blows	>50								Milky			
			27.00	SPT													
27.0	28.5	1.5	28.00	D/S	8cm/50blows	>50								Milky			
			28.50	SPT													
28.5	30.0	1.5	29.50	D/S	4cm/50blows	>50								Milky			
			30.00	SPT													
										63	Total sp	42%					

SDR=Soft Disintegrated Rock      cm/50= no. of blows      sp=Small pieces      vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: IIT Campus (AD4 Building)			BORE HOLE NO. 6		Ground Level: 522.243		Dia. Of Casing: NX								
Date : 08-01-2012			Water Table:		Details of Rock core		Rate of Drill Min/m								
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	
				Depth (m)	Type										No. blows for Penetration of (15-30-45)cm
0.0	1.5	Silty soil		1.00	D/S	4-7-9	16							Muddy	
				1.50	SPT										
1.5	0.5														Muddy
2.0	3.0	Silty Morum		2.50	D/S	15-19-26	45							Brownish	
				3.00	SPT										
3.0	4.5	SDR		4.00	D/S	19cm/50blows	>50							Brownish	
				4.50	SPT										
4.5	6.0	SDR		5.50	D/S	20cm/50blows	>50							Brownish	
				6.00	SPT										
6.0	7.5	SDR		7.00	D/S	14cm/50blows	>50							Brownish	
				7.50	SPT										
7.5	9.0	SDR		8.50	D/S	10cm/50blows	>50							Brownish	
				9.00	SPT										
9.0	10.0	SDR		10.00	D/S										Brownish



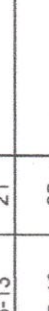

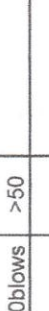
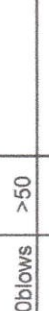
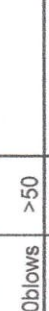
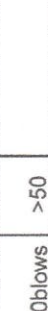
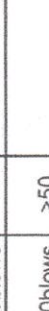
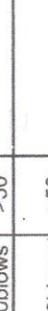
SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces

vsp=Very Small Pieces

FIELD BORE LOG CHART

Project: IIT Campus (AD4 Building)			BORE HOLE NO. 7			Ground Level: 522.839 Dia. Of Casing: NX Water Table: 23.80 m								
Date : 07-01-2012 to 08-01-2012			SPT			Details of Rock core								
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		N	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
				Depth (m)	Type									
0.0	1.5	Silty soil		1.00 D/S	15								Muddy	
1.5	3.0	Soil + Boulder		1.50 SPT	21								Muddy	
3.0	4.5			2.50 D/S	32								Muddy	
4.5	6.0	Silty Morum		3.00 SPT	>50								Brownish	
6.0	7.5			4.00 D/S	>50								Brownish	
7.5	9.0			4.50 SPT	>50								Brownish	
9.0	10.5			5.50 D/S	>50								Brownish	
10.5	12.0	SDR		6.00 SPT	>50								Brownish	
12.0	13.5			7.00 D/S	>50								Brownish	
13.5	15.0			7.50 SPT	>50								Brownish	
				8.50 D/S	>50								Brownish	
				9.00 SPT	>50								Brownish	
				10.00 D/S	>50								Brownish	
				10.50 SPT	>50								Brownish	
				11.50 D/S	>50								Brownish	
				12.00 SPT	>50								Brownish	
				13.00 D/S	>50								Brownish	
				13.50 SPT	>50								Brownish	
				14.50 D/S	>50								Brownish	
				15.00 SPT	>50								Brownish	

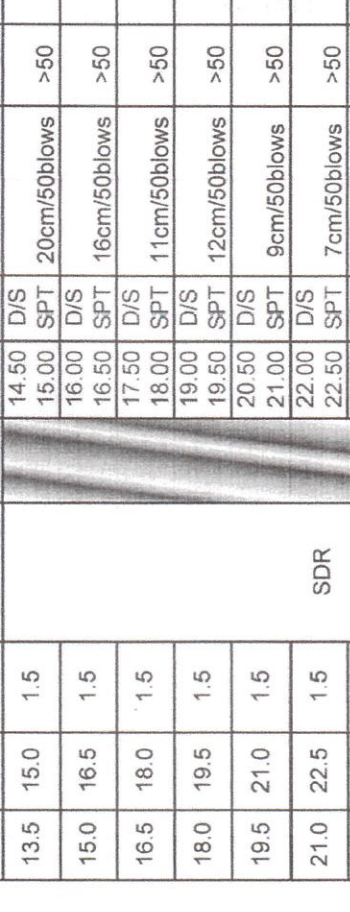
SDR=Soft Disintegrated Rock  
 cm/50= no. of blows  
 sp=Small pieces vsp=Very Small Pieces  
 BH-7 Cont..









FIELD BORE LOG CHART																
Project: IIT Campus FH1				BORE HOLE NO. 8				Ground Level: 523.401 Dia. Of Casing: NX Water Table: 23.00 m								
Date : 06-01-2012 to 07-01-2012																
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Details of Rock core			Rate of Drill Min/m				
				Depth (m)	Type				No. blows for Penetration of (15-30-45)cm	Total Length (cm)	No. of Pieces		% of core Recovery	RQD Value %	Avg. RQD %	Water colour
13.5	15.0	SDR		14.50	D/S											
	15.0			15.00	SPT	20cm/50blows	>50							Brownish		
15.0	16.5			16.00	D/S										Brownish	
	16.5			16.50	SPT	16cm/50blows	>50									Brownish
16.5	18.0			17.50	D/S											Brownish
	18.0			18.00	SPT	11cm/50blows	>50									Brownish
18.0	19.5			19.00	D/S											Brownish
	19.5			19.50	SPT	12cm/50blows	>50									Brownish
19.5	21.0			20.50	D/S											Brownish
	21.0			21.00	SPT	9cm/50blows	>50									Brownish
21.0	22.5			22.00	D/S											Brownish
	22.5			22.50	SPT	7cm/50blows	>50									Brownish
22.5	24.0			23.50	D/S											Brownish
	24.0			24.00	SPT	6cm/50blows	>50									Brownish
24.0	25.5			25.00	D/S											Brownish
	25.5			25.50	SPT	7cm/50blows	>50									Brownish
25.5	27.0	26.50	D/S											Brownish		
	27.0	27.00	SPT	5cm/50blows	>50									Brownish		
27.0	28.5	28.00	D/S											Brownish		
	28.5	28.50	SPT	3cm/50blows	>50									Brownish		
28.5	30.0	29.50	D/S											Brownish		
	30.0	30.00	SPT	3cm/50blows	>50									Brownish		

SDR=Soft Disintegrated Rock


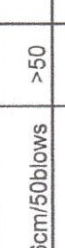

cm/50= no.of blows

sp=Small pieces

vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: IIT Campus (DNB3)		Ground Level: 524.247		BORE HOLE NO. 47		Dia. Of Casing: NX												
Date : 02-02-2012		Water Table:		Details of Rock core														
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m			
				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm	Value	
0.0	1.0	Silty soil		1.00	D/S													
1.0	0.5	Silty Morum		1.50	SPT	9-14-21	35											
1.5	1.5			2.50	D/S													
3.0	1.5	SDR		3.00	SPT	16-22-31	53											
4.5	1.5			4.00	D/S													
6.0	1.5			4.50	SPT	16cm/50blows	>50											
7.5	1.5			5.50	D/S													
9.0	1.5			6.00	SPT	10cm/50blows	>50											
				7.00	D/S													
				7.50	SPT	6cm/50blows	>50											
				8.50	D/S													
				9.00	SPT	4cm/50blows	>50											
				10.00	D/S													

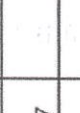
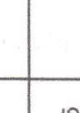
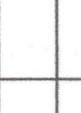
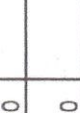
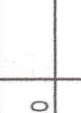
SDR=Soft Disintegrated Rock

cm/50= no. of blows

sp=Small pieces vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: IIT Campus (DNB3)		BORE HOLE NO. 48		Ground Level: 525.766 Dia. Of Casing: NX											
Date : 01-02-2012 to 02-02-2012		Water Table:		Details of Rock core											
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
				Depth (m)	Type										
0.0	1.5	Silty soil		1.00	D/S	7-7-10	17							Red	
1.5	0.3			1.50	SPT										
1.8	1.2	Silty Morum		2.50	D/S	14-17-28	45							Red	
3.0	0.5			3.00	SPT										
3.5	1.0	SDR		4.00	D/S	18cm/50blows	>50							Brownish	
4.5	1.5			4.50	SPT										
6.0	1.5			5.50	D/S										
6.0	1.5	SDR		6.00	SPT	15cm/50blows	>50							Brownish	
7.5	1.5			7.00	D/S										
7.5	1.5			7.50	SPT										
9.0	1.5	SDR		8.50	D/S	9cm/50blows	>50							Brownish	
9.0	1.0			9.00	SPT										
9.0	1.0	10.00	D/S	10.00	D/S	4cm/50blows	>50							Brownish	

SDR=Soft Disintegrated Rock      cm/50= no.of blows      sp=Small pieces      vsp=Very Small Pieces

**Annexure – 2**

**BIS (IS) CODES**

1. IS: 2131 – 1981: Method of Standard Penetration Test for Soils.
2. IS: 4968 (Part 1) – 1976: Method for subsurface sounding for soils.
3. IS: 2132: Code of Practice for thin walled tube sampling of Soils.
4. IS: 2720 Part I onwards: Methods of Laboratory Tests for Soils.
5. IS: 1498 – 1970: Classification and Identification of Soils for General Engineering Purpose.
6. IS: 1122-1974: Method of test for determination of true specific gravity of natural building stones.
7. IS: 1124-1974 (reaffirmed 2003): Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.
8. IS: 8764-1978: Method of test for determination of point load strength index of rocks.
9. IS: 6403 – 1981: Code of Practice for determination of Bearing Capacity of Shallow Foundations.
10. IS: 12070 – 1987: Code of Practice for Design and Construction of Shallow Foundations on Rocks.
11. IS: 8009 – 1976 (Part I): Code of Practice for calculation of settlements of Foundations.
12. IS: 78 – 1983 – Appendix I: Classification and Characteristics of Rocks.
13. IS: 1892 – 1962: Code of Practice for Site Investigations for Foundations.
14. IS: 4453 – 1985: Code of Practice for presentation of drilling information and core description in foundation investigation.
15. IS: 4078: Code of Practice for indexing and storage of drill cores.
16. IS: 6926 – 1996: Diamond Core Drilling for Site Investigation.