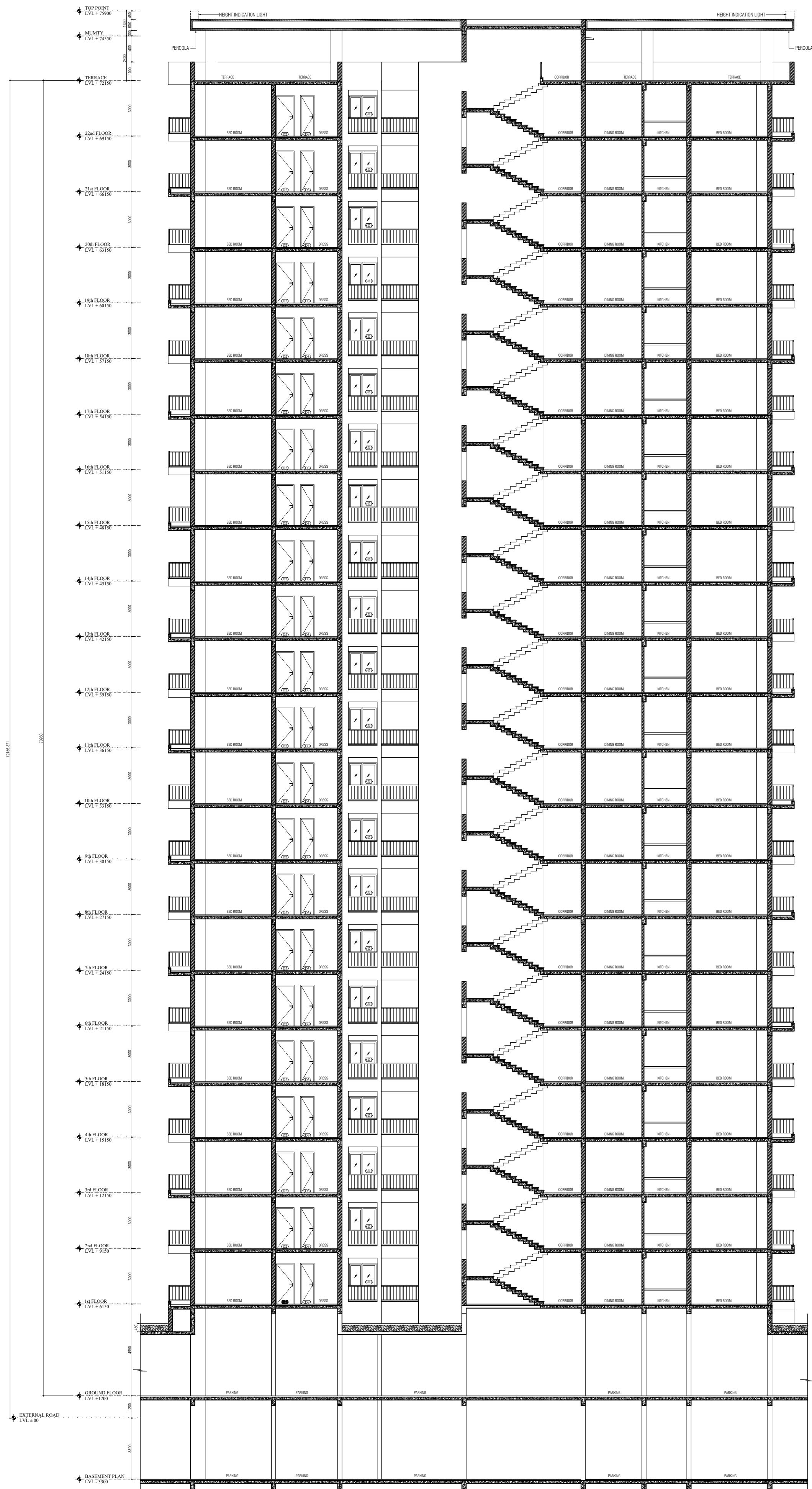


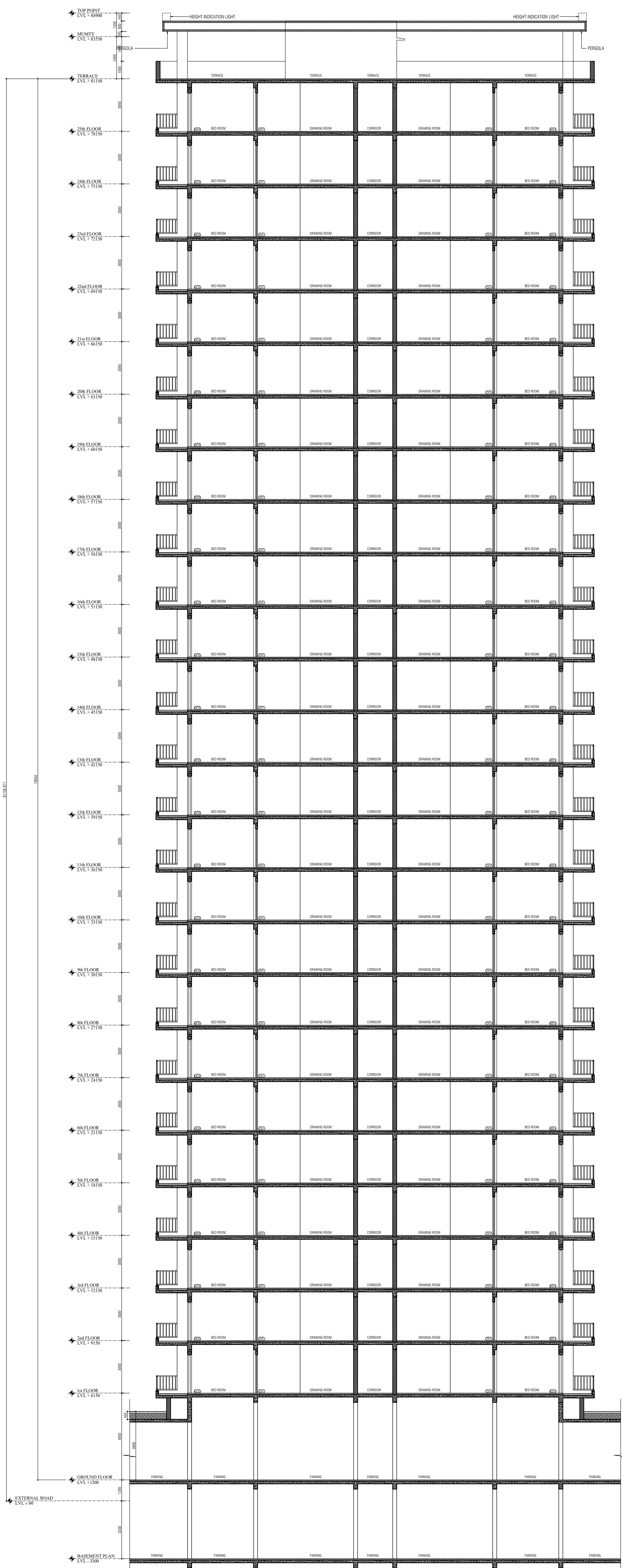
Annexure -VIII

Section Plan



TOWER-B
SECTION AT-S2

01



TOWER-B
SECTION AT-S1

02

PLOT DETAILS:-

PROPOSED COMMERCIAL & RESIDENTIAL BUILDING OF
(1) NEEBHA SINGH (2) ASHOK KUMAR GUPTA & OTHERS
(3) UMA DEVI (4) DILIP KUMAR & OTHERS
(5) KUMAR SHIVAM (6) PARBHA SAHAY
(7) MUKULCHAND SINGH (8) RAJNI VERMA & OTHERS
(9) SRIMATI LAKHPATI DEVI & OTHERS
(10) JAILENDRA KUMAR & OTHERS
(11) KUMARI KOMAL (12) SHRIMATI MADHWI & OTHERS
(13) SHRIMATI HEMANT DEVI & OTHERS
(14) SHRIMATI SWATI SHURBHI & OTHERS
(15) SHRIMATI SONI DEVI & OTHERS
(16) NITISH KUMAR (17) ASHOK KUMAR SINGH
(18) AISHWARYA SINGH (19) HARENDRA KUMAR SINGH
(20) PRINYANKA SINGH (21) GAURAV TANDAN
(22) DIVESH KUMAR (23)SHRIMATI LALITA DEVI & OTHERS
(24) SHRIMATI KUMARI KANCHAN & OTHERS
(25) SHRIMATI SHARMILA KUMARI & OTHERS
(26) ASHOK KUMAR & OTHERS (27) KUMARI NITU SINHA &
OTHERS (28) SANJAY SINGH & OTHERS (29) PUJA SINGH
(30) VIKASH KUMAR SINGH (31) MANISH KUMAR JHA
(32) MANISH KUMAR JHA (33) PRAKASH SINGH
(34) SUNITA SINGH (35) GITIKA (36) GITIKA
AT MAUZA SARARI & LAKHNIBIGHA, KHATA NO- 375,175,
186,185,29,391,188,204,413,81,331,81. PLOT NO-546,547,19
,20,39,14,526,40,41,521,52,525,522,15. THANA NO-44,41
AT USARI SARARI DANAPUR PATNA.

DEVELOPER:-
M/S MUNDESHWARI MULTICON PVT. LTD.

TOWER-B	SCALE 1:100		DRAWING NO.
			06/25

	SIG. OF STRUCTURE ENGINEER

SIGNATURE OF DEVELOPER	SIGNATURE OF ARCHITECT
------------------------	------------------------

Annexure-IX

Parking Plan



BASEMENT PLAN
391 New CAR PARKING
AREA-50410 SQM



Annexure-X
Soil Investigation Report

REPORT ON
GEOTECHNICAL INVESTIGATIONS

FOR THE PROPOSED

**New Building Sarari City
At
Patna**

Your Ref. No. Nil Date 16.11.2021

Submitted to
Mundeshwari Multicon Pvt. Ltd.

Office: - 1st Floor, Amitabh Kunj, Main Road, Buddha Colony
Patna - 800 001

January, 2022



तमसो मा ज्योतिर्गमय

BAIDYANATH FOUNDATION CONSULTANTS PVT. LTD.

[Unit : Bihar Foundation Consultants]

Having an

NABL Accredited / ISO 9001: 2015 Certified Laboratory

Ganga Darshan Apartment, Flat No. 403.

Patna - 10

[e-mail : bifcon.pat@gmail.com, Phone No: + 91612 - 2272826]



New Building Sarari City at Patna



Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

PN - 211226



CONTENTS

<u>Sl.No.</u>	<u>Description</u>	<u>Page No.</u>
1	Introduction	1
2	Field Work	1
3	Laboratory Test	2
4	Presentation of Test Results	2
5	Soil Stratification	2
6	Foundation Analysis	2
7	Recommendations	3-5

Appendix

[Containing Figures and Tables]

- A. Bore Holes Location Map
- B. Field Test Observations & Laboratory Test Results
- C. Graph of Grain size Analysis
- D. Triaxial shear / Direct shear strength test curves
- E. 'e-log p' Curves from Consolidation Tests
- F. Sample calculation of pile / bearing capacity
- G. Copy of Work Order



Report on Sub Soil Investigations for the Proposed
New Building Sarari City at Patna

1. INTRODUCTION

The subsoil investigations reported herein were taken up [Your Ref. No. Nil Date 16.11.2021] to find out the nature of subsoil at the site of the proposed construction and to recommend the capacity and type of its foundation.

After certain tests on the soil, as detailed below, the desired recommendations have been made on **page 3-4** of this Report.

2. FIELD WORK

The fieldwork consisted of sinking bore holes, collecting soil samples and conducting the necessary field tests.

2.1. Boring

Taking guidance from IS: 1892, 150 mm diameter bore holes were sunk at locations shown in the bore hole location map.

2.2 Sampling

2.2.1 Undisturbed Soil Samples

Open drive samplers of 100-mm diameter and about 450-mm length were used for obtaining undisturbed samples of cohesive soils. The collection, sealing, labeling and transportation of the samples to the laboratory were done as per the IS guide-lines.

2.2.2 Disturbed Soil Samples

Disturbed soil samples were collected at suitable intervals of depth (not more than 2.5 m) and at all depths of change in the nature of the subsoil. These samples were sealed in polythene bags with proper identification labels.

2.3 Field Tests

2.3.1 Standard Penetration Tests (SPT)

These tests were conducted as per IS: 2131 – 1963. The depth interval between two consecutive tests was 1 to 1.5 m. The tests were located in between the levels at which undisturbed soil samples were collected.



Report on Sub Soil Investigations for the Proposed
New Building Sarari City at Patna

3. LABORATORY TESTS

Some or all of the following laboratory tests, as necessary, were done on the collected soil samples. Representative soil samples were selected for this from the different soil strata encountered during boring. The tests were performed as per the relevant Indian Standard Codes of Practice.

- (a) Natural moisture content
- (b) Bulk density
- (c) Grain size analysis (using sieves and / or hydrometer)
- (d) Specific gravity of soil solids
- (e) Atterberg's limit tests (liquid, plastic and shrinkage limits)
- (f) Shear Tests :
 - [I] Triaxial compression test (unconsolidated – undrained), generally for fine-grained soils
 - [II] Unconfined compression tests, only on cohesive soils
 - [III] Direct shear tests, generally for coarse-grained soils
- (g) Other tests as and when required.

4. PRESENTATION OF TEST RESULTS

The field and laboratory test are given in the **Appendix B**.

5. SOIL STRATIFICATION

The results of field tests in thirteen bore holes sunk at the site [vide Location Sketch in App. A] and the results of laboratory tests conducted on the collected soil samples indicate that the soil stratification at the site is as describe below.

The sub soil in all BH's is sandy silty clay /sandy silty clay [types CH/CL/CI] up to the depth of about 22.5 m in BH 1 to 11 and 21.0 m in BH 12 and 13. Then follows silty sand / sand [type SM-SP/SP] up to the investigated depth of [30.0 m bgl in BH 1 to 7 and 9 to 11] and [35.0 m bgl in BH 8, 12 and 13]. It is also gritty at some locations and depths.

Ground water table was struck at about 2.30 m to 4.20 m depth below GL in January 2022 It is subject to seasonal variations.

6. FOUNDATION ANALYSIS

The safe capacity of foundation of any type and size may be determined on the basis of the soil data given in this Report by using the standard methods of foundation design and following the relevant Indian Standard Codes.



Report on Sub Soil Investigations for the Proposed
New Building Sarari City at Patna

7. RECOMMENDATIONS

The design of the foundation for the proposed structure depends on the nature of both [a] the subsoil and [b] the structure.

The sub soil in all BH's is sandy silty clay /sandy silty clay [types CH/CL/CI] up to the depth of about 22.5 m in BH 1 to 11 and 21.0 m in BH 12 and 13. Then follows silty sand / sand [type SM-SP/SP] up to the investigated depth of [30.0 m bgl in BH 1 to 7 and 9 to 11] and [35.0 m bgl in BH 8, 12 and 13]. It is also gritty at some locations and depths.

Ground water table was struck at about 2.30 m to 4.20 m depth below GL in January 2022 It is subject to seasonal variations.

Hence, any one or more of the following three alternative foundation types may be used, depending on structural and economic considerations:

1. The subsoil is soft up to about 2 m in BH 11. Hence the proposed structure may be provided with shallow foundation at a depth of 2.0 m or more.
2. Plane piles of lengths 12.0 m to 35.0 m with shaft diameters 0.30 m, 0.40 m, 0.50 m and 0.60 m may be adopted.
3. U/r piles of lengths 4.0 m to 10.0 m may be used. The diameter of the bulb should be two times the stem diameter. The stem diameters may be taken as 0.25 m, 0.30 m, 0.40 m and 0.50* m.

***However 0.5 m stem diameter shall be used for U/R piles of lengths 6 m or more.**

By way of example, the values of safe capacities of each one of the above three types of foundations of the above mentioned sizes and depths have been calculated (vide Samples of Calculations in Appendix F) and are tabulated below.

Table 1: Allowable Net Bearing Pressures [q_{an}] and Settlements Expected [s]

Depth (m)	Width (m)	Net allowable bearing pressure (t/m ²) for			Maximum expected settlement (mm)
		Strip footing	Square footing	Raft footing	
2.0	2.0	6.0	7.1	...	75
	3.0	5.4	6.8	...	75
	10.0	...	...	6.4	100
2.5	2.0	7.8	9.3	...	75
	3.0	6.0	8.7	...	75
	10.0	...	...	7.4	100
3.0	2.0	10.0	12.1	...	75
	3.0	6.6	11.2	...	75
	10.0	...	...	7.8	100
3.5	2.0	10.6	12.7	...	75
	3.0	7.3	11.6	...	75
	10.0	...	...	8.1	100
4.0	2.0	11.1	13.2	...	75
	3.0	7.9	12.0	...	75
	10.0	...	...	8.5	100
4.5	2.0	11.5	13.8	...	75
	3.0	8.5	12.4	...	75
	10.0	...	...	8.9	100



Report on Sub Soil Investigations for the Proposed
New Building Sarari City at Patna

Table 2. Safe Capacities of Plane Piles
[Factor of safety = 2.5 in skin friction and 3 in bearing]

Pile length [m]	Safe Capacities [tonnes] For Plane Piles of diameters (m) (<i>SUBJECT TO CHECKING FOR SLENDERNESS RATIO**</i>)			
	0.3 m	0.4 m	0.5 m	0.6 m
12.0	17.0	23.9	31.2	39.2
14.0	21.0	29.6	38.8	48.7
16.0	25.0	35.2	46.0	57.8
18.0	29.0	40.7	53.2	66.8
20.0	33.2	46.7	61.2	76.8
22.0	37.4	52.6	69.0	86.7
23.0	38.8	55.4	74.3	96.1
25.0	41.7	60.5	82.3	107.7
27.0	44.5	65.5	90.2	118.9
29.0	47.4	70.6	98.1	130.4
31.0	50.3	75.8	106.2	142.1
33.0	53.2	81.0	114.5	154.1
35.0	56.1	86.2	122.6	165.8

**For a preliminary checking of the slenderness ratio, the modulus of subgrade reaction (k) may be estimated from the following empirical relation given in IS: 2950-1981 (Second Revision) Table 1.
 $k \text{ (kN/m}^3\text{)} = 240 c$, where $c \text{ (kN/m}^2\text{)}$ is the value of cohesion of the soil at the concerned depth.



Report on Sub Soil Investigations for the Proposed
New Building Sarari City at Patna

**Table 3. Safe Capacities of U/R Piles [Factor of safety = 2.5]
[Bulb diameter = 2.0 times the shaft diameter]**

Pile length below pile Cap (m)	Safe Pile Capacity [tonnes] (SUBJECT TO CHECKING FOR SLENDERNESS RATIO**)							
	Stem diameter (m)							
	0.25		0.30		0.40		0.50	
	One bulb	Two bulbs	One bulb	Two bulbs	One bulb	Two bulbs	One bulb	Two bulbs
4.0	3.7	4.6	5.1	6.3	8.3	10.5		
6.0	4.8	6.1	6.3	8.2	10.0	13.7	14.5	19.7
8.0	5.0	6.1	6.4	8.0	9.7	12.4	13.6	17.8
10.0	6.9	8.0	9.0	10.5	13.8	16.5	19.5	23.8

**For a preliminary checking of the slenderness ratio, the modulus of subgrade reaction (k) may be estimated from the following empirical relation given in IS: 2950-1981 (Second Revision) Table 1.
 $k \text{ (kN/m}^3\text{)} = 240 c$, where $c \text{ (kN/m}^2\text{)}$ is the value of cohesion of the soil at the concerned depth.

Table 4. Value of k Some Depth of 20 m to 35 m

Depth (m)	C in case of clay (t/m ²)	N in case of sand	Value of k (kg/cm ³)	
			C in case of clay	N in case of sand
20.0	1.60	...	2.7	...
22.0	1.88	...	2.7	...
23.0	2.18	...	2.8	...
25.0	...	32	...	3.0
27.0	...	27	...	2.7
29.0	...	28	...	2.8
31.0	...	32	...	3.0
33.0	...	35	...	3.5
35.0	...	37	...	3.7

Notes :

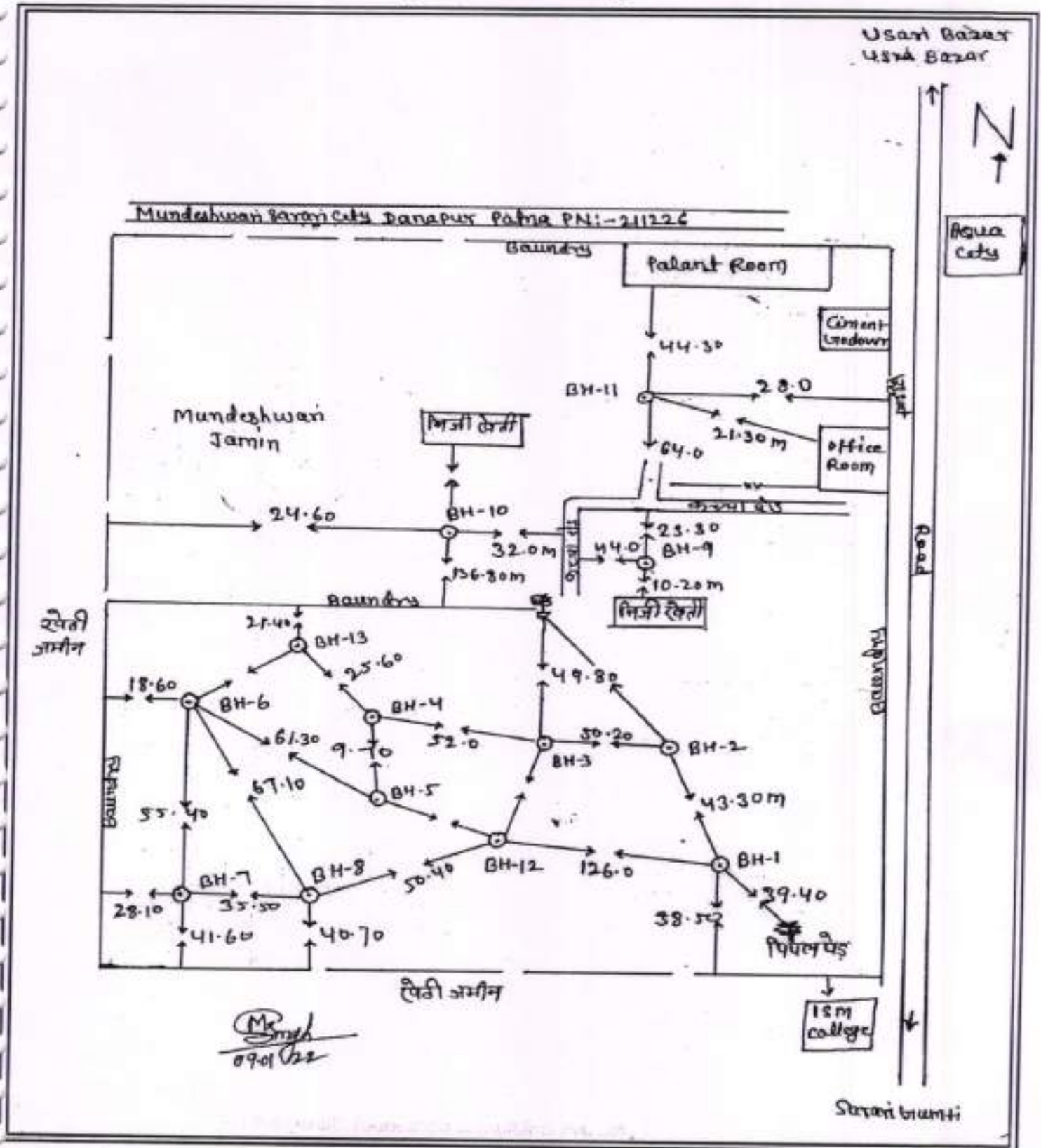
1. If a subsoil condition much different from those reported herein is met with during foundation trenching or piling, suitable steps should be taken.
2. If concreting of piles is to be done below water table, DMC and tremie method should be adopted.
3. If u/r piles are provided, care should be taken to ensure proper formation of bulbs.
4. Shallow foundations or pile caps should be isolated from the surrounding expansive soil by layers of compacted local sand.
5. As per the provisions of the IS Code, an appropriate number of piles must be subjected to routine load tests to check the veracity of the above recommended values of the safe capacities of piles.

For Baidyanath Foundation Consultants Pvt. Ltd.,


 (Prof. C.N. Sinha, Dr.-Ing., FIE)
 Chief Consultant.



New Building Sarari City at Patna



Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]



PN - 211226

Appendix - A

NAME OF WORK : Sub soil Investigation for C/O New Building Sarani City at Patna				BORING FINISH DATE : 29.12.2021				WATER TABLE : 4.00 m bgl									
BORE HOLE NO. : 1				BORING METHOD : Rotary				RECORD ON : 27.12.2021									
Site Incharge :- Mukesh Singh				TERMINATION DEPTH : 30.0 m				Shear Test									
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °	Compression Index (C _c)	
				from	to												
1.0			Greyish silty clay, CH	0.0		3.0											
1.5	S1	8						57.0	29.3	27.7	1.96	27.6	2.71		0.39	4.5	
2.5																	
3.0	S2	9					3.0				1.99	26.7	2.70		0.43	4.9	0.143
4.0			Greyish silty clay, CI	3.0		1.5											
4.5	S3	13					4.5					25.4	2.70		0.59	5.1	0.137
5.5			Greyish silty clay, CI with grits	4.5		1.5											
6.0	S4	16					6.0				2.02	24.7	2.70		0.65	5.1	
7.0			Reddish greyish silty clay, CI	6.0		1.5											
7.5	S5	5					7.5		36.3	12.1	24.2	1.95	29.3	2.70	0.26	3.2	
8.5			Reddish greyish silty clay, CL	7.5		3.0											
9.0	S6	6									1.96	28.6	2.70		0.30	3.6	
10.0																	
10.5	S7	16					10.5		34.0	16.7	17.3	2.02	24.7	2.70	0.65	5.1	
11.5			Reddish greyish silty clay, CI	10.5		3.0											
12.0	S8	18									2.02	24.7	2.70		0.69	5.2	
13.0																	
13.5	S9	25					13.5		40.7	21.7	19.0	2.03	24.1	2.69	0.83	5.3	
14.5			Yellowish greyish silty clay, CI with grits	13.5		1.5											
15.0	S10	29					15.0				2.04	23.4	2.69		0.91	5.3	



Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

NAME OF WORK : Sub soil Investigation for C/O New Builing Sarani City at Patna										BORING FINISH DATE : 29.12.2021			WATER TABLE : 4.00 m bgl			
BORE HOLE NO. : 1										BORING METHOD : Rotary						
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m			RECORD ON : 27.12.2021			
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test		Friction Angle, ϕ°	Compression Index (C_c)
				from	to								Type of Test	Cohesion, c (kg/cm ²)		
16.0			Yellowish greyish silty clay, CI with grits	15.0		7.5										
16.5	S11	19					46.8	26.1	20.7	2.02	24.7	2.70	0.71	5.2		
17.5																
18.0	S12	22								2.03	24.2	2.70	0.77	5.2		
19.0																
19.5	S13	24					45.6	26.4	19.2	2.03	24.2	2.70	0.81	5.3		
20.5																
21.0	S14	30								2.05	22.9	2.70	0.93	5.3		
22.0																
22.5	S15	50+			22.5											
23.5			Greyish sand, SP	22.5		7.5	38.6	24.2	14.4	2.09	20.8	2.70	1.34	5.5		
24.0	S16	39								1.84	35.6	2.62	0.00	31.4		
25.0																
25.5	S17	34								1.84	35.2	2.61	0.00	30.5		
26.5																
27.0	S18	35								1.84	35.3	2.61	0.00	30.6		
28.0																
28.5	S19	32								1.85	34.8	2.62	0.00	30.2		
29.5																
30.0	S20	33			30.0					1.84	35.1	2.61	0.00	30.3		



NAME OF WORK : Sub soil Investigation for C/O New Bulding Sarari City at Patna										BORING FINISH DATE : 30.12.2021				WATER TABLE : 3.10 m bgl				
BORE HOLE NO : 2										BORING METHOD : Rotary				RECORD ON : 29.12.2021				
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m								
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)		
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °			
1.0			Greyish silty clay, CH	0.0		3.0												
1.5	S1	10									2.00	26.2	2.71		0.47		5.0	
2.5																		
3.0	S2	11			3.0				53.7	28.1	25.6	2.01	25.5	2.71			0.50	5.1
4.0			Greyish silty clay, CI	3.0		3.0										0.138		
4.5	S3	12																
5.5																		
6.0	S4	7			6.0				36.2	22.4	13.8	1.97	26.0	2.70			0.35	4.1
7.0			Reddish greyish silty clay, CL	6.0		3.0												
7.5	S5	6									1.96	26.6	2.70		3.00		3.6	
8.5																		
9.0	S6	8			9.0				29.9	22.6	7.3	1.98	27.4	2.70			0.40	4.6
10.0			Reddish greyish silty clay, CI with grits	9.0		4.5												
10.5	S7	10									2.00	26.0	2.70		0.48		5.0	
11.5																		
12.0	S8	19							38.6	22.4	16.2	2.02	24.6	2.69			0.71	5.1
13.0			Reddish greyish silty clay, CH with grits			1.5												
13.5	S9	22			13.5													
14.5																		
15.0	S10	24			13.5				59.4	28.5	30.9	2.03	24.4	2.71			0.80	5.3



NAME OF WORK : Sub soil Investigation for C/O New Building Sarari City at Patna										BORING FINISH DATE : 30.12.2021				WATER TABLE : 3.10 m bgl			
BORE HOLE NO. : 2										BORING METHOD : Rotary							
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m				RECORD ON : 29.12.2021			
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (Cc)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °		
16.0			Reddish greyish silty clay, CI with grits	15.0		3.0											
16.5	S11	27									2.04	23.5	2.70		0.87	5.3	
17.5																	
18.0	S12	25	Yellowish greyish silty clay, CI with grits		18.0	4.5	45.1	21.3	23.8	2.03	24.2	2.70		0.83	5.3		
19.0				18.0													
19.5	S13	27									2.04	23.5	2.70		0.87	5.3	
20.5			Greyish sand, SP			7.5											
21.0	S14	41					40.4	22.7	17.7	2.07	21.8	2.70			1.15	5.4	
22.0																	
22.5	S15	45			22.5					2.08	21.3	2.70		1.23	5.4		
23.5				22.5													
24.0	S16	30									1.85	34.6	2.62		0.00	30.0	
25.0																	
25.5	S17	34									1.84	35.2	2.60		0.00	30.5	
26.5																	
27.0	S18	37								1.84	35.5	2.62		0.00	31.1		
28.0																	
28.5	S19	38									1.84	35.6	2.62		0.00	31.4	
29.5																	
30.0	S20	42			30.0						1.84	35.6	2.62		0.00	31.6	



NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 31.12.2021		WATER TABLE : 3.10 m bgl											
New Building Sarari City at Patna				BORING METHOD : Rotary													
BORE HOLE NO. : 3				TERMINATION DEPTH : 30.0 m		RECORD ON : 30.12.2021											
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (Cc)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ°		
1.0			Greyish silty clay, CH	0.0		3.0											
1.5	S1	8						60.1	29.9	30.2	1.98	27.6	2.71				
2.5																	
3.0	S2	9					3.0				1.99	26.7	2.71				
4.0			Reddish greyish silty clay, CI	3.0		3.0										0.143	
4.5	S3	10						37.5	13.8	23.7	2.00	26.0	2.70				
5.5																	
6.0	S4	10					6.0				2.00	26.0	2.70				
7.0			Reddish greyish silty clay, CL with grits	6.0		6.0											
7.5	S5	6						31.9	21.7	10.2	1.96	26.6	2.70				
8.5																	
9.0	S6	11									2.01	25.4	2.70				
10.0			Reddish greyish silty clay, CI with grits														
10.5	S7	15						37.2	24.4	12.8	2.01	25.3	2.70				
11.5																	
12.0	S8	23					12.0				2.03	24.2	2.70				
13.0			Reddish greyish silty clay, CI with grits	12.0		3.0											
13.5	S9	22						39.2	24.0	15.2	2.03	24.2	2.70				
14.5																	
15.0	S10	25					15.0				2.03	24.1	2.70				



NAME OF WORK : Sub soil Investigation for C/O New Building Sarari City at Patna										BORING FINISH DATE : 31.12.2021		WATER TABLE : 3.10 m bgl					
BORE HOLE NO. : 3										BORING METHOD : Rotary							
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m				RECORD ON : 30.12.2021			
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, φ °		
16.0			Yellowish greyish sandy silty clay, CI with grits	15.0		3.0											
16.5	S11	30					39.3	25.1	14.2	2.05	22.9	2.70		0.93	5.3		
17.5																	
18.0	S12	41			18.0					2.07	21.8	2.70		1.15	5.4		
19.0			Yellowish greyish silty clay, CI with grits	18.0		4.5											
19.5	S13	47					39.8	24.9	14.9	2.08	21.3	2.70		1.27	5.5		
20.5																	
21.0	S14	55								2.10	20.4	2.70		1.43	5.5		
22.0			Greyish sand, SP														
22.5	S15	44			22.5		41.9	24.2	17.7	2.09	20.8	2.70		1.21	5.4		
23.5					22.5												
24.0	S16	32								1.85	34.8	2.62		0.00	30.2		
25.0			Greyish sand, SP														
25.5	S17	32								1.85	34.8	2.62		0.00	30.2		
26.5																	
27.0	S18	35								1.84	35.3	2.61		0.00	30.5		
28.0			Greyish sand, SP														
28.5	S19	31								1.85	34.7	2.62		0.00	30.1		
29.5																	
30.0	S20	35								1.84	35.3	2.61		0.00	30.5		



NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 01.01.2022				WATER TABLE : 4.10 m bgl									
New Builing Sarani City at Patna				BORING METHOD : Rotary													
BORE HOLE NO. : 4				TERMINATION DEPTH : 30.0 m				RECORD ON : 31.12.2021									
Site Incharge :- Mukesh Singh																	
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Indx.%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °		
1.0			Greyish silty clay, CH	0.0		3.0											
1.5	S1	6									1.96	28.8	2.71		0.29	3.5	
2.5																	
3.0	S2	8	Greyish silty clay, CL		3.0	3.0	54.3	28.9	25.4	1.98	27.6	2.71		0.39	4.5	0.147	
4.0																	
4.5	S3	15									2.01	25.3	2.70		0.63	5.1	0.135
5.5			Reddish greyish silty clay, CI			4.5											
6.0	S4	12			6.0			30.0	22.6	7.4	2.01	25.4	2.70		0.55	5.1	
7.0																	
7.5	S5	14	Reddish greyish silty clay, CI			4.5											
8.5											2.01	25.3	2.70		0.61	5.1	
9.0	S6	7						35.5	22.0	13.6	1.97	28.0	2.70		0.35	4.1	
10.0			Reddish greyish silty clay, CI			4.5											
10.5	S7	12									2.01	25.3	2.70		0.55	5.1	
11.5					10.5												
12.0	S8	18	Reddish greyish silty clay, CI with grits			4.5	37.2	20.7	16.5	2.02	24.7	2.70		0.69	5.2		
13.0																	
13.5	S9	23									2.03	24.2	2.70		0.79	5.3	
14.5			Reddish greyish silty clay, CI with grits			4.5											
15.0	S10	26			15.0			37.4	21.6	15.8	2.04	23.6	2.70		0.85	5.3	



Appendix- B4(a)

Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

PN-211226

NAME OF WORK : Sub soil Investigation for C/O New Building Sarari City at Patna				BORING FINISH DATE : 01.01.2022				WATER TABLE : 4.10 m bgl										
BORE HOLE NO. : 4				BORING METHOD : Rotary														
Site Incharge :- Mukesh Singh				TERMINATION DEPTH : 30.0 m				RECORD ON : 31.12.2021										
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)		
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °			
16.0			Reddish greyish silty clay, CI with grits	15.0		1.5												
16.5	S11	30				16.5					2.05	22.9	2.70		0.93	5.3		
17.5					16.5													
18.0	S12	33	Yellowish greyish silty clay, CI with grits			6.0	47.1	25.3	21.8	2.05	22.7	2.69		0.95	5.4			
19.0																		
19.5	S13	38										2.06	22.3	2.70		1.09	5.4	
20.5																		
21.0	S14	45						44.7	25.0	19.7	2.08	21.3	2.70			1.23	5.4	
22.0			Greyish sand, SP			7.5												
22.5	S15	49					22.5				2.09	20.8	2.70		1.31	5.4		
23.5					22.5													
24.0	S16	38									1.84	35.6	2.62		0.00	30.8		
25.0																		
25.5	S17	35	Greyish sand, SP			7.5				1.84	35.3	2.61		0.00	30.5			
26.5																		
27.0	S18	32									1.85	34.8	2.62		0.00	30.2		
28.0																		
28.5	S19	30									1.85	34.6	2.62		0.00	30.0		
29.5			Greyish sand, SP			7.5												
30.0	S20	33					30.0				1.84	35.1	2.61		0.00	30.3		



NAME OF WORK : Sub soil Investigation for C/O New Building Sarani City at Patna										BORING FINISH DATE : 02.01.2022			WATER TABLE : 4.10 m bgl				
BORE HOLE NO. : 5										BORING METHOD : Rotary							
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m			RECORD ON : 01.01.2022				
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Indx, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °		
1.0			Greyish silty clay, CH	0.0		3.0	56.7	29.0	27.7	1.99	26.8	2.71					
1.5	S1	9													0.43	4.9	
2.5																	
3.0	S2	13										2.01	25.4	2.70		0.59	5.1
4.0			Reddish greyish silty clay, CI	3.0		3.0	36.7	23.8	12.9	2.00	26.0	2.70				0.140	
4.5	S3	10													0.48	5.0	
5.5																	
6.0	S4	8					6.0					1.98	27.4	2.70		0.40	4.6
7.0			Reddish greyish silty clay, CL	6.0		6.0											
7.5	S5	4						34.2	22.2	12.0	1.94	29.7	2.70		0.20	2.5	
8.5																	
9.0	S6	5									1.95	29.3		2.70		0.25	3.1
10.0			Reddish greyish silty clay, CI			6.0											
10.5	S7	11															
11.5																	
12.0	S8	15										2.01	25.3	2.70		0.63	5.1
13.0			Reddish greyish silty clay, CI with grits	12.0		3.0											
13.5	S9	18						48.8	27.5	21.3	2.02	24.7	2.70		0.69	5.2	
14.5																	
15.0	S10	23					15.0					2.03	24.2	2.70		0.79	5.3



NAME OF WORK : Sub soil Investigation for C/O New Buling Sarani City at Patna										BORING FINISH DATE : 04.01.2022				WATER TABLE : 4.00 m bgl			
BORE HOLE NO. : 6										BORING METHOD : Rotary				RECORD ON : 03.01.2022			
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m							
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth (m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm ³)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Friction Angle, ϕ°	Compression Index (C _c)
				from	to								Type of Test	Cohesion, c (kg/cm ²)			
1.0			Greyish silty clay, CH	0.0		3.0											
1.5	S1	7								1.97	28.1	2.71		0.34		4.0	
2.5																	
3.0	S2	10			3.0		50.4	26.9	23.5	2.00	26.2	2.71		0.47		5.0	
4.0			Greyish silty clay, CI with grits	3.0		3.0											
4.5	S3	13								2.01	25.4	2.70		0.58		5.1	0.137
5.5																	
6.0	S4	7			6.0		39.2	23.7	15.5	1.97	28.0	2.70		0.35		4.1	
7.0			Reddish greyish silty clay, CI	6.0		4.5											
7.5	S5	6								1.96	28.6	2.70		0.30		3.6	
8.5																	
9.0	S6	9					36.0	21.7	14.3	1.99	26.6	2.70		0.44		5.0	
10.0			Reddish greyish silty clay, CI with grits			4.5											
10.5	S7	20			10.5					2.02	24.6	2.69		0.73		5.2	
11.5				10.5													
12.0	S8	20					35.9	20.7	15.2	2.02	24.6	2.69		0.73		5.2	
13.0						4.5											
13.5	S9	24								2.03	24.1	2.60		0.81		5.3	
14.5																	
15.0	S10	27			15.0		38.3	21.6	16.7	2.04	23.5	2.70		0.87		5.3	



NAME OF WORK : Sub soil Investigation for C/O										BORING FINISH DATE : 04.01.2022				WATER TABLE : 4.00 m bgl			
New Building Sarani City at Patna										BORING METHOD : Rotary				RECORD ON : 03.01.2022			
BORE HOLE NO. : 6										TERMINATION DEPTH : 30.0 m				Shear Test			
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °	Compression Index (C _p)	
				from	to												
16.0			Reddish greyish silty clay, CI with grits	15.0		1.5											
16.5	S11	29			16.5						2.05	23.0	2.70		0.91	5.3	
17.5					16.5												
18.0	S12	32	Yellowish greyish silty clay, CI with grits			6.0	55.0	29.3	25.7	2.05	22.8	2.70		0.97	5.3		
19.0																	
19.5	S13	29									2.05	23.0	2.70		0.91	5.3	
20.5																	
21.0	S14	38						44.5	25.9	18.6	2.06	22.4	2.70		1.09	5.4	
22.0																	
22.5	S15	44	Greyish silty sand, SM-SP		22.5	3.0				2.06	21.3	2.70		1.21	5.4		
23.5				22.5													
24.0	S16	35									1.84	35.3	2.61		0.00	30.5	
25.0																	
25.5	S17	38	Greyish sand, SP		25.5	3.0				1.84	35.6	2.62		0.00	31.3		
26.5				25.5													
27.0	S18	33									1.84	35.1	2.61		0.00	30.3	
28.0																	
28.5	S19	32	Greyish silty sand, SM-SP		28.5	1.5				1.85	34.8	2.62		0.00	30.2		
29.5				28.5													
30.0	S20	38			30.0						1.84	35.4	2.62		0.00	30.9	



NAME OF WORK : Sub soil Investigation for C/O New Buling Sarari City at Patna				BORING FINISH DATE : 05.01.2022				WATER TABLE : 4.10 m bgl										
BORE HOLE NO. : 7				BORING METHOD : Rotary				RECORD ON : 04.01.2022										
Site Incharge :- Mukesh Singh				TERMINATION DEPTH : 30.0 m														
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Indx.%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _p)		
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, φ °			
1.0			Greyish silty clay, CH	0.0		3.0												
1.5	S1	8					55.5	27.4	28.1	1.98	27.6	2.71		0.39	4.5			
2.5																		
3.0	S2	10			3.0						2.00	26.2	2.71		0.47		5.0	
4.0			Greyish silty clay, CI	3.0		3.0												
4.5	S3	12					38.8	21.8	17.0	2.01	25.4	2.70		0.55	5.1			
5.5																		
6.0	S4	8			6.0						1.98	27.4	2.70		0.40		4.6	
7.0			Reddish greyish silty clay, CL	6.0		3.0												
7.5	S5	6					34.4	20.1	14.3	1.96	28.6	2.70		0.30	3.6			
8.5																		
9.0	S6	7			9.0						1.97	28.0	2.70		0.35		4.1	
10.0			Reddish greyish silty clay, CI with grits	9.0		6.0												
10.5	S7	13					36.0	21.0	15.0	2.01	25.4	2.70		0.59	5.1			
11.5																		
12.0	S8	17									2.02	24.7	2.70		0.67		5.1	
13.0																		
13.5	S9	20					47.2	23.7	23.5	2.02	24.6	2.69			0.73		5.2	
14.5																		
15.0	S10	27			15.0						2.04	23.5	2.70		0.67		5.3	



Appendix- B7(a)

Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

PN- 211226

NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 07.01.2022				WATER TABLE : 3.50 m bgl									
New Building Sarari City at Patna				BORING METHOD : Rotary													
BORE HOLE NO. : 9				Site Incharge :- Mukesh Singh				RECORD ON : 06.01.2022									
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _p)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °		
1.0			Greyish silty clay, CH	0.0		3.0	57.0	28.6	28.4	1.98	27.6	2.71					
1.5	S1	8															
2.5																	
3.0	S2	10			3.0							2.00	26.2	2.71		0.47	5.0
4.0			Greyish silty clay, CI	3.0		3.0											
4.5	S3	12						35.6	22.0	13.6	2.01	25.4	2.70		0.55	5.1	0.136
5.5																	
6.0	S4	10			6.0							2.00	26.0	2.70		0.48	5.0
7.0			Reddish greyish silty clay, CI	6.0		3.0											
7.5	S5	8						36.3	22.2	14.1	1.98	27.4	2.70		0.40	4.6	
8.5																	
9.0	S6	9			9.0							1.99	26.6	2.70		0.44	5.0
10.0			Reddish greyish silty clay, CL	9.0		3.0											
10.5	S7	11						34.0	21.0	13.0	2.01	25.4	2.70		0.51	5.1	
11.5																	
12.0	S8	12			12.0							2.01	25.4	2.70		0.55	5.1
13.0			Reddish greyish silty clay, CL with grits	12.0		3.0											
13.5	S9	16						34.7	21.7	13.0	2.02	24.7	2.70		0.65	5.1	
14.5																	
15.0	S10	25			15.0							2.03	24.1	2.69		0.83	5.3



Appendix- B9(a)

Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

PN- 211226

NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 07.01.2022		WATER TABLE : 3.50 m bgl												
New Building Sarani City at Patna				BORING METHOD : Rotary														
BORE HOLE NO. : 9				TERMINATION DEPTH : 30.0 m		RECORD ON : 06.01.2022												
Site Incharge :- Mukesh Singh																		
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Friction Angle, ϕ °	Compression Index (Cc)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)				
16.0			Reddish greyish silty clay, CI with grits	15.0		1.5												
16.5	S11	16				16.5		48.3	25.9	22.4	2.02	24.8	2.71		0.64		5.1	
17.5					16.5													
18.0	S12	30	Yellowish greyish silty clay, CI with grits			6.0												
19.0											2.05	22.9	2.70		0.93		5.3	
19.5	S13	34						38.3	24.8	13.5	2.05	22.7	2.69		1.00		5.4	
20.5																		
21.0	S14	38									2.06	22.4	2.70		1.09		5.4	
22.0																		
22.5	S15	42						41.1	24.9	16.2	2.07	21.8	2.70		1.17		5.4	
23.5			Greyish silty sand, SM-SP	22.5														
24.0	S16	30					3.0				1.85	34.6	2.62		0.00		30.0	
25.0																		
25.5	S17	34	Greyish sand, SP		25.5					1.84	35.2	2.61		0.00		30.4		
26.5					25.5		1.5											
27.0	S18	30	Greyish silty sand, SM-SP		27.0					1.85	34.6	2.62		0.00		30.0		
28.0					27.0		1.5											
28.5	S19	33				28.5					1.84	35.4	2.62		0.00		30.3	
29.5			Greyish sand, SP	28.5		1.5												
30.0	S20	38				30.0					1.84	35.6	2.62		0.00		31.4	



Appendix- B9(b)

Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

PN- 211226

NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 08.01.2022				WATER TABLE : 3.60 m bgl									
New Building Sarari City at Patna				BORING METHOD : Rotary				RECORD ON : 07.01.2022									
BORE HOLE NO. : 10				TERMINATION DEPTH : 30.0 m													
Site Incharge :- Mukesh Singh																	
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Friction Angle, ϕ°	Compression Index (C_c)
				from	to								Type of Test	Cohesion, c (kg/cm ²)			
1.0			Greyish silty clay, CH	0.0		3.0											
1.5	S1	7								1.97	28.2	2.71		0.34		4.0	
2.5																	
3.0	S2	9	Greyish silty clay, CI		3.0	3.0	58.2	29.7	28.5	1.99	26.6	2.71		0.43		4.9	
4.0				3.0													
4.5	S3	11								2.01	25.5	2.71		0.50		5.0	
5.5			Reddish greyish silty clay, CI			6.0											
6.0	S4	10			6.0		40.4	22.7	17.7	2.00	26.0	2.70		0.48		5.0	
7.0				6.0													
7.5	S5	7	Reddish greyish silty clay, CI			6.0				1.97	28.0	2.70		0.35		4.1	
8.5																	
9.0	S6	6								1.96	28.6	2.70		0.30		3.6	
10.0			Reddish greyish silty clay, CI			6.0											
10.5	S7	14								2.01	25.3	2.70		0.61		5.1	
11.5																	
12.0	S8	16	Reddish greyish silty clay, CI with grits		12.0	3.0	35.6	21.5	14.1	2.02	24.7	2.70		0.65		5.1	
13.0				12.0													
13.5	S9	18								2.02	24.7	2.70		0.69		5.3	
14.5			Reddish greyish silty clay, CI with grits			3.0											
15.0	S10	22			15.0			36.1	21.7	14.4	2.03	24.2	2.70		0.77		5.2



NAME OF WORK : Sub soil Investigation for C/O New Building Sarari City at Patna										BORING FINISH DATE : 08.01.2022			WATER TABLE : 3.60 m bgl					
BORE HOLE NO. : 10										BORING METHOD : Rotary								
Site Incharge :- Mukesh Singh										TERMINATION DEPTH : 30.0 m			RECORD ON : 07.01.2022					
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (g/cm ³)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)		
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, φ °			
16.0			Reddish greyish silty clay, CI with grits	15.0		1.5												
16.5	S11	22			16.5						2.03	24.2	2.70	0.77	5.2			
17.5					16.5		3.0											
18.0	S12	23	Yellowish greyish silty clay, CH with grits															
19.0																		
19.5	S13	28				19.5				2.04	23.5	2.70	0.89	5.3				
20.5			Yellowish greyish silty clay, CI with grits	19.5		3.0												
21.0	S14	31																
22.0																		
22.5	S15	38	Greyish sand, SP		22.5	3.0												
23.5																		
24.0	S16	29									1.85	34.5	2.62	0.00	29.9			
25.0			Greyish silty sand, SM-SP			1.5												
25.5	S17	32			25.5						1.85	34.8	2.62	0.00	30.2			
26.5					25.5													
27.0	S18	27	Greyish sand, SP		27.0	3.0												
28.0																		
28.5	S19	30									1.85	34.6	2.62	0.00	30.0			
29.5																		
30.0	S20	33			30.0						1.84	35.1	2.61	0.00	30.3			



NAME OF WORK : Sub soil Investigation for C/O New Building Sarari City at Patna				BORING FINISH DATE : 08.01.2022				WATER TABLE : 3.60 m bgl								
BORE HOLE NO. : 11				BORING METHOD : Rotary				RECORD ON : 08.01.2022								
Site Incharge :- Mukesh Singh				TERMINATION DEPTH : 30.0 m												
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, φ °	
1.0			Greyish silty clay, CH with brick bats	0.0		3.0										
1.5	S1	4					50.0	28.0	22.0	1.94	29.8	2.71		0.19	2.5	
2.5																
3.0	S2	5	Greyish silty clay, CH		3.0	3.0				1.95	29.5	2.71		0.24	3.0	0.157
4.0				3.0												
4.5	S3	6					55.8	29.3	26.5	1.96	28.8	2.71		0.29	3.5	0.154
5.5			Greyish reddish silty clay, CL			3.0										
6.0	S4	8			6.0					1.98	27.4	2.70		0.40	4.6	
7.0				6.0												
7.5	S5	10	Reddish greyish silty clay, CL with grits			1.5	34.9	21.6	13.3	2.00	26.0	2.70		0.48	5.0	
8.5																
9.0	S6	8			9.0					1.96	27.4	2.70		0.40	4.6	
10.0			Reddish greyish silty clay, Ci with grits	9.0		4.5										
10.5	S7	9			10.5		32.8	21.2	11.6	1.99	26.6	2.70		0.44	5.0	
11.5				10.5												
12.0	S8	15	Reddish greyish silty clay, Ci with grits							2.01	25.3	2.70		0.63	5.1	
13.0																
13.5	S9	20					35.0	21.5	13.5	2.02	24.6	2.69		0.73	5.2	
14.5																
15.0	S10	24			15.0					2.03	24.3	2.70		0.81	5.3	



NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 08.01.2022				WATER TABLE : 3.60 m bgl										
New Building Sarani City at Patna				BORING METHOD : Rotary				RECORD ON : 08.01.2022										
BORE HOLE NO. : 11				TERMINATION DEPTH : 30.0 m				Shear Test										
Depth Below GL (m)	Sample No	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Indx.%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °	Compression Index (C _c)		
				from	to													
16.0			Reddish greyish silty clay, CI with grits	15.0	16.5	1.5	38.6	23.4	16.2	2.04	23.6	2.70		0.87	5.3			
16.5	S11	26																
17.5					16.5						2.05	22.7	2.69		0.99	5.4		
18.0	S12	33																
19.0			Yellowish greyish silty clay, CI with grits			6.0												
19.5	S13	35					44.9	24.6	20.3	2.06	22.5	2.70		1.03	5.4			
20.5																		
21.0	S14	38									2.06	22.4	2.70		1.09	5.4		
22.0																		
22.5	S15	43					22.5	43.4	23.7	19.7	2.07	21.8	2.70		1.19	5.4		
23.5			Greyish sand, SP	22.5														
24.0	S16	45								1.84	35.6	2.62		0.00	31.7			
25.0																		
25.5	S17	32								1.85	34.8	2.62		0.00	30.2			
26.5																		
27.0	S18	35								1.84	35.3	2.61		0.00	30.7			
28.0																		
28.5	S19	33								1.84	35.1	2.61		0.00	30.3			
29.5																		
30.0	S20	38				30.0				1.84	35.6	2.62		0.00	31.4			



NAME OF WORK : Sub soil Investigation for C/O										BORING FINISH DATE : 09.01.2022				WATER TABLE : 2.60 m bgl				
New Building Sarani City at Patna										BORING METHOD : Rotary				RECORD ON : 10.01.2022				
BORE HOLE NO. : 12										TERMINATION DEPTH : 35.0 m								
Site Incharge :- Anwer Khan																		
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)		
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, φ °			
1.0			Greyish silty clay, CH	0.0		3.0												
1.5	S1	6						52.7	28.0	24.7	1.96	28.8	2.71		0.29		3.5	
2.5																		
3.0	S2	13			3.0						2.01	25.5	2.71		0.58		5.1	
4.0			Greyish silty clay, CL	3.0		1.5												
4.5	S3	12			4.5			34.8	23.4	11.4	2.01	25.4	2.70		0.55		5.1	0.136
5.5																		
6.0	S4	11									2.01	25.4	2.70		0.51		5.1	
7.0			Reddish yellowish silty clay, CL			3.0												
7.5	S5	9			7.5			32.1	13.1	19.0	1.99	26.6	2.70		0.44		5.0	
8.5																		
9.0	S6	11			7.5						2.01	25.4	2.70		0.51		5.1	
10.0			Yellowish greyish silty clay, CL with grits			3.0												
10.5	S7	12																
11.5																		
12.0	S8	14			10.5						2.01	25.4	2.70		0.55		5.1	
13.0			Reddish yellowish greyish silty clay, CI with grits	10.5	12.0	1.5												
13.5	S9	21																
14.5																		
15.0	S10	27			12.0						2.03	24.3	2.70		0.75		5.2	
16.0			Yellowish greyish silty clay, CH	13.5		3.0												
16.5	S11	29																
17.5																		
18.0	S12	31			16.5						2.05	23.0	2.70		0.91		5.3	
19.0			Yellowish greyish silty clay, CI with grits	16.5		1.5												
19.5	S13	34			18.0						2.05	22.8	2.70		0.95		5.3	
			Yellowish greyish silty clay, CI	18.0	19.5	1.5												
							43.9	24.9	19.0	2.05	22.7	2.69		1.01	5.4			



Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

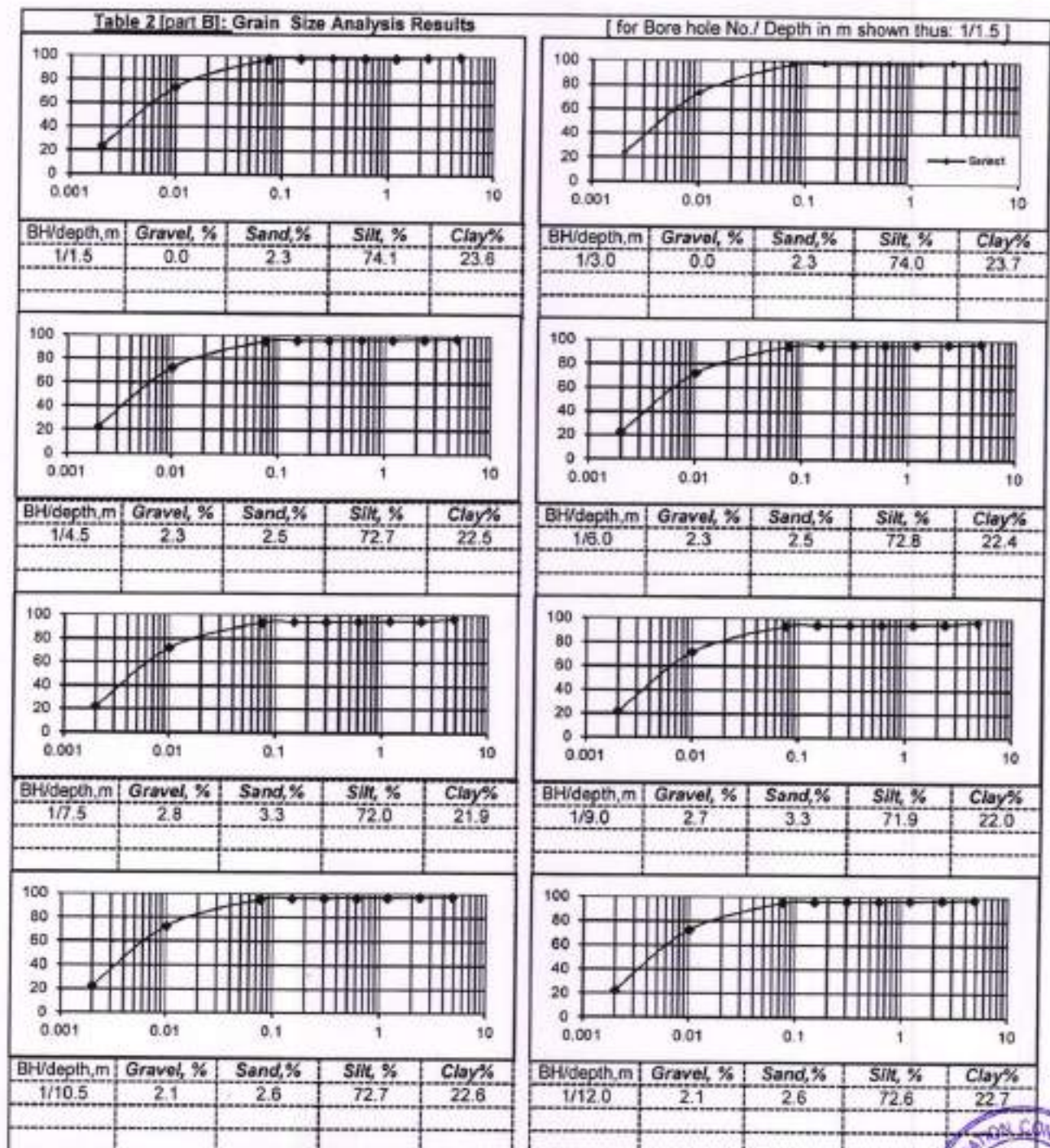
NAME OF WORK : Sub soil Investigation for C/O				BORING FINISH DATE : 09.01.2022				WATER TABLE : 2.60 m bgl										
New Building Sarali City at Patna				BORING METHOD : Rotary				RECORD ON : 10.01.2022										
BORE HOLE NO. : 12				TERMINATION DEPTH : 35.0 m				Shear Test										
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Indx,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °	Compression Index (C _p)		
				from	to													
20.5			Yellowish greyish silty clay, CI with grits	20.5	21.0	1.5				2.06	22.5	2.70		1.03	5.4			
21.0	S14	35																
22.0																		
22.5	S15	38	Greyish silty sand, SM-SP			14.0				1.84	35.6	2.62		0.00	31.4			
23.5																		
24.0	S16	40									1.84	35.6	2.62		0.00	31.5		
25.0																		
25.5	S17	32									1.85	34.8	2.62		0.00	30.2		
26.5																		
27.0	S18	32									1.85	34.8	2.62		0.00	30.2		
28.0																		
28.5	S19	28									1.86	33.9	2.62		0.00	29.8		
29.5																		
30.0	S20	31									1.85	34.7	2.62		0.00	30.1		
31.0																		
31.5	S21	33									1.84	35.1	2.61		0.00	30.3		
32.5																		
33.0	S22	35									1.84	35.3	2.61		0.00	30.7		
34.0																		
35.0	S23	37					35.0				1.84	35.5	2.62		0.00	31.1		



NAME OF WORK : Sub soil Investigation for C/O										BORING FINISH DATE : 10.01.2022		WATER TABLE : 2.30 m bgl					
New Building Sarari City at Patna										BORING METHOD: Rotary							
BORE HOLE NO. : 13										TERMINATION DEPTH : 35.0 m		RECORD ON : 11.01.2022					
Site Incharge :- Anwer Khan																	
Depth Below GL (m)	Sample No.	SPT 'N' Value observation	Visual Description of Soil with IS Classification	Depth(m)		Thickness (m)	Liquid Limit	Plastic Limit	Plasticity Index, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _p)	
				from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, ϕ °		
20.5			Yellowish greyish sandy silty clay, CL with grits	20.5		1.5											
21.0	S14	65			21.0		27.0	14.5	12.5	2.11	19.8	2.70		1.63	5.6		
22.0					21.0												
22.5	S15	58								1.84	35.8	2.64		0.00	32.6		
23.5																	
24.0	S16	55	Greyish silty sand, SM-SP			14.0				1.84	35.8	2.64		0.00	32.6		
25.0																	
25.5	S17	56									1.84	35.8	2.64		0.00	32.6	
26.5																	
27.0	S18	59									1.84	35.9	2.64		0.00	32.7	
28.0																	
28.5	S19	59									1.84	35.9	2.64		0.00	32.7	
29.5																	
30.0	S20	60									1.84	35.9	2.64		0.00	32.7	
31.0																	
31.5	S21	55							1.84	32.8	2.64		0.00	32.6			
32.5																	
33.0	S22	60							1.84	32.9	2.64		0.00	32.7			
34.0																	
35.0	S23	59			35.0				1.84	32.9	2.64		0.00	32.7			



Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

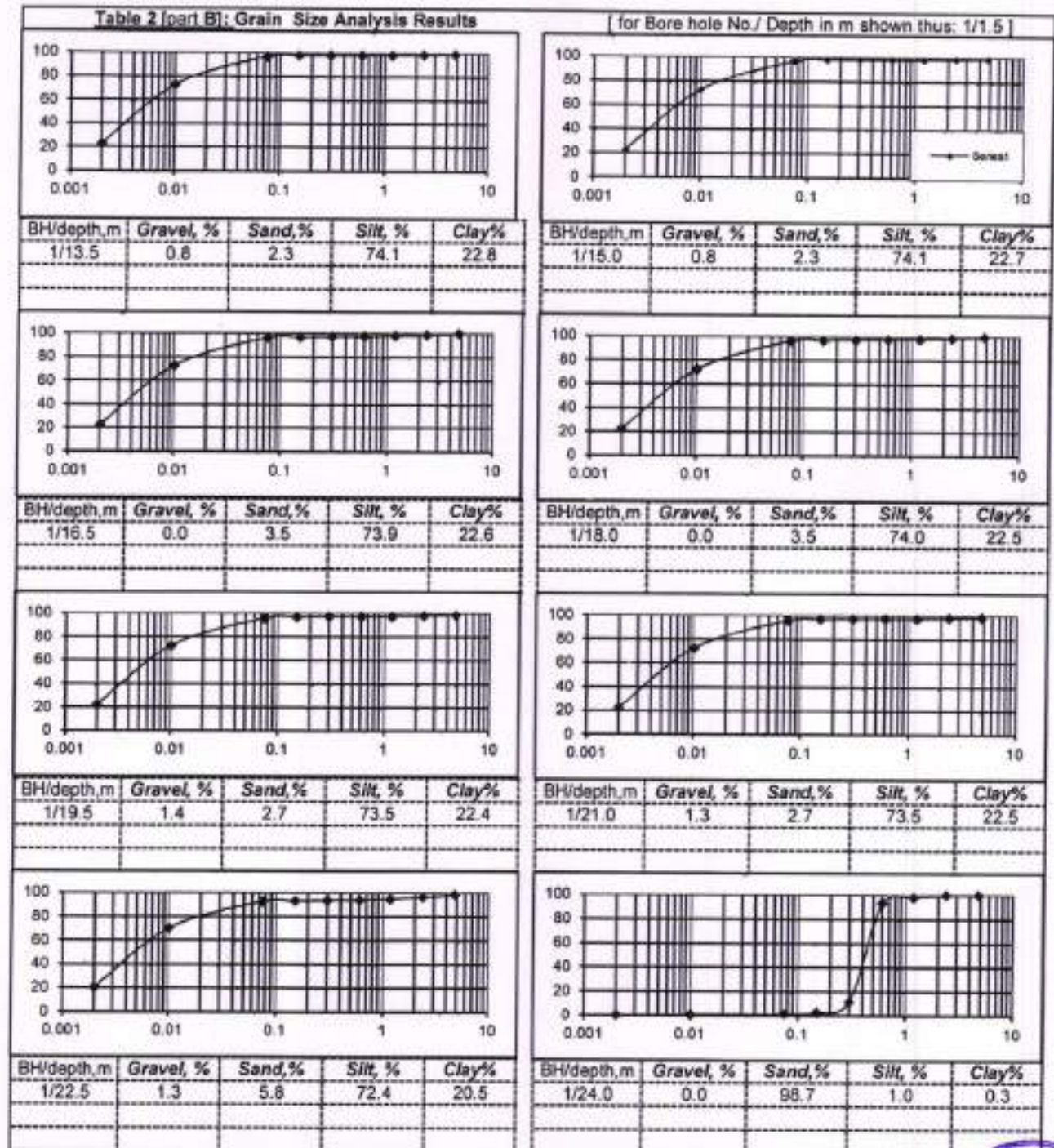


Baldyanath Foundation Consultants Pvt. Ltd.,
403, Oange Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

PN - 211226

Appendix - C1

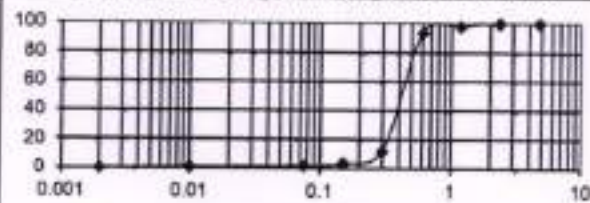
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



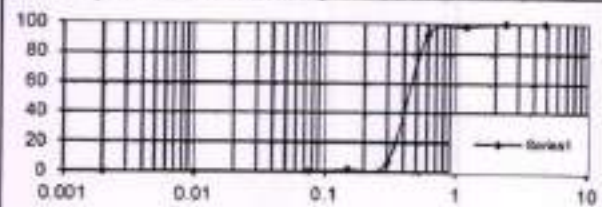
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

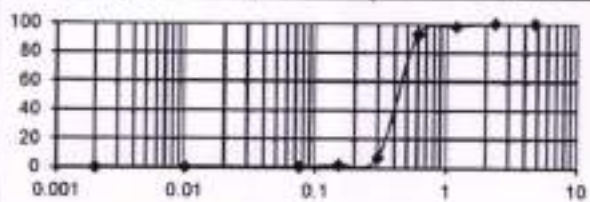
[for Bore hole No./ Depth in m shown thus: 1/1.5]



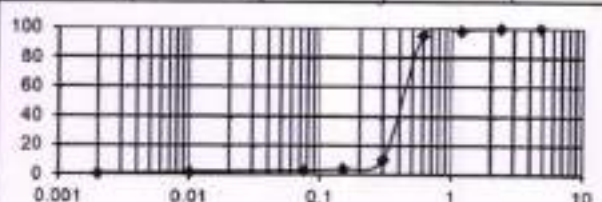
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
1/25.5	0.0	98.0	1.6	0.4



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
1/27.0	0.0	99.4	0.4	0.2



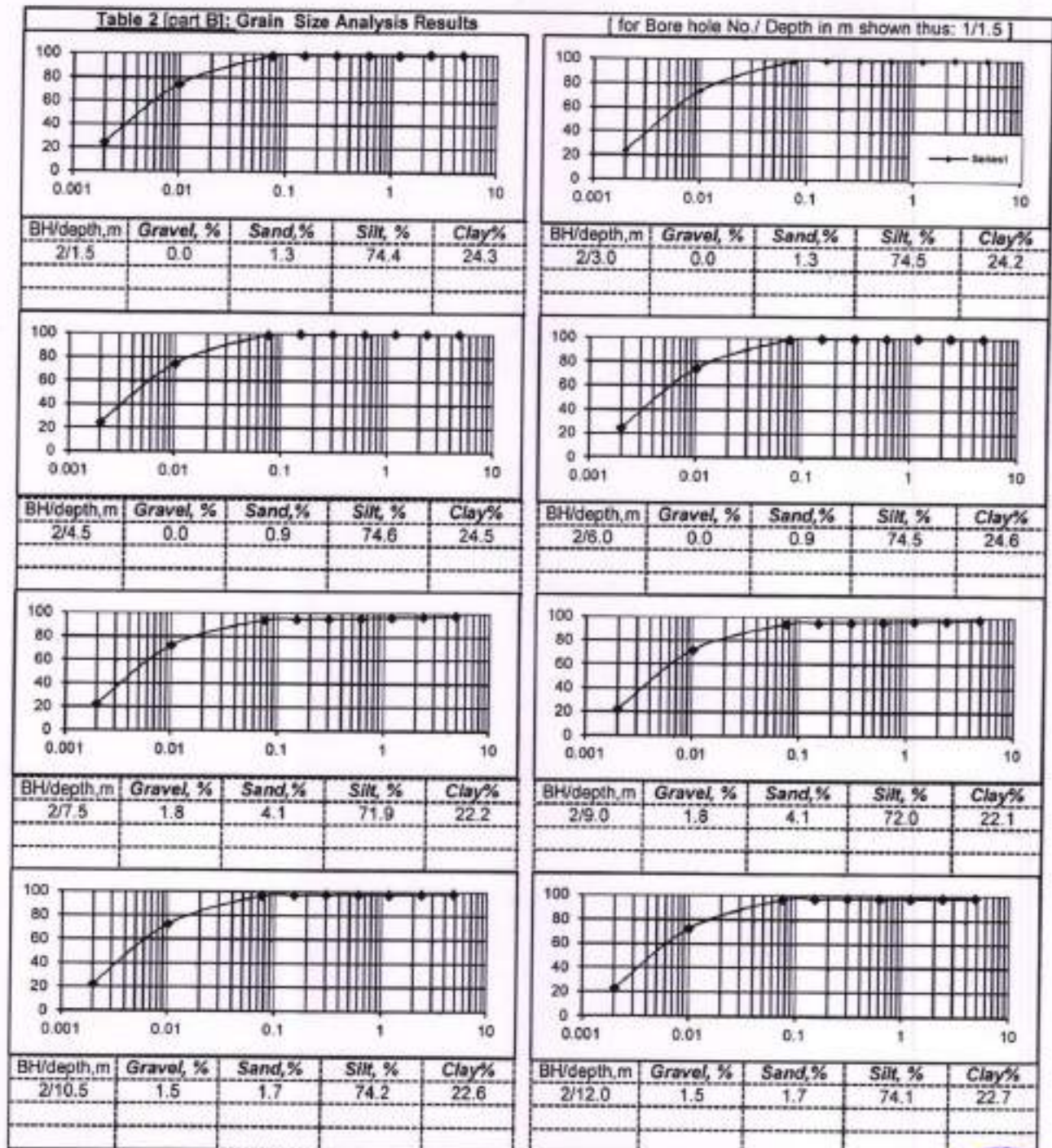
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
1/28.5	0.0	98.9	0.8	0.3



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
1/30.0	0.0	98.9	2.4	0.7

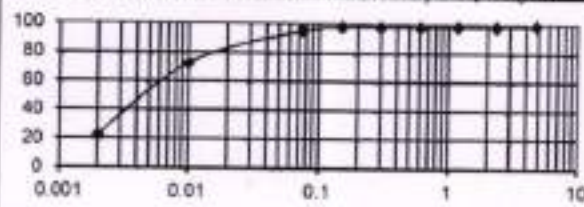


Report on sub-soil investigation for the proposed
New Building Sarani City at Patna

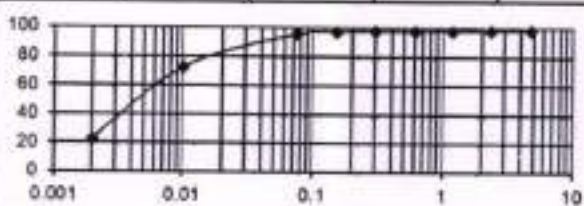


Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

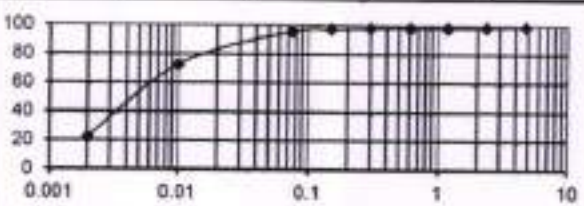
Table 2 (part B): Grain Size Analysis Results



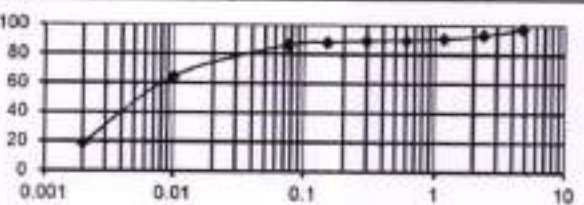
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/13.5	1.2	3.5	72.8	22.5



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/16.5	1.4	2.9	73.0	22.6

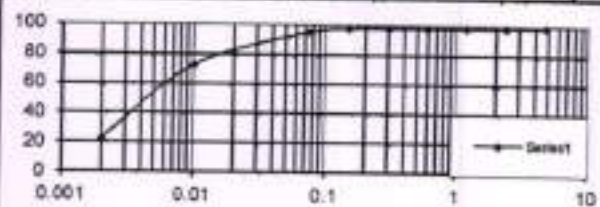


BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/19.5	1.0	3.3	73.2	22.5

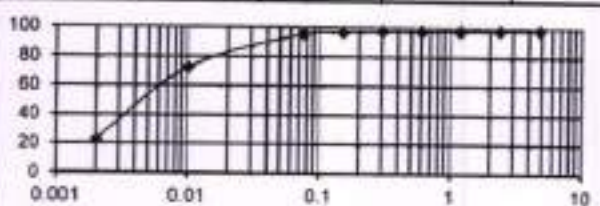


BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/22.5	2.1	11.3	68.0	18.6

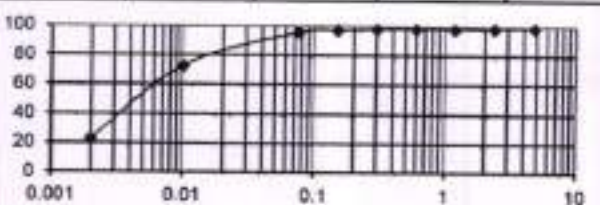
[for Bore hole No./ Depth in m shown thus: 1/1.5]



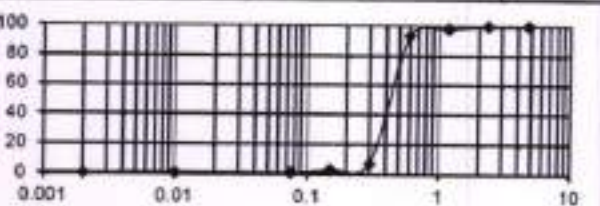
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/15.0	1.2	3.5	72.9	22.4



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/18.0	1.4	2.9	72.9	22.7



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/21.0	1.0	3.3	72.9	22.8



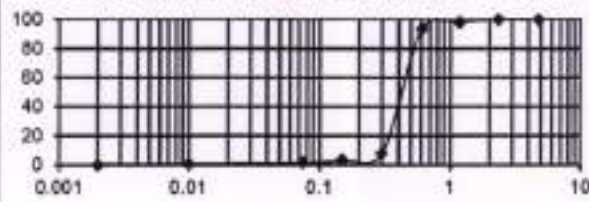
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/24.0	0.0	99.2	0.5	0.3



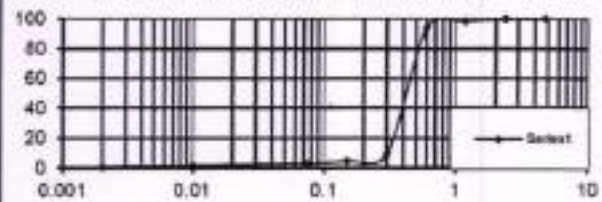
Report on sub-soil investigation for the proposed
New Bulling Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

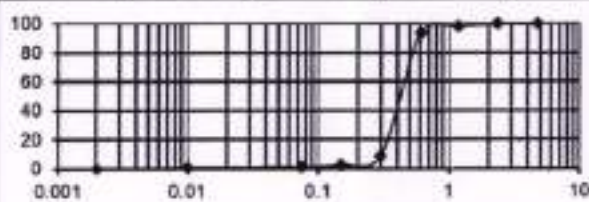
[for Bore hole No./ Depth in m shown thus: 1/1.5]



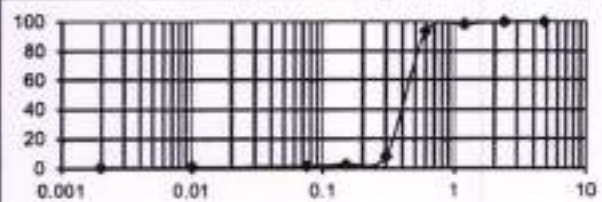
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/25.5	0.0	98.2	1.4	0.4



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/27.0	0.0	96.9	2.5	0.6



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/28.5	0.0	98.5	1.1	0.4

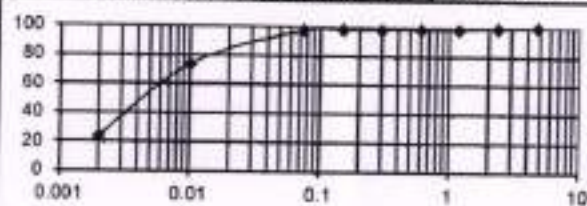


BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
2/30.0	0.0	98.5	1.0	0.5



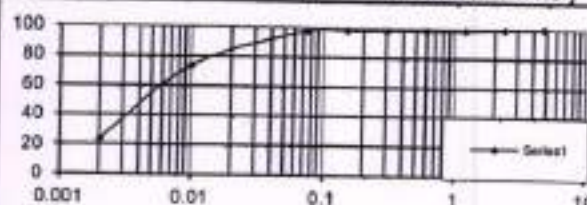
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

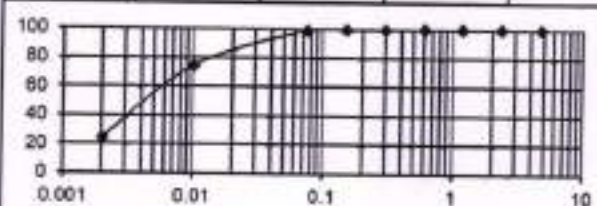


BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/1.5	0.0	2.3	74.1	23.6

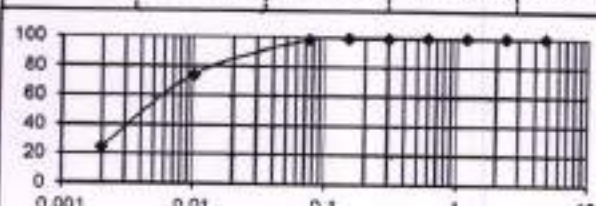
[for Bore hole No./ Depth in m shown thus: 1/1.5]



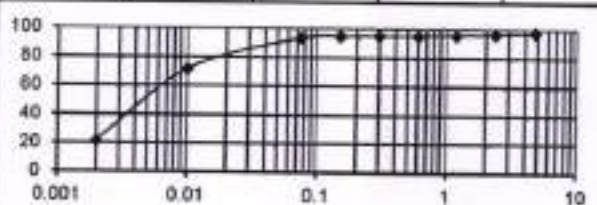
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/3.0	0.0	2.3	74.1	23.7



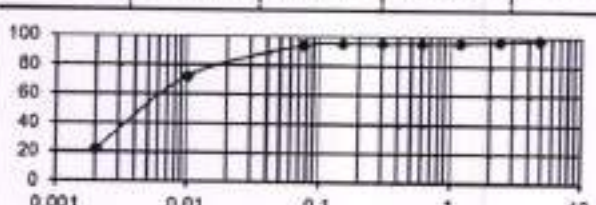
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/4.5	0.0	0.9	74.6	24.5



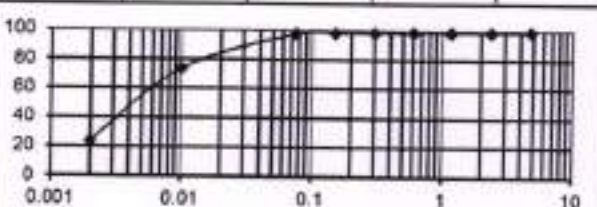
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/6.0	0.0	1.0	74.6	24.4



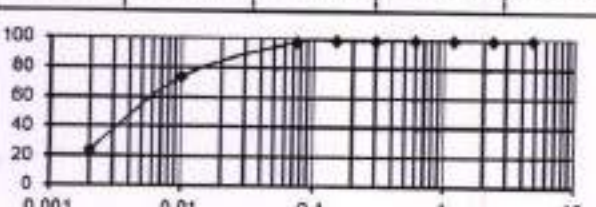
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/7.5	2.3	4.1	72.0	21.5



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/9.0	1.8	4.2	71.9	22.2



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/10.5	0.6	1.6	74.0	23.8



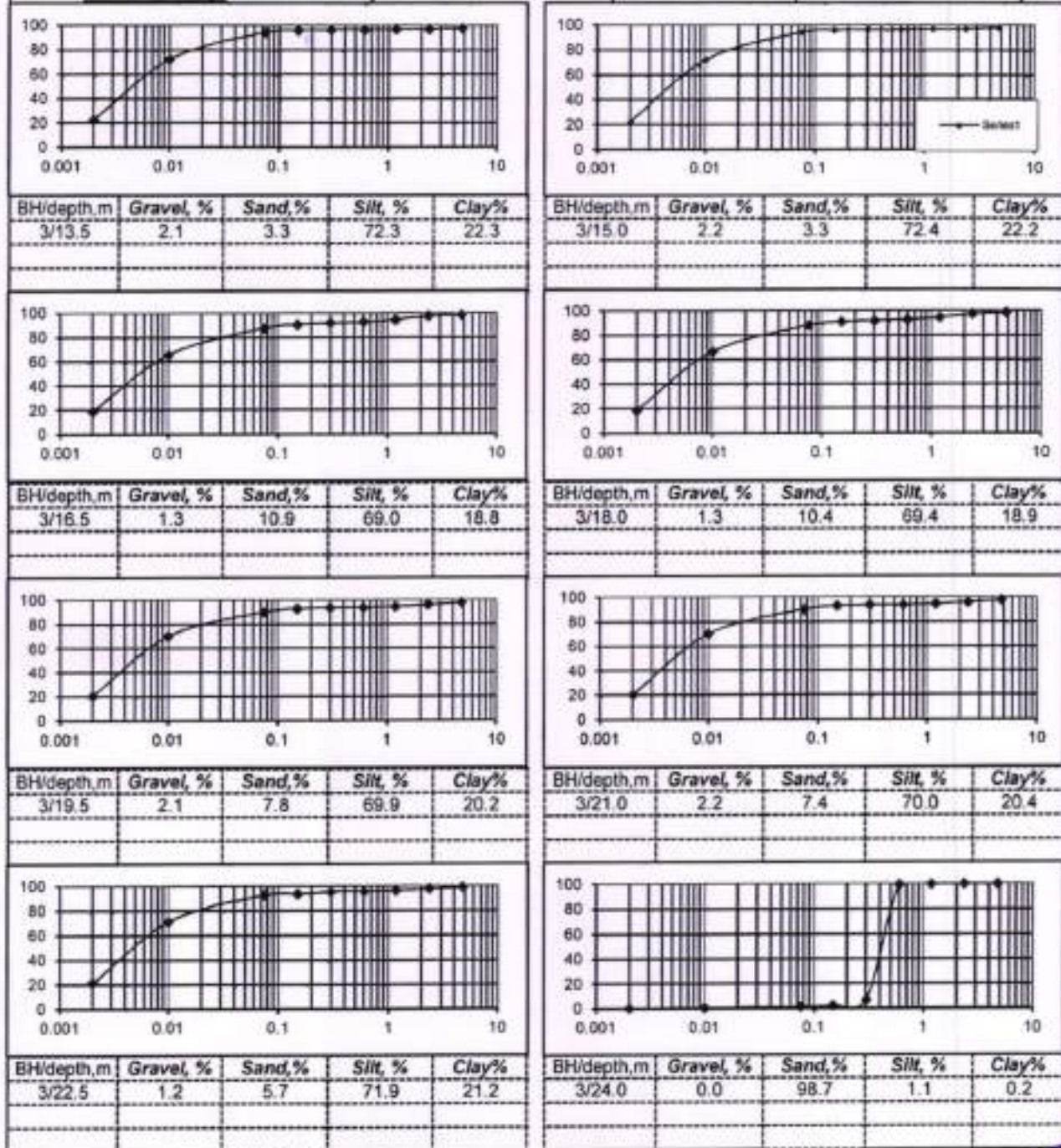
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
3/12.0	0.6	1.5	74.0	23.9



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

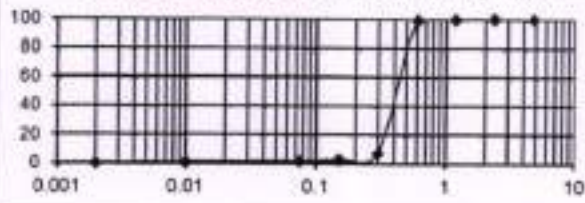
[for Bore hole No./ Depth in m shown thus: 1/1.5]



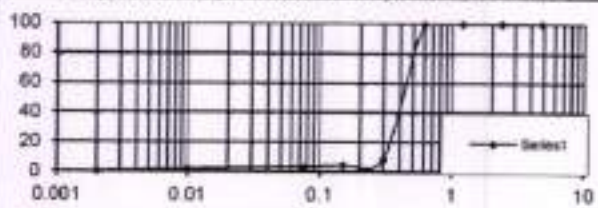
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

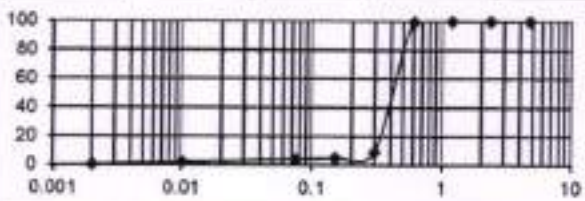
[for Bore hole No. / Depth in m shown thus: 1/1.5]



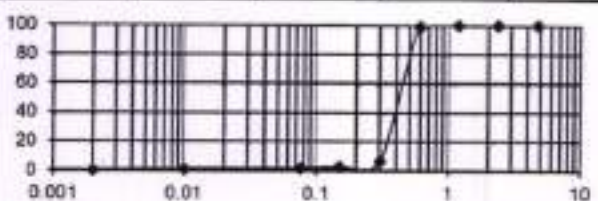
BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
3/25.5	0.0	98.2	1.4	0.4



BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
3/27.0	0.0	96.4	3.0	0.6



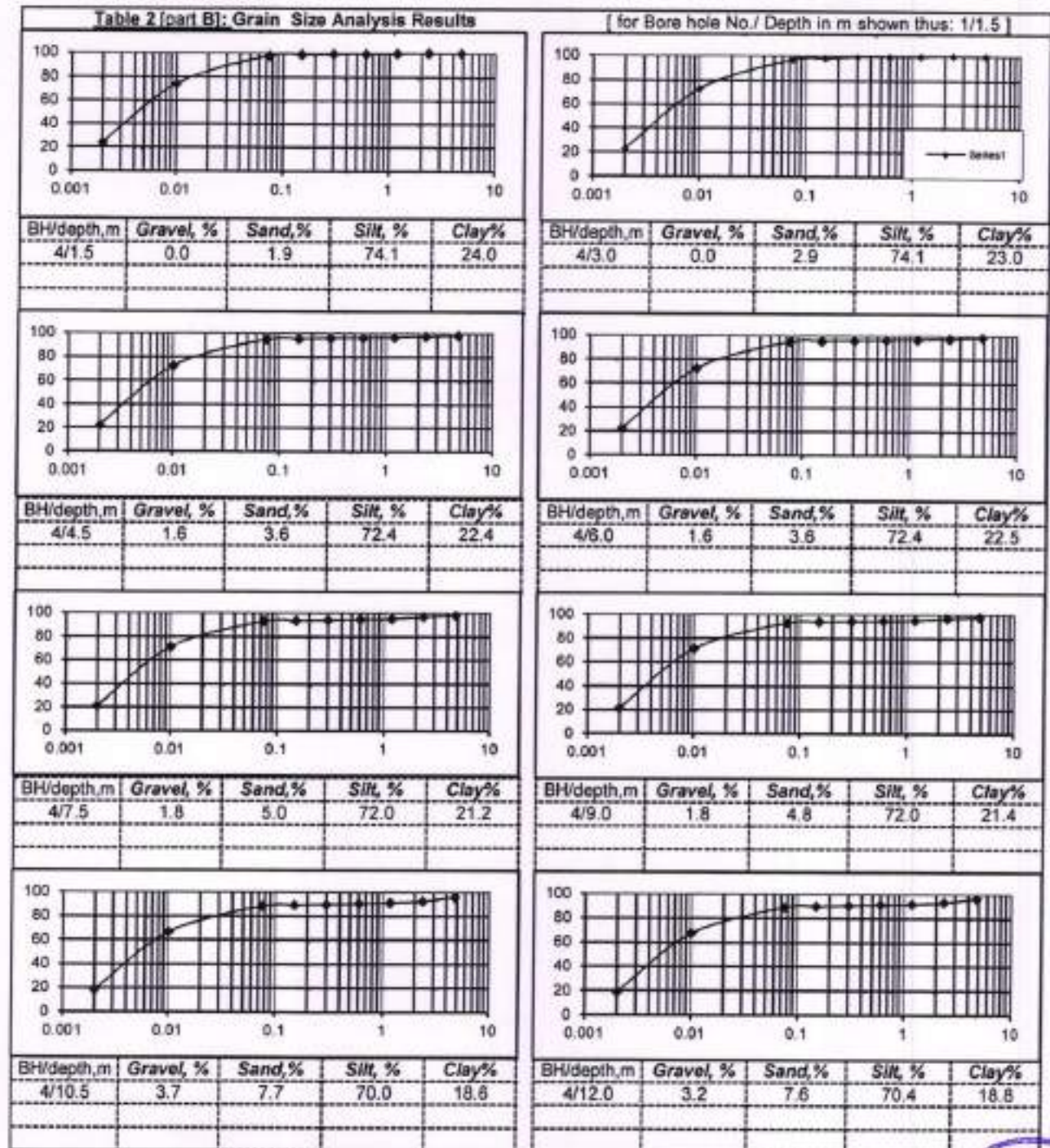
BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
3/28.5	0.0	95.9	3.4	0.7



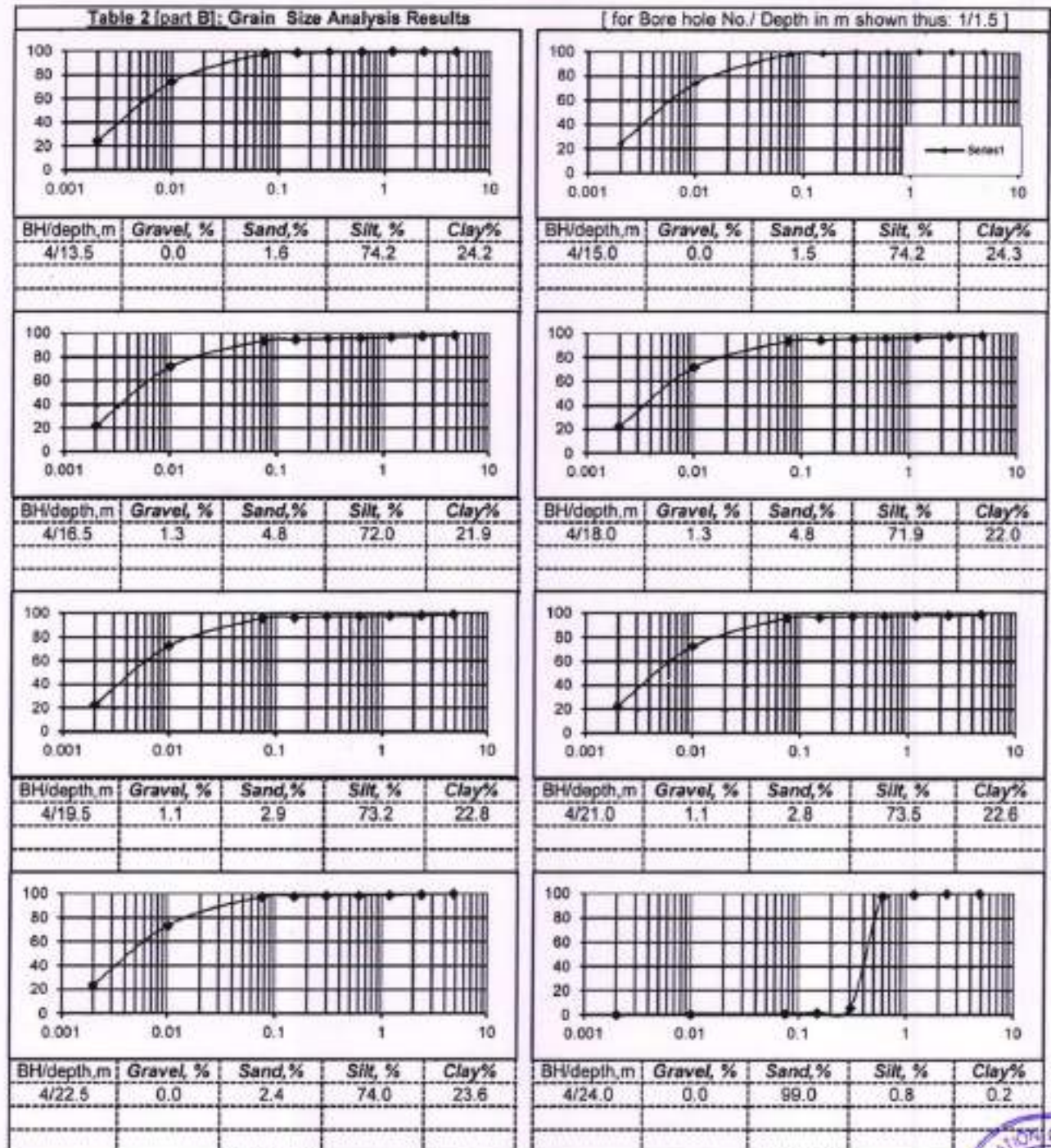
BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
3/30.0	0.0	98.2	1.5	0.3



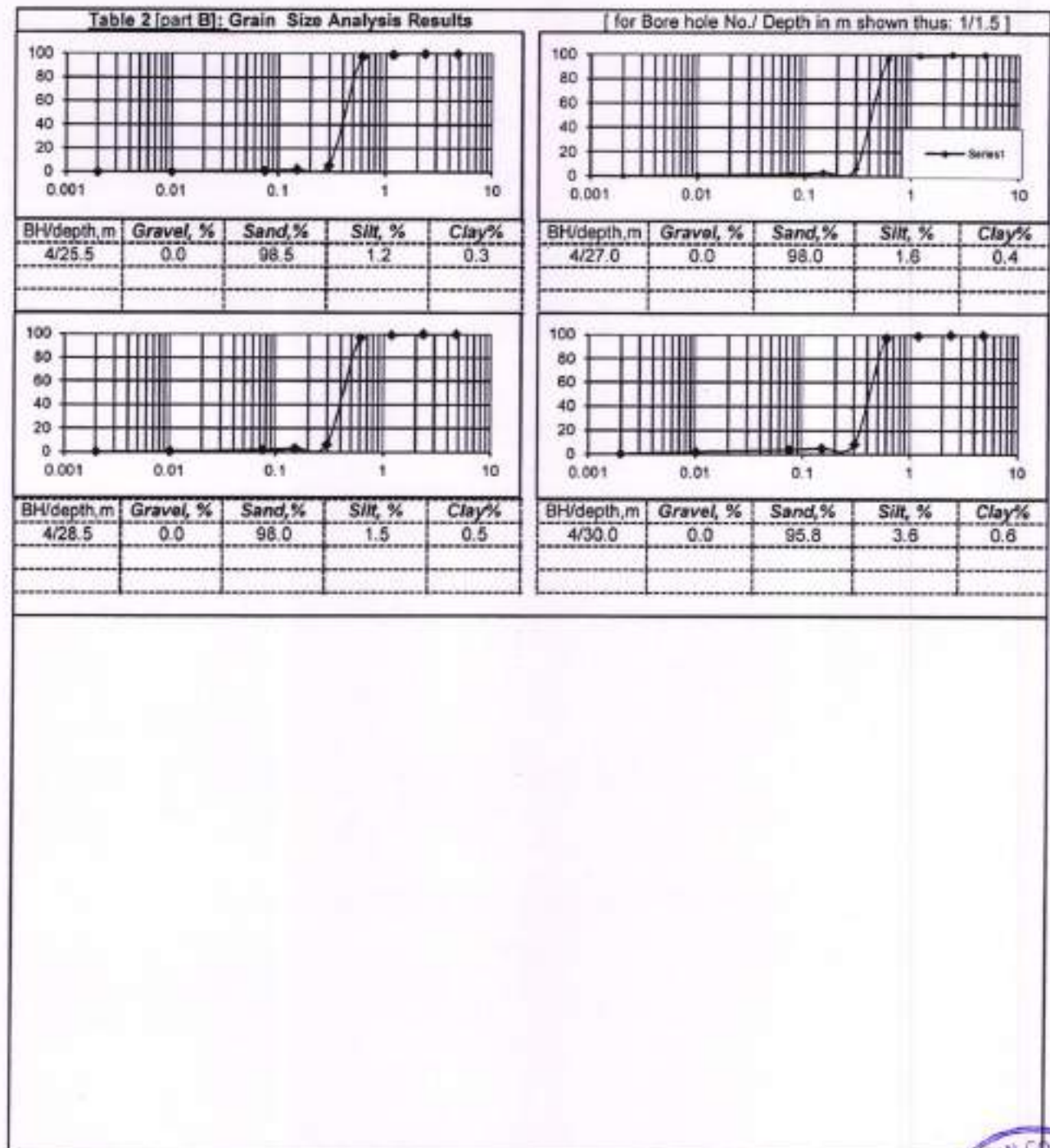
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



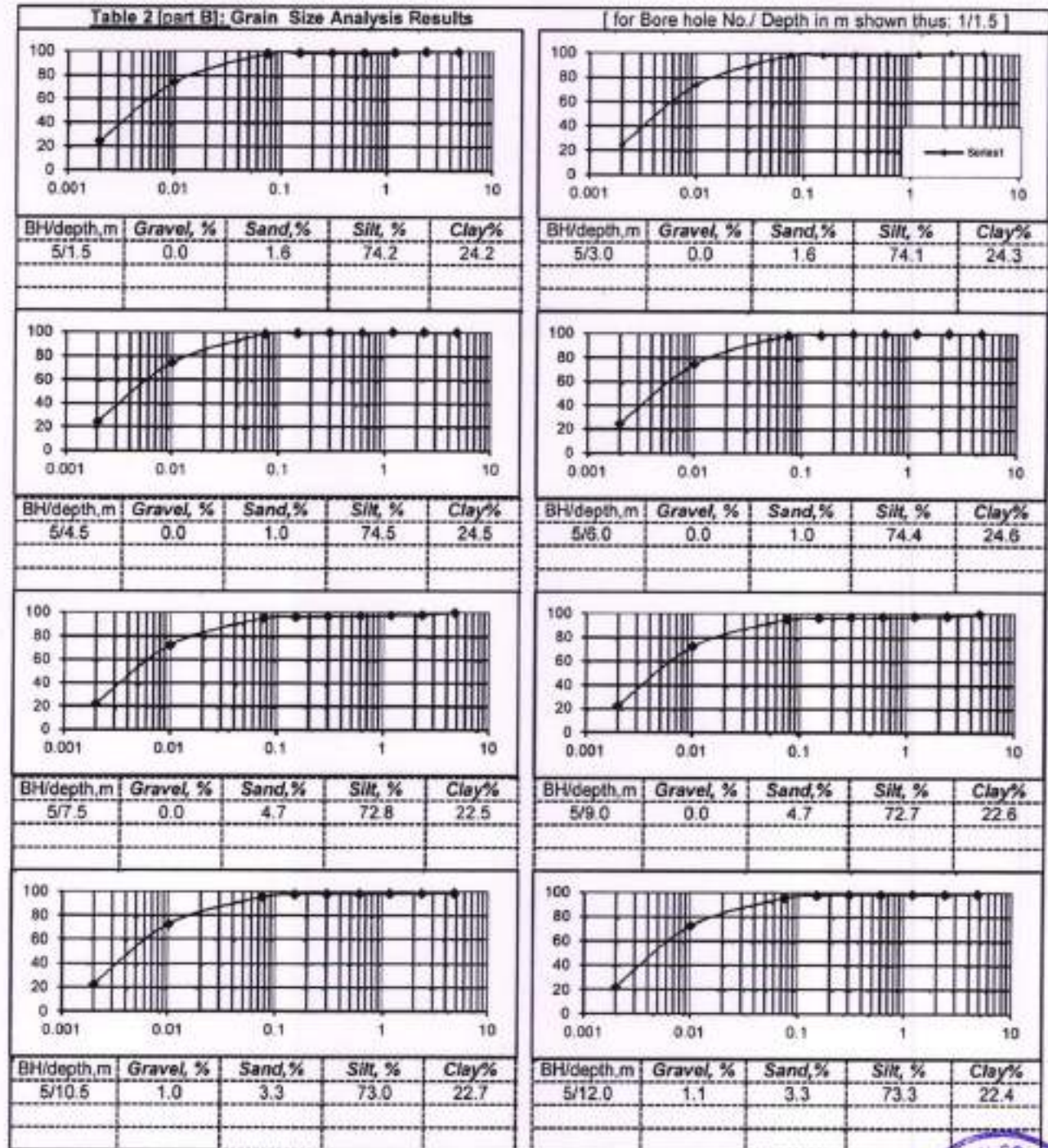
Report on sub-soil investigation for the proposed
New Bulling Sarari City at Patna



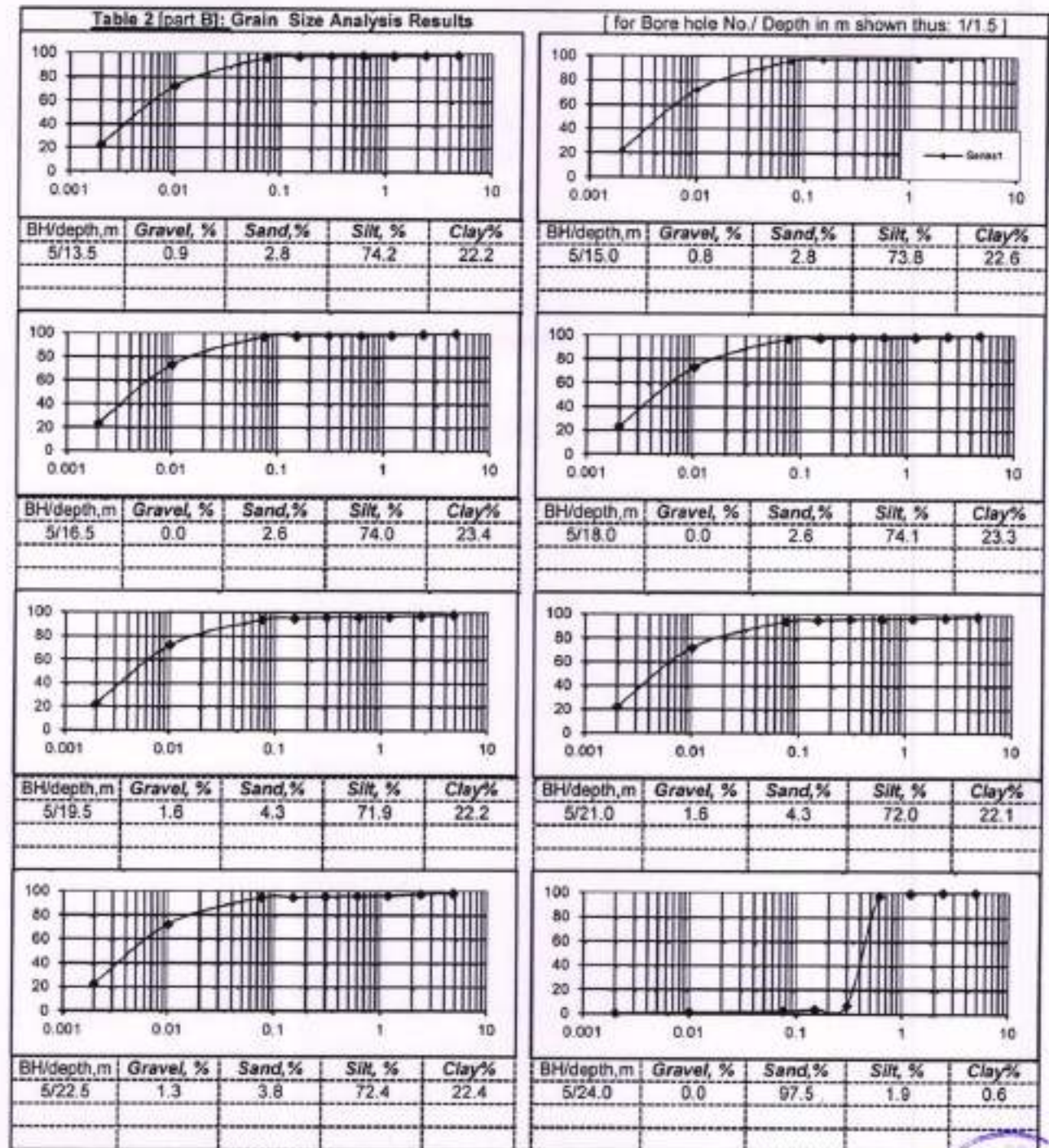
Report on sub-soil investigation for the proposed
New Building Sarani City at Patna



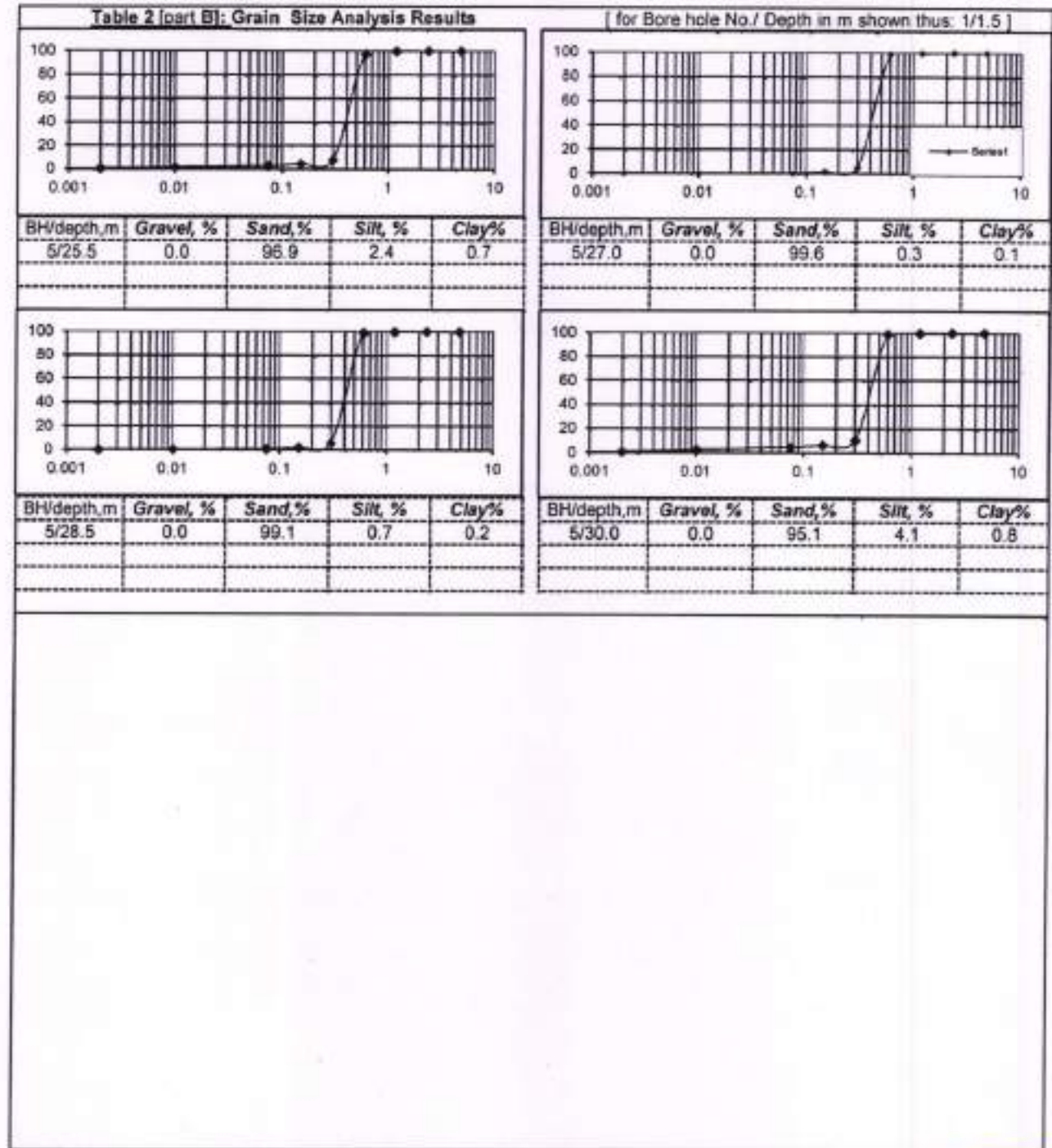
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



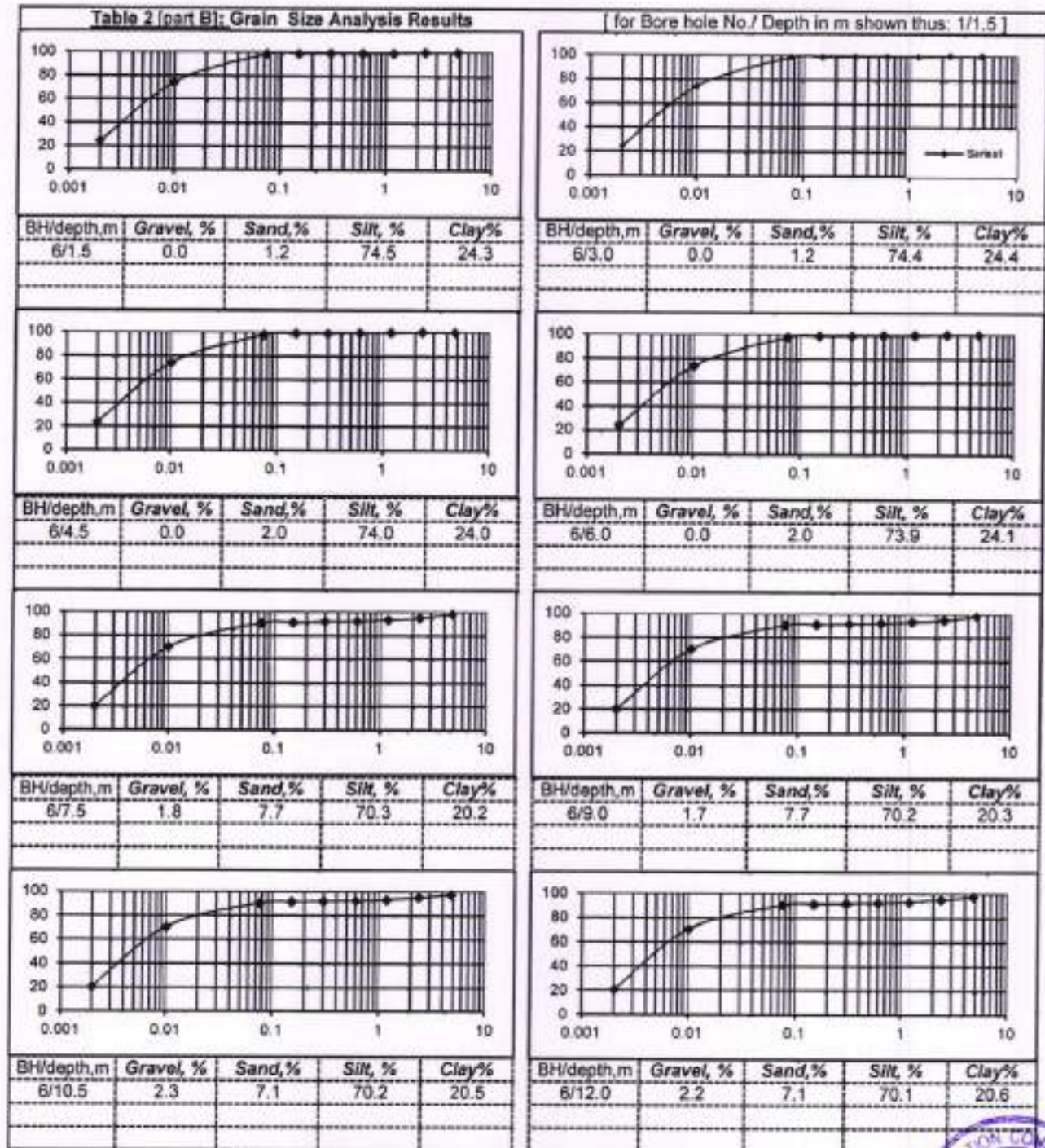
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

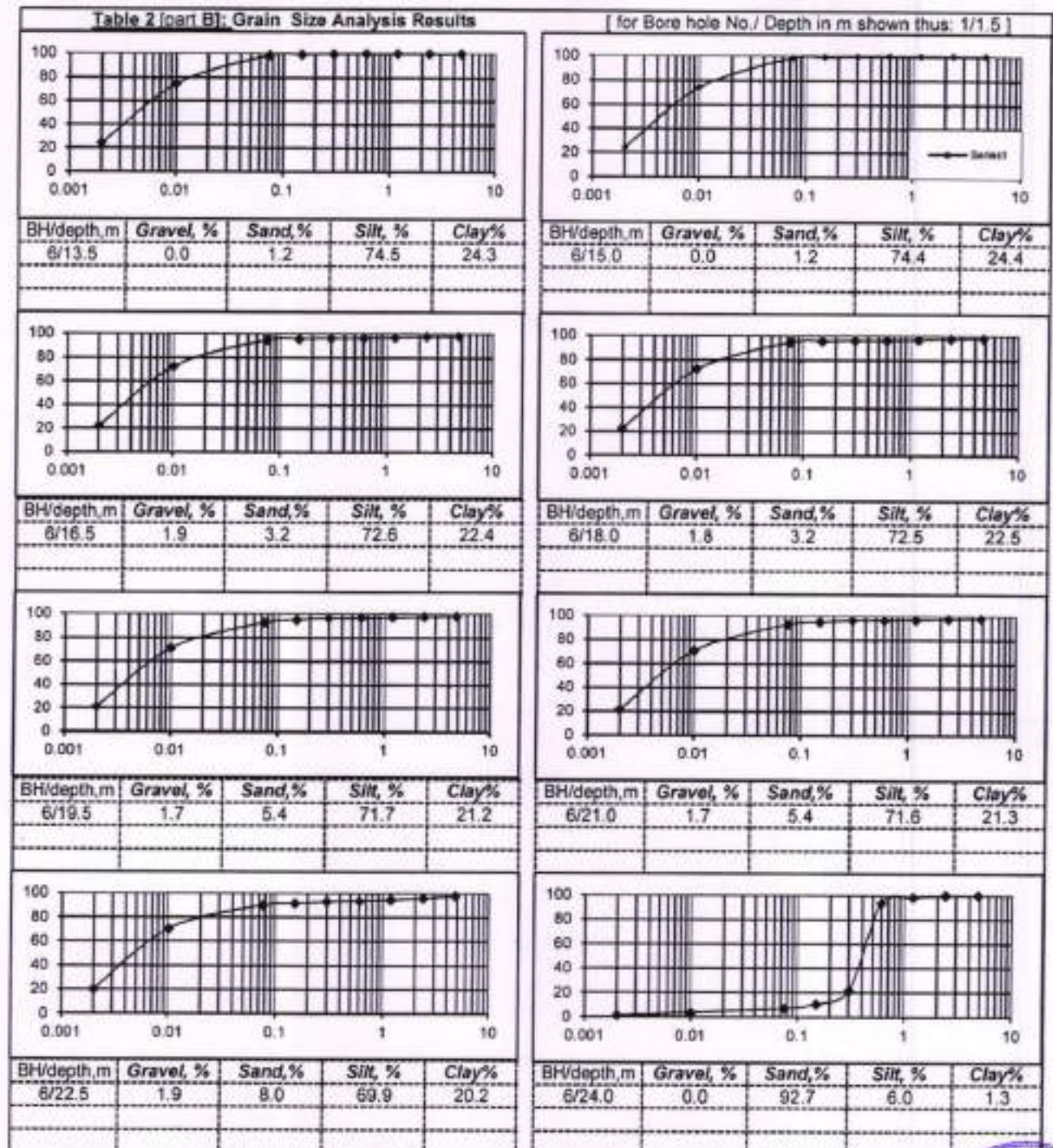


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10,
[Unit : Bihar Foundation Consultants]

PN - 211226

Appendix - C16

Report on sub-soil investigation for the proposed
New Buling Sarani City at Patna

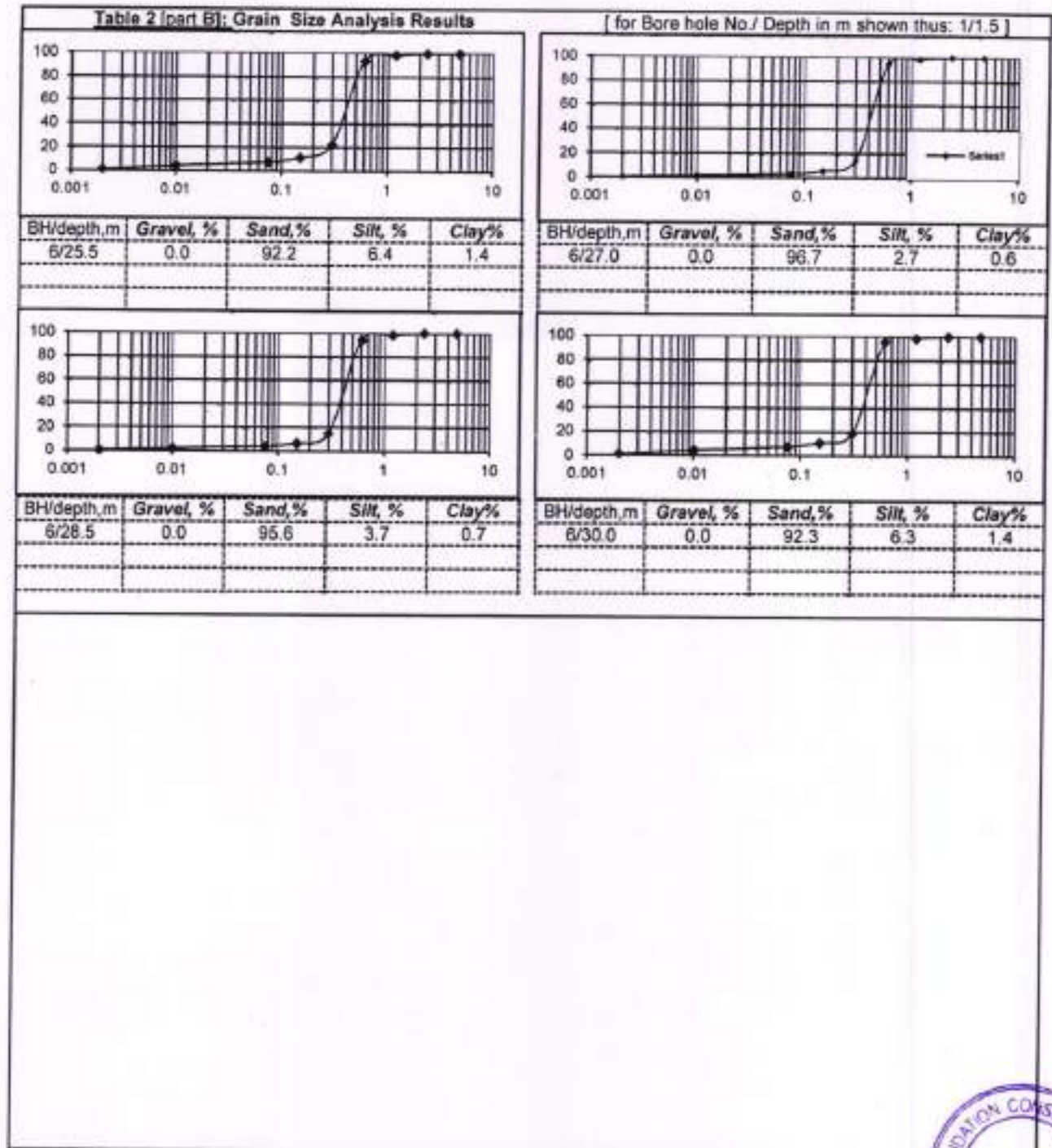


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

PN - 211226

Appendix - C17

Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

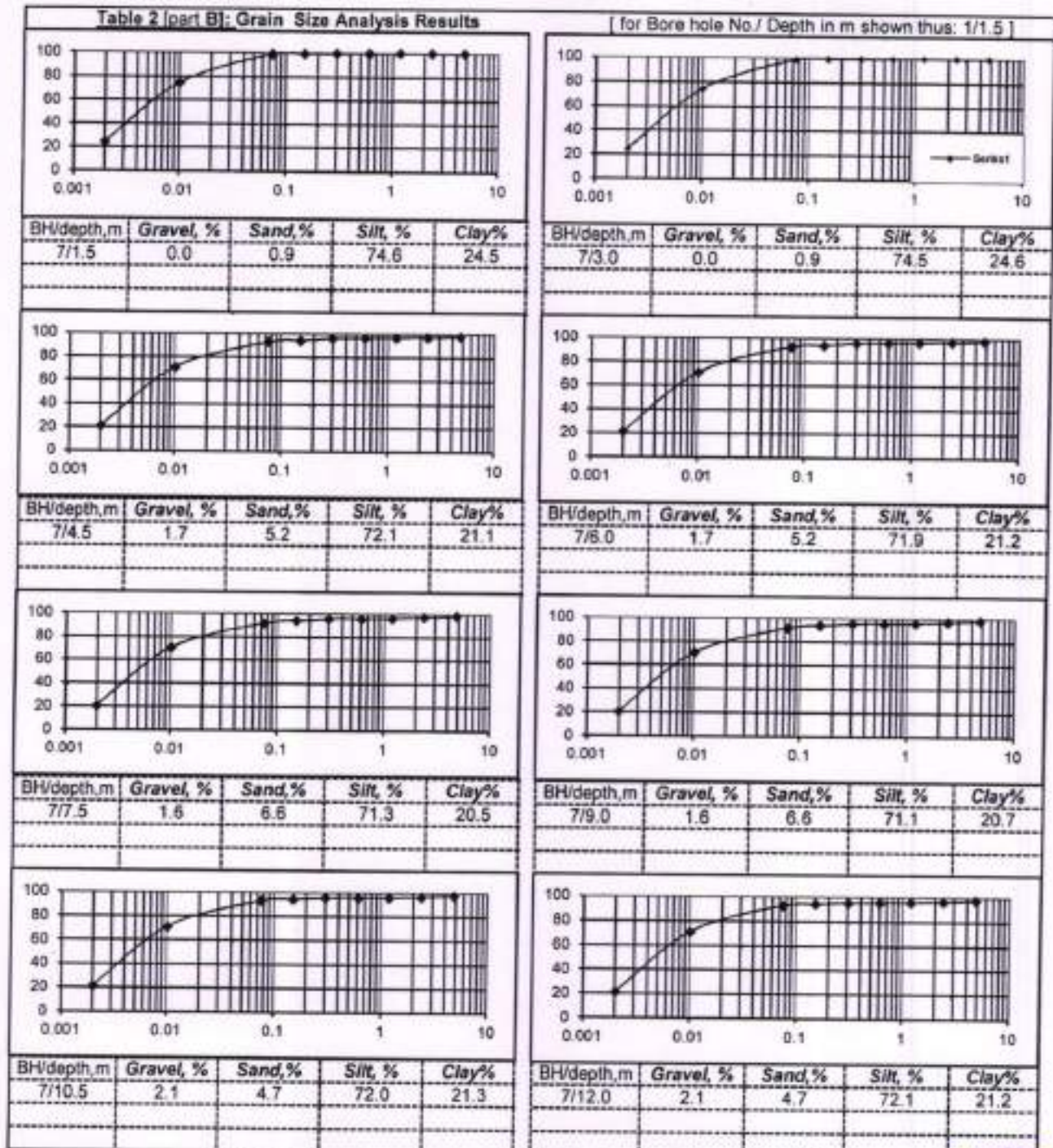


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna - 10,
[Unit : Bihar Foundation Consultants]

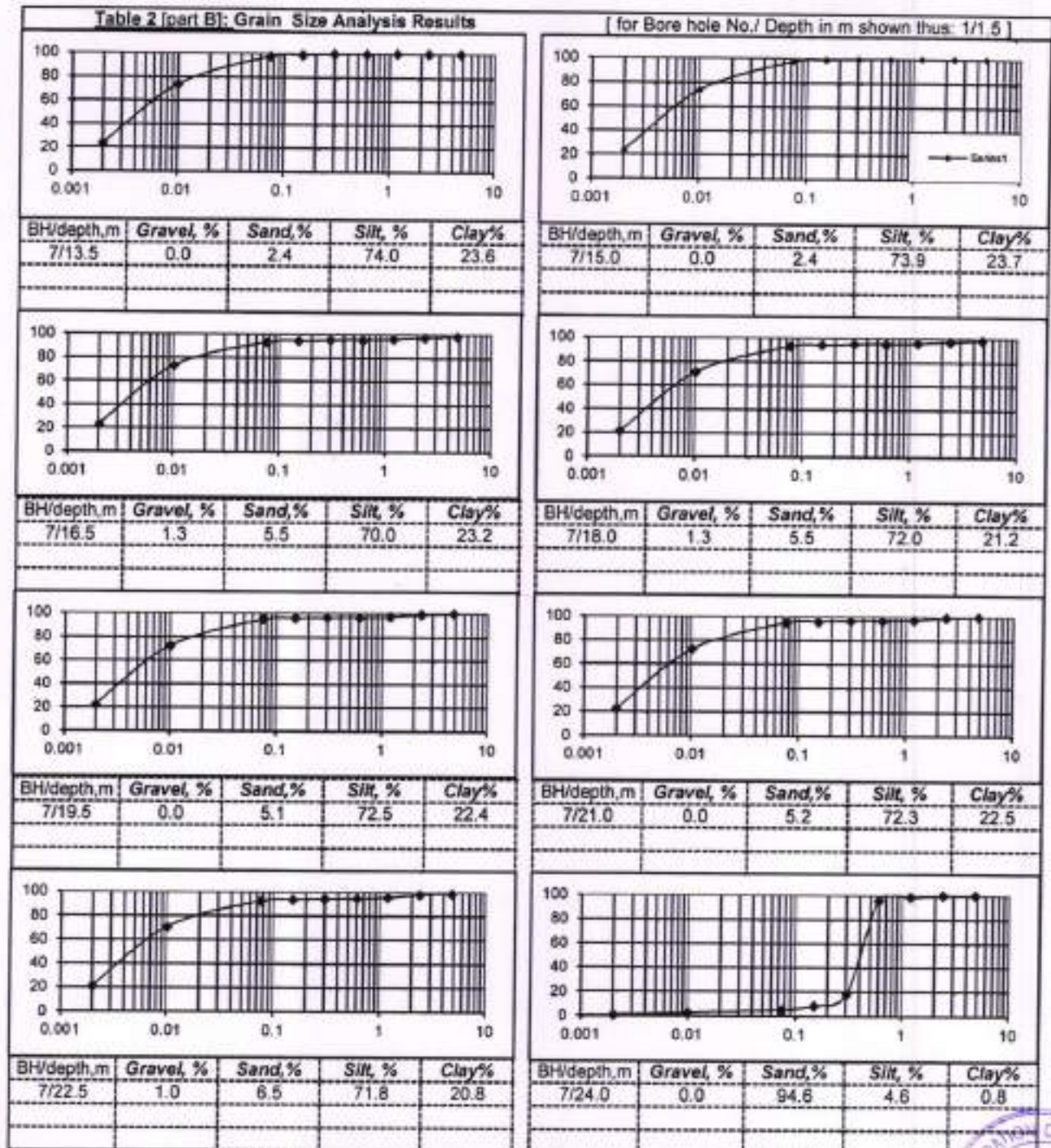
PW - 211226

Appendix - C18

Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

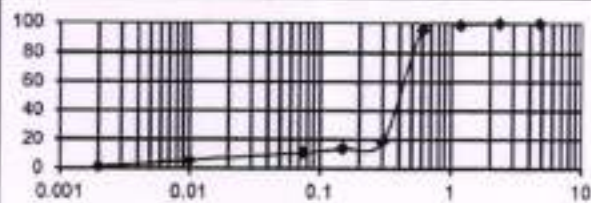
PN - 211226

Appendix - C20

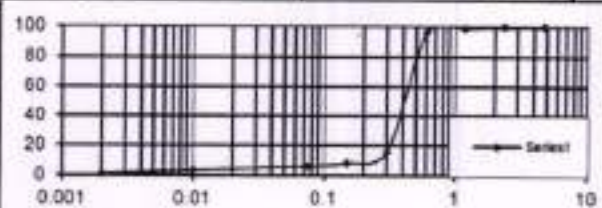
Report on sub-soil investigation for the proposed
New Bulding Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

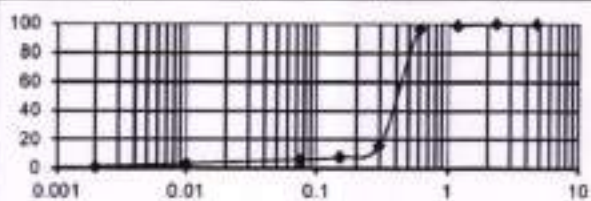
[for Bore hole No./ Depth in m shown thus: 1/1.5]



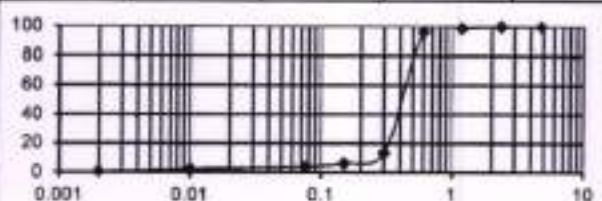
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
7/25.5	0.0	89.0	9.4	1.6



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
7/27.0	0.0	94.0	5.0	1.1



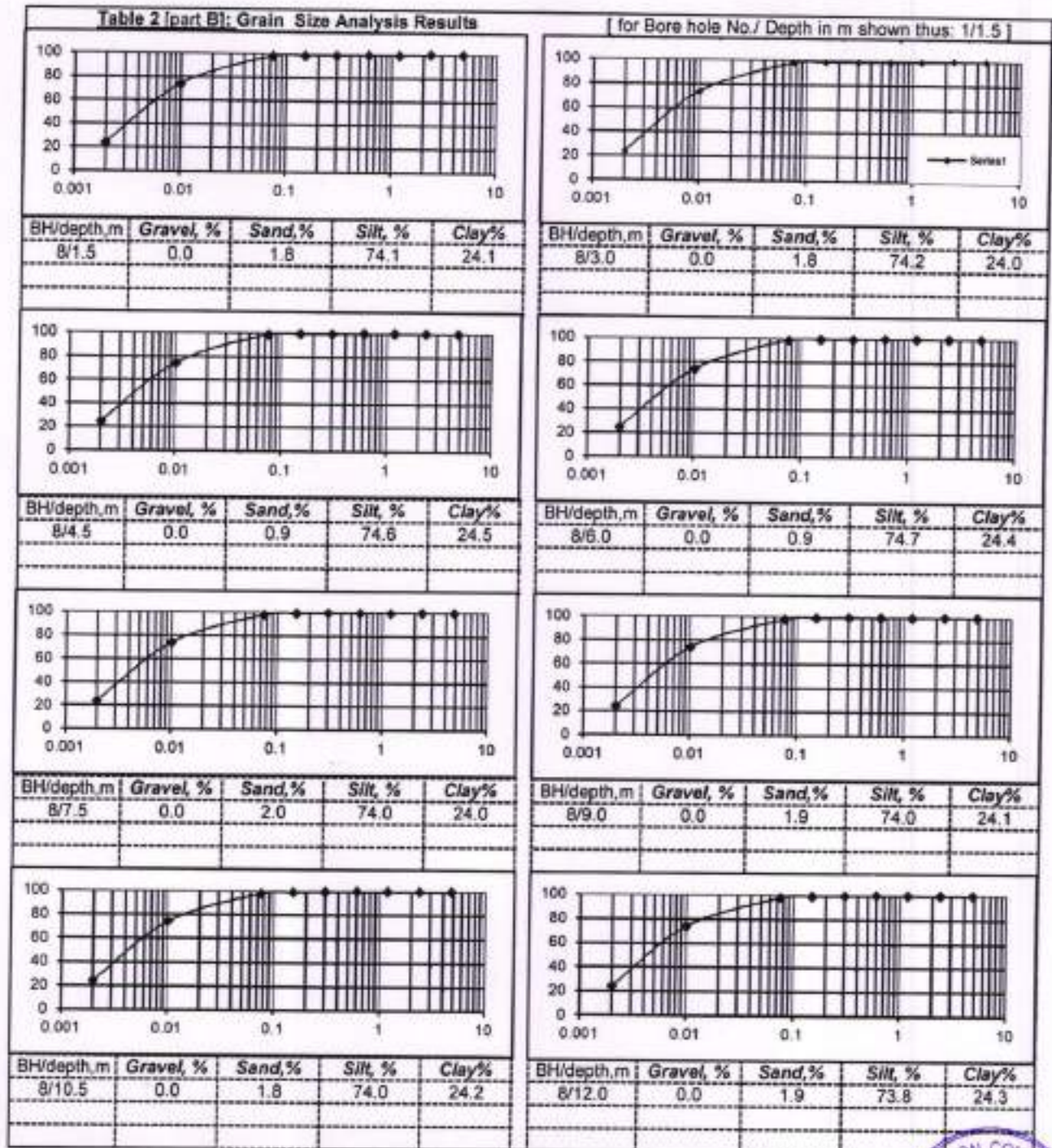
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
7/28.5	0.0	93.8	5.0	1.2



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
7/30.0	0.0	96.2	3.1	0.7



Report on sub-soil investigation for the proposed
New Building Sarani City at Patna

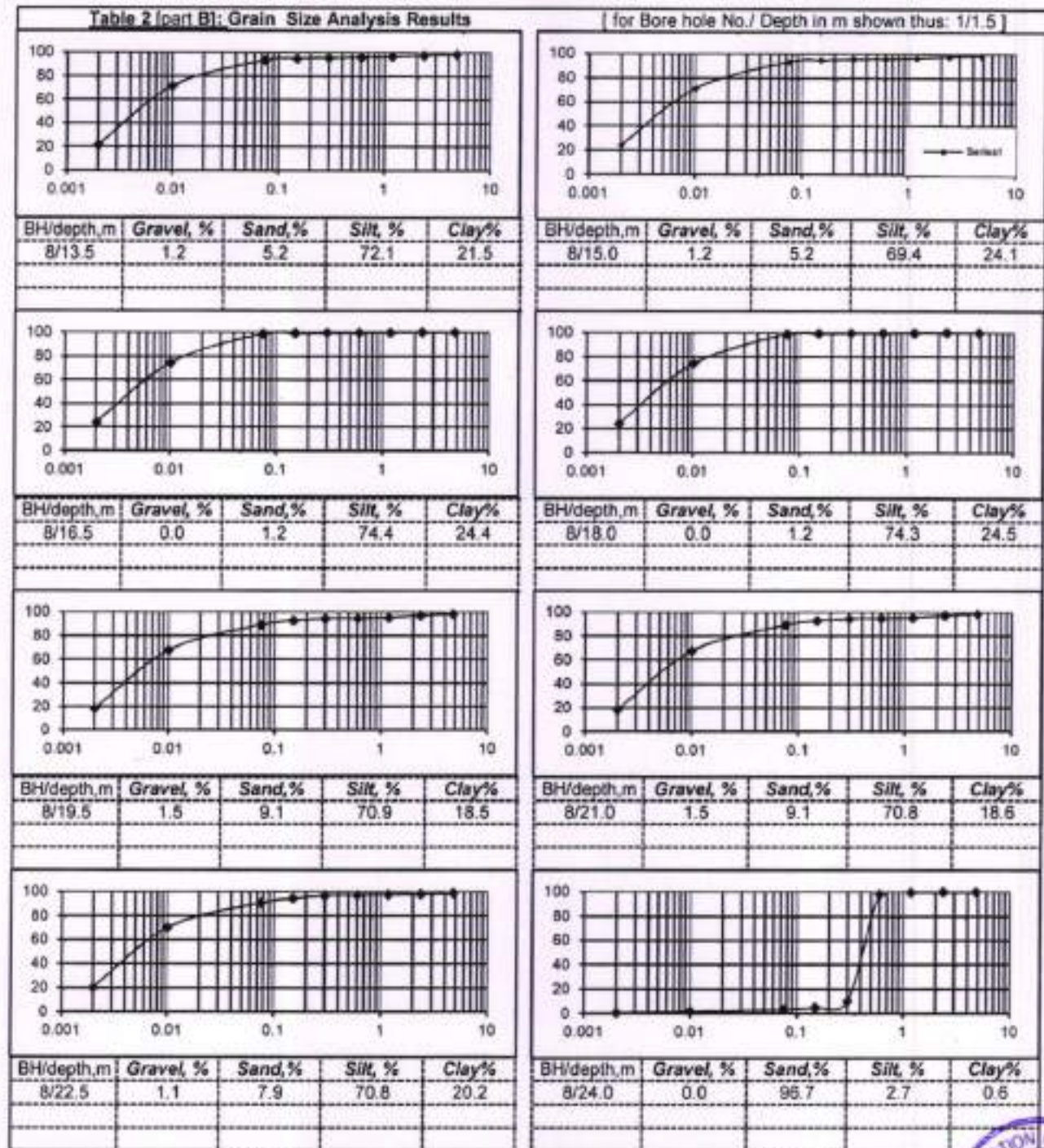


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

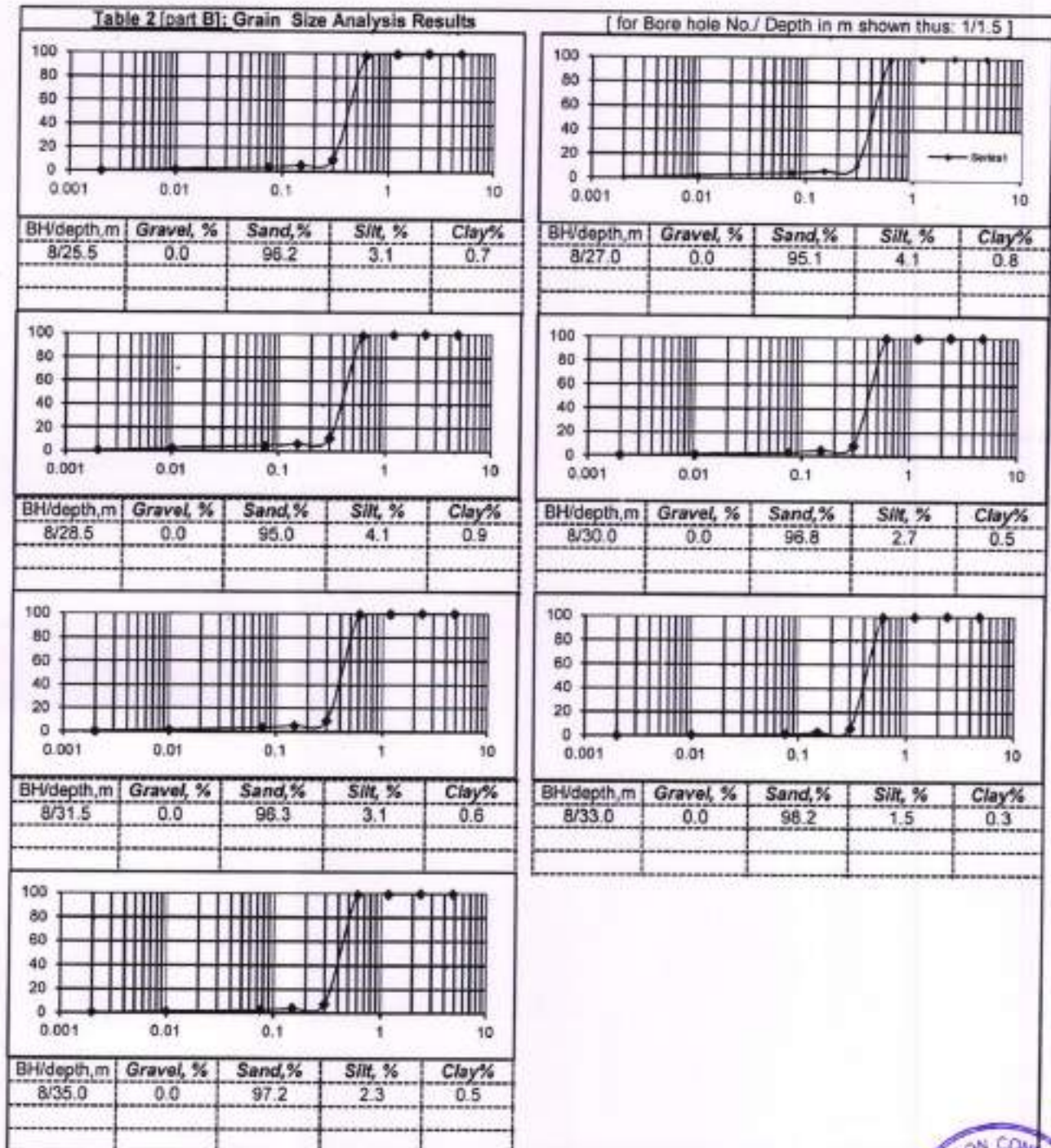
PN - 211226

Appendix - C22

Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

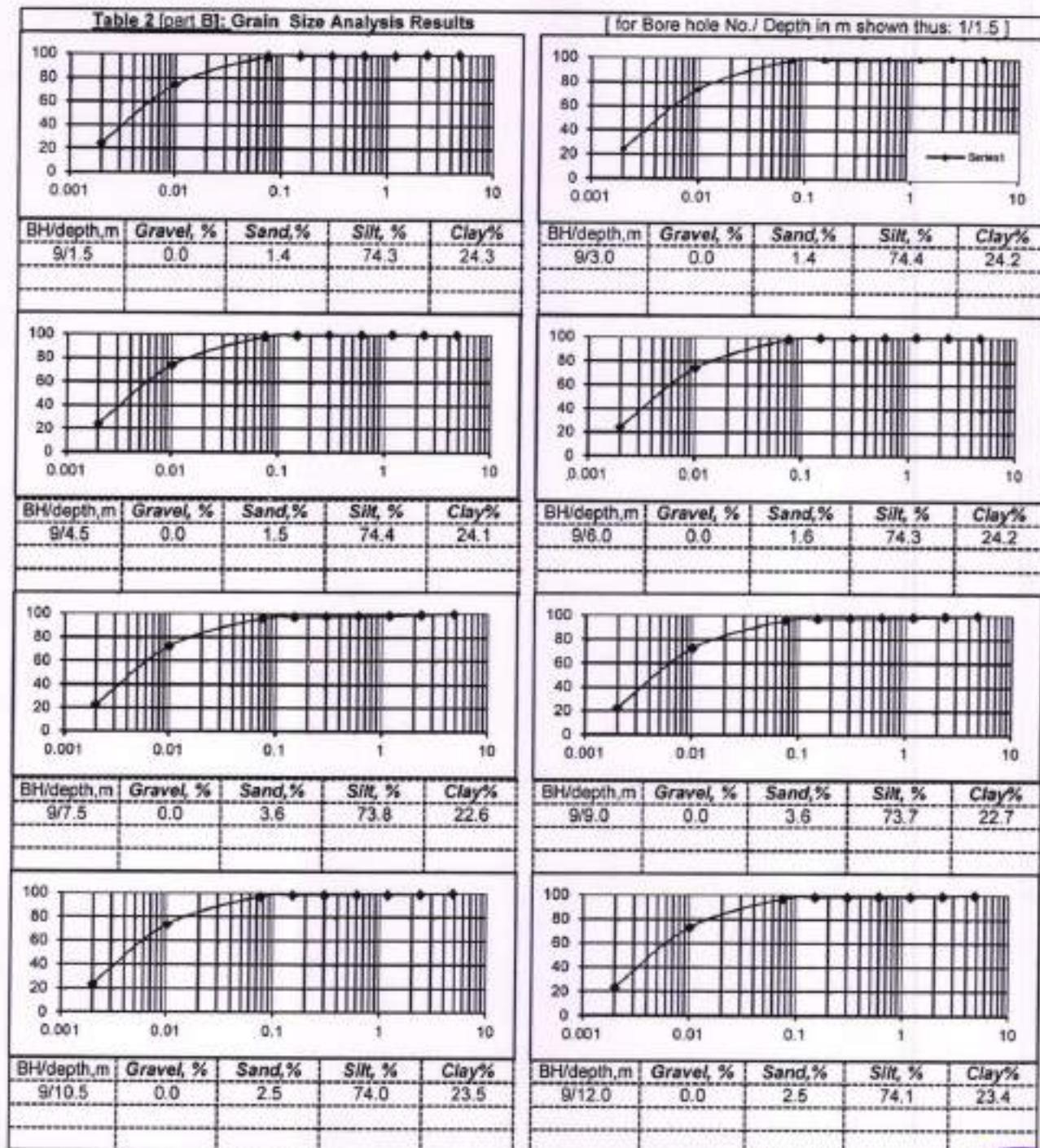


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

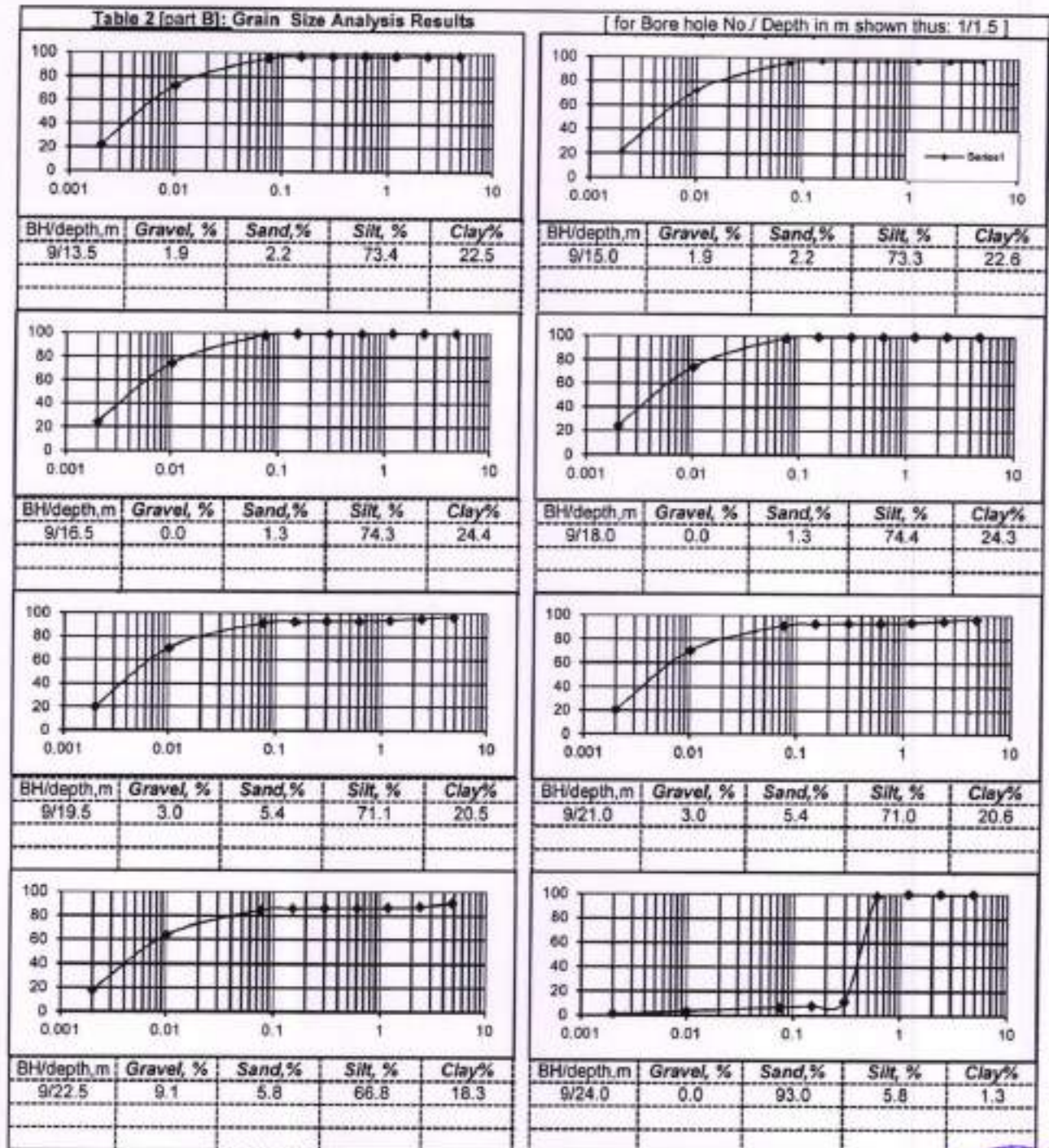
PN - 211226

Appendix - C24

Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna



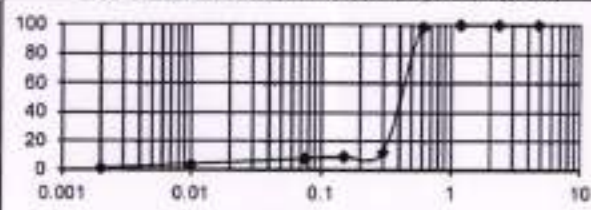
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



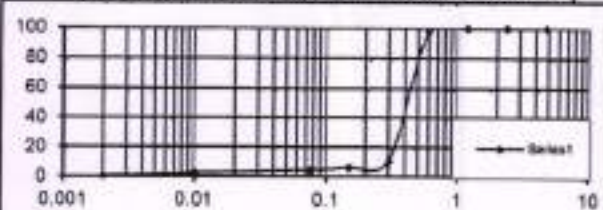
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

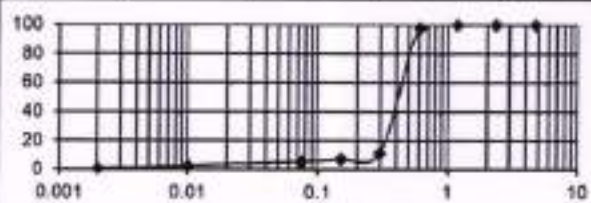
[for Bore hole No./ Depth in m shown thus: 1/1.5]



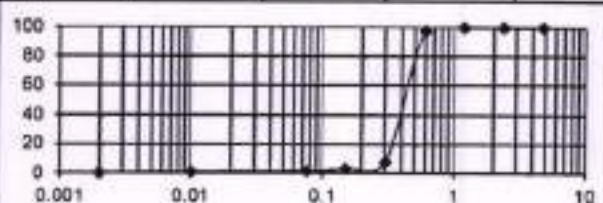
BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
9/25.5	0.0	91.8	6.8	1.4



BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
9/27.0	0.0	95.4	3.8	0.8



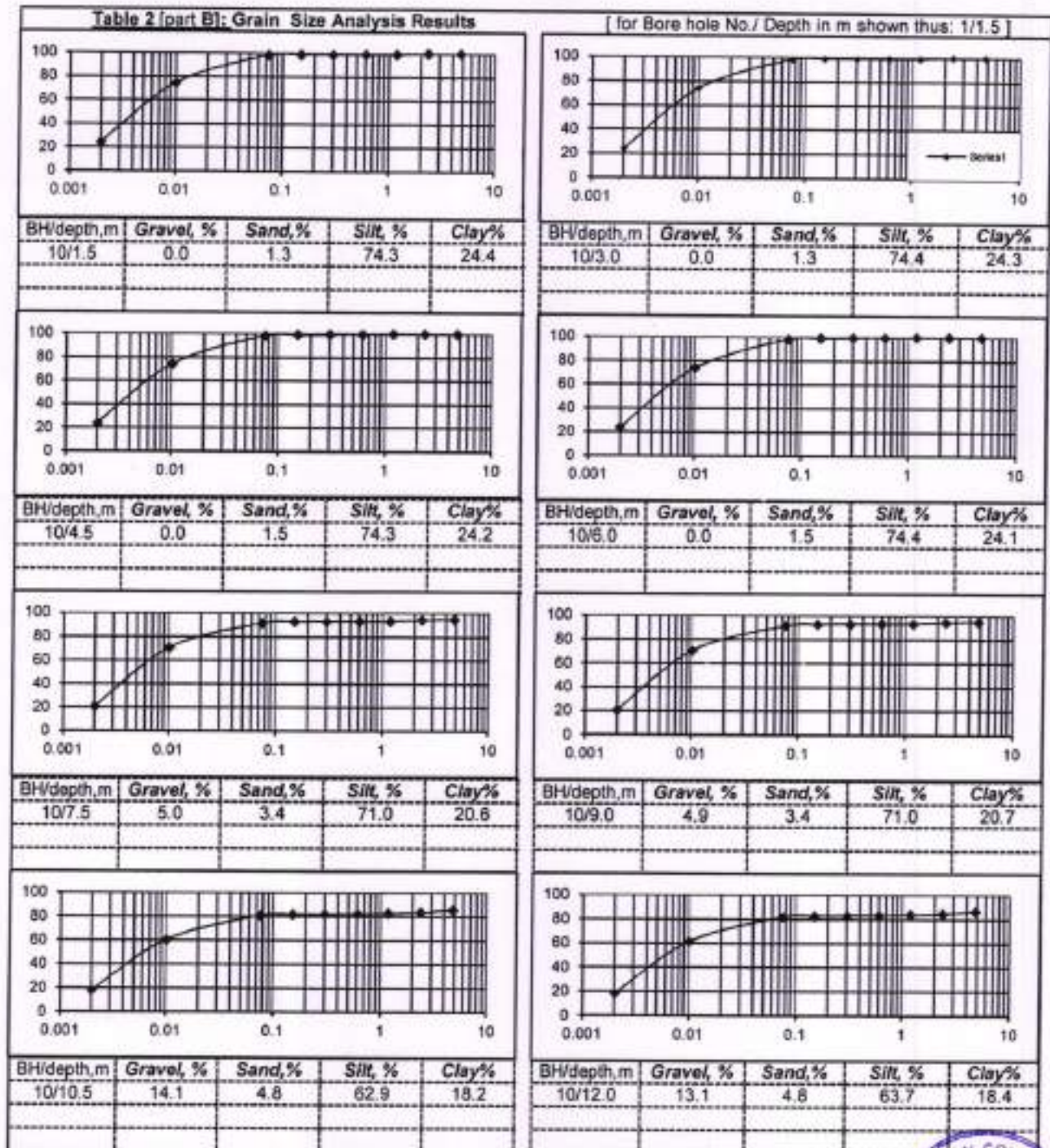
BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
9/28.5	0.0	94.3	4.8	0.9



BH/depth,m	Gravel, %	Sand, %	Silt, %	Clay%
9/30.0	0.0	98.3	1.3	0.4



Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

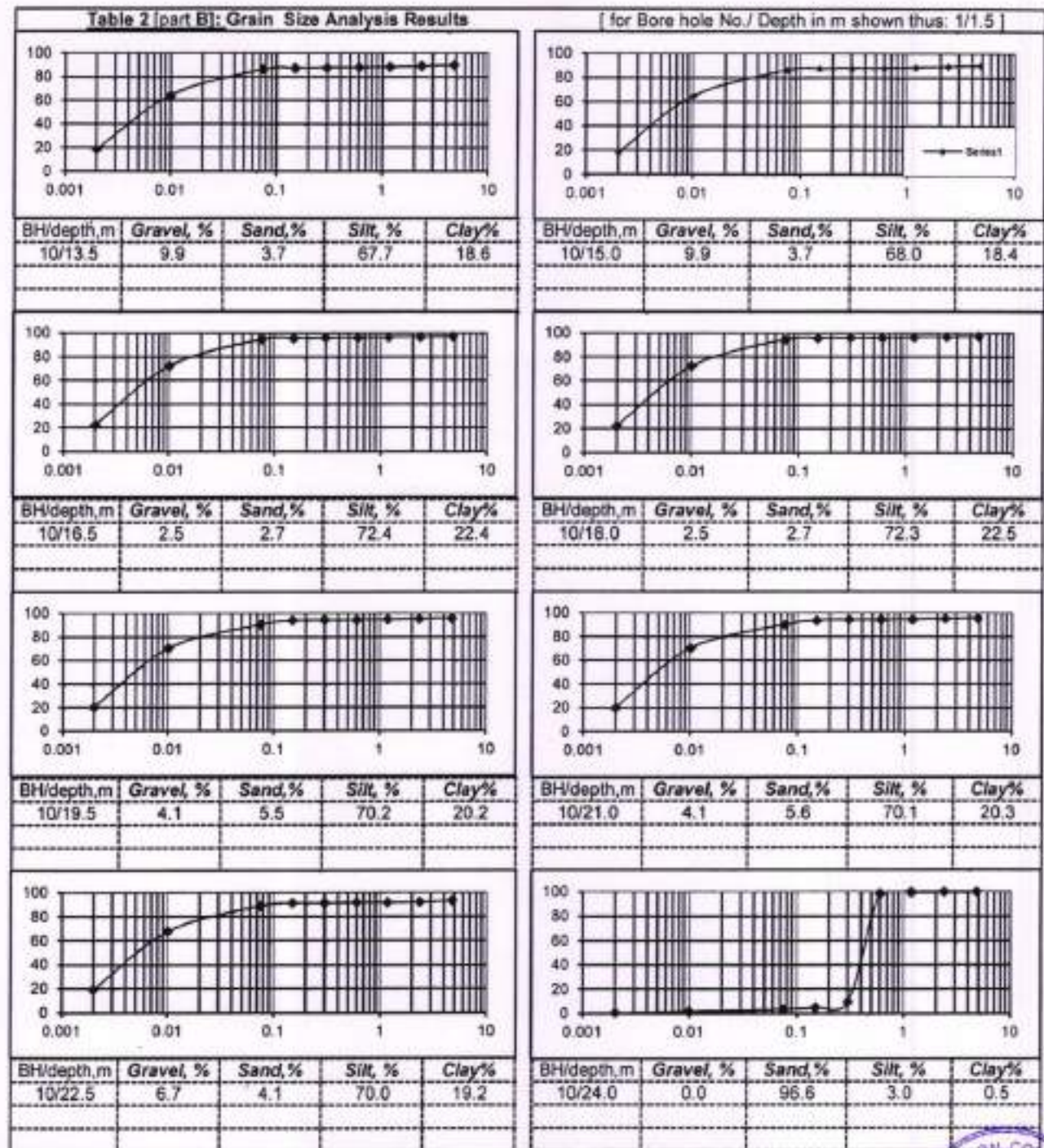


Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna - 10.
[Unit : Bihar Foundation Consultants]

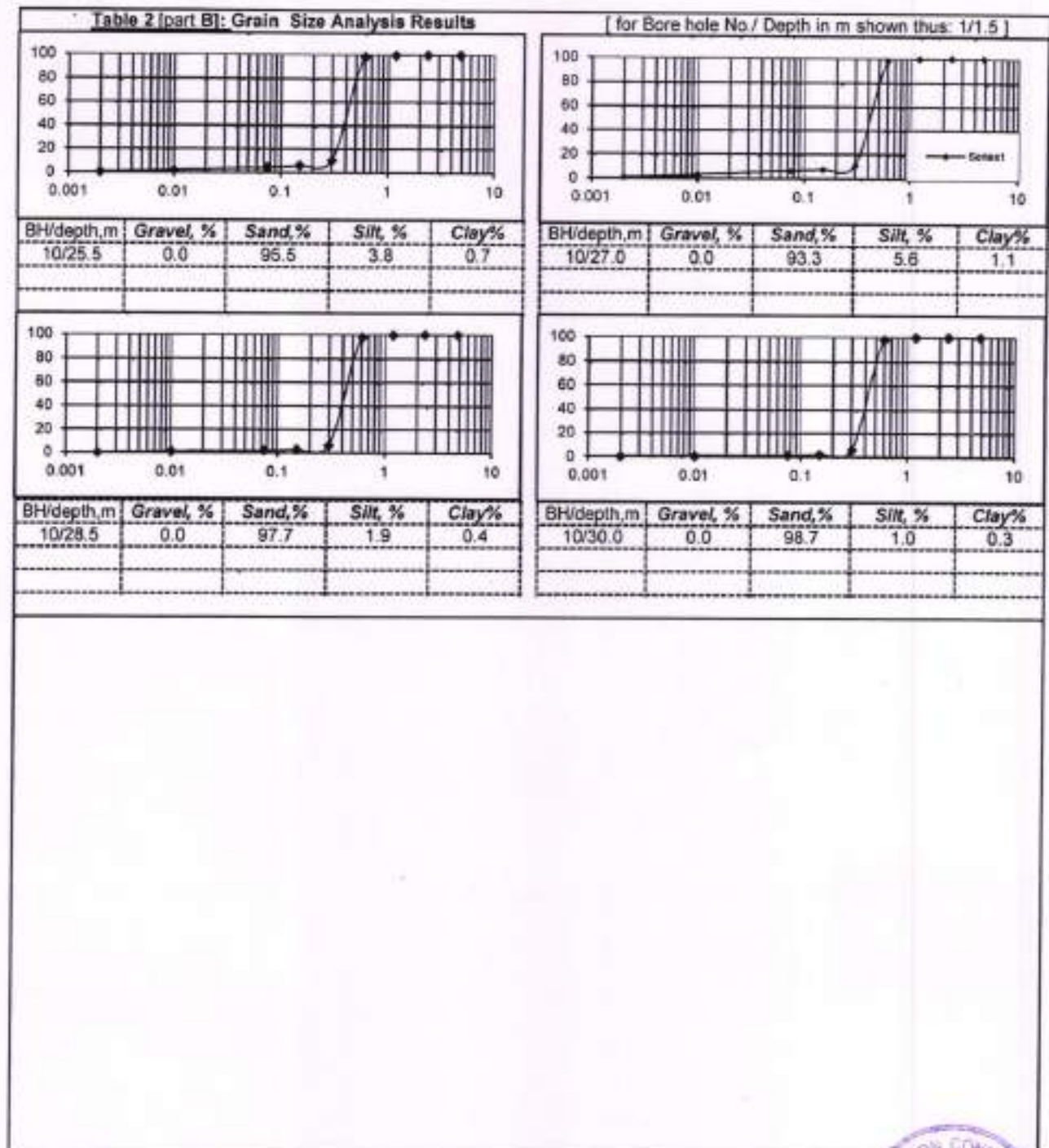
PN - 211226

Appendix - C28

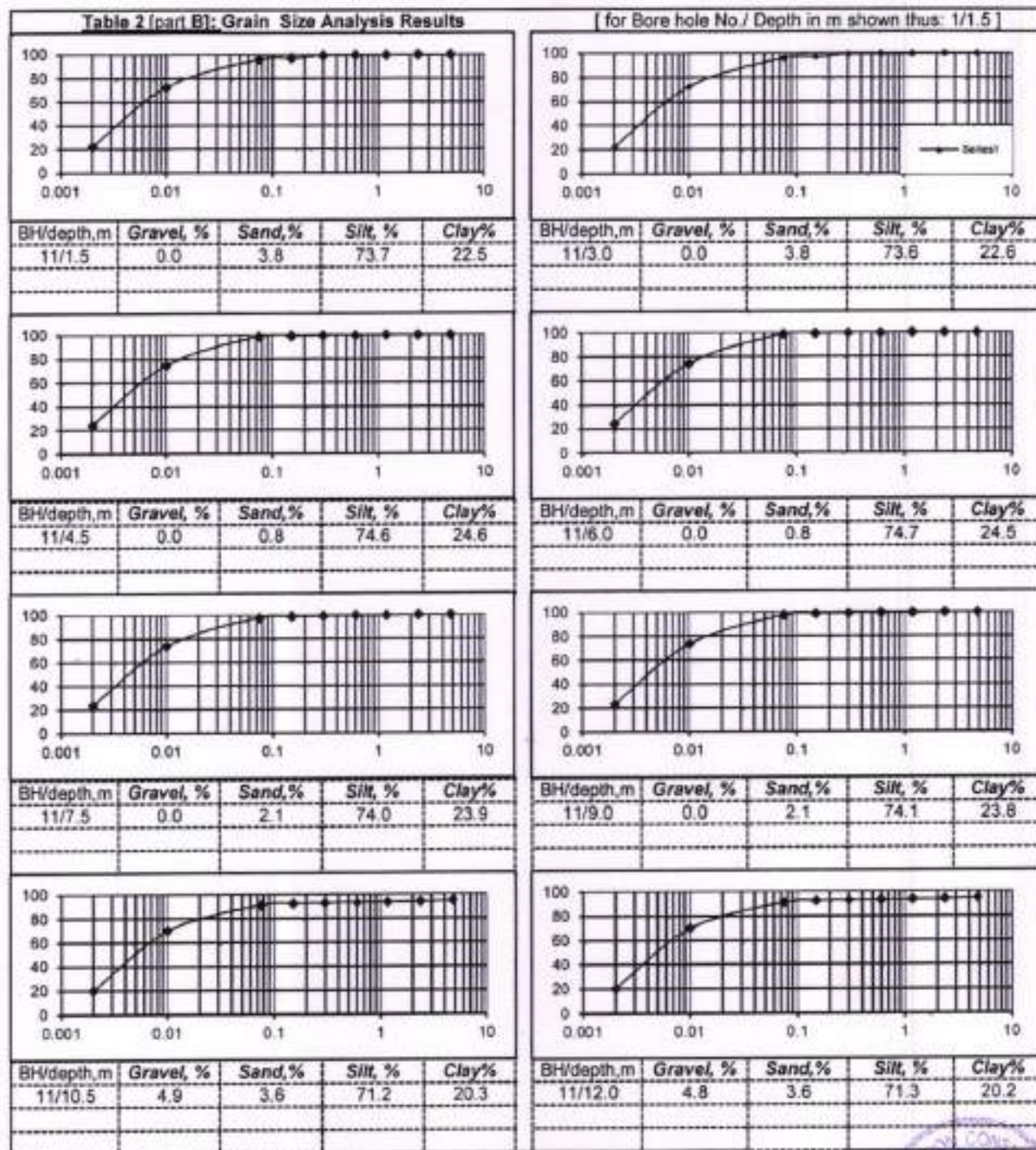
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



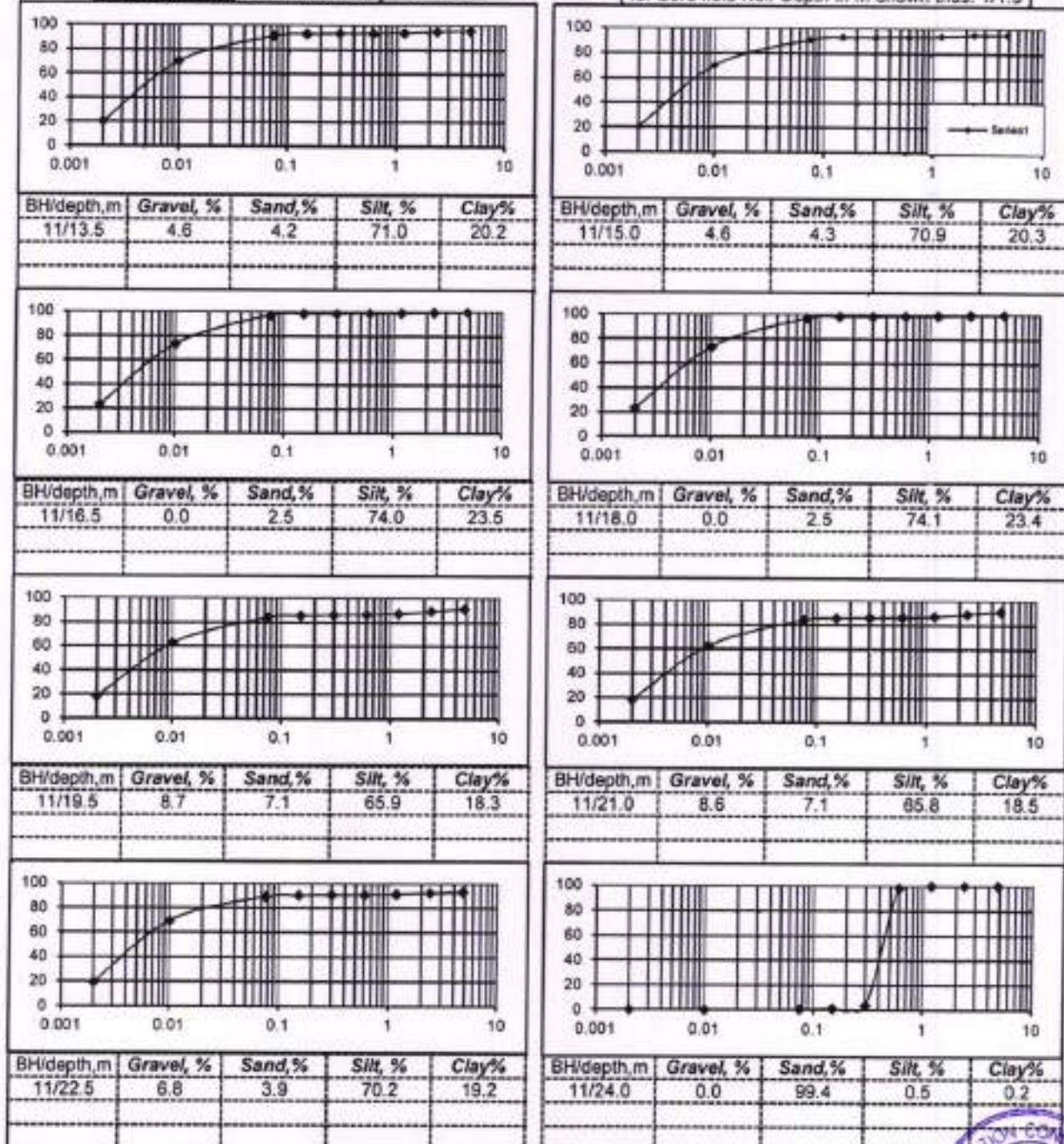
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 [part B]: Grain Size Analysis Results

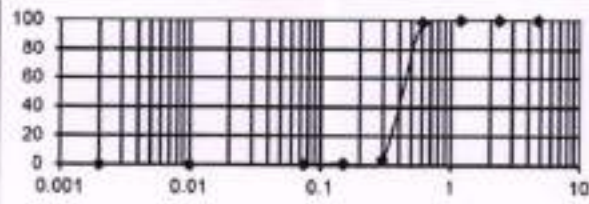
[for Bore hole No./ Depth in m shown thus: 1/1.5]



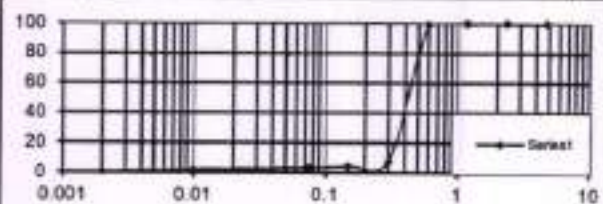
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

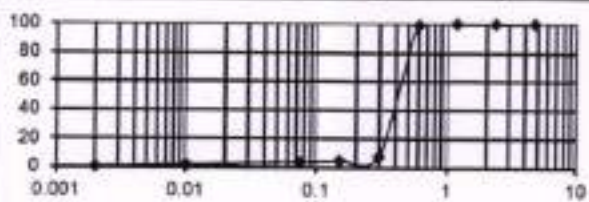
[for Bore hole No./ Depth in m shown thus: 1/1.5]



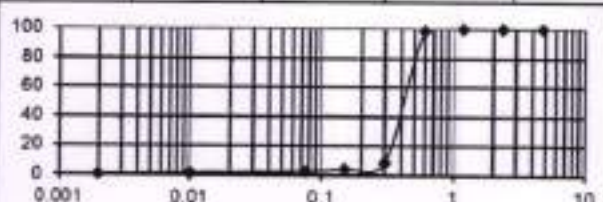
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
11/25.5	0.0	99.6	0.3	0.1



BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
11/27.0	0.0	96.8	2.6	0.6



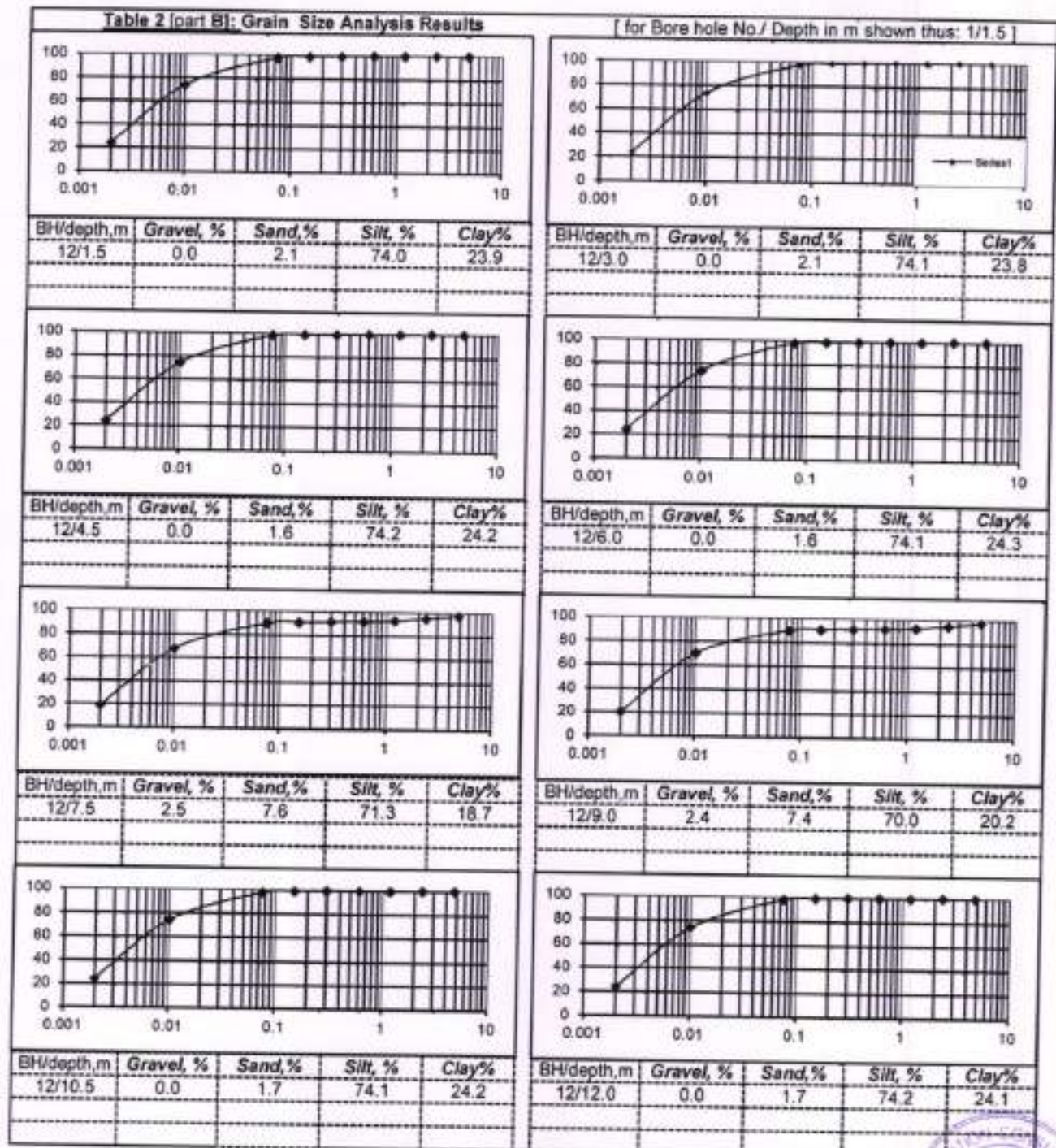
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
11/28.5	0.0	96.2	3.1	0.7



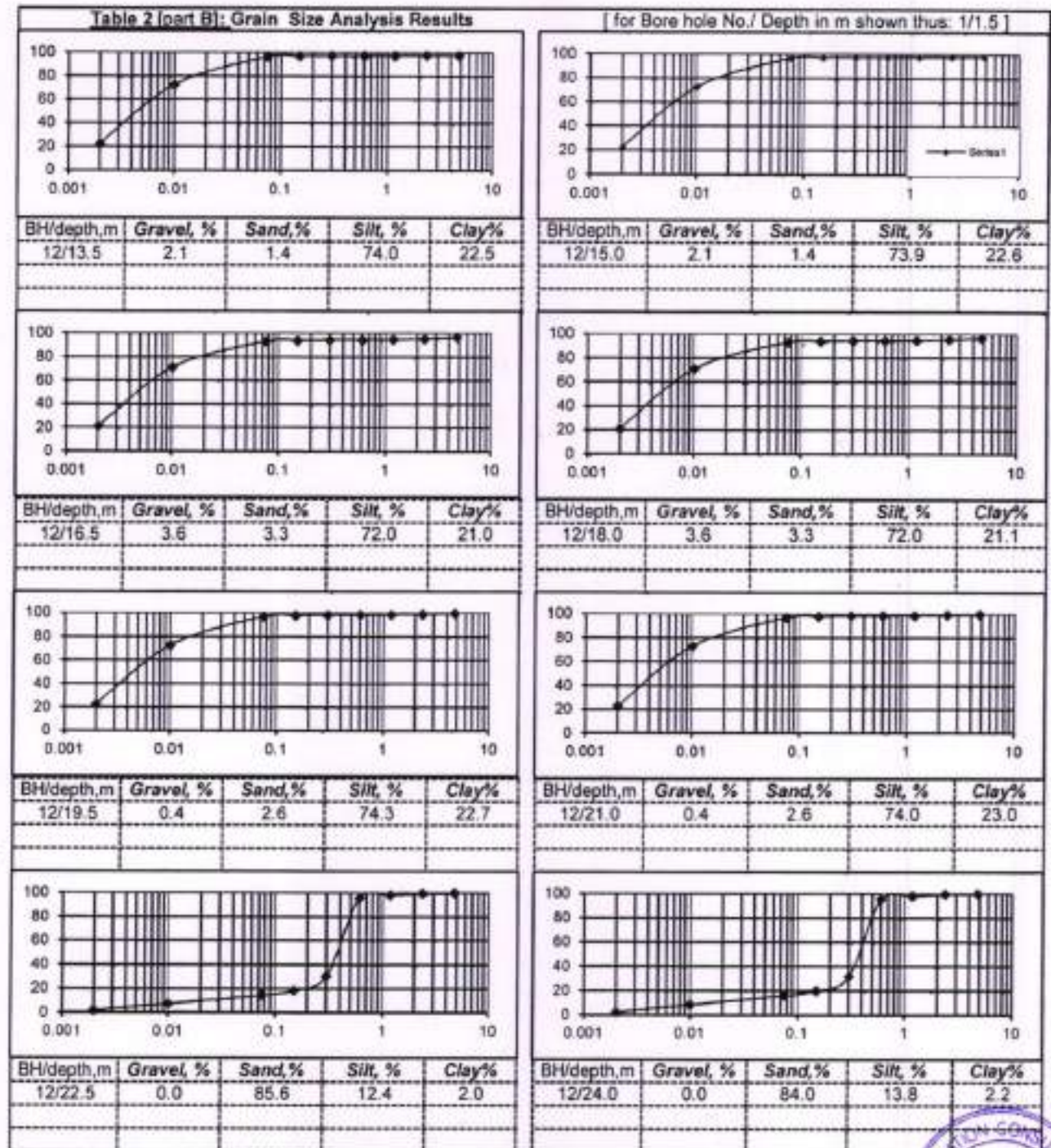
BH/depth, m	Gravel, %	Sand, %	Silt, %	Clay%
11/30.0	0.0	97.3	2.2	0.5



Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



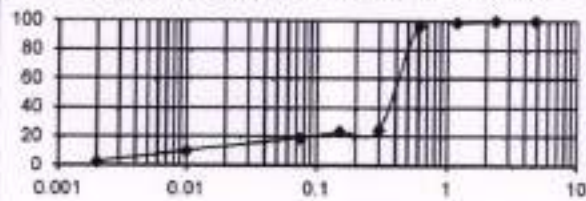
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna



Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna -10.
[Unit : Bihar Foundation Consultants]

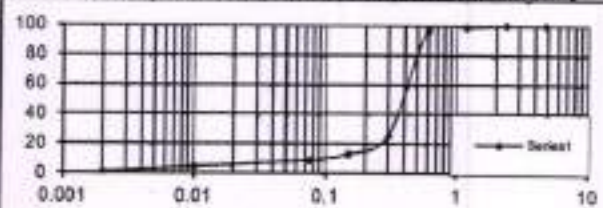
Report on sub-soil investigation for the proposed
New Buling Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

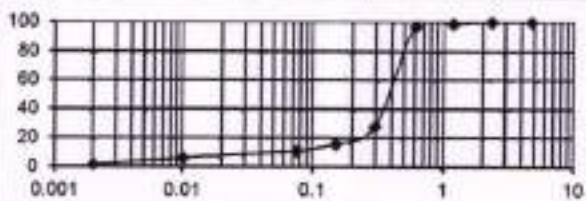


BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/25.5	0.0	80.8	16.4	2.8

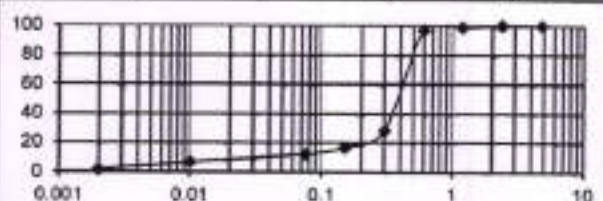
[for Bore hole No./ Depth in m shown thus: 1/1.5]



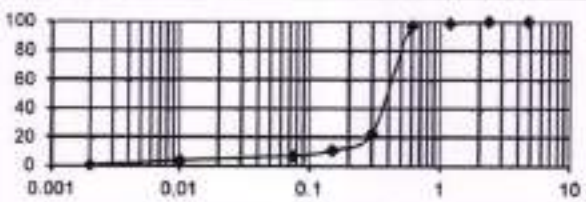
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/27.0	0.0	91.2	7.4	1.4



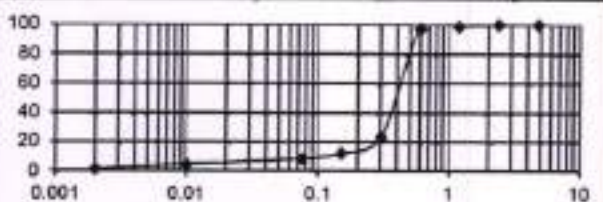
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/28.5	0.0	88.7	9.5	1.8



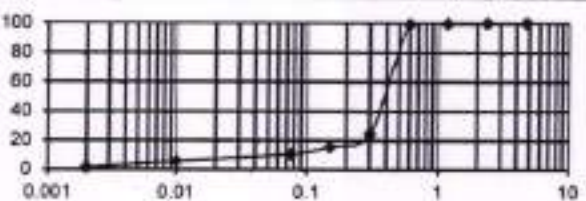
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/30.0	0.0	87.6	10.5	1.9



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/31.5	0.0	92.6	6.3	1.1



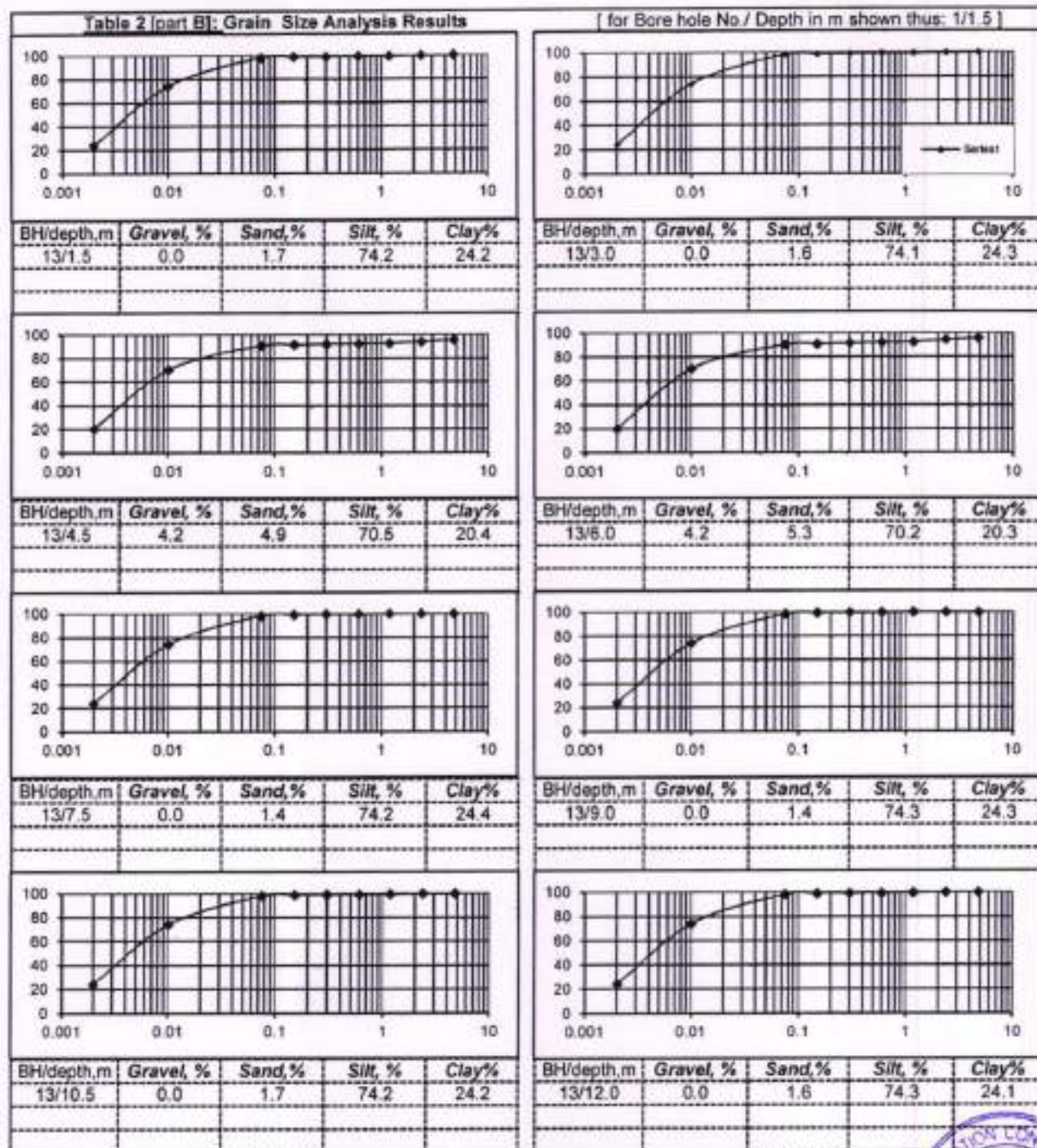
BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/33.0	0.0	91.5	7.1	1.4



BH/depth,m	Gravel, %	Sand,%	Silt, %	Clay%
12/35.0	0.0	89.4	9.1	1.5



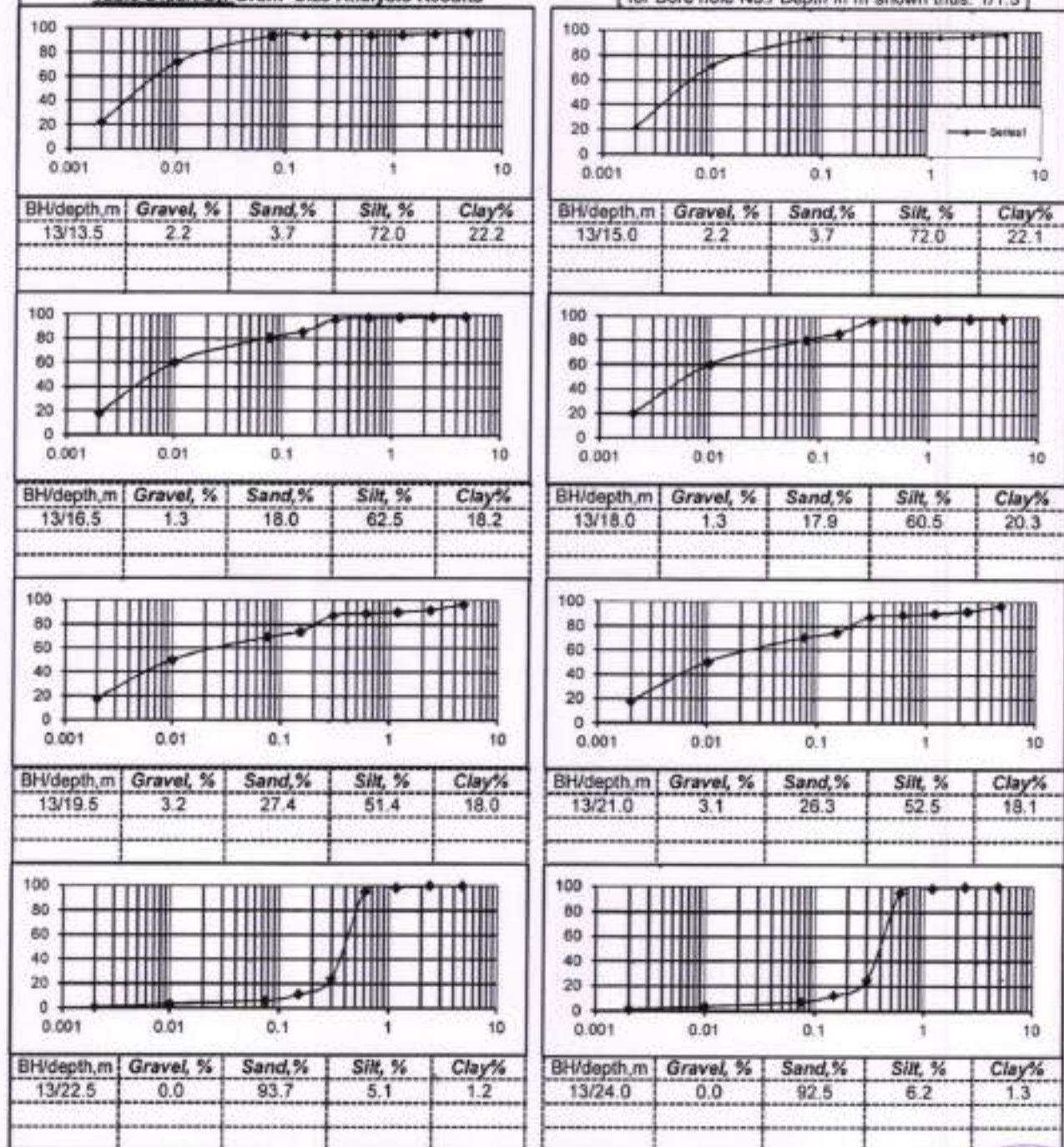
Report on sub-soil investigation for the proposed
New Bulling Sarari City at Patna



Report on sub-soil investigation for the proposed
New Bulling Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

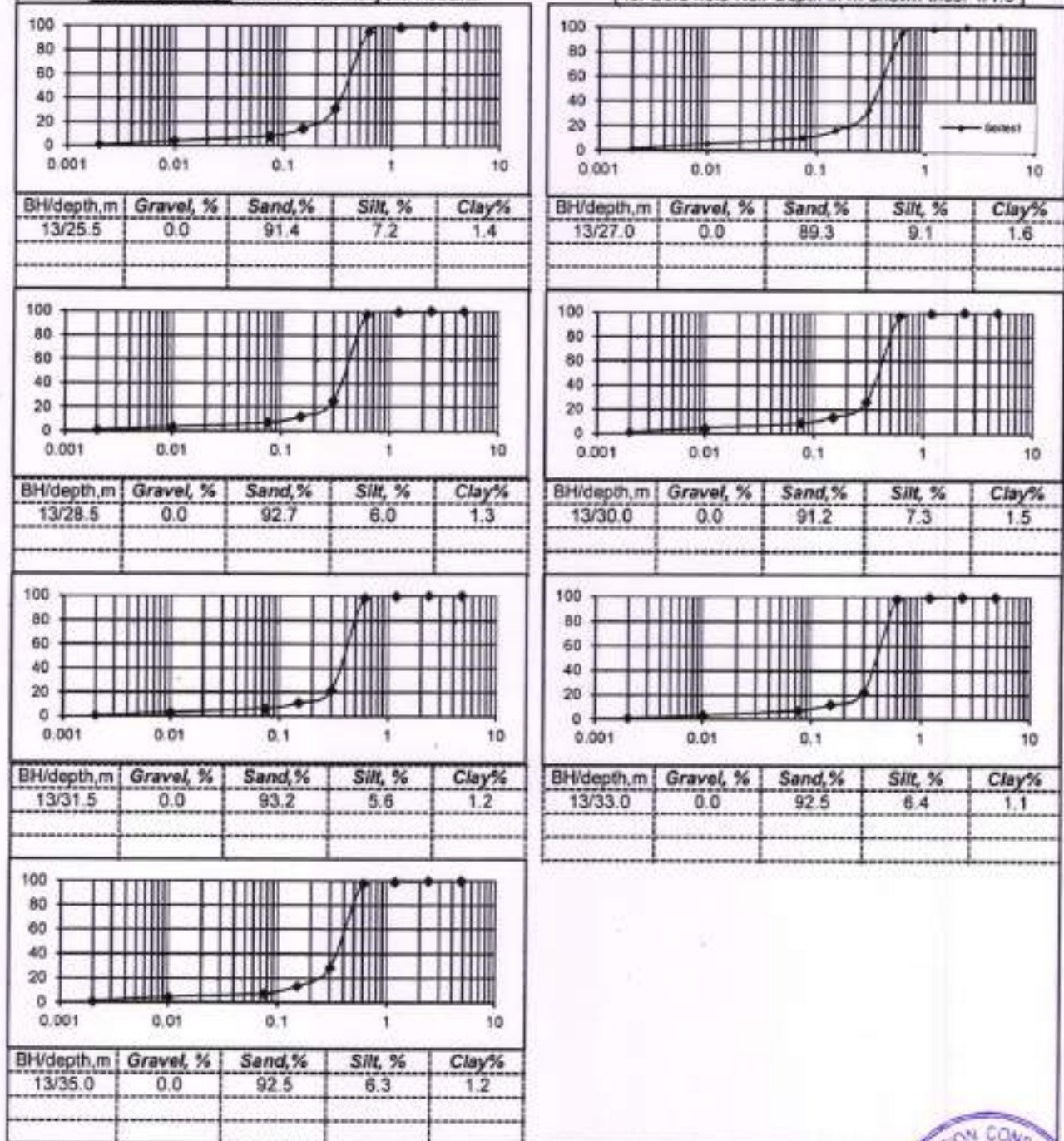
[for Bore hole No./ Depth in m shown thus: 1/1.5]



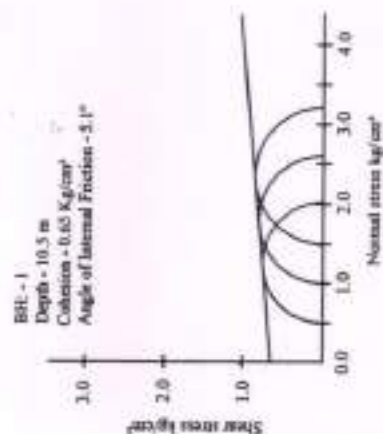
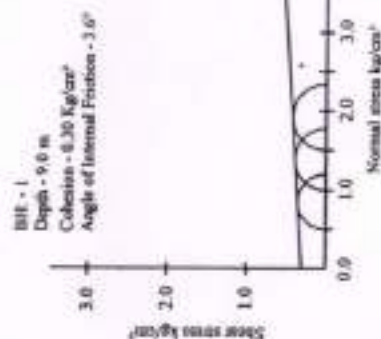
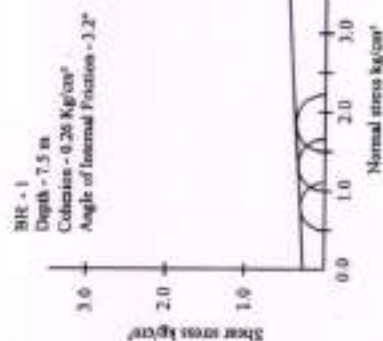
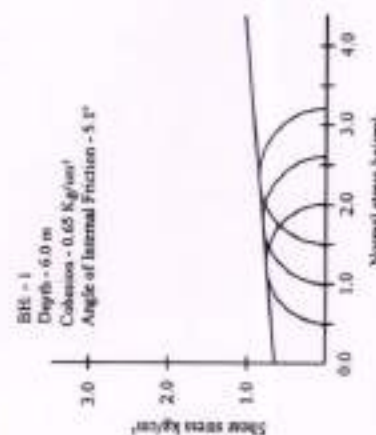
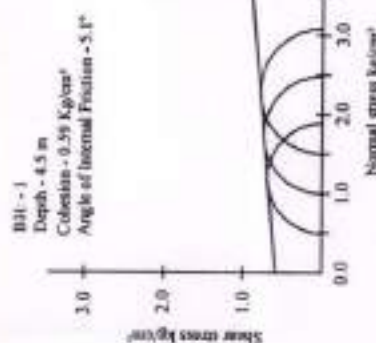
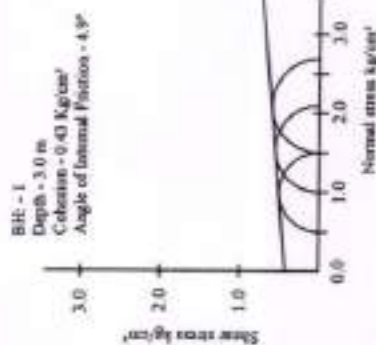
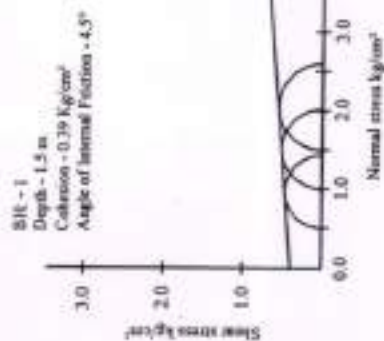
Report on sub-soil investigation for the proposed
New Building Sarari City at Patna

Table 2 (part B): Grain Size Analysis Results

[for Bore hole No./ Depth in m shown thus: 1/1.5]



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D1

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

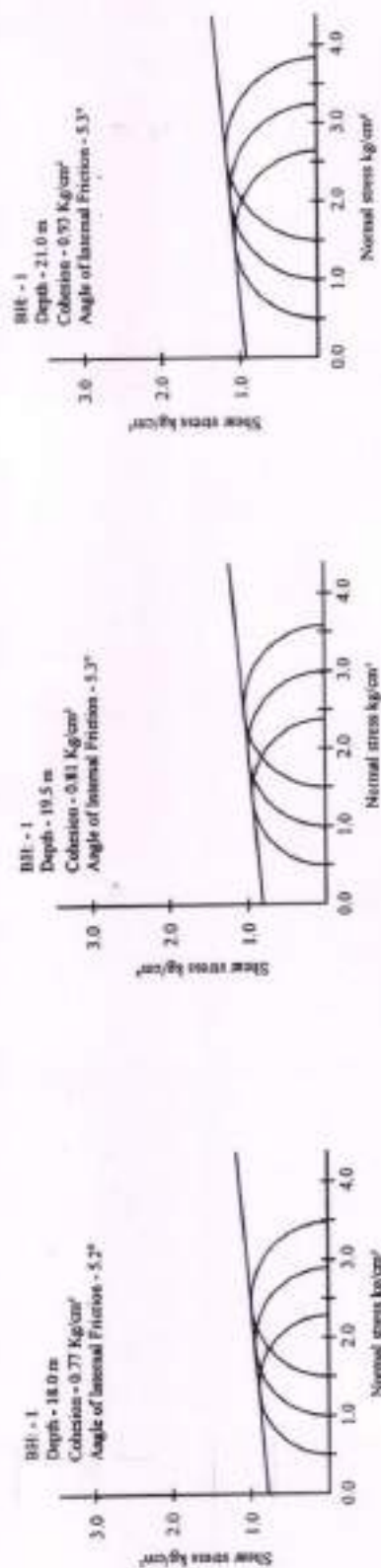
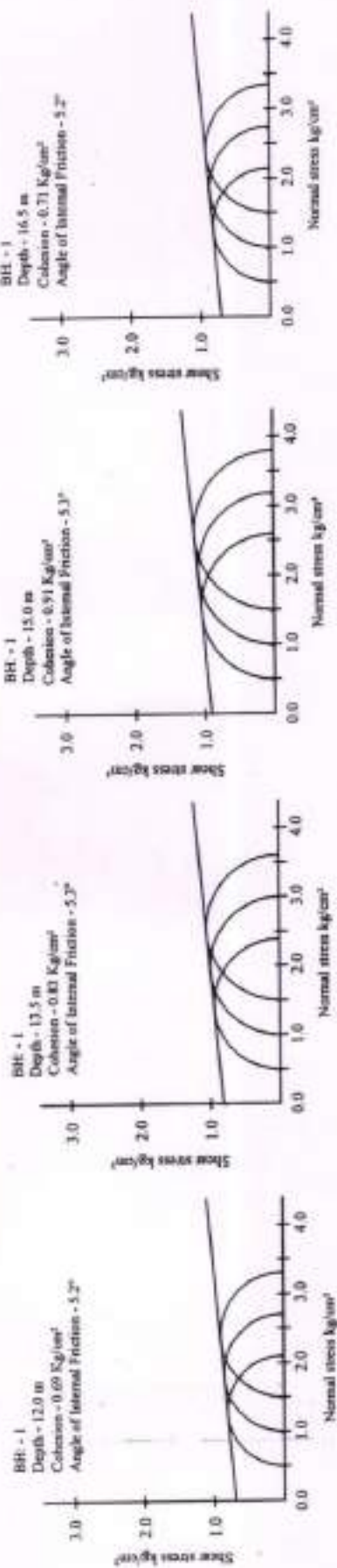
For the Proposed

New Building Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



For the Proposed

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

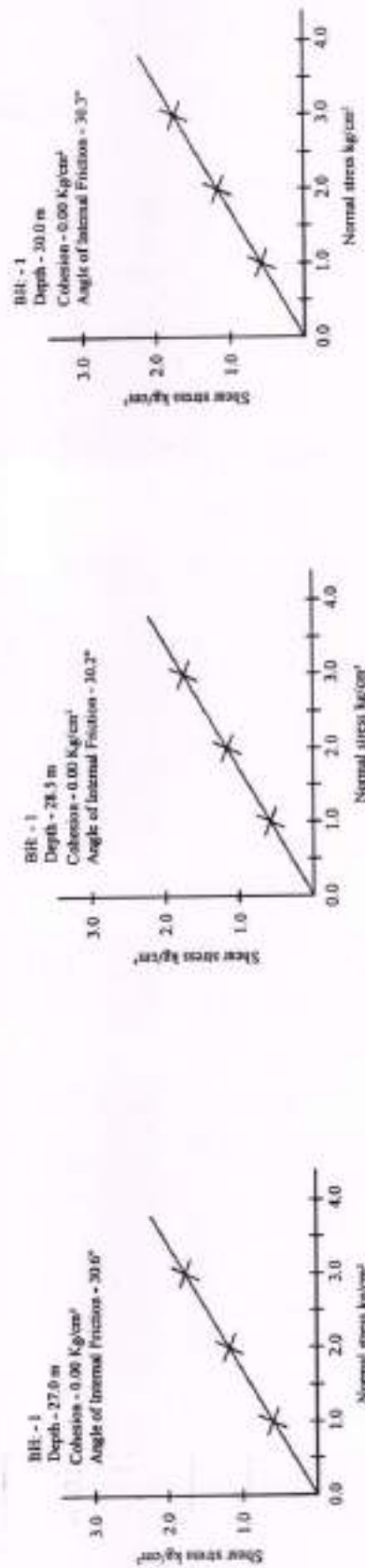
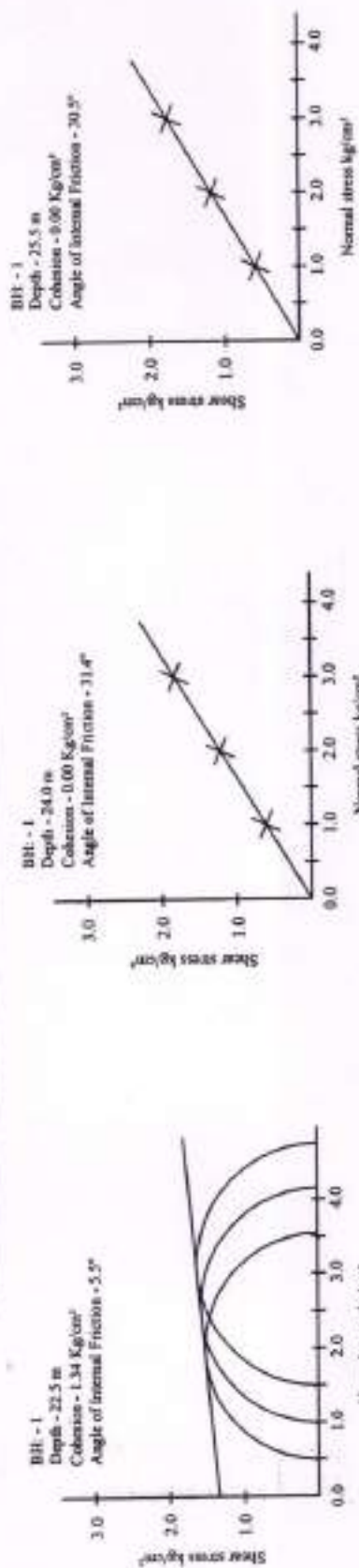
New Buling Sarari City at Patna

Project No. 211226

Appendix - D2



TRIAXIAL / DIRECT SHEAR TEST PLOTS



For the Proposed

Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

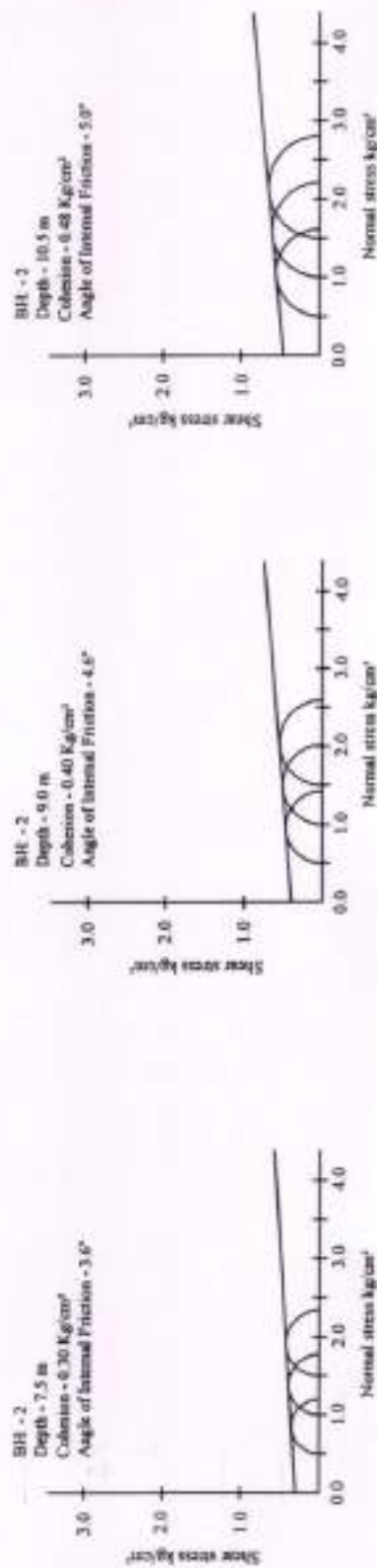
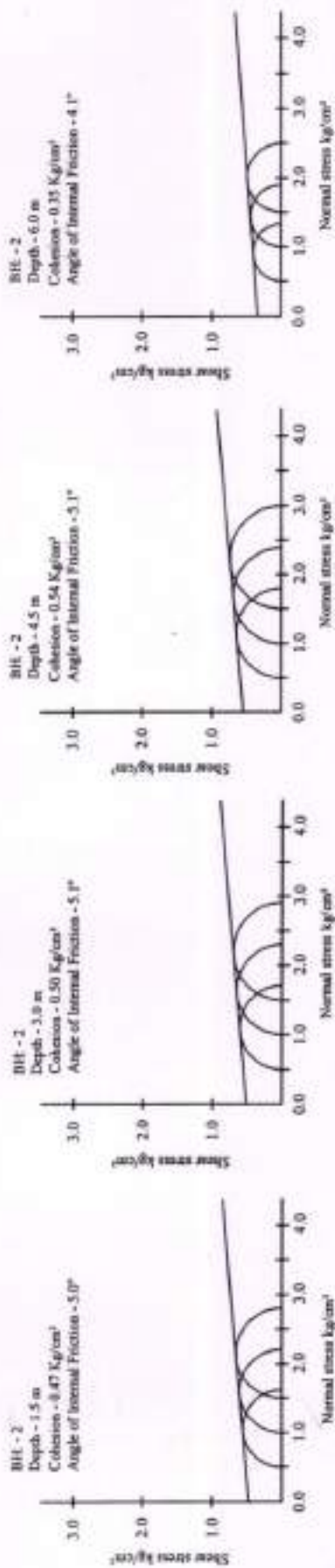


Appendix - D3

New Building Sarari City at Patna

Project No. 211226

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

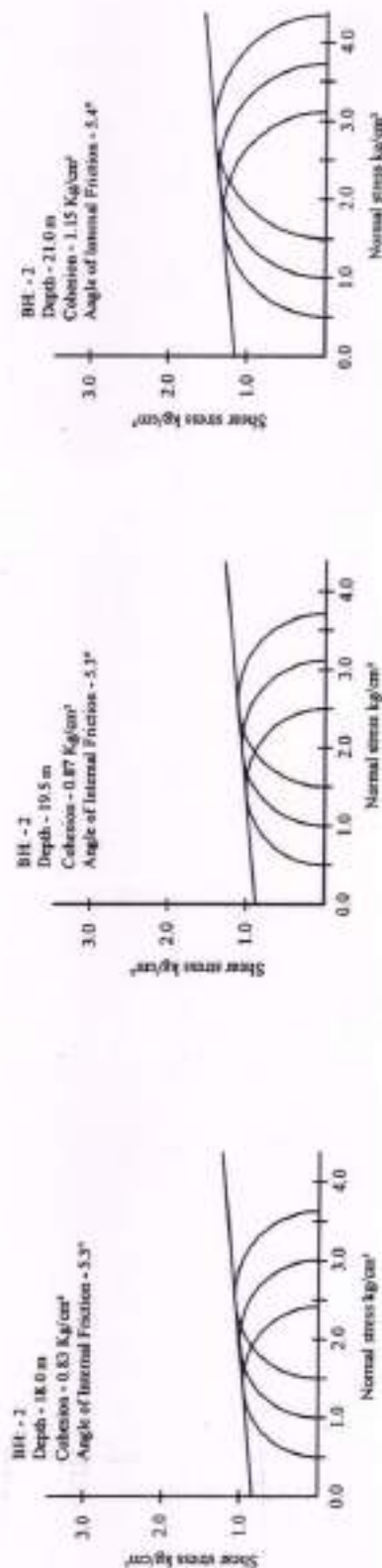
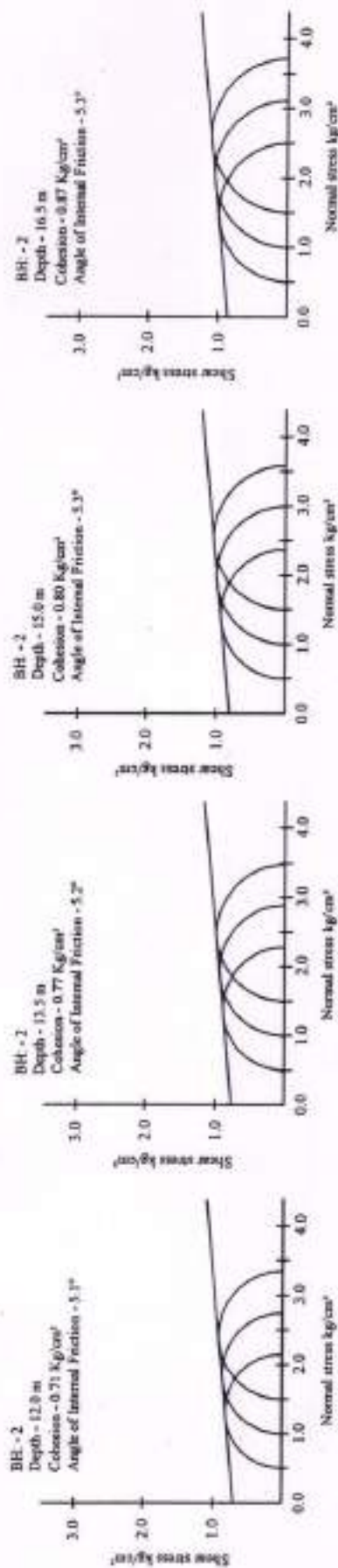
New Building Sarari City at Patna

Project No. 211226

Appendix - D4



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

Project No. 211226

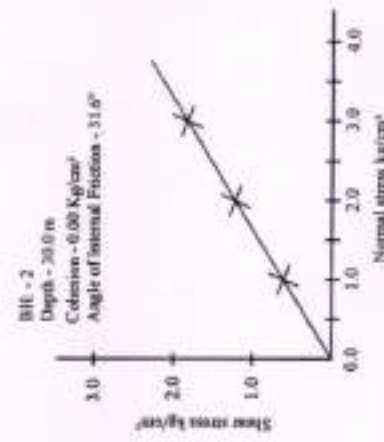
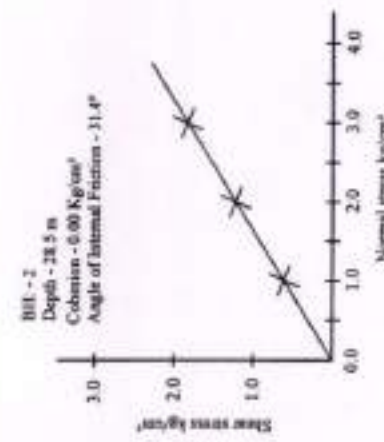
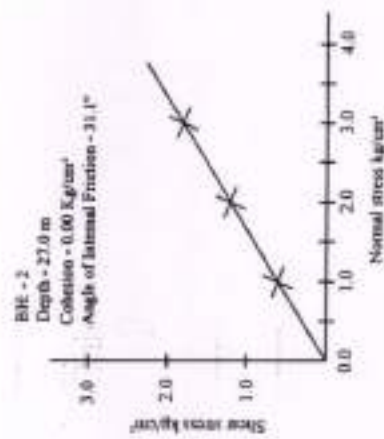
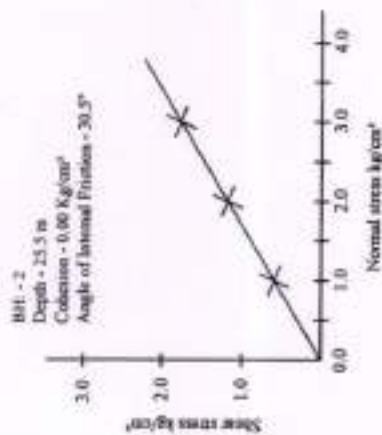
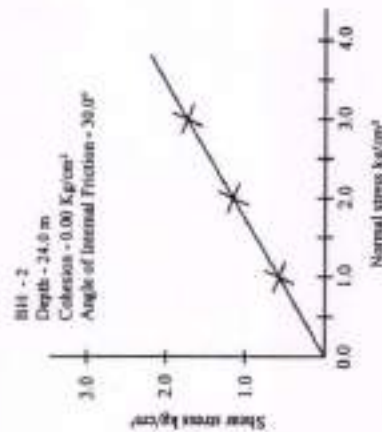
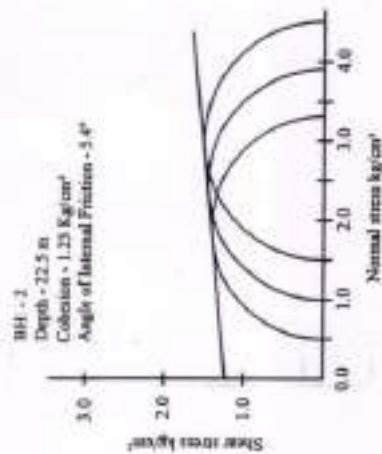
For the Proposed

New Building Sarari City at Patna

Appendix - D5



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

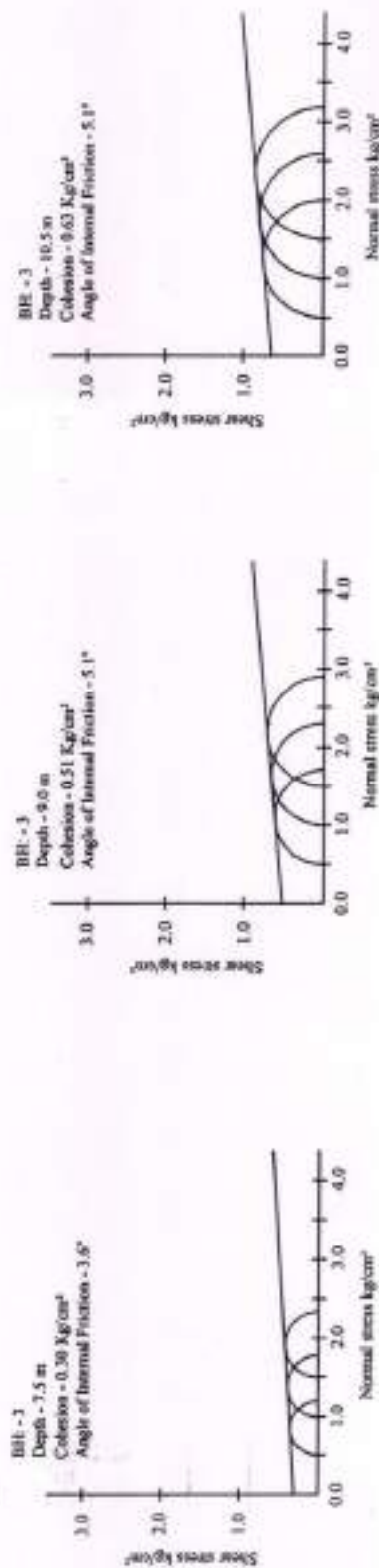
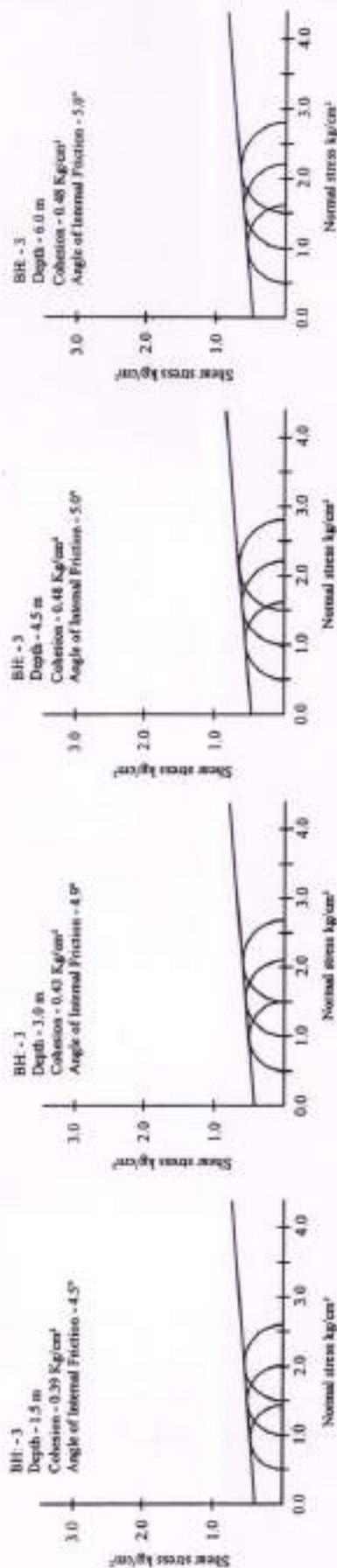
New Buling Sarari City at Patna

Project No. 211226

Appendix - D6



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D7

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

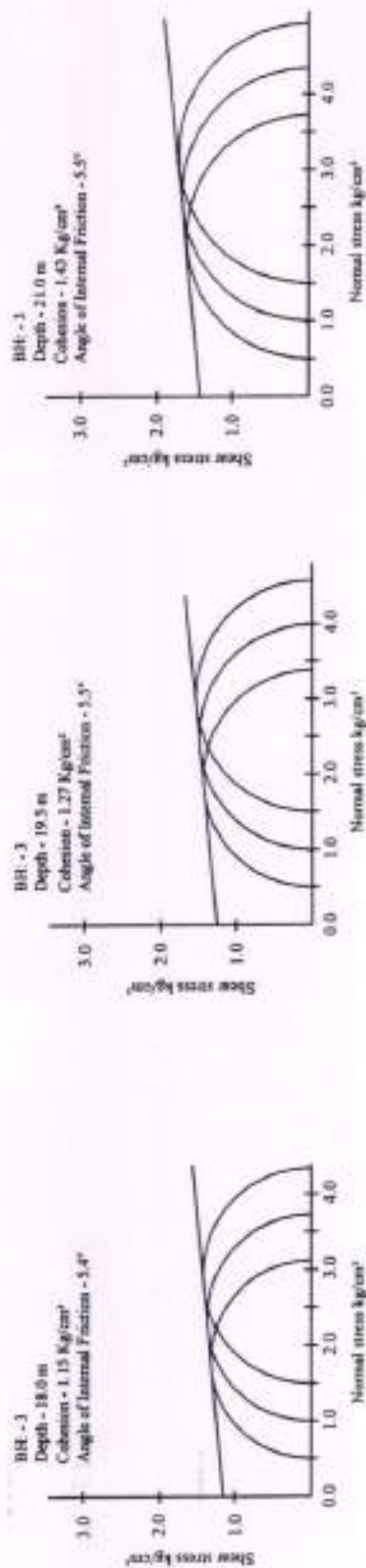
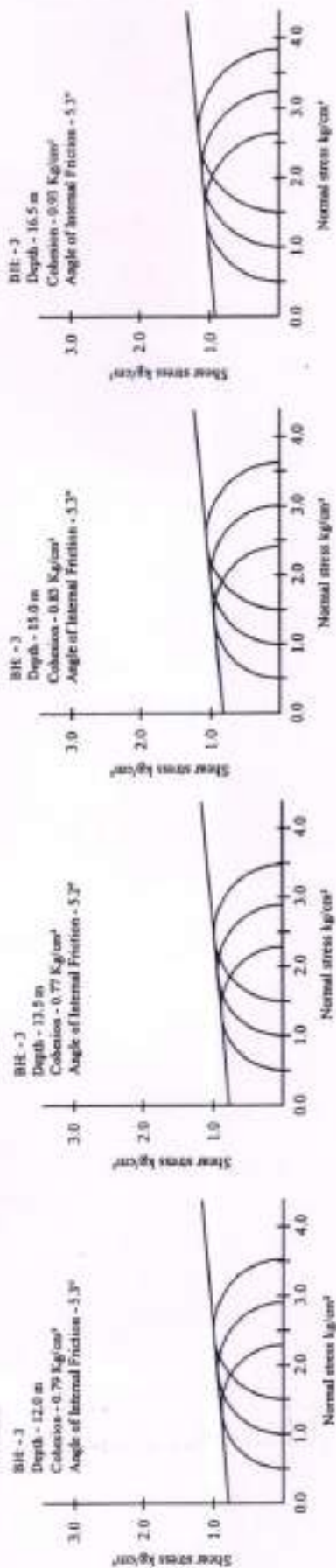
For the Proposed



Project No. 211226

New Building Sarari City at Patna

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

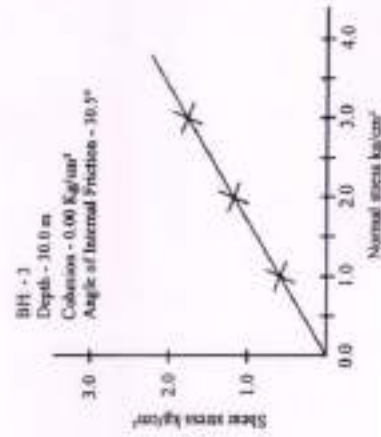
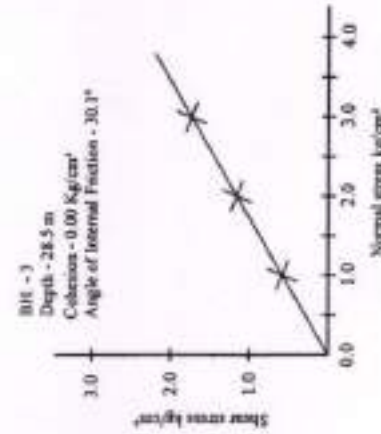
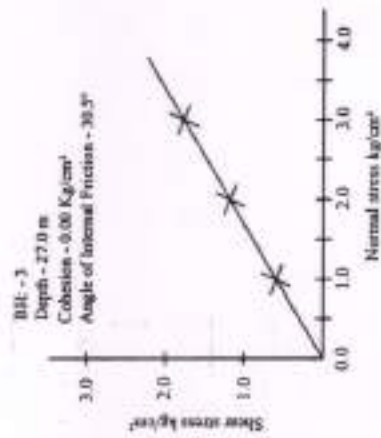
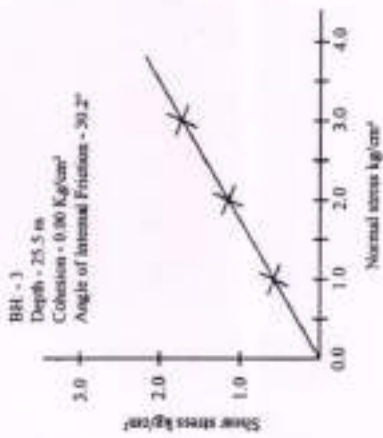
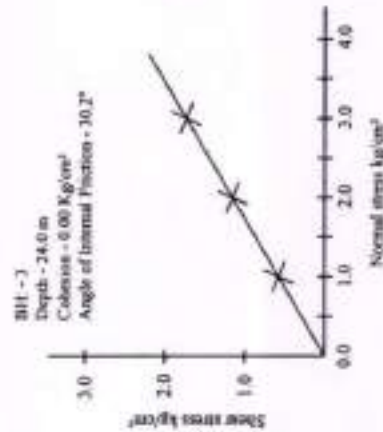
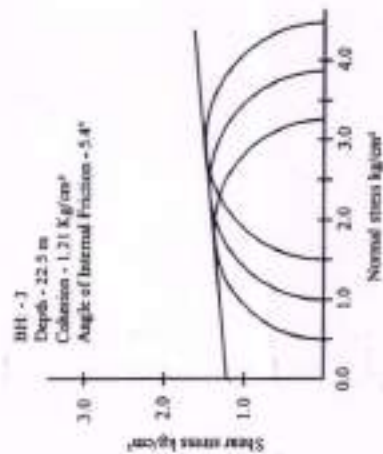
New Building Sarari City at Patna

Project No. 211226

Appendix - D8



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D9

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

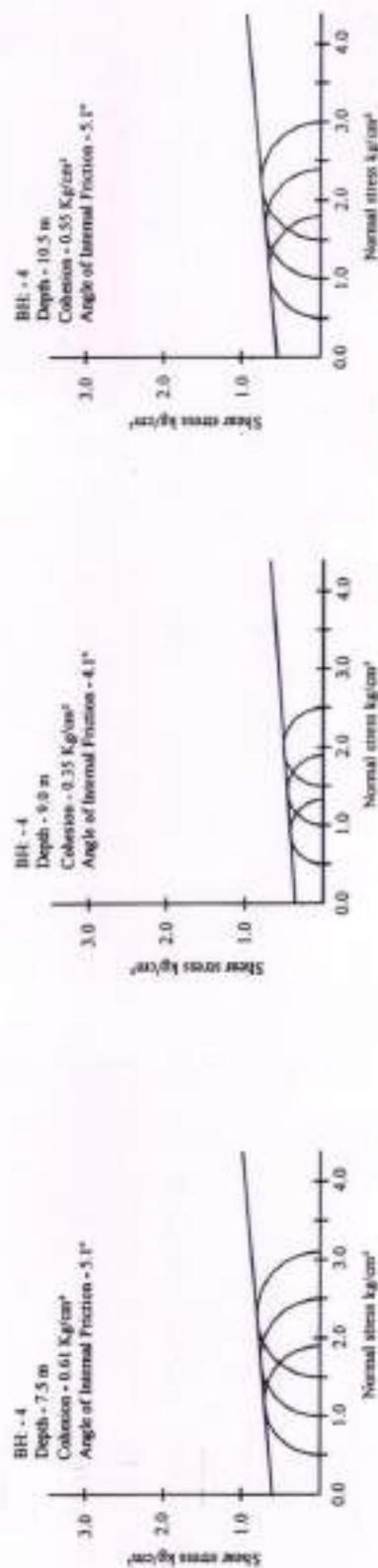
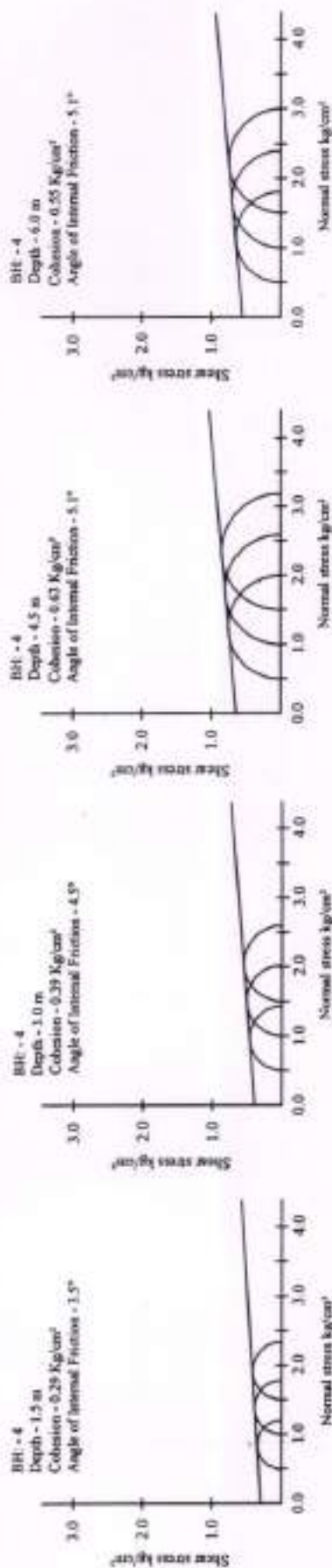
Project No. 211226

For the Proposed

New Buling Sarari City at Patna



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

Project No. 211226

For the Proposed

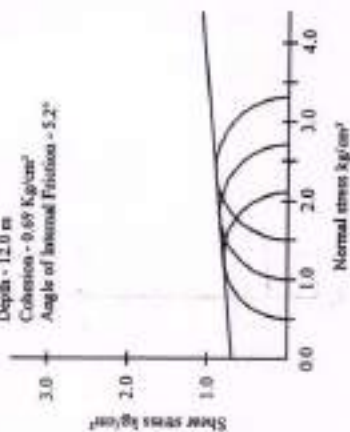
New Buling Sarari City at Patna

Appendix - D10

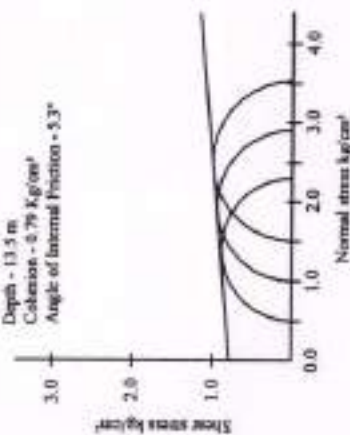


TRIAXIAL / DIRECT SHEAR TEST PLOTS

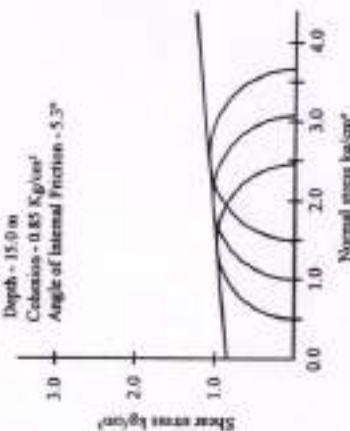
BH-4
Depth - 12.0 m
Cohesion - 0.69 Kg/cm²
Angle of Internal Friction - 5.2°



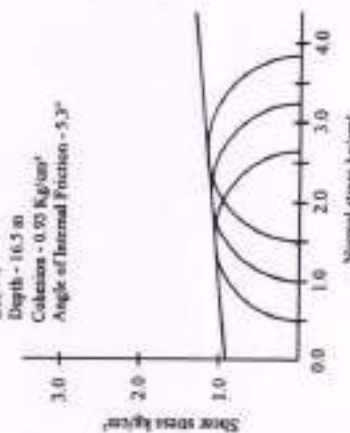
BH-4
Depth - 13.5 m
Cohesion - 0.79 Kg/cm²
Angle of Internal Friction - 5.3°



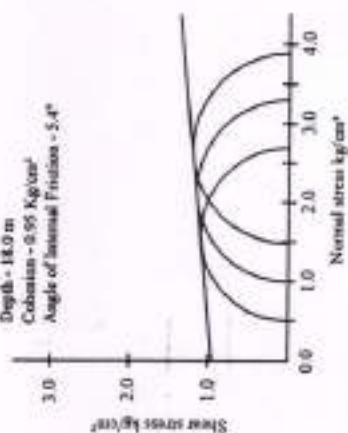
BH-4
Depth - 15.0 m
Cohesion - 0.85 Kg/cm²
Angle of Internal Friction - 5.3°



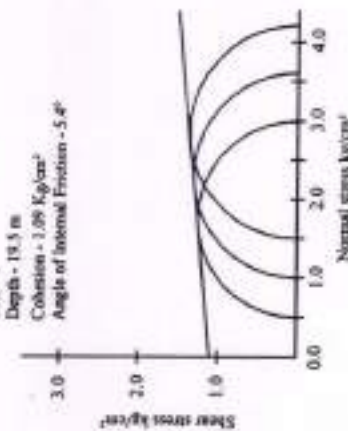
BH-4
Depth - 16.5 m
Cohesion - 0.95 Kg/cm²
Angle of Internal Friction - 5.3°



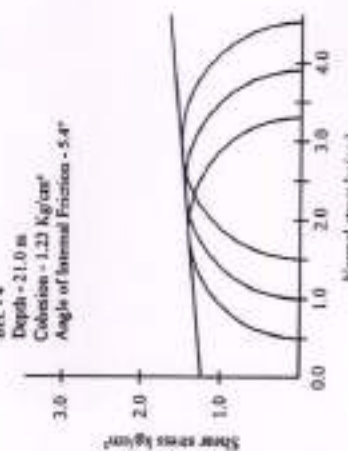
BH-4
Depth - 18.0 m
Cohesion - 0.95 Kg/cm²
Angle of Internal Friction - 5.4°



BH-4
Depth - 19.5 m
Cohesion - 1.09 Kg/cm²
Angle of Internal Friction - 5.4°



BH-4
Depth - 21.0 m
Cohesion - 1.23 Kg/cm²
Angle of Internal Friction - 5.4°



Appendix - D11

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

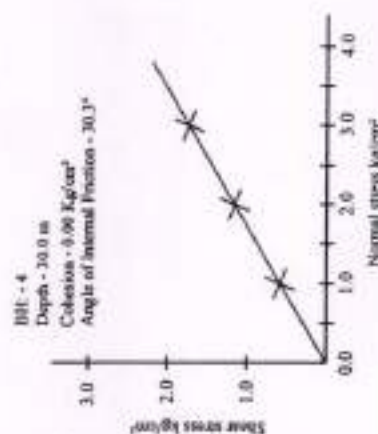
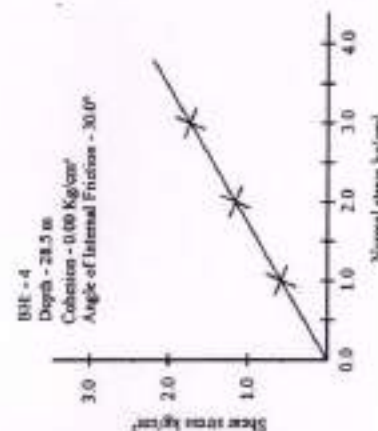
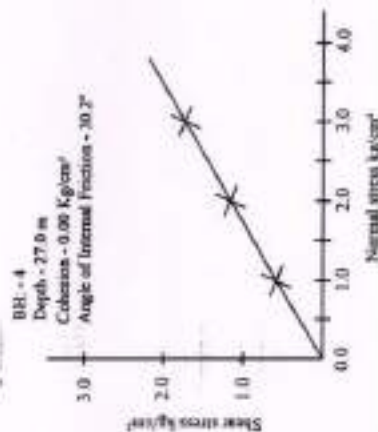
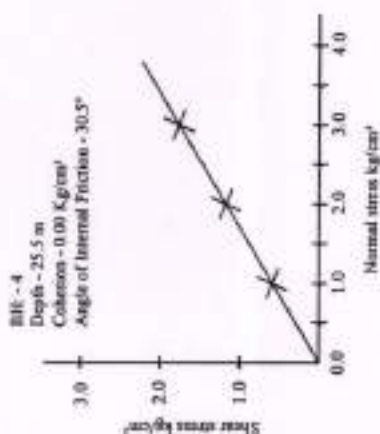
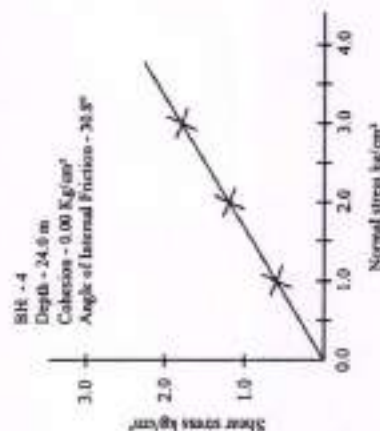
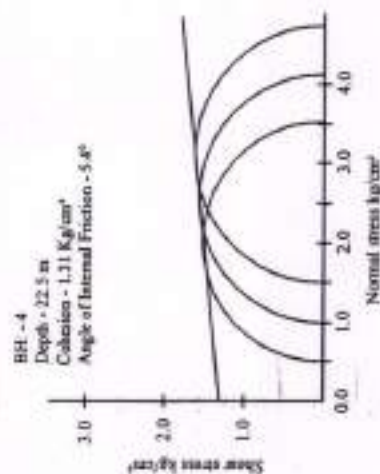


Project No. 211226

For the Proposed

New Building Sarari City at Patna

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D12

Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

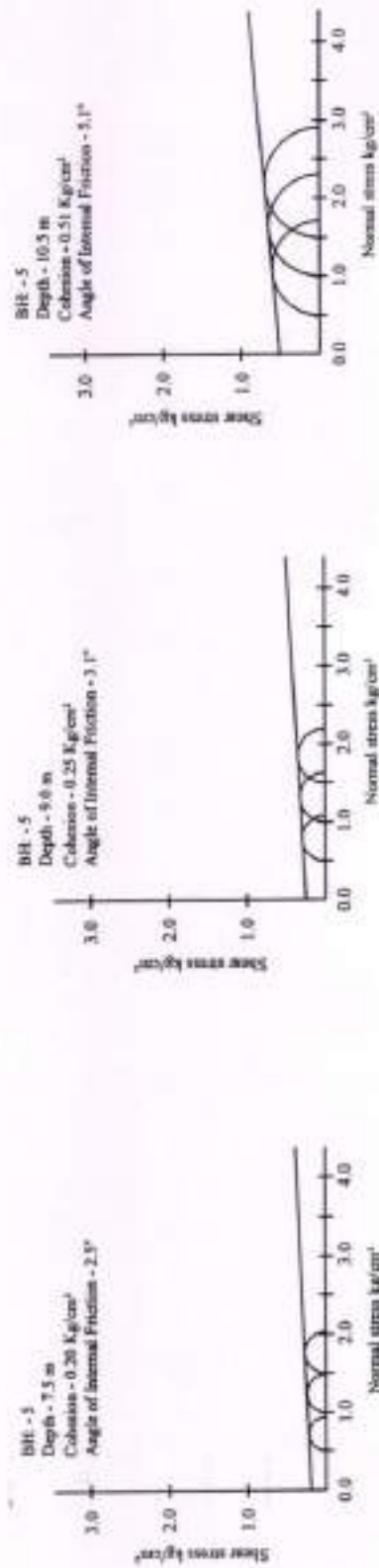
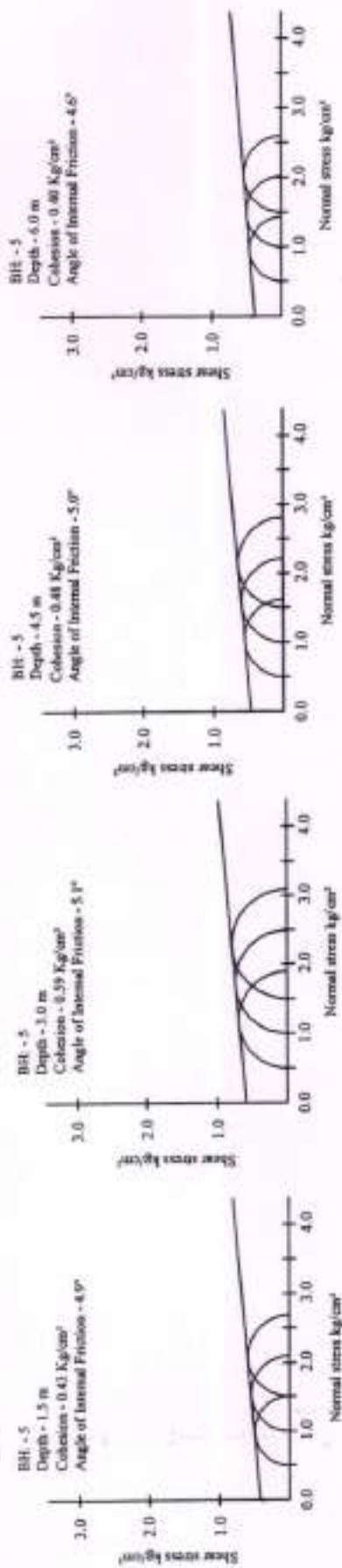
Project No. 211226

For the Proposed

New Building Sarari City at Patna



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D13

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

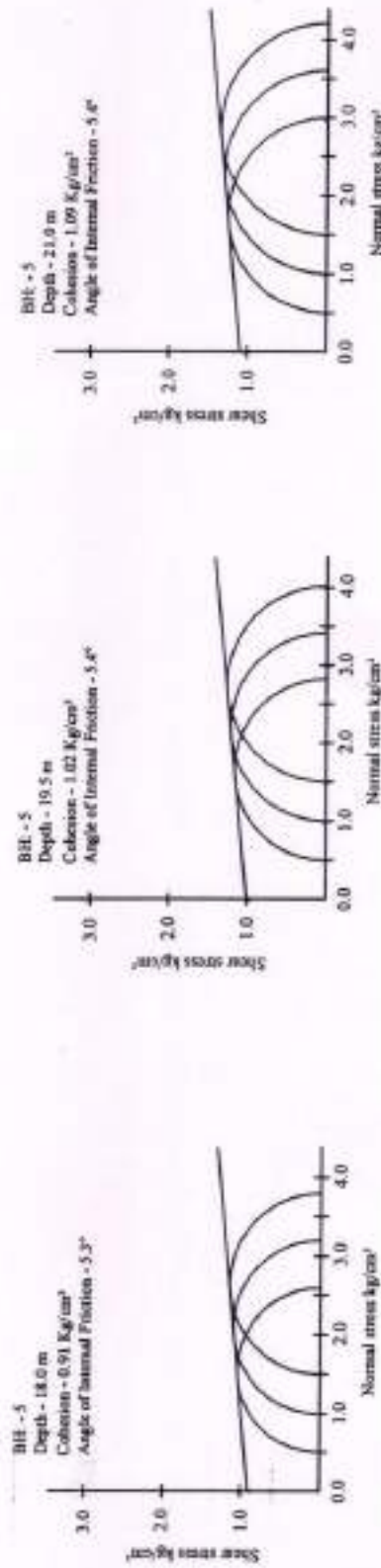
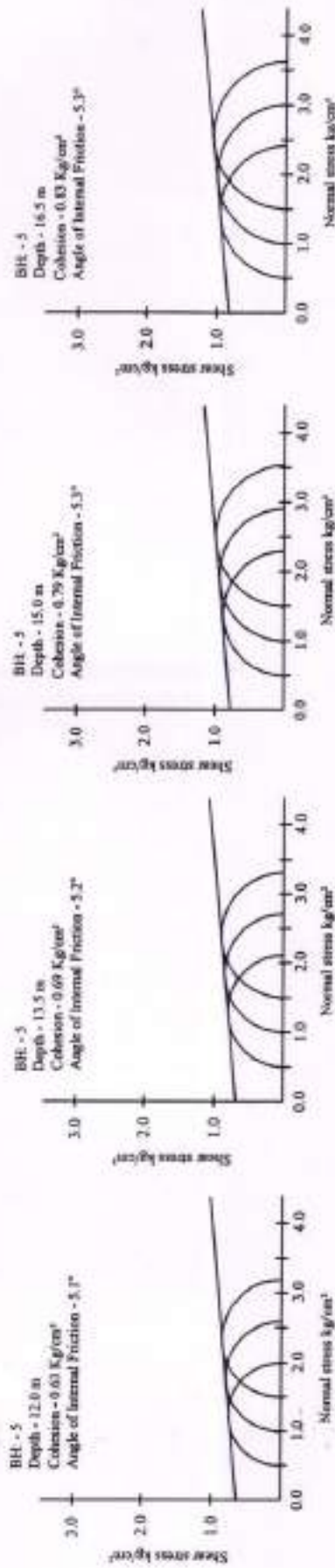
Project No. 211226

For the Proposed

New Building Sarari City at Patna



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D14

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

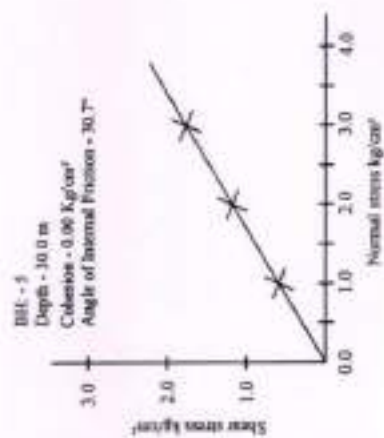
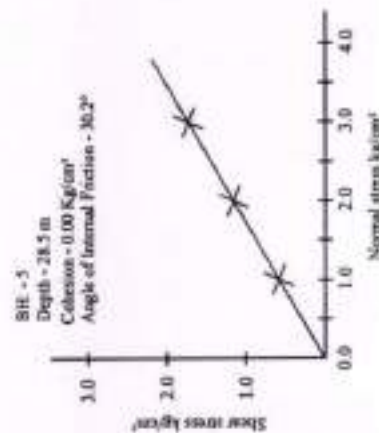
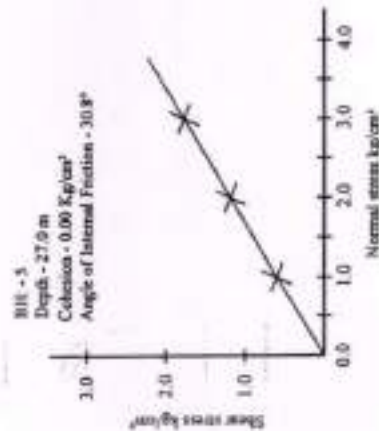
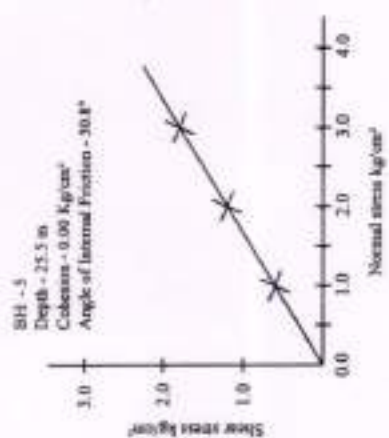
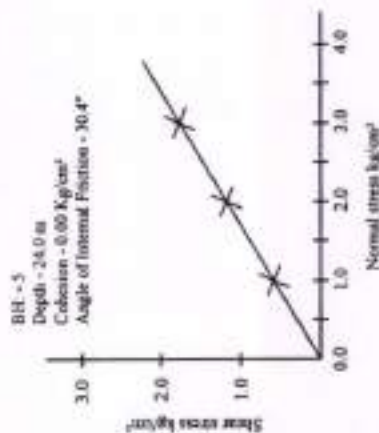
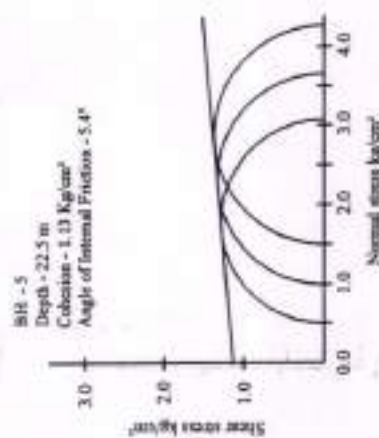
For the Proposed

New Buling Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

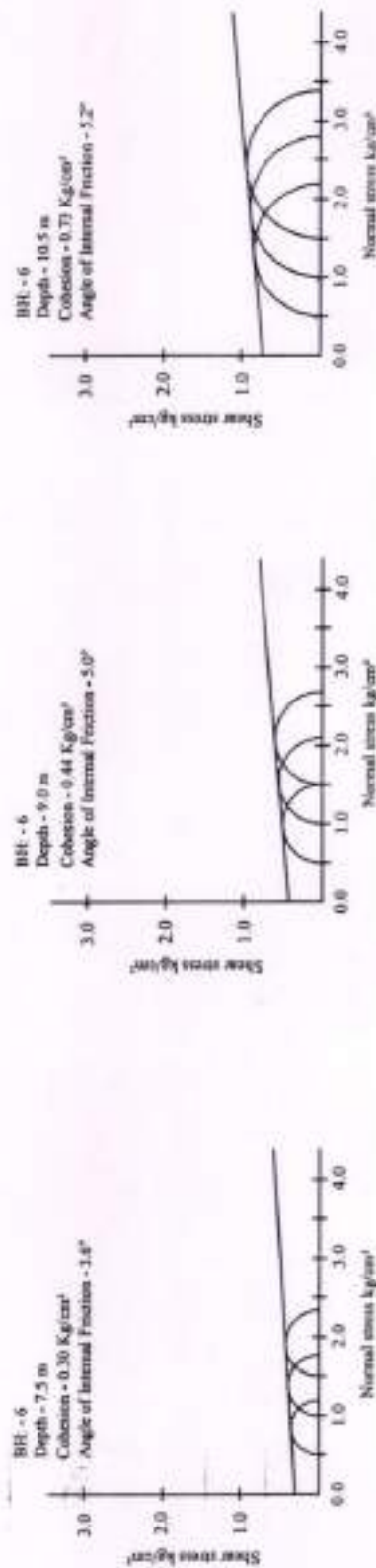
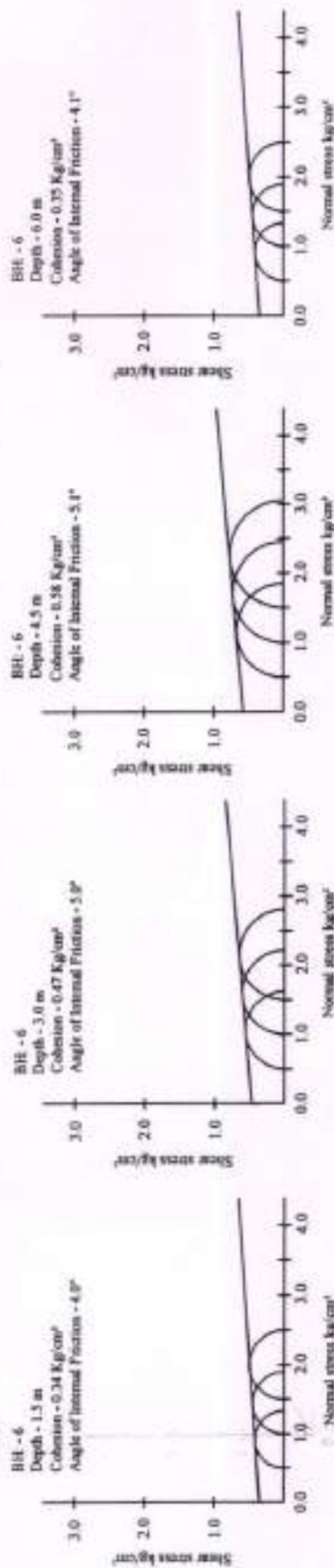
New Building Sarari City at Patna

Project No. 211226

Appendix - D15



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

Project No. 211226

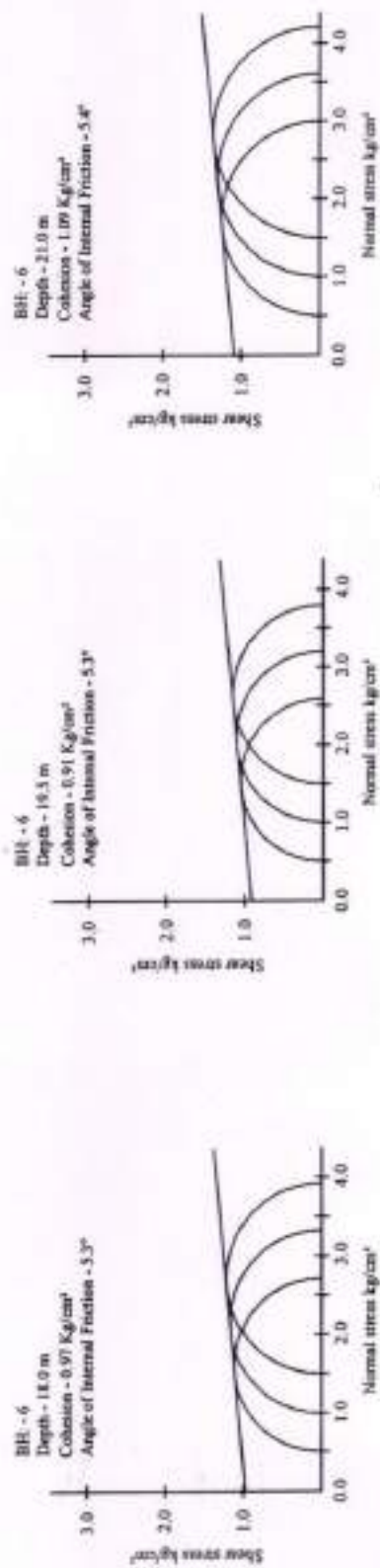
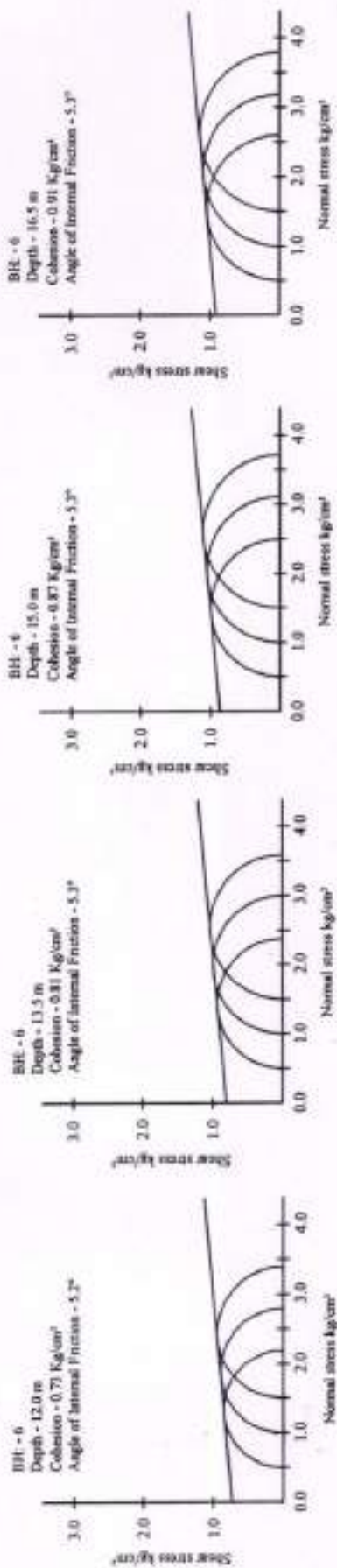
For the Proposed

New Building Sarari City at Patna

Appendix - D16



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

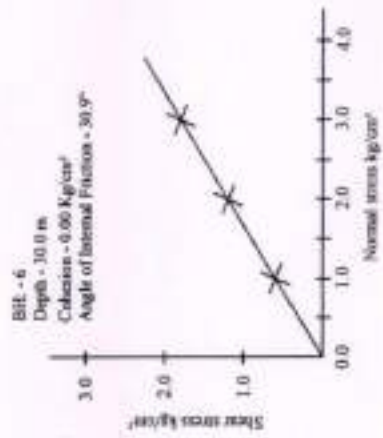
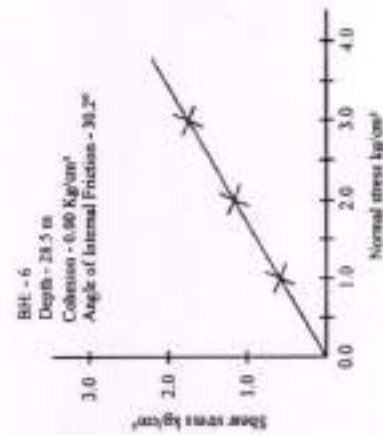
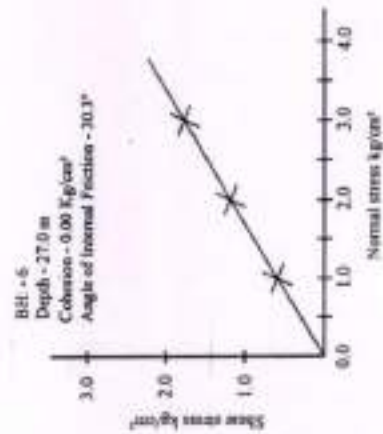
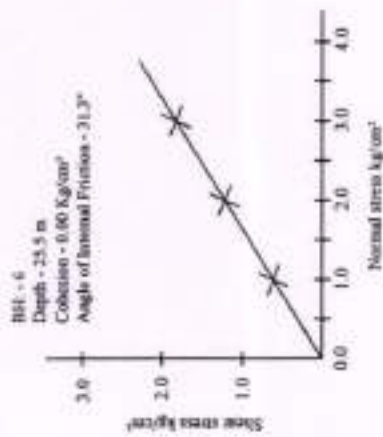
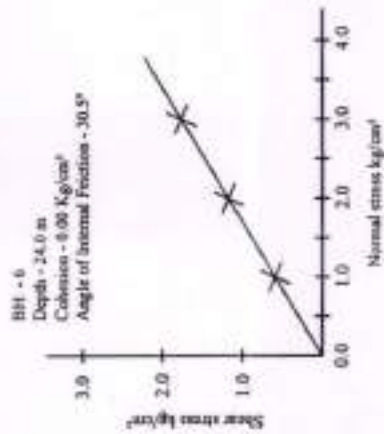
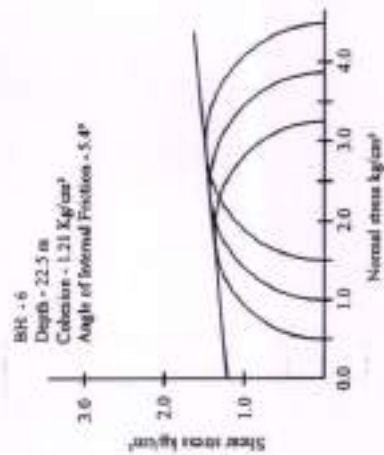
New Buidling Sarari City at Patna

Project No. 211226

Appendix - D17



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D18

Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

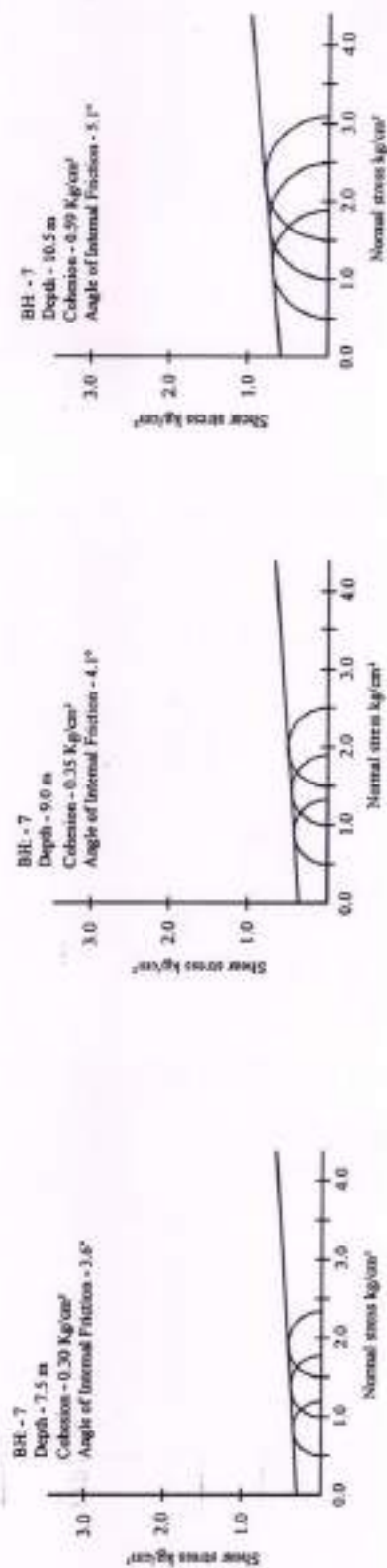
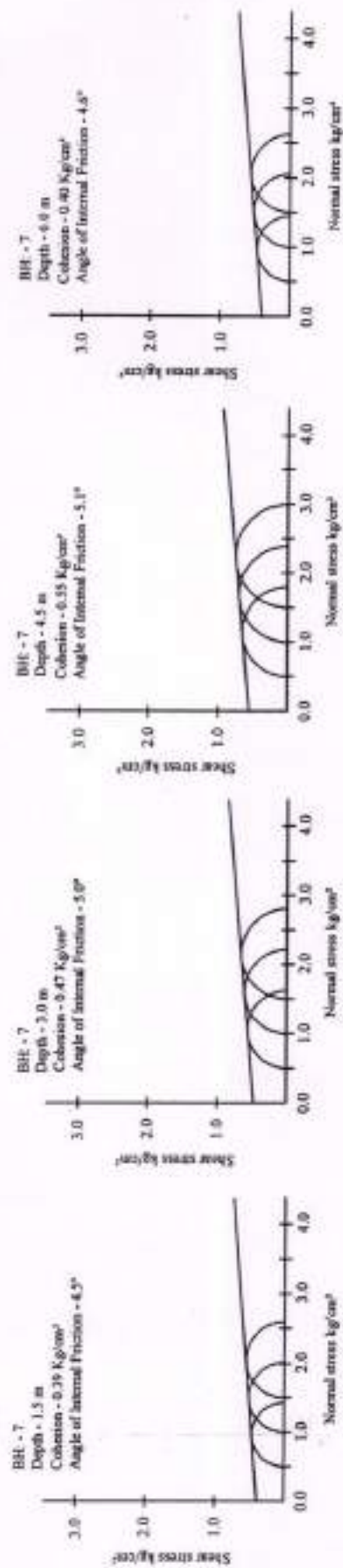
Project No. 211226

For the Proposed

New Building Sarari City at Patna



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D19

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

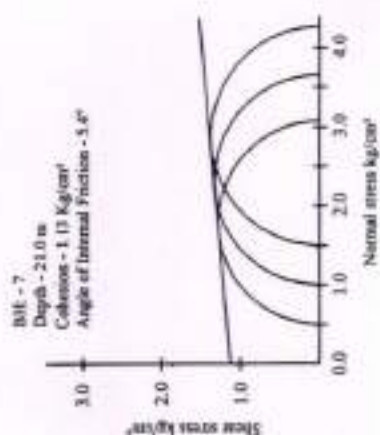
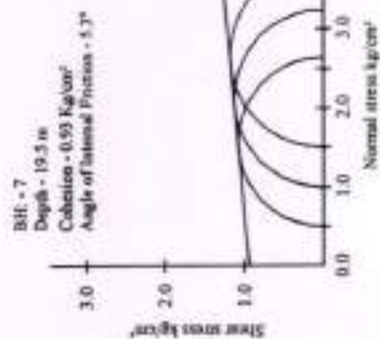
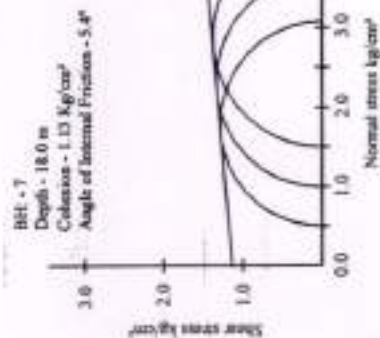
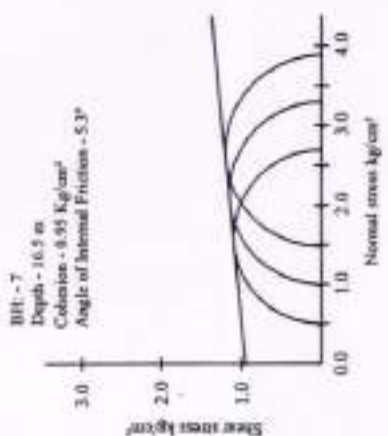
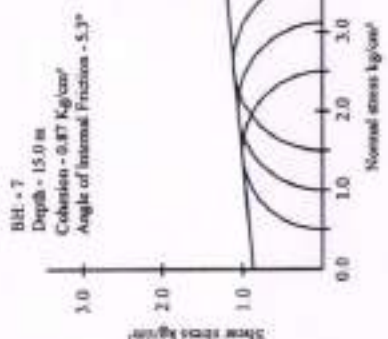
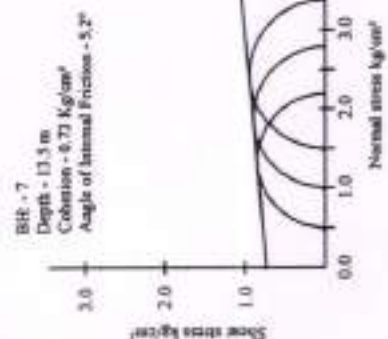
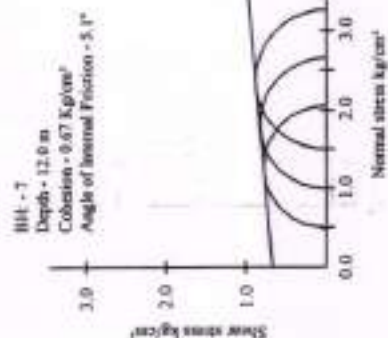
For the Proposed

New Building Sarari City at Patna

Project No. 211226



TRIAxIAL / DIRECT SHEAR TEST PLOTS



Appendix - D20

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

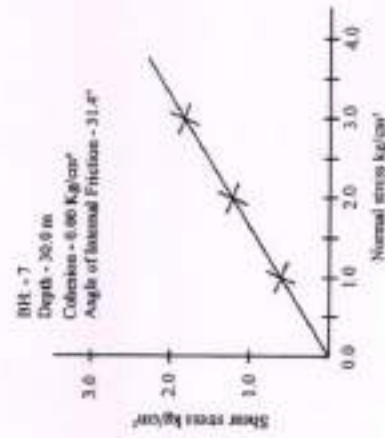
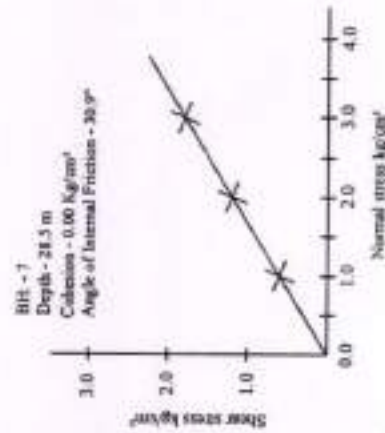
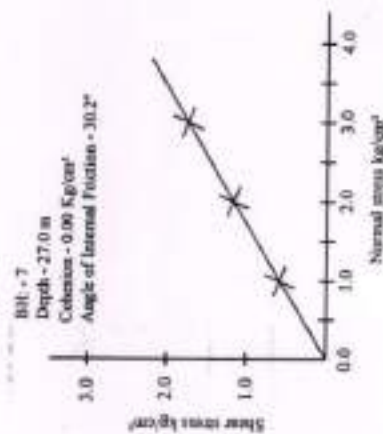
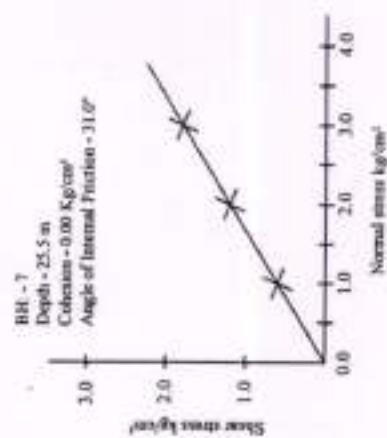
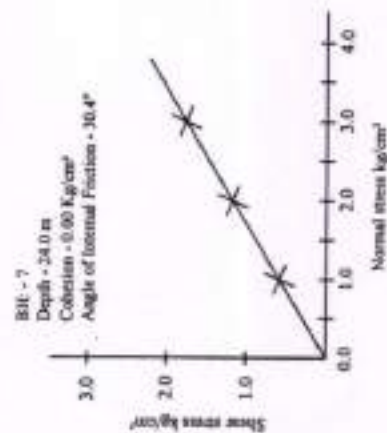
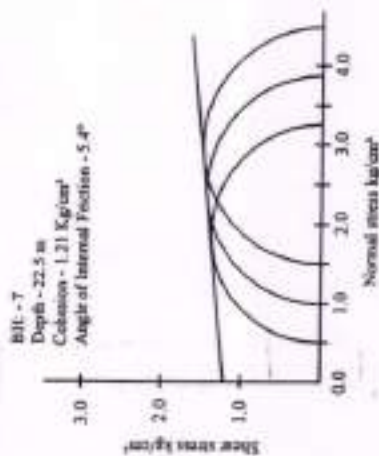


Project No. 211226

For the Proposed

New Building Sarari City at Patna

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

For the Proposed

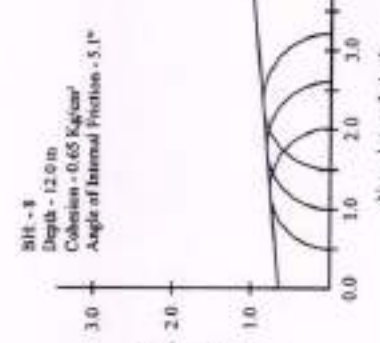
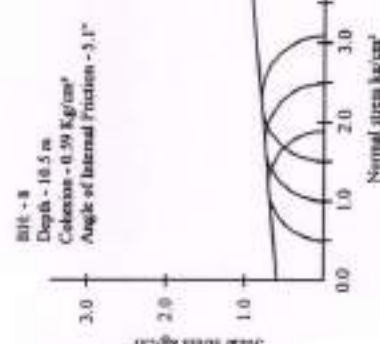
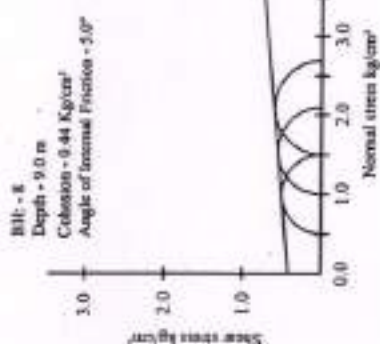
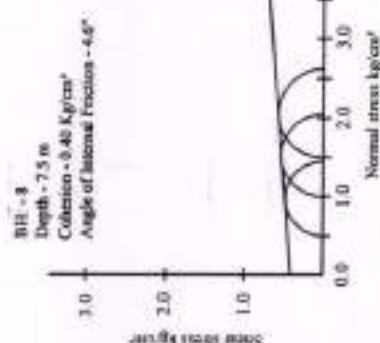
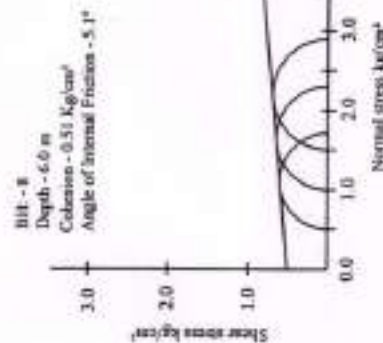
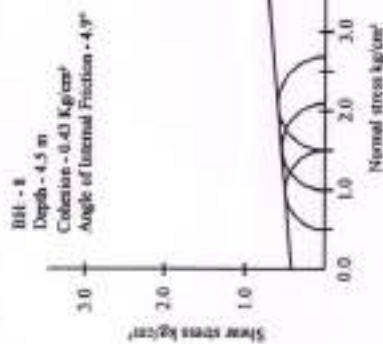
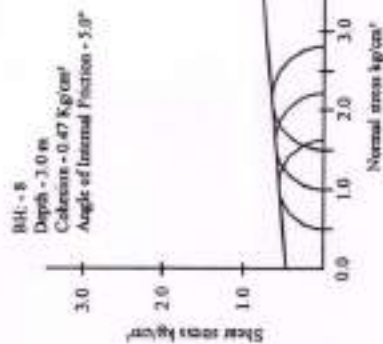
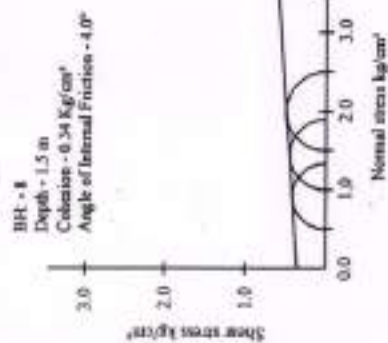
New Building Sarari City at Patna

Project No. 211226



Appendix - D21

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

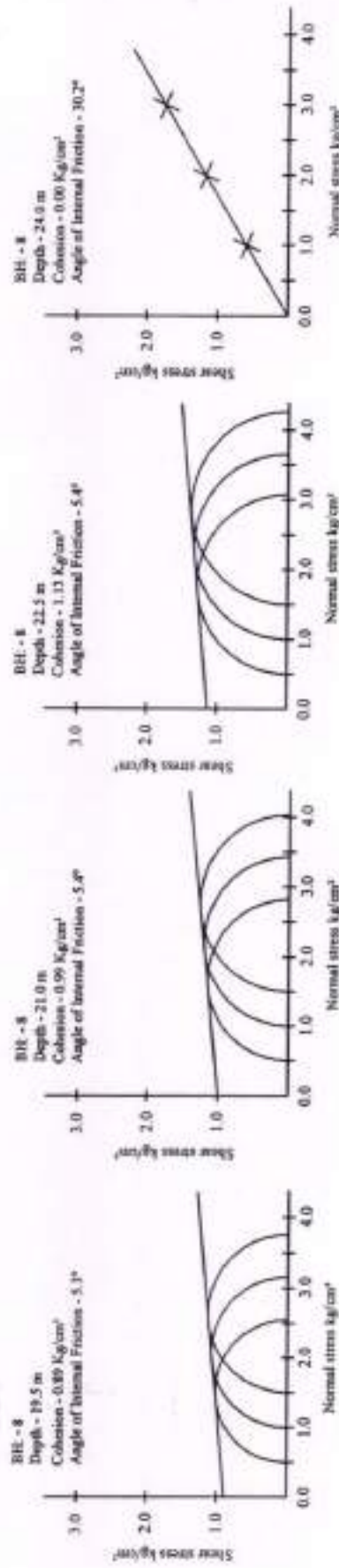
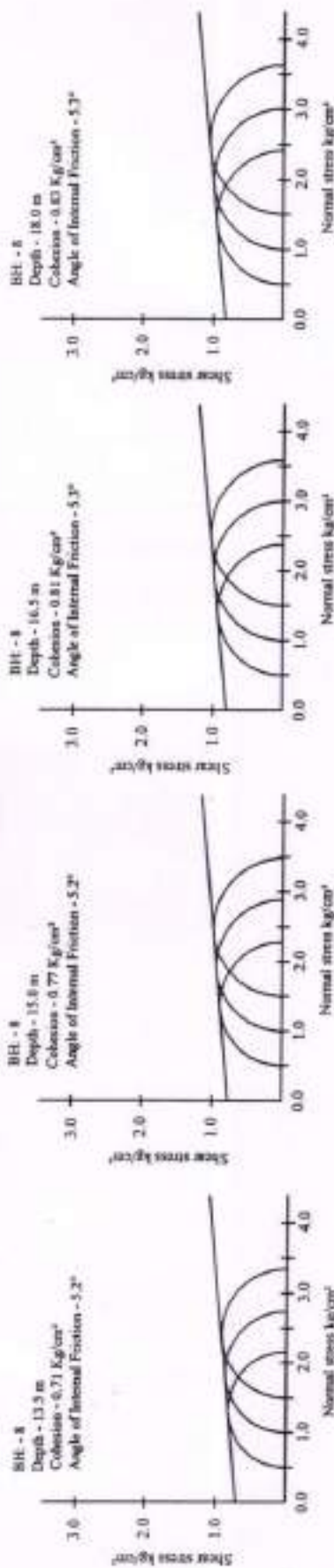
New Building Sarari City at Patna

Project No. 211226

Appendix - D22



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

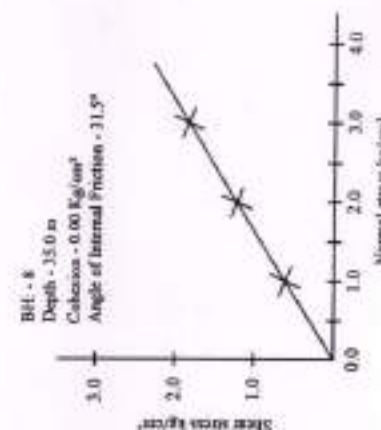
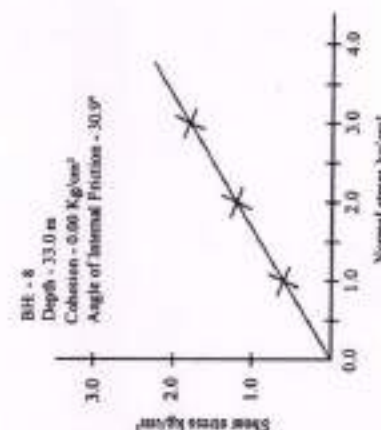
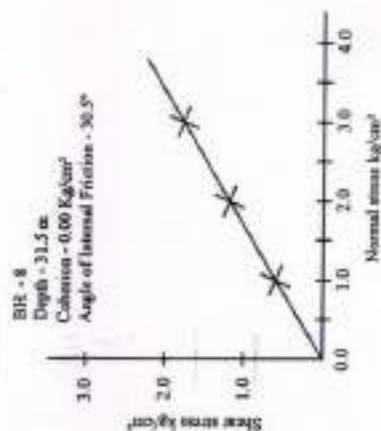
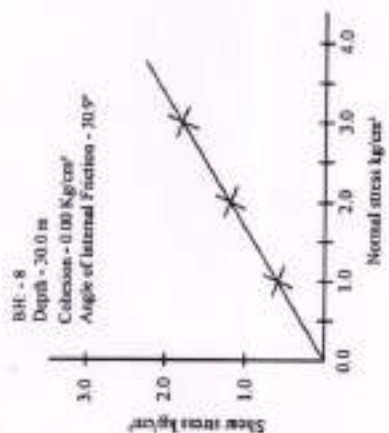
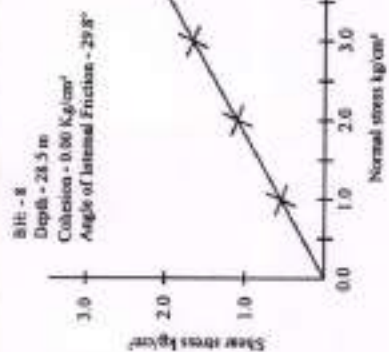
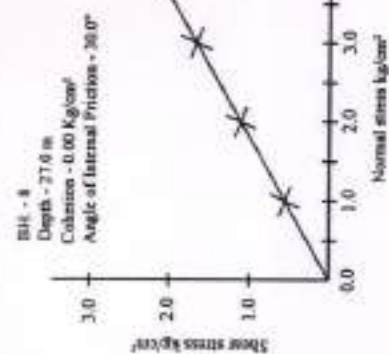
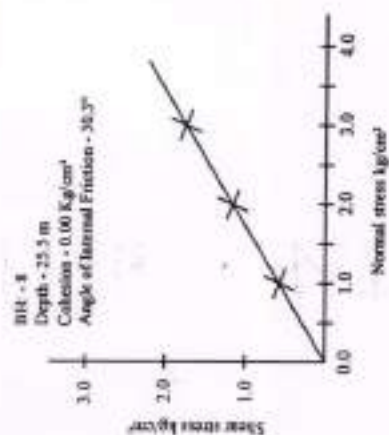
New Building Sarari City at Patna

Project No. 211226

Appendix - D23



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

For the Proposed

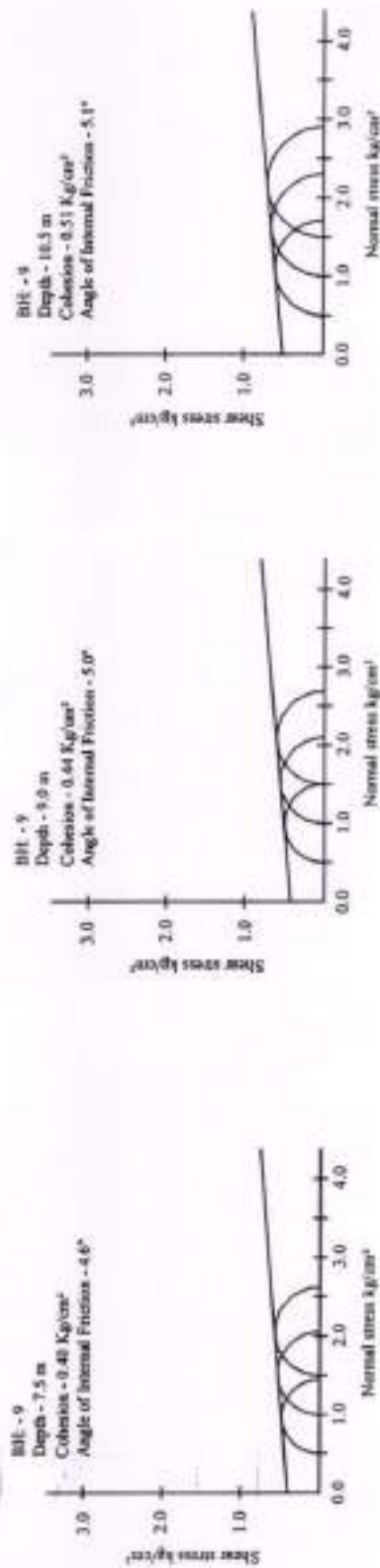
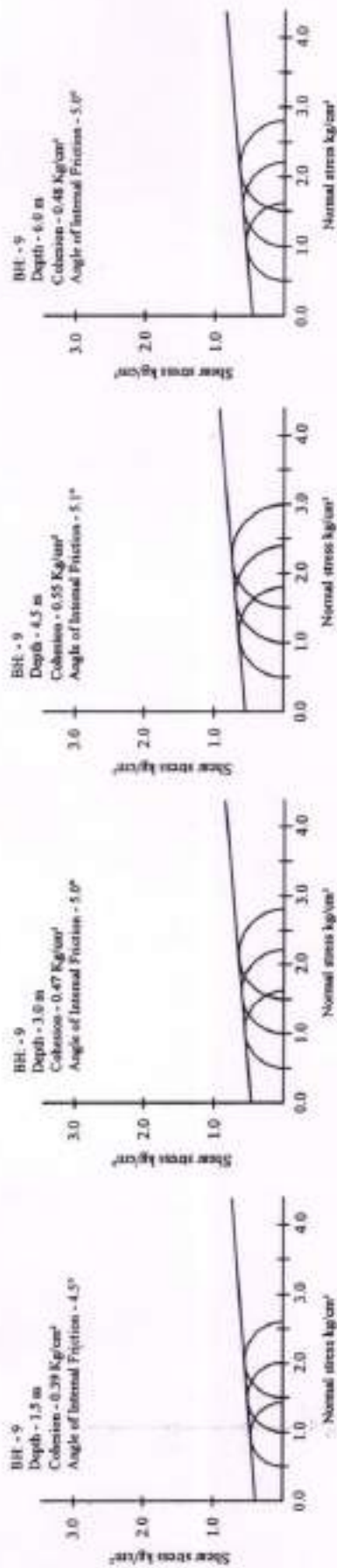
New Building Sarari City at Patna

Project No. 211226

Appendix - D24



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D25

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

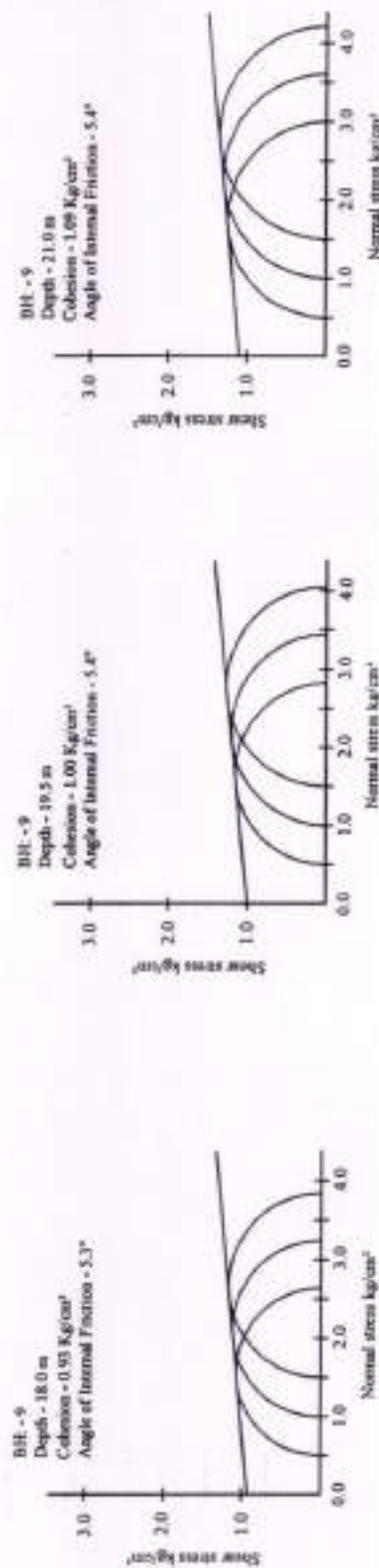
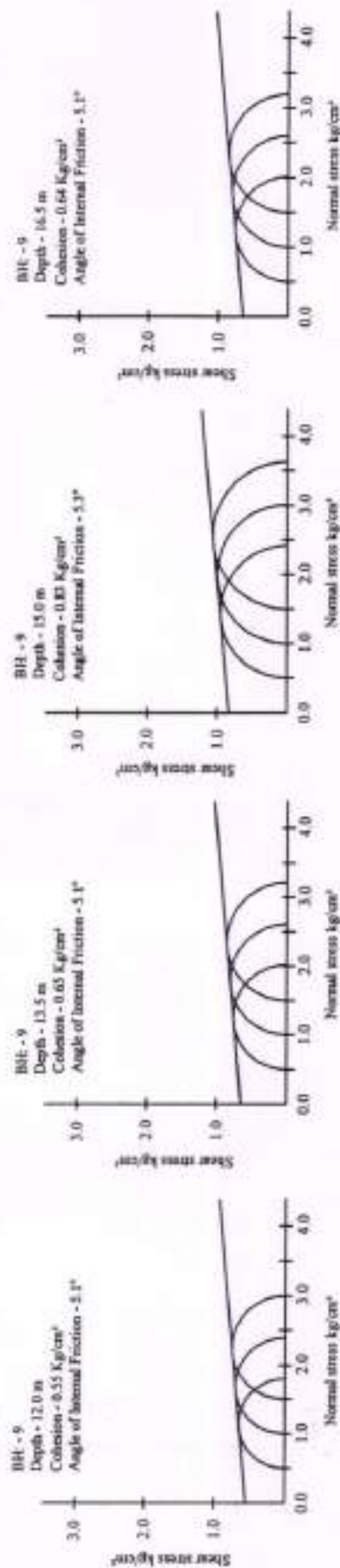
For the Proposed

New Building Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D26

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

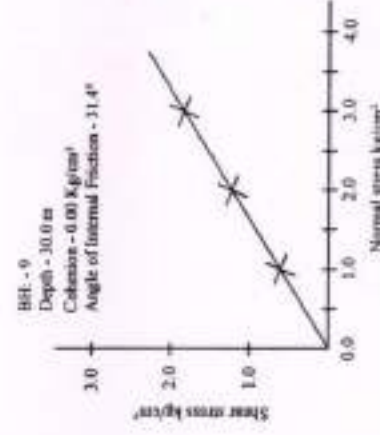
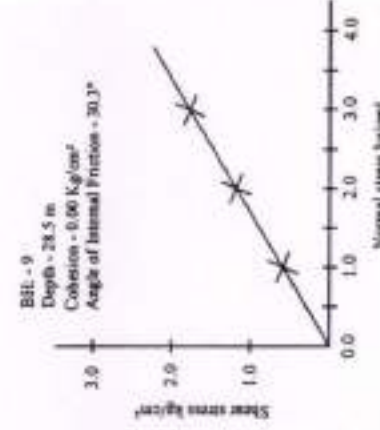
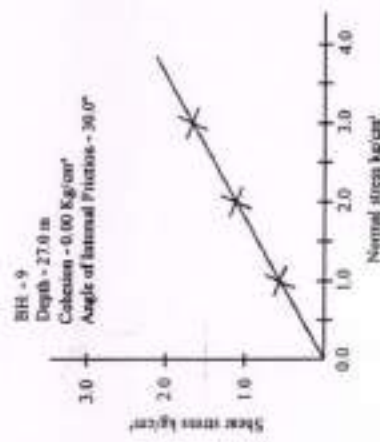
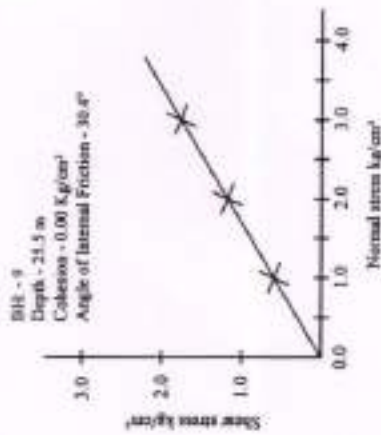
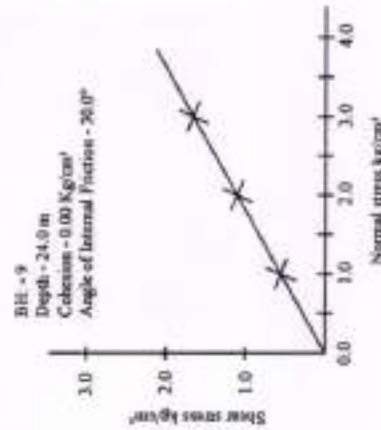
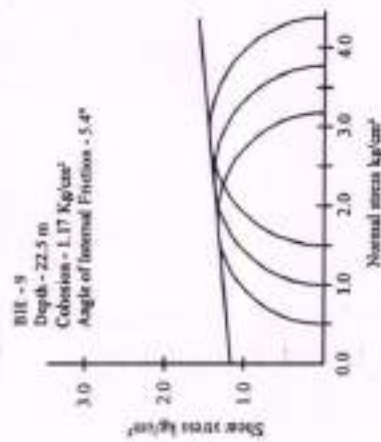
Project No. 211226

For the Proposed

New Bailing Sarari City at Patna



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

For the Proposed

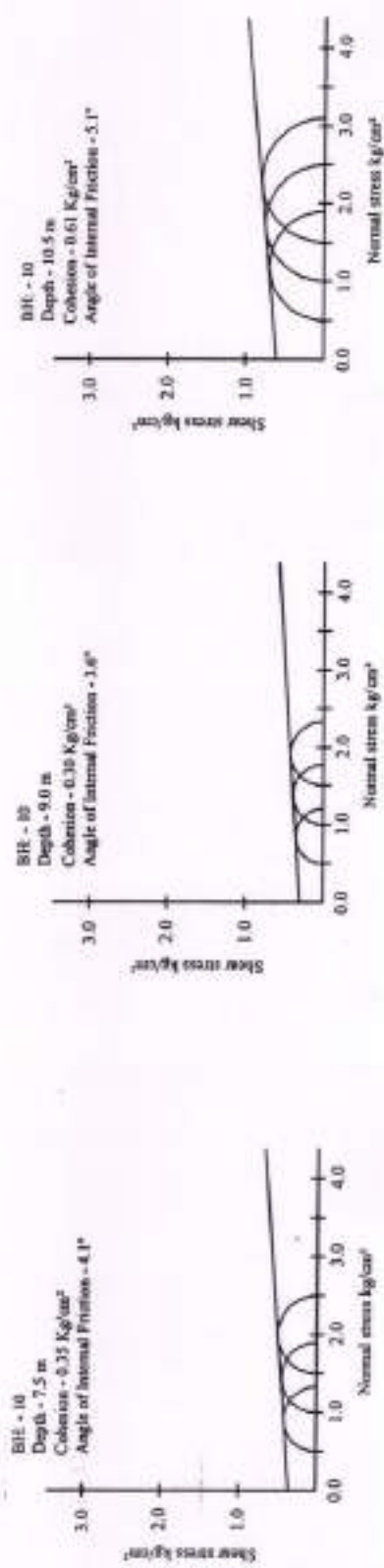
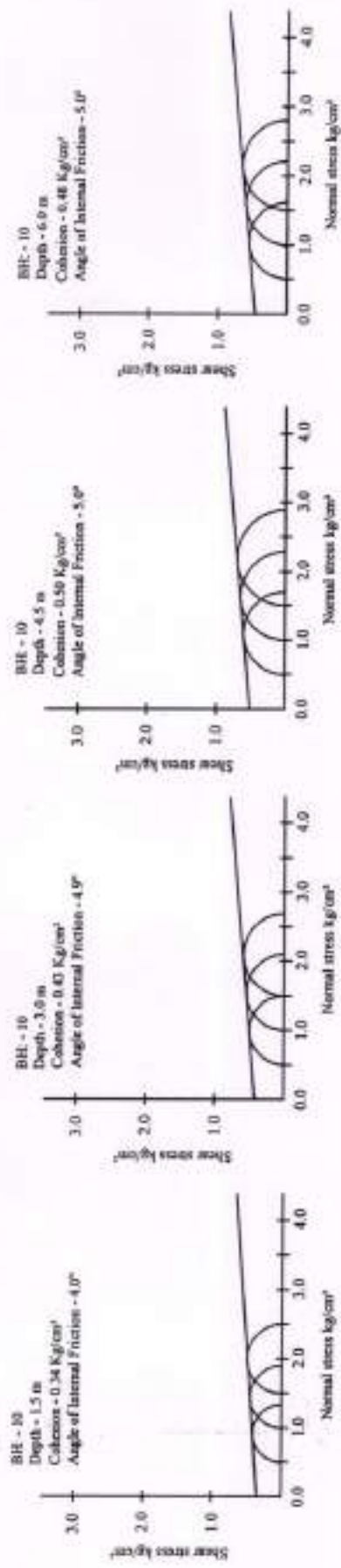
New Building Sarari City at Patna

Project No. 211226

Appendix - D27



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

New Building Sarari City at Patna

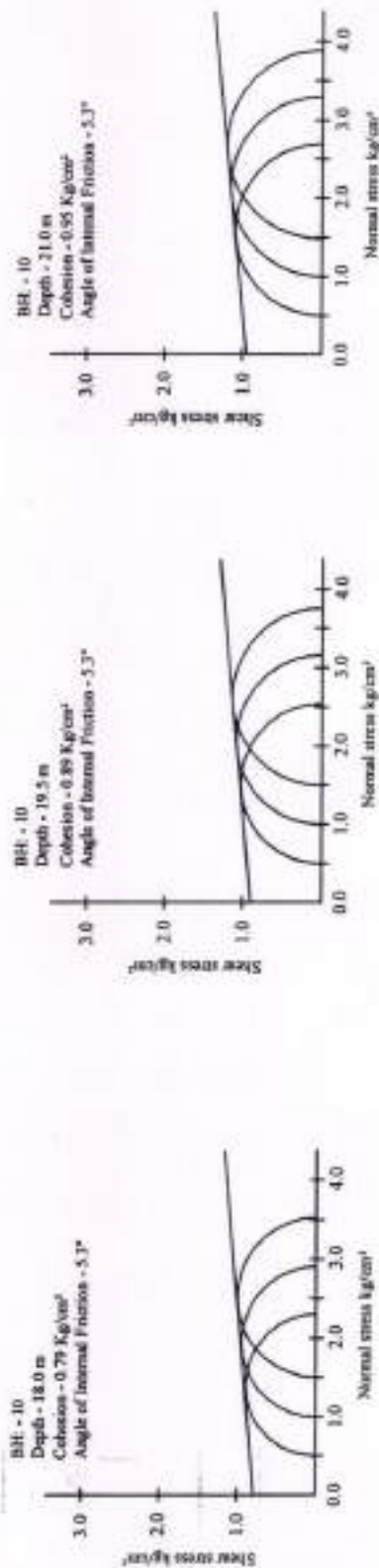
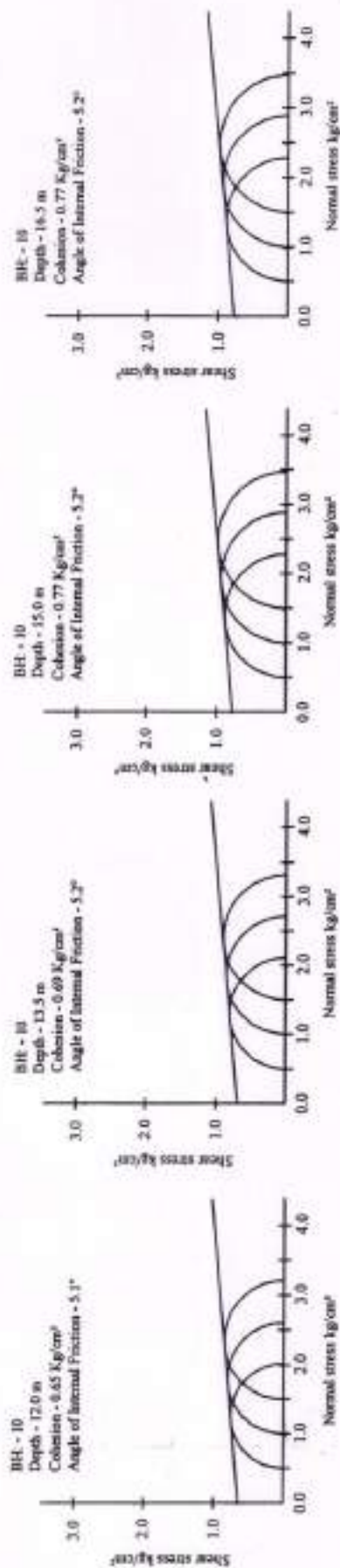
For the Proposed

Project No. 211226

Appendix - D28



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

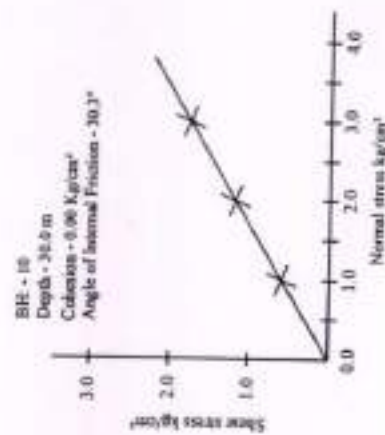
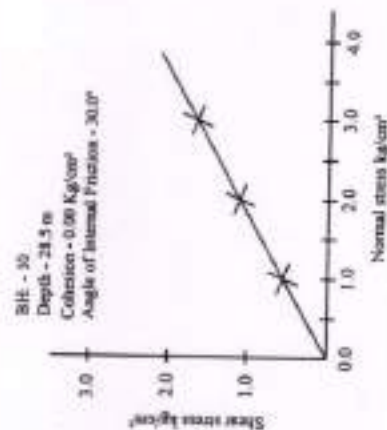
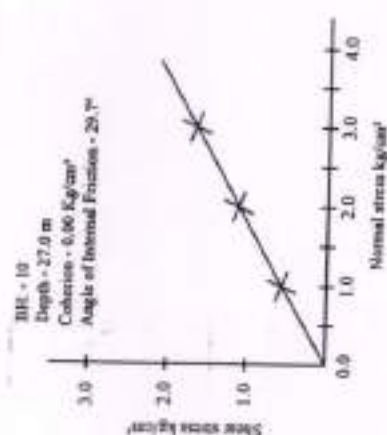
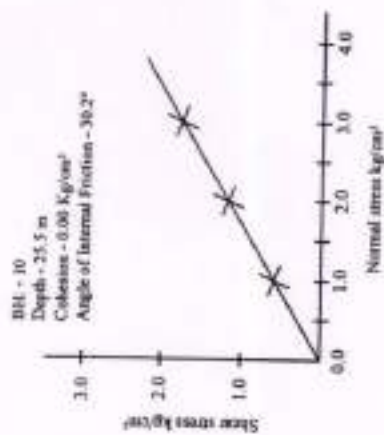
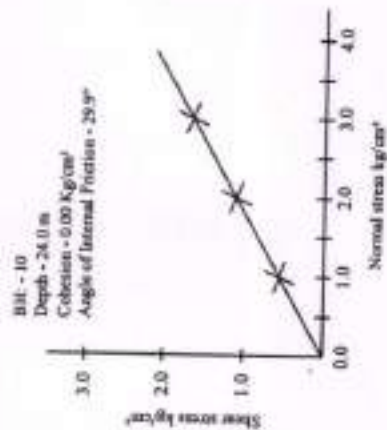
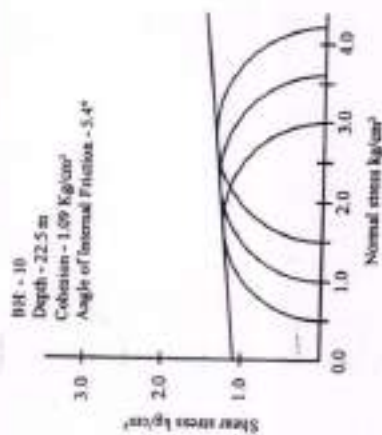
New Building Sarari City at Patna

Project No. 211226



Appendix - D29

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D30

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

Project No. 211226

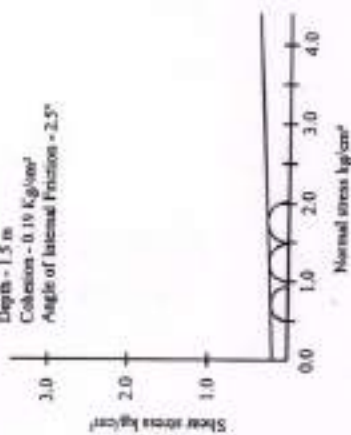
For the Proposed

New Building Sarari City at Patna

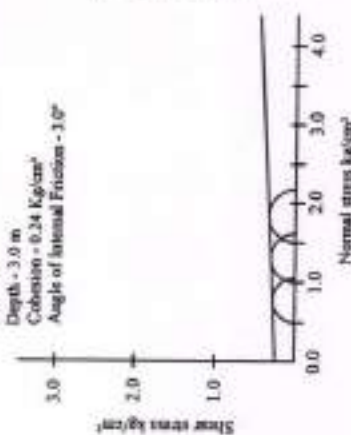


TRIAXIAL / DIRECT SHEAR TEST PLOTS

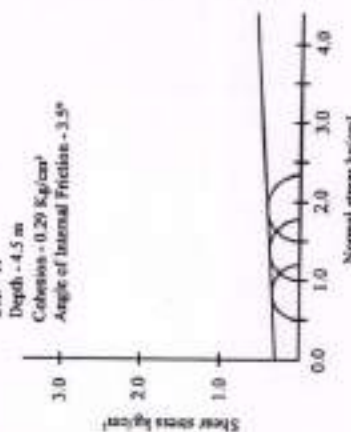
BH - 11
Depth - 1.5 m
Cohesion - 0.19 Kg/cm²
Angle of Internal Friction - 2.5°



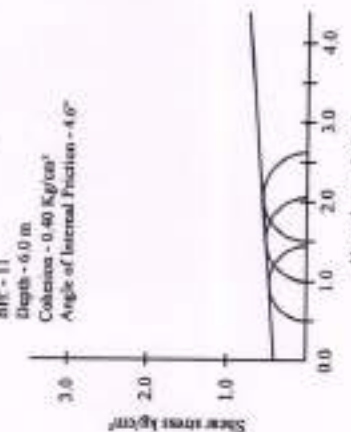
BH - 11
Depth - 3.0 m
Cohesion - 0.24 Kg/cm²
Angle of Internal Friction - 3.0°



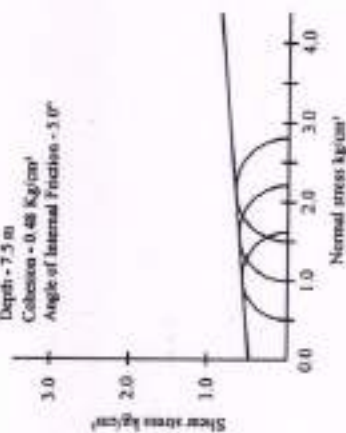
BH - 11
Depth - 4.5 m
Cohesion - 0.29 Kg/cm²
Angle of Internal Friction - 3.5°



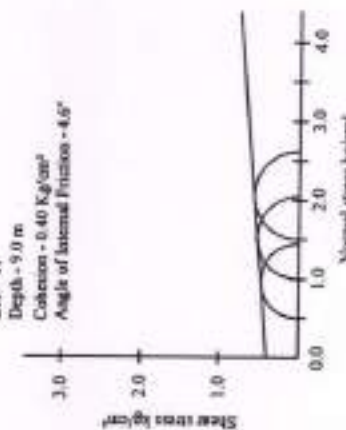
BH - 11
Depth - 6.0 m
Cohesion - 0.40 Kg/cm²
Angle of Internal Friction - 4.0°



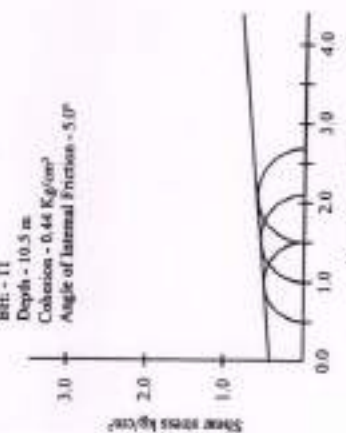
BH - 11
Depth - 7.5 m
Cohesion - 0.48 Kg/cm²
Angle of Internal Friction - 3.0°



BH - 11
Depth - 9.0 m
Cohesion - 0.40 Kg/cm²
Angle of Internal Friction - 4.0°



BH - 11
Depth - 10.5 m
Cohesion - 0.44 Kg/cm²
Angle of Internal Friction - 5.0°



Appendix - D31

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

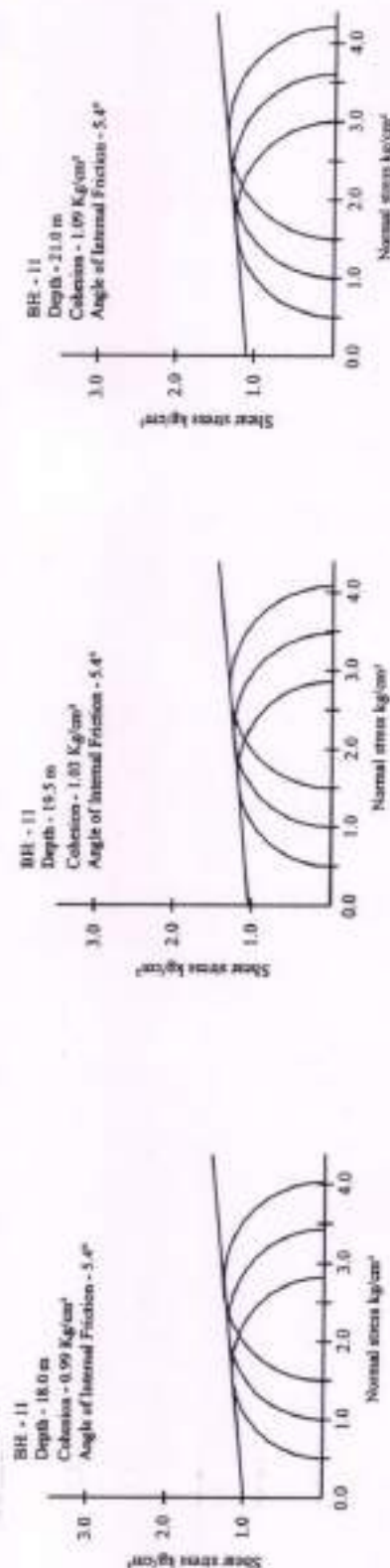
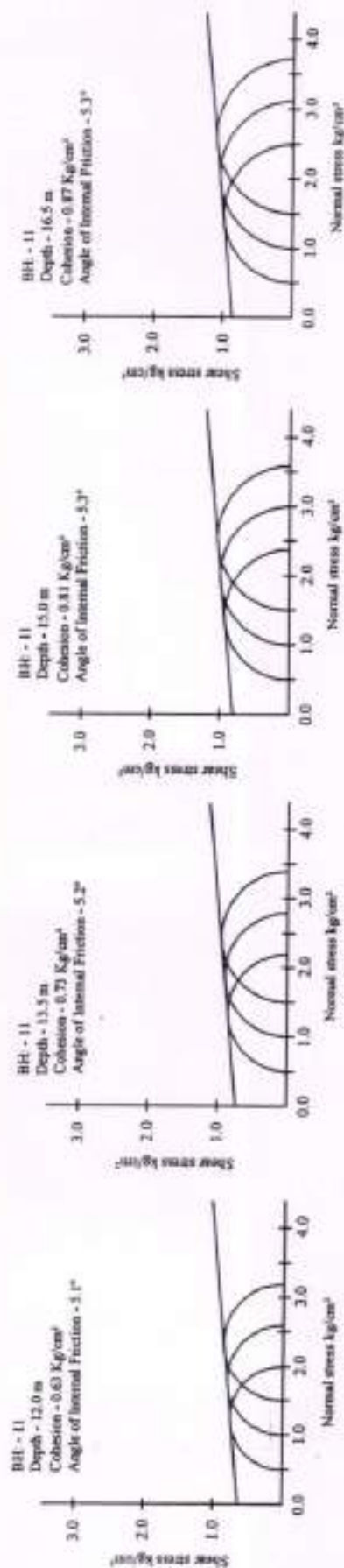


Project No. 211226

For the Proposed

New Buling Sarari City at Patna

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D32

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

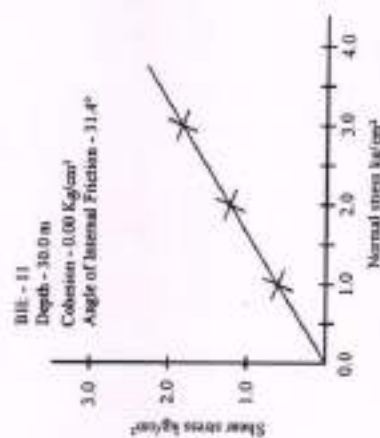
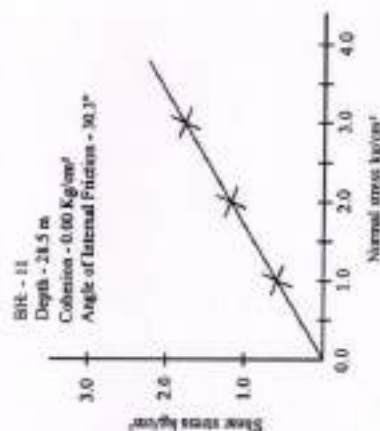
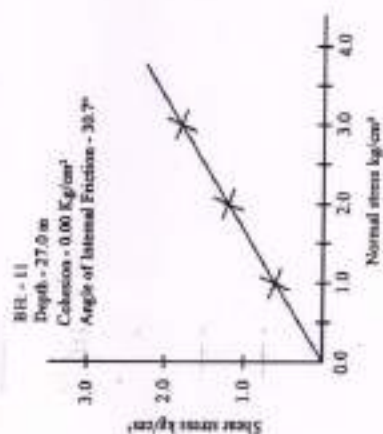
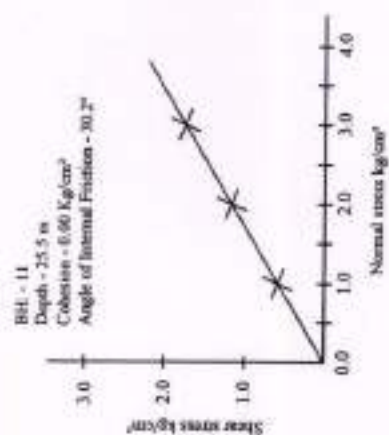
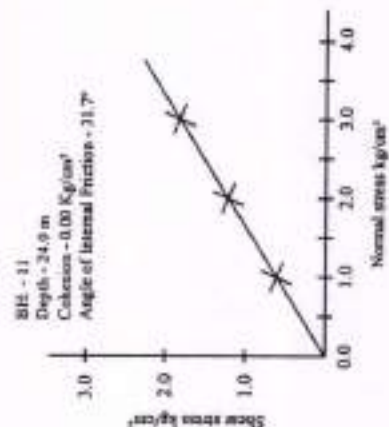
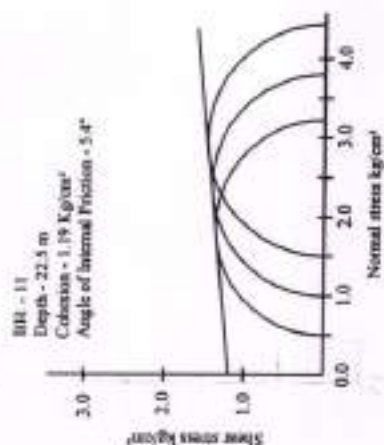
For the Proposed

New Bulling Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

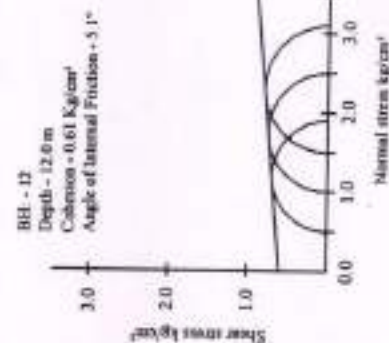
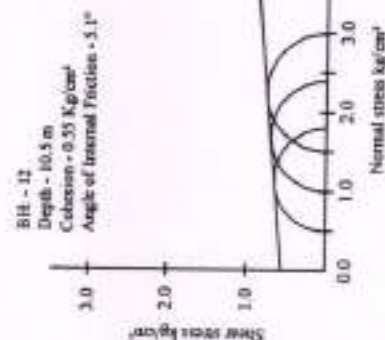
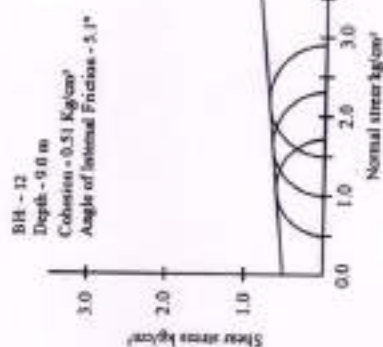
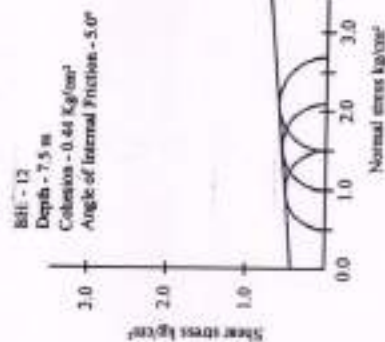
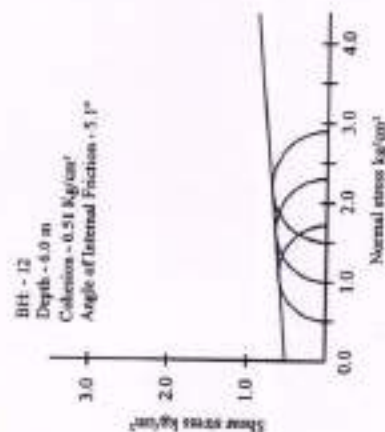
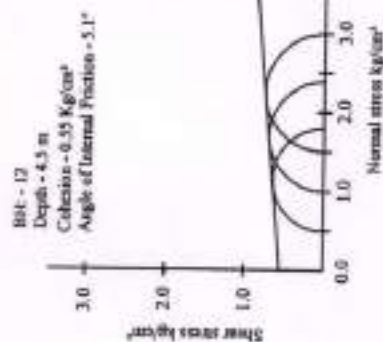
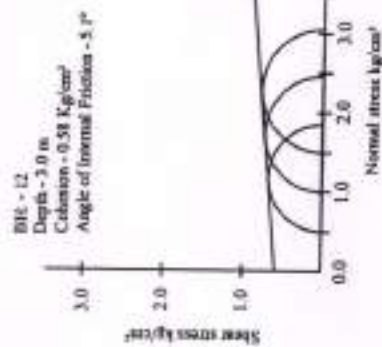
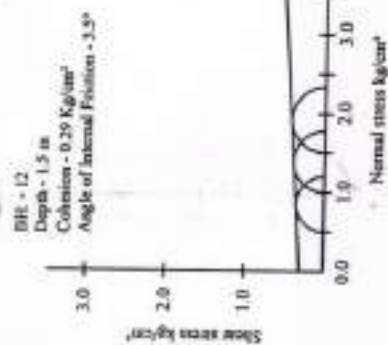
New Building Sarari City at Patna

Project No. 211226



Appendix - D33

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D34

Baidyanath Foundation Consultants Pvt. Ltd.,
 [Unit : Bihar Foundation Consultants]

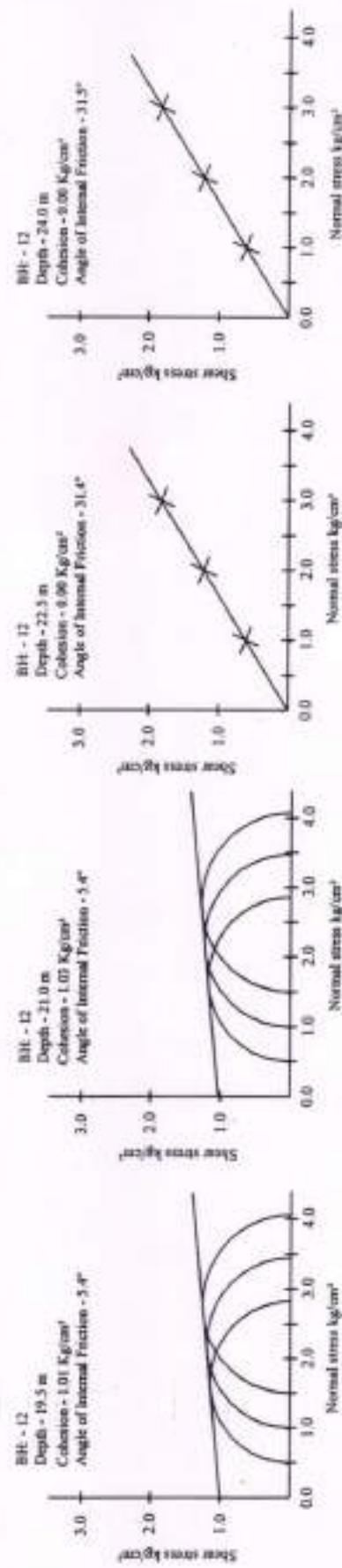
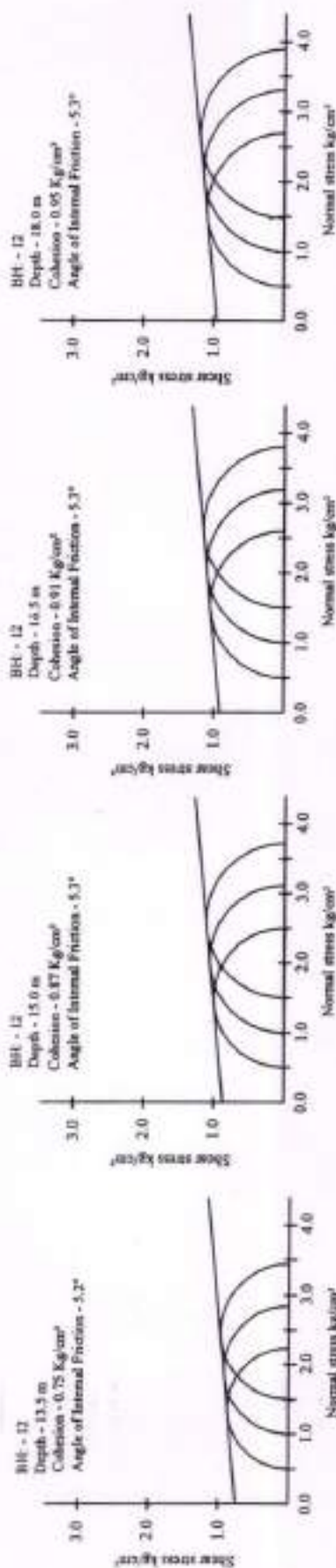
For the Proposed

New Building Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D35

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

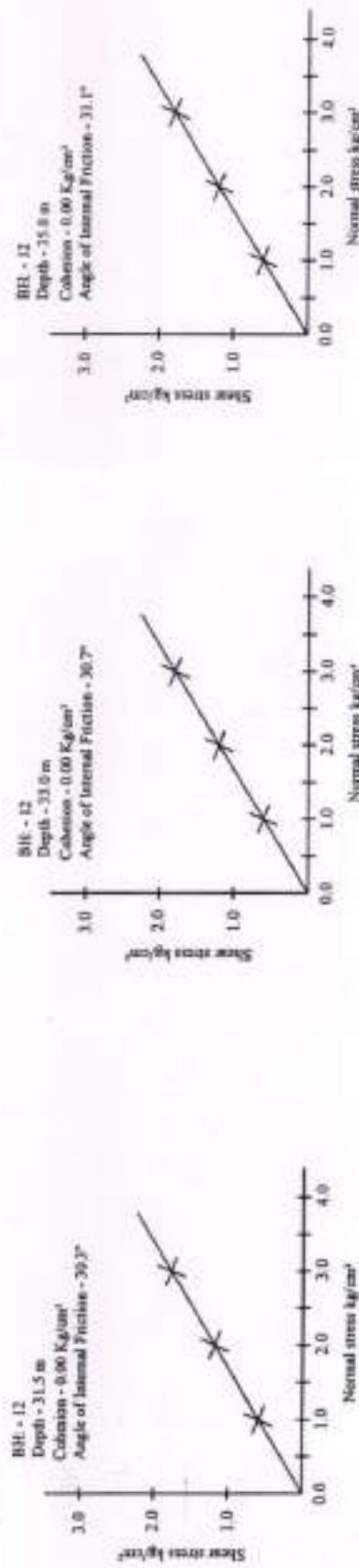
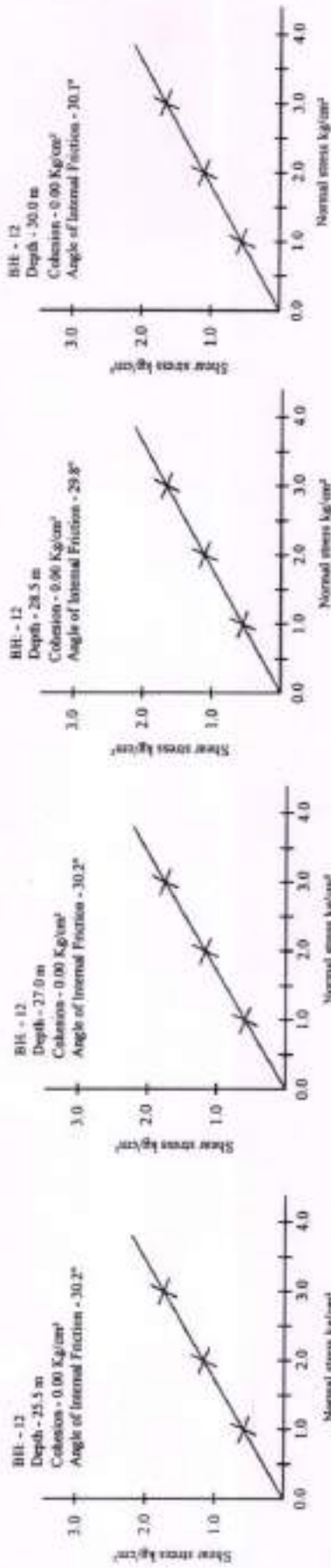
For the Proposed

New Building Sarari City at Patna

Project No. 211226



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

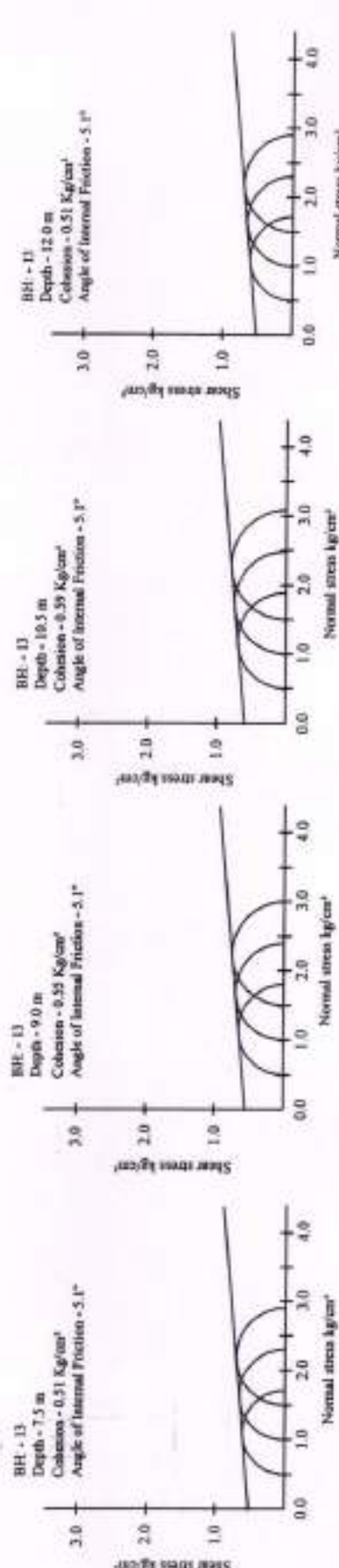
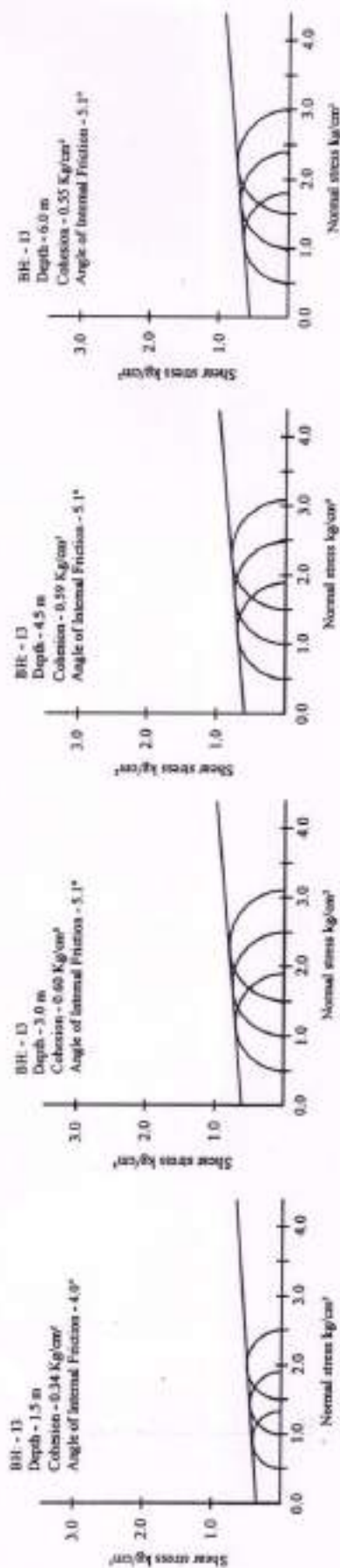
New Biling Sarari City at Patna

Project No. 211226



Appendix - D36

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

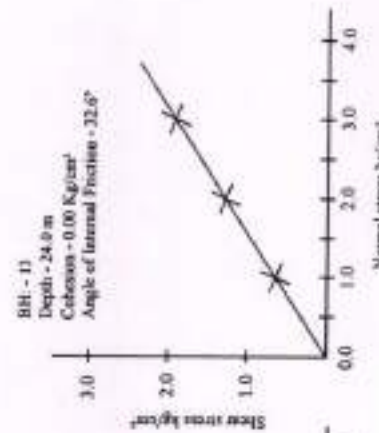
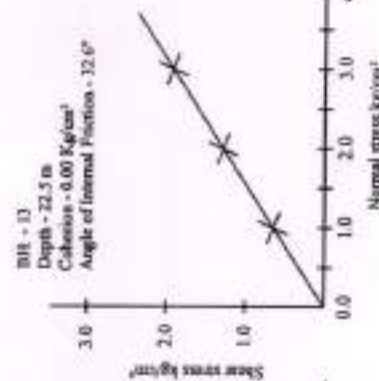
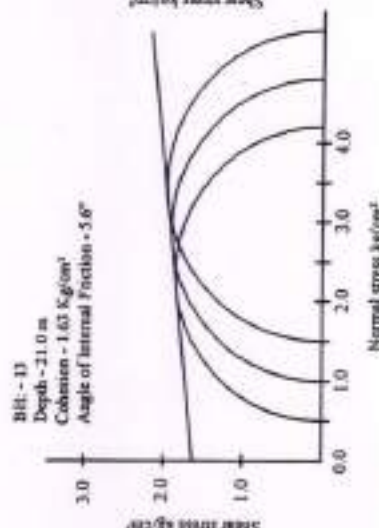
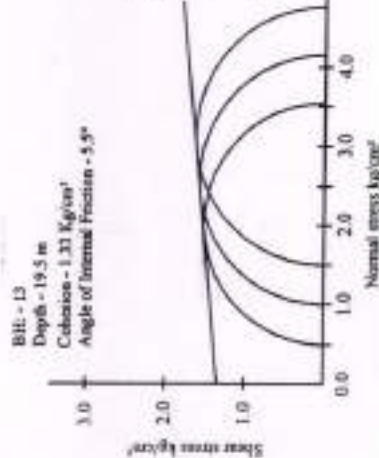
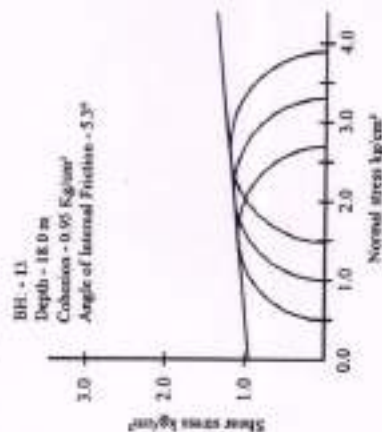
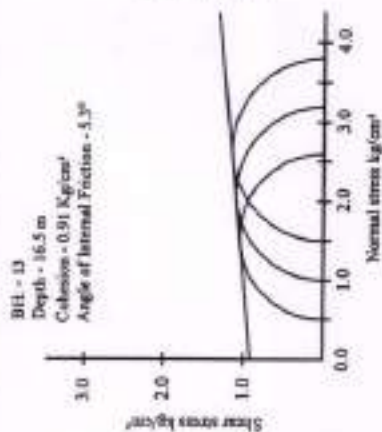
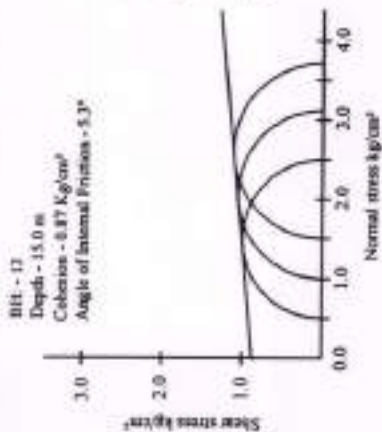
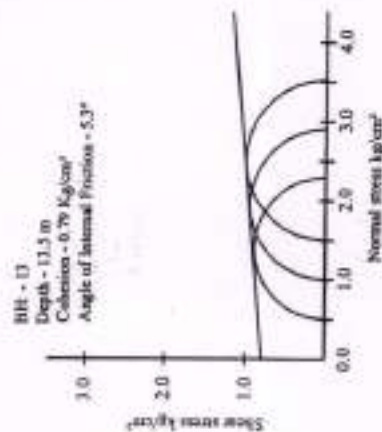
New Building Sarari City at Patna

Project No. 211226

Appendix - D37



TRIAXIAL / DIRECT SHEAR TEST PLOTS



Appendix - D38

Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

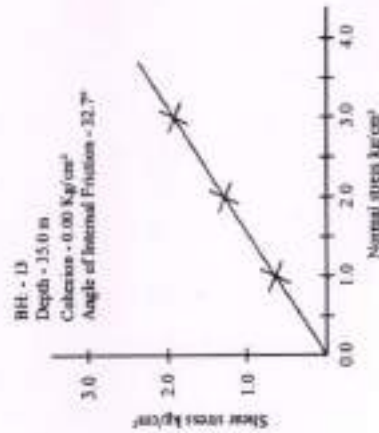
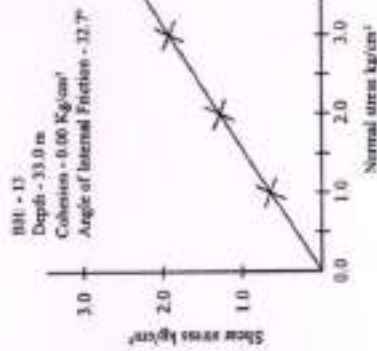
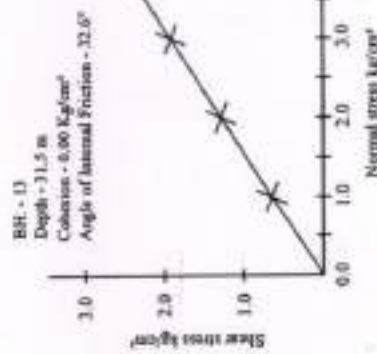
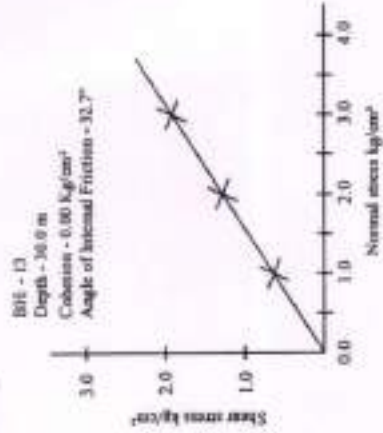
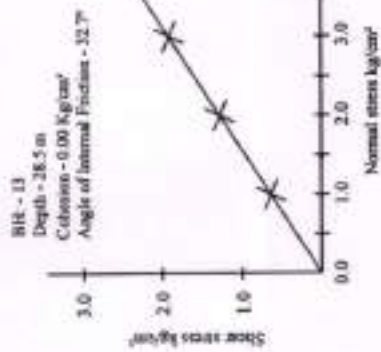
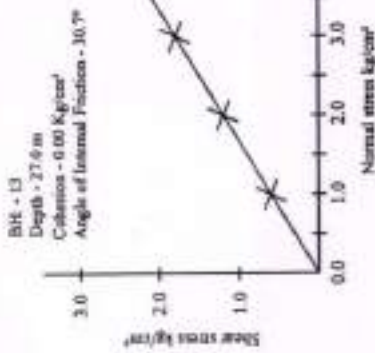
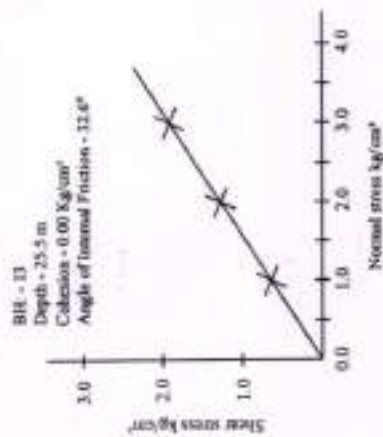


Project No. 211226

For the Proposed

New Building Sarari City at Patna

TRIAXIAL / DIRECT SHEAR TEST PLOTS



Baidyanath Foundation Consultants Pvt. Ltd.,
[Unit : Bihar Foundation Consultants]

For the Proposed

New Building Sarari City at Patna

Project No. 211226

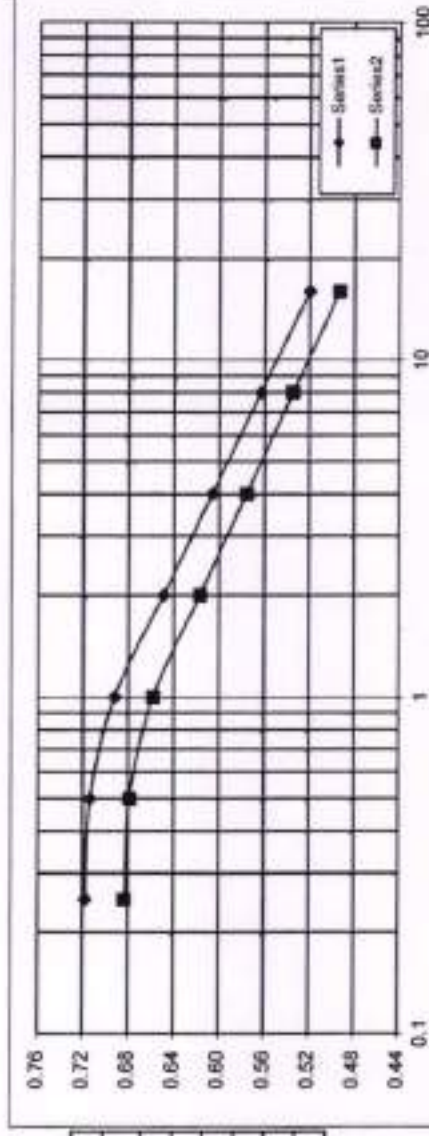
Appendix - D39



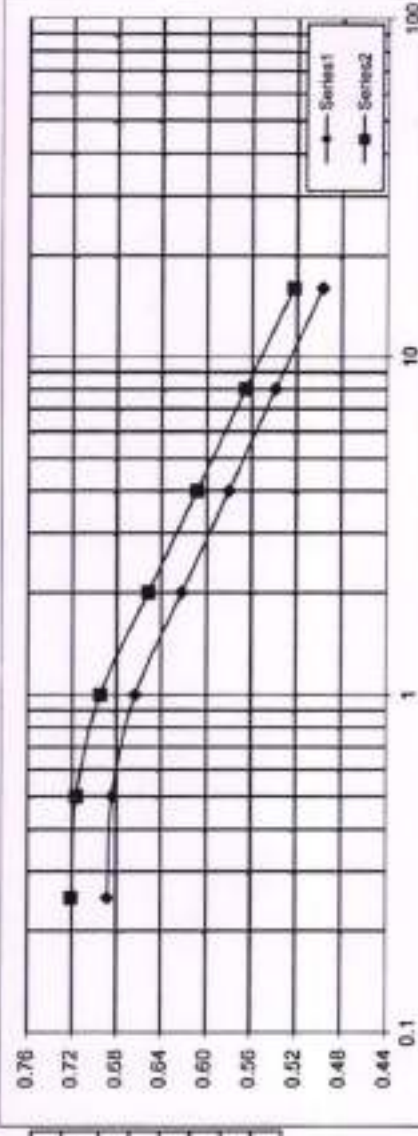
Fig. e - log p Plots from Consolidation Tests

X-axis : Pressure, p (kg/cm^2) on log scale.

Y-axis : Void ratio, e



BH No./	Initial V.R.	C_c	CURVE
Depth (m)	e_0		
1/3.0	0.7209	0.143	Series1
1/4.5	0.6858	0.137	Series2



BH No./	Initial V.R.	C_c	CURVE
Depth (m)	e_0		
2/4.5	0.6911	0.138	Series1
3/3.0	0.7236	0.143	Series2

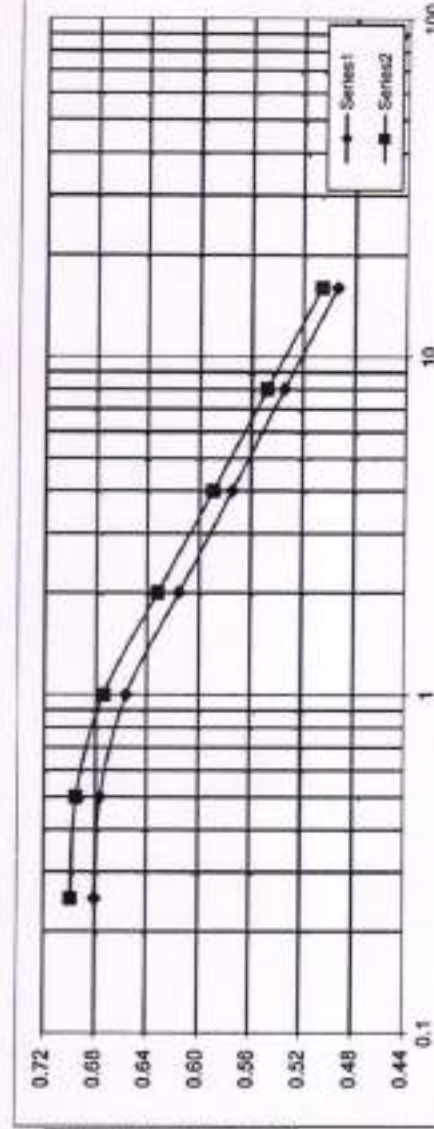
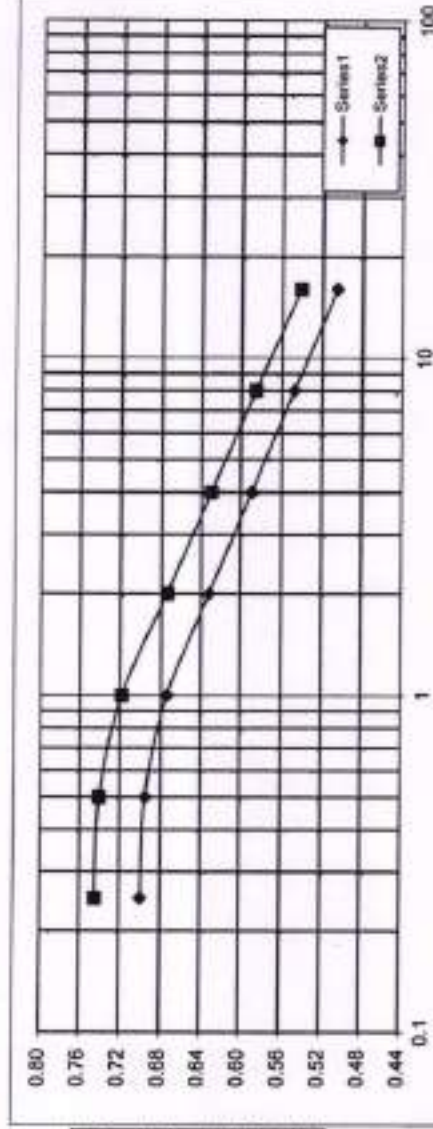


Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

Fig. e - log p Plots from Consolidation Tests

X-axis : Pressure, p (kg/cm²) on log scale.

Y-axis : Void ratio, e

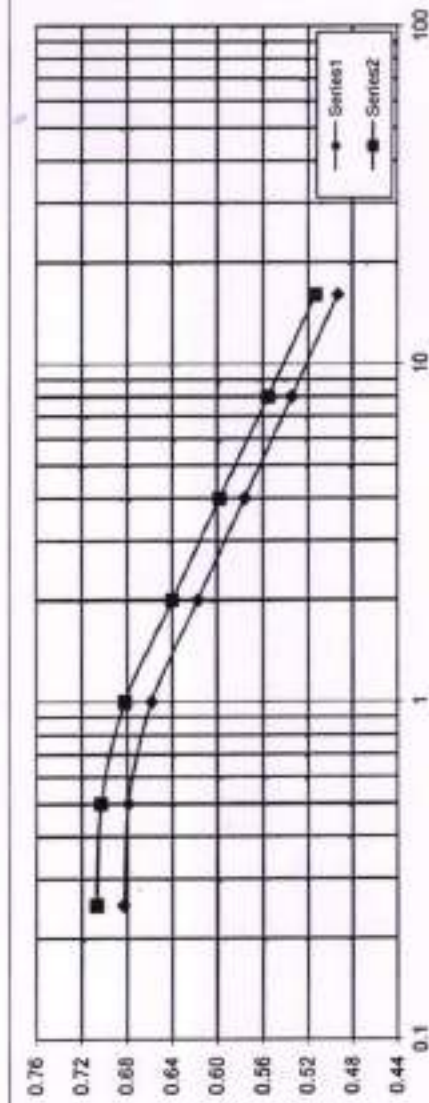


Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

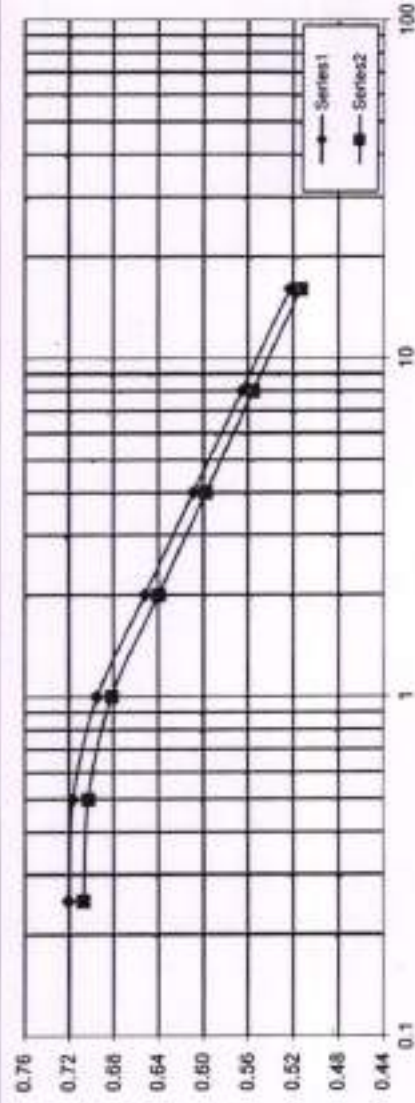
Fig. e - log p Plots from Consolidation Tests

X-axis: Pressure, p (kg/cm^2) on log scale.

Y-axis: Void ratio, e



BH No./	Initial V.R.	Initial V.R.	CURVE
Depth (m)	C_c	e_0	
6/4.5	0.137	0.6856	Series1
8/3.0	0.140	0.7100	Series2



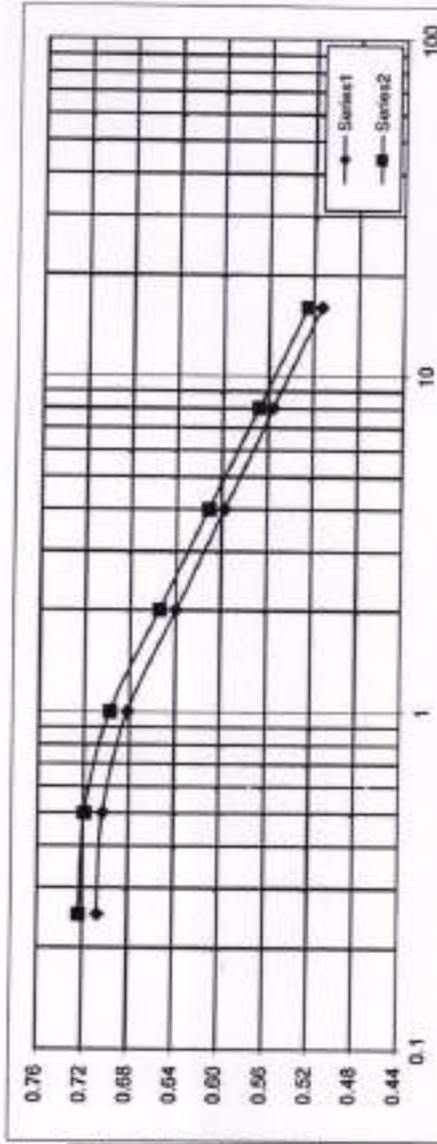
BH No./	Initial V.R.	Initial V.R.	CURVE
Depth (m)	C_c	e_0	
8/4.5	0.143	0.7236	Series1
9/3.0	0.140	0.7100	Series2



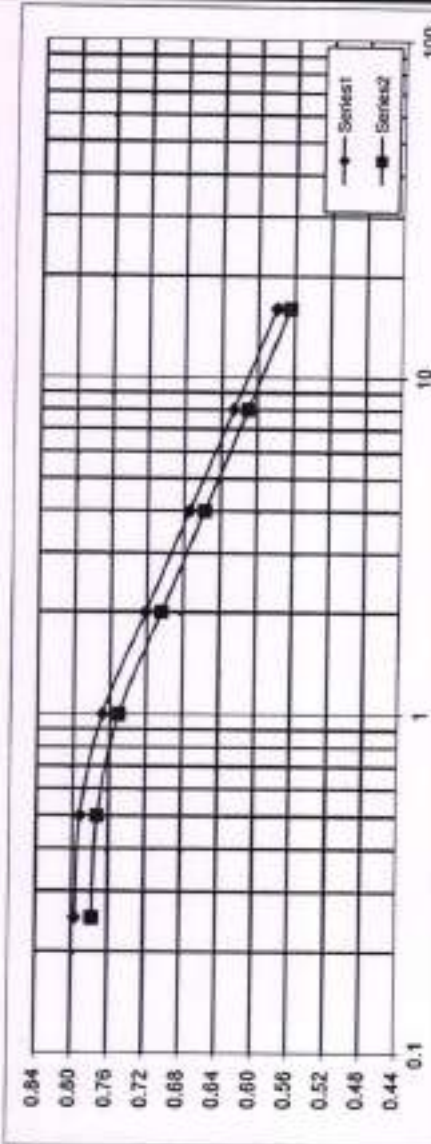
Fig. e - log p Plots from Consolidation Tests

X-axis : Pressure, p (kg/cm^2) on log scale.

Y-axis : Void ratio, e



BH No./	Initial V.R.	Cc	CURVE
Depth (m)	e_0		
9/4.5	0.7100	0.140	Series1
10/3.0	0.7263	0.143	Series2



BH No./	Initial V.R.	Cc	CURVE
Depth (m)	e_0		
11/3.0	0.7995	0.157	Series1
11/4.5	0.7805	0.154	Series2

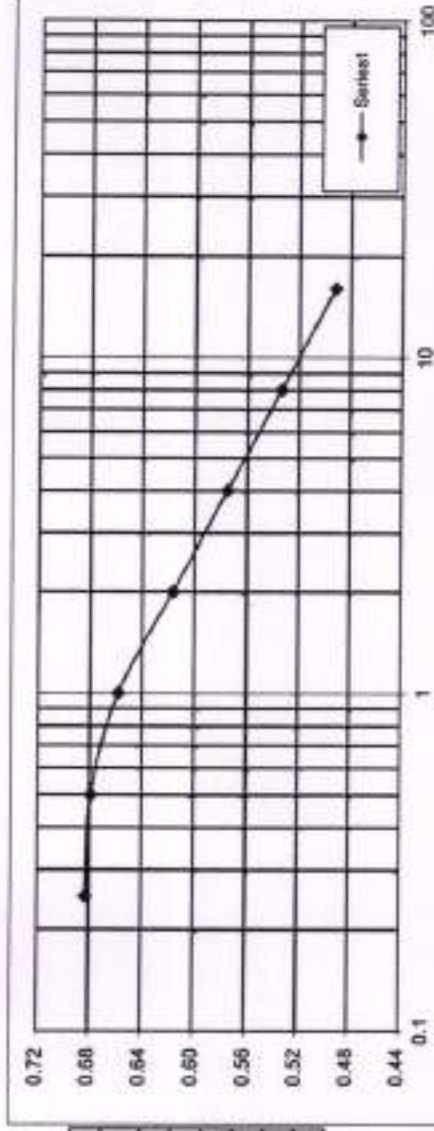


Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

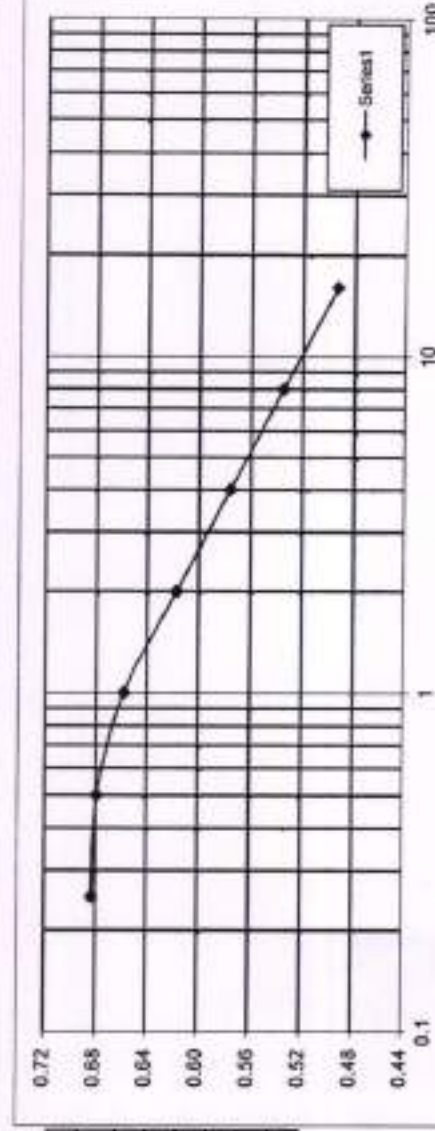
Fig. e - log p Plots from Consolidation Tests

X-axis : Pressure, p (kg/cm^2) on log scale.

Y-axis : Void ratio, e



BH No./	Initial V.R.		
Depth (m)	C_c	e_0	CURVE
12/4.5	0.138	0.6858	Series1



BH No./	Initial V.R.		
Depth (m)	C_c	e_0	CURVE
13/4.5	0.137	0.6858	Series1



Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

Report on Sub Soil Investigations for the proposed New Builing Sarari City at Patna

SAMPLE CALCULATION OF BEARING CAPACITY OF SHALLOW FOUNDATION

The determination of the **net safe bearing capacity**, q_{ns} , is done on the basis of the shear failure criterion after dividing the value of the **net ultimate bearing capacity** q_{nf} , calculated as described below, by a suitable factor of safety. The **net soil pressure**, q_s , for a given permissible settlement is then calculated as explained in the next section. The lower of the two values, q_{ns} and q_s , thus determined is taken as the **allowable bearing capacity** of the soil.

1. Shear Failure Criterion :

The **net ultimate bearing capacity** q_{nf} (t/m^2) of a shallow foundation of breadth B (m) and depth D (m) is given as per IS:6403-1981 (Sec.5.1.2) by the following equation :

$$q_{nf} = c N_c s_c d_c i_c + q (N_q - 1) s_q d_q i_q + 0.5 \gamma B N_\gamma s_\gamma d_\gamma i_\gamma w$$

where c = cohesion (t/m^2)
 γ = unit weight of subsoil (t/m^3) [submerged unit weight, γ' , is taken where so applicable]
 q = effective surcharge (t/m^2) = γD
 N_c, N_q, N_γ = bearing capacity factors, which are functions of ϕ , the angle of internal friction of the soil.
 s_c, s_q, s_γ = shape factors
 d_c, d_q, d_γ = depth factors
 i_c, i_q, i_γ = inclination factors
 w = water table factor (= 0.5 to 1.0) depending on the depth, D_w of water table [vide Table below].

} related to cohesion, surcharge and density of subsoil respectively

The bearing capacity factors (N 's) are functions of ϕ , the angle of internal friction of the soil. The values of these factors are found for general shear failure by referring to standard tables. If subsoil conditions are such as to lead to local shear failure, the values of these factors are found for a reduced value of angle of internal friction (ϕ') given by the equation : $\tan \phi' = 0.67 \tan \phi$. The value of cohesion is also reduced to $c' = 0.67 c$.

The values of the other factors in the above equation for usual conditions are as tabulated below :

$s_c =$	1.3	1+0.2B/L	1	$d_c =$	1+0.2(N ϕ) ^{0.5} D/B	D_w at	G.L.	Fou'dn. Level
$s_q =$	1.2	1+0.2B/L	1	$d_q = d_\gamma =$	1	for	0.5	1
$s_\gamma =$	0.8/0.6	1-0.4B/L	1	$d_q = d_\gamma =$	1+0.1(N ϕ) ^{0.5} D/B	$\phi > 10^\circ$	Interpolation	between
FOR	sq // O	Rect.	STRIP	$i_c, i_q, i_\gamma =$	1 for vertical load		these values	is linear.

In the present case, the representative values of cohesion c and angle of internal friction (ϕ) may be obtained from the soil data given earlier. Full submergence of the soil has been assumed. The **safe bearing capacity**, q_{ns} , has been obtained by dividing q_{nf} by a safety factor, 3.

One example of calculation of safe bearing capacity for a certain shape, depth and width of a footing is given in Table A on the next page. The net safe bearing capacity for the footing is entered in the last column of Table A. Calculations for other depths and widths of footings are done similarly.

The value of net safe bearing capacity (q_{ns}) calculated for each set of values of B and D is used for calculating the consolidation settlement s as explained in Sec. 2 below.

2. Settlement Criterion for Foundation on cohesive soil.

As per IS:8009(Part I)-1976, Sec. 9.2.2.2, the settlement s (in mm) is given by the equation :

$$s = \frac{1000 H C_c \log \left(\frac{1 + \Delta p / p_0}{1 + e_0} \right) \lambda}{\lambda}$$

where H = thickness (in m) of the compressible layer
 C_c = compression index of the soil
 e_0 = initial void ratio at mid-height of compressible soil layer = its m/c (m) x sp. Gravity
 p_0 = initial effective pressure at mid-height of the layer (t/m^2)
 Δp = pressure increment at the mid-height of the layer due to the foundation (t/m^2)
 λ = correction factor



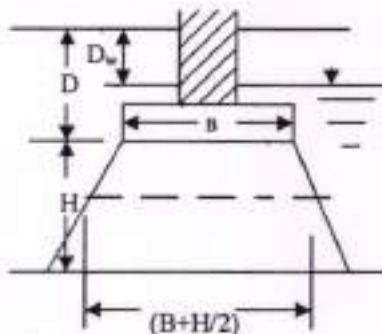
Report on Sub Soil Investigations for the proposed New Buiing Sarari City at Patna

If there are different layers with different compression indices and void ratios, s is calculated for each one of these and then added together to get the settlement.

The pressure increment at any plane due to the footing load may be calculated by assuming the dispersion of load at a slope of 1 horizontal to 2 vertical. Hence the load applied over a width B of a foundation (vide the Fig. below) is spread at a depth $H/2$ below it over a width $(B + H/2)$.

A correction factor $\lambda = 0.80$ is used as per IS Code to find the corrected settlement. If this value of corrected s is within the permissible limit specified in the Code, the corresponding value of q_{na} is also the net allowable bearing capacity q_{na} . If not, trials give the desired value of q_{na} . One example of this settlement analysis is given below the Table B in Sec. 3.

$$\text{If } D_w > (D + 1.5 B/2), p_u = \gamma (D + 1.5 B/2) \text{ t/m}^2, \text{ otherwise, } p_u = \gamma D_w + (\gamma - 1) (D - D_w + H/2) \text{ t/m}^2$$



D_w = depth of water table below ground level.

D = depth of foundation

B = breadth of foundation

$H = 1.5 \times B$ = thickness of compressible soil layer in the zone of influence of the loaded foundation.

Breadth of the influence zone at the mid-plane of the compressible layer, of thickness $H = (B + H/2)$.

In case of a rectangular or square footing a similar dispersion of load takes place along the other side of footing.

3. SAMPLE CALCULATION

Table A Calculation of Net Safe Bearing Capacity

Shape of Foundation:			F.S. =	$\gamma, \text{ t/m}^3 =$		C =	$\phi =$	$N_c =$	$N_q =$	$N_3 =$
STRIP			3	1.95		24	3.0	5.90	1.31	0.24
D [m]	B [m]	d_c	$d_q = d_g$	c	q	I Term	II Term	III Term	qnf	qnf / F
2	2	1.21	1	2.4	1.95	17.15	0.60	0.24	17.99	6.00

Calculation of capacity by Pile for e.p. for New Bulling Sarani City at Patna

Based on IS:2911 (Part I, Sec. 2) 2010, Annex B, (Clauses 6.3.1.1 and 6.3.2) using both cohesion (c), in t/m^2 and angle of internal friction (ϕ°).

WHEN Pile diameter, D (m) = 0.30 Area of pile base, A_p (m^2) = 0.071 & circ/mfr'ncos (in m) of pile base, $j = 3.14 \times D = 0.942$
 Surface area of pile's contact with soil, A (m^2) = $j \times t$ where t = thickness of soil layer in contact with pile.
In CLAY: Skin friction, $Q_s = K P_{avg} \tan \delta$, where $K = 1.5$
 and $\delta = \phi$. End bearing, $Q_b = A_p (0.5 D_r N_c + P_{hp} N_b)$,
 where P = overburden press at mid-layer or pile tip, as the case be,
 and the values of N_q and N_r are to be taken from the IS Code
 *Max'm permissible $P(t/m^2) = 15$ to $20 \times$ pile diameter (D) $\times \gamma_{sub}$
 = 4.5 to 5.82 t/m^2 .

where Reduction factor, α , depends on c , as given in Fig. 2 of Annex. B of the above IS Code:2911
 End bearing, $Q_b = A_p C_p N_c$ where $N_c = 9$

Let factor of safety in friction, $f_s = 2.5$

Total Ultimate capacity of pile, $Q_u = Q_s + Q_b$.
 Safe capacity of pile, $Q_{sf} = (Q_s / f_s + Q_b / f_b)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Depth of soil layer (m)	Soil type	T_{sub} t/m^2	c t/m^2	α	ϕ	t (m)	$P = \gamma \times t$ t/m^2	$P_{hp} = \Sigma p$ t/m^2	Permissible P_{sub} t/m^2	P_{sub} t/m^2	$A = j \times t$ m^2	Q_s (for 1 layer) t	ΣQ_s t	Q_b t	Q_u t	Q_{sf} (rounded off) tonnes	Pile Length m
0.0-0.5	stiff clay					0.5	0.00	0.00	0.0	0.0	Not considered due to cut-off						
0.5-4.0	stiff clay	0.94	2.43	1.00	3.03	3.5	9.29	9.29	3.3	1.6	3.30	8.44	8.44	2.40	10.84		0.5
4.0-8.0	stiff clay	0.97	3.25	1.00	3.85	4.0	3.88	7.17	4.4	4.4	3.77	13.91	22.35	2.94	25.29		4.0
8.0-12.0	stiff clay	0.98	3.90	1.00	4.43	4.0	3.92	11.09	4.4	4.4	3.77	15.61	38.96	4.21	43.17		8.0
12.0-14.0	stiff clay	1.00	5.85	0.76	5.10	2.0	2.00	13.09	4.4	4.4	1.88	9.43	48.43	4.95	53.41	17.0	12.0
14.0-16.0	stiff clay	1.02	7.05	0.65	5.20	2.0	2.04	15.13	4.4	4.4	1.88	9.70	58.19	5.27	63.45	21.0	14.0
16.0-18.0	stiff clay	1.03	7.50	0.60	5.20	2.0	2.06	17.19	4.4	4.4	1.88	9.80	67.78	5.59	73.37	25.0	16.0
18.0-20.0	stiff clay	1.03	8.00	0.58	5.30	2.0	2.06	19.25	4.4	4.4	1.88	9.89	77.67	6.48	84.15	33.2	20.0
20.0-22.0	stiff clay	1.05	8.40	0.48	5.30	2.0	2.10	21.35	4.4	4.4	1.88	9.94	87.32	7.44	94.75	37.4	22.0
22.0-23.0	stiff clay	1.06	10.90	0.41	5.40	1.0	1.05	22.41	4.4	4.4	0.94	4.70	92.11	7.44	99.55	38.8	23.0
23.0-25.0	sand	0.85	0.00		30.00	2.0	1.70	24.11	4.4	4.4	1.88	7.12	99.23	5.94	105.17	41.7	25.0
25.0-27.0	sand	0.85	0.00		30.10	2.0	1.70	25.81	4.4	4.4	1.88	7.15	106.37	5.88	112.25	44.5	27.0
27.0-29.0	sand	0.85	0.00		30.30	2.0	1.70	27.51	4.4	4.4	1.88	7.13	113.49	5.91	119.40	47.4	29.0
29.0-31.0	sand	0.85	0.00		30.05	2.0	1.70	29.21	4.4	4.4	1.88	7.13	120.62	6.01	126.63	50.3	31.0
31.0-33.0	sand	0.85	0.00		30.20	2.0	1.70	30.91	4.4	4.4	1.88	7.18	127.80	6.22	134.02	53.2	33.0
33.0-35.0	sand	0.84	0.00		30.50	2.0	1.58	32.59	4.4	4.4	1.88	7.25	135.06	6.22	141.28	56.1	35.0
Depth d	T_{sub} t/m^2	ϕ°	N_q	N_b	Q_b	for ϕ	Q_b for c	ϕ Q_b									
12.0	1.00	5.10	0.46	1.58	0.49	5.85	3.72										
14.0	1.02	5.20	0.47	1.50	0.50	7.05	4.48										
16.0	1.03	5.20	0.47	1.60	0.50	7.50	4.77										
18.0	1.03	5.30	0.48	1.61	0.50	8.00	5.09										
20.0	1.05	5.30	0.48	1.61	0.50	9.40	5.98										
22.0	1.06	5.40	0.60	1.63	0.61	10.80	6.83										
23.0	0.85	30.00	22.40	18.40	5.85	0.00	0.00										
25.0	0.85	30.10	22.74	18.81	5.94	0.00	0.00										
27.0	0.85	30.00	22.40	18.40	5.85	0.00	0.00										
29.0	0.85	30.05	22.57	18.51	5.91	0.00	0.00										
31.0	0.85	30.20	23.08	18.82	6.01	0.00	0.00										
33.0	0.84	30.50	24.13	19.48	6.22	0.00	0.00										
35.0	0.84	30.50	24.13	19.48	6.22	0.00	0.00										



L	D	Du	No. of bulbs, n=	Ap m ²	Aa m ²	As m ²	As' m ²	cp l/m ²	c'a l/m ²	ca l/m ²	Qs
4.0	0.25	0.50	1	0.05	0.15	2.32	0.00	3.50	3.50	2.70	3.7
4.0	0.25	0.50	2	0.05	0.15	1.73	1.18	3.50	3.50	2.70	4.6
6.0	0.25	0.50	1	0.05	0.15	3.89	0.00	3.50	3.50	2.96	4.8
6.0	0.25	0.50	2	0.05	0.15	3.30	1.18	3.50	3.50	2.96	6.1
8.0	0.25	0.50	1	0.05	0.15	5.46	0.00	2.50	2.50	2.98	5.0
8.0	0.25	0.50	2	0.05	0.15	4.87	1.18	2.50	2.50	2.98	6.1
10.0	0.25	0.50	1	0.05	0.15	7.03	0.00	4.00	4.00	2.90	6.9
10.0	0.25	0.50	2	0.05	0.15	6.44	1.18	4.00	4.00	2.90	8.0

aver coh.

at base, cp over depth (L-0.55) to (L+0.45)

at bulbs, c'a over depth (L-0.55- 1.5 Du) to (L-0.55)

on stem, ca over depth 0 -(L- 1.5 Du) & (L-0.55) to L

cyl. Bulbs, ca' Bulb dia = 2 x shaft dia

Factor of safety = 2.50

where Qu = Ap Nc cp + AaNc c'a + [0.5] As ca + A's ca'

Ap = area of base of pile = pi D²/4

Aa = area of annular ring = pi Du²/4 - Ap

As = area of stem = pi D(L- 1.5 (n-1) Du-0.55-0.5)

As' = area of cyl. bet. bulbs = pi Du 1.5(n-1) Du

Nc = No. of bulbs

cp = cohesion at base

c'a = cohesion at bulbs

ca = cohesion on stem

ca' = cohesion between bulbs

[0.5] As ca + A's ca' = average value of cohesion between bulbs

aver. coh. over depth (L-0.55) to (L+ 0.45)
at base, cp over depth (L-0.55- 1.5 Du) to (L-0.55)
at bulbs, c'a over depth 0 -(L- 1.5 Du) & (L-0.55) to L
on stem, ca' over depth 0 -(L- 1.5 Du) & (L-0.55) to L
Bet. Bulbs, ca' Bulb dia = 2 x shaft dia

at base, cp
at bulbs, c'a
on stem, ca

cyl. Bot. Bulbs, ca' 2 x shaft dia

[illegible]

Baidyanath Foundation Consultants Pvt. Ltd.,
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]

New Building Sarari City at Patna



Mundeshwari Multicon Pvt. Ltd.

An ISO 9001: 2008 and 14001 : 2004 certified company

Ref. No.

Date

To,
Baidyanath Foundation Consultants Pvt. Ltd.
Flat #403, 405, Ganga Darshan Apartment,
West of Sadaquat Ashram, Patna.
Phone No. +91 7050139112, 878967120

Sub - Quotation for Geo-technical investigation work for proposed New Building Sarari City at Patna.

Dear Sir,

We are pleased to give you work order for the above said site.

Sl. No.	Description	Unit	Qty.	Rate	Amount
1	(a) Drilling 100/150mm nominal dia exploratory 10 nos. of boreholes in soil, silt, sand up to 35 m depth below GL or where "Refusal" is reached, whichever is earlier; Total = 350m (b) Collecting disrobed undisturbed soil samples on required depth (c) Conducting standard penetration test at 1.5 m depth intervals or at change of strata; (d) Testing the soil samples in laboratory as per relevant IS code preparing a Report including Recommendation for suitable safe Bearing Capacity and submitting it in triplicate	M	350	750	262500.00
2	Mobilization and Demobilization	1 job	1	5000	5000.00
	Total				267500.00
	Add :- 18% GST Amount (As per government rate)				48150.00
	Gross Total				315650.00

Rupees - Three lac fifteen thousand six hundred fifty only.

Yours truly

MUNDESHWARI MULTICON PVT. LTD.

DIRECTOR

Director

M.M.P.L

Office : 1st Floor, Amitabh Kunj, Main Road, Buddha Colony, Patna - 800 001

Toll Free Number : 1800-120-0945, Mob : +91-9204174599, +91-9631216494, 9135010051

Website : www.mundeshwari.co.in

Email : info@mundeshwari.co.in

Baidyanath Foundation Consultants Pvt. Ltd.
403, Ganga Darshan Apartment, Patna-10
[Unit : Bihar Foundation Consultants]



PN - 211226

Appendix - G