

REPORT ON
GEOTECHNICAL INVESTIGATIONS

FOR THE PROPOSED

**Gandhi Memorial High School
At
Muzaffarganj, Block - Khargpur,
Dist. Munger**

Your Letter No.- BSEIDC/TECH/1960/2018-1369 Dated – 02.03.2021
[SI. No. 13]

Submitted to
**The Chief Engineer
BSEIDC, Patna**

April, 2021



BIHAR FOUNDATION CONSULTANTS

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**Gandhi Memorial High School at Muzaffarganj,
Block - Khargpur, Dist. Munger**



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

PN - 210411

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	3-4

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
- G. Copy of Work Oder

1. INTRODUCTION

The subsoil investigations reported herein were taken up (vide W.O. No. **BSEIDC/Tech/1960/2018-1369 Dated – 02.03.2021**
[Serial No. 13]

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.

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 three bore hole 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 3 BH's is silty clay [type CL/CI] in various sequences and different depths up to the investigated depth of 10.5 m bgl. It is also gritty at some locations and depths.

Ground water table was struck at about 5.50 m to 5.60 m depth below GL in April, 2021. 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.

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 3 BH's is silty clay [type CL/CI] in various sequences and different depths up to the investigated depth of 10.5 m bgl. It is also gritty at some locations and depths.

Ground water table was struck at about 5.50 m to 5.60 m depth below GL in April, 2021. It is subject to seasonal variations.

Hence,

1. The proposed structure may be provided with shallow foundation at a depth of 1.5 m or more.
2. Alternatively, U/R piles of lengths 4.0 m to 8.0 m may be used with stem diameters of 0.25 m, 0.30 m and 0.40 m and bulb diameters equal to 2 times the stem diameter.

By way of example, the values of safe capacities of

- (1) Shallow foundations and (2) Single or double bulbed u/r piles 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_{na}] 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	
1.5	2.0	6.0	7.1	...	75
	3.0	5.2	6.8	...	75
	10.0	...	...	6.5	100
2.0	2.0	8.3	9.9	...	75
	3.0	6.0	9.4	...	75
	10.0	...	...	7.7	100
2.5	2.0	10.1	13.5	...	75
	3.0	6.7	11.8	...	75
	10.0	...	...	8.2	100
3.0	2.0	11.3	17.3	...	75
	3.0	7.4	13.0	...	75
	10.0	...	...	8.6	100
3.5	2.0	12.7	19.7	...	75
	3.0	8.2	14.4	...	75
	10.0	...	...	9.1	100
4.0	2.0	14.1	20.0*	...	75
	3.0	9.0	15.8	...	75
	10.0	...	...	9.6	100
4.5	2.0	15.5	20.0*	...	75
	3.0	9.8	17.2	...	75
	10.0	...	...	10.1	100

Report on Sub Soil Investigations for the Proposed
Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger

*The calculated values are 20.0 (t/m²) or more, but for the sake of safety they have been limited to 20.0 (t/m²).

**Table 2. 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] <i>(subject to checking for sl ender ness r atio)</i>					
	Stem diameter (m)					
	0.25		0.30		0.40	
	One bulb	Two bulbs	One bulb	Two bulbs	One bulb	Two bulbs
4.0	5.6	6.9	7.7	9.5	12.8	15.9
6.0	7.8	9.4	10.4	12.7	16.7	20.7
8.0	10.6	12.5	13.8	16.6	21.6	26.5

*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.

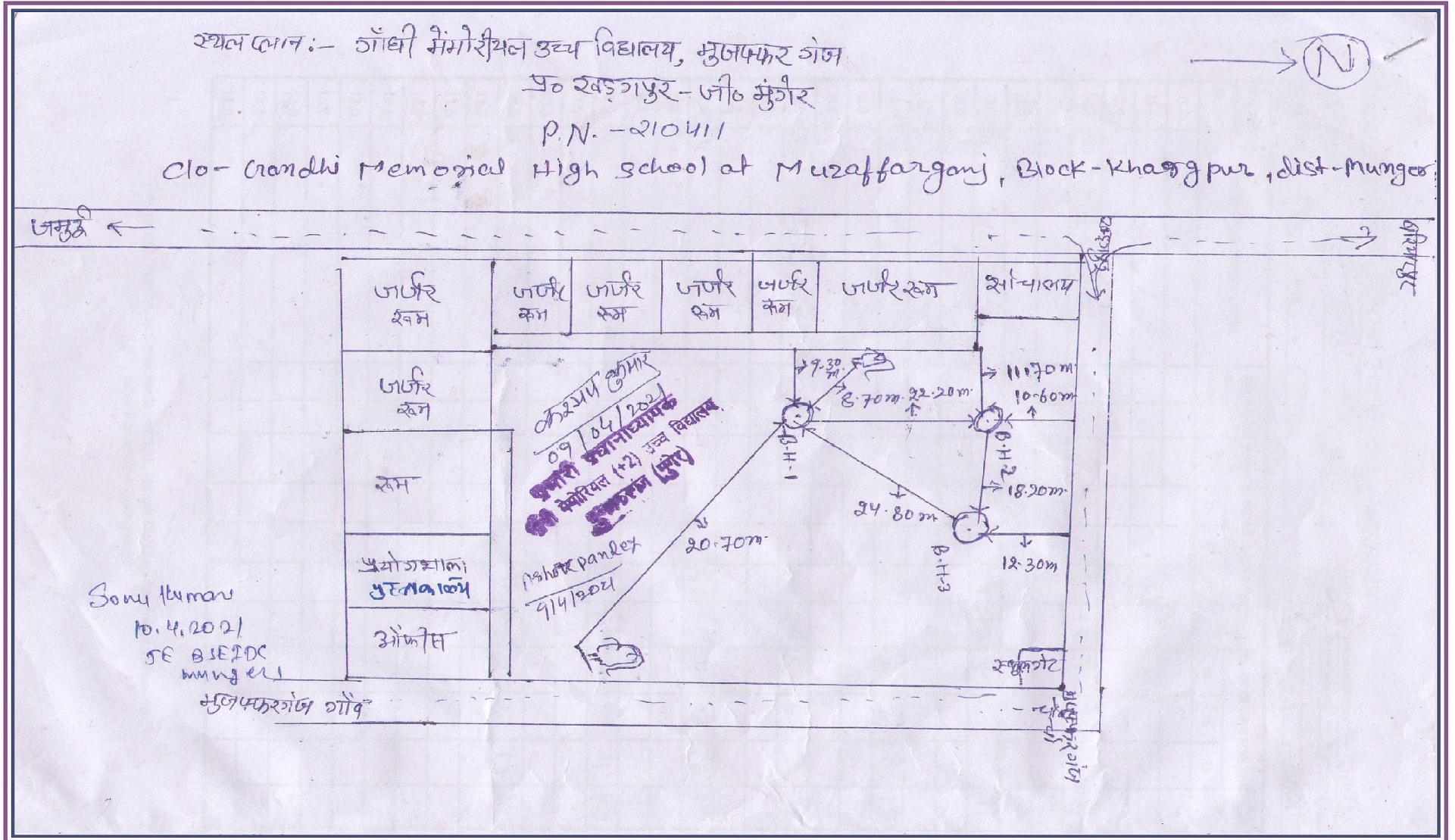
Notes :

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 Bihar Foundation Consultants

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

Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger



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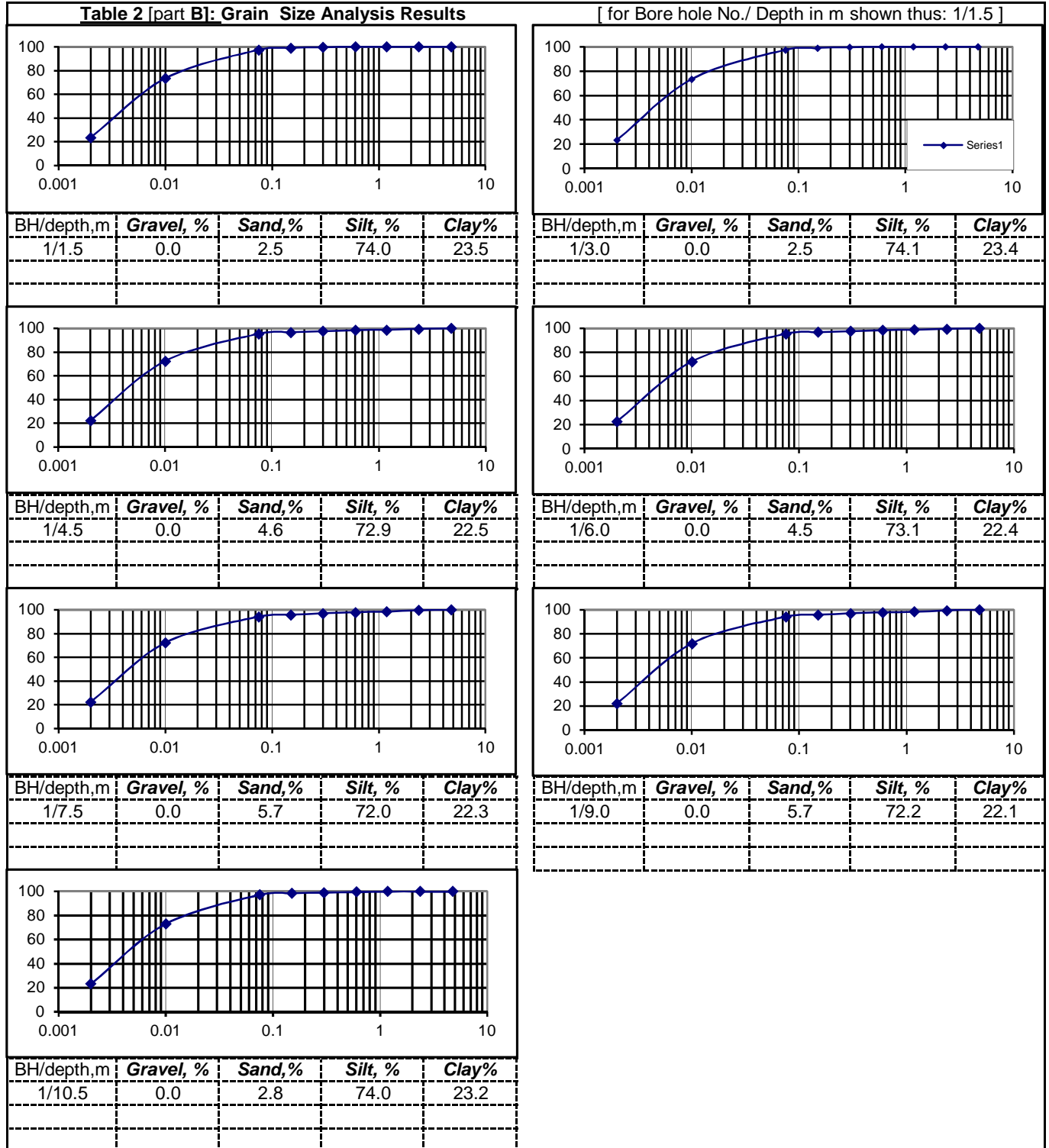
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Appendix - A

NAME OF WORK : Sub soil Investigation for C/O						BORING FINISH DATE : 10.04.2021		WATER TABLE : 5.50 m bgl											
Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger						BORING METHOD : Rotary													
BORE HOLE NO. : 1		Site Incharge - Ashok Pandey				TERMINATION DEPTH : 10.5 m		RECORD ON : 10.04.2021											
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 Indx,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)			
		Obsr.		from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, F°				
1.0			Yellowish silty clay, CL	0.0		3.0													
1.5	S1	6						31.0	21.6	9.4	1.96	28.6	2.70		0.30	3.6			
2.5																			
3.0	S2	11			3.0					2.01	25.5	2.71		0.51	5.1				
4.0			Yellowish silty clay, CI	3.0		1.5													
4.5	S3	15			4.5			44.0	23.3	20.7	2.01	25.3	2.70		0.62	5.1	0.135		
5.5			Yellowish silty clay, CI with grits	4.5		6.0													
6.0	S4	15									2.01	25.3	2.70		0.62	5.1			
7.0																			
7.5	S5	18						46.4	15.3	31.1	2.02	24.8	2.71		0.68	5.2			
8.5																			
9.0	S6	20									2.02	24.7	2.70		0.72	5.2			
10.0																			
10.5	S7	24			10.5					2.03	24.2	2.70		0.81	5.3				

NAME OF WORK : Sub soil Investigation for C/O						BORING FINISH DATE : 10.04.2021				WATER TABLE : 5.60 m bgl								
Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger						BORING METHOD : Rotary												
BORE HOLE NO. : 2		Site Incharge - Ashok Pandey				TERMINATION DEPTH : 10.5 m				RECORD ON : 10.04.2021								
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 Indx, %	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)		
		Obsr.		from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, F°			
1.0			Yellowish silty clay, CL	0.0		3.0												
1.5	S1	5									1.95	29.3	2.70		0.25	3.1		
2.5																		
3.0	S2	10			3.0			33.9	18.0	15.9	2.00	26.0	2.70		0.48	5.0	0.140	
4.0			Yellowish silty clay, CI	3.0		3.0												
4.5	S3	14									2.01	25.3	2.70		0.60	5.1	0.136	
5.5																		
6.0	S4	18			6.0			42.1	19.5	22.6	2.02	24.8	2.71		0.68	5.2		
7.0			Yellowish silty clay, CI with grits	6.0		4.5												
7.5	S5	22									2.03	24.4	2.71		0.76	5.2		
8.5																		
9.0	S6	23						42.5	21.3	21.2	2.03	24.4	2.71		0.78	5.2		
10.0																		
10.5	S7	25		10.5														

NAME OF WORK : Sub soil Investigation for C/O						BORING FINISH DATE : 11.04.2021		WATER TABLE : 5.50 m bgl											
Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger						BORING METHOD : Rotary													
BORE HOLE NO. : 3		Site Incharge - Ashok Pandey				TERMINATION DEPTH : 10.5 m		RECORD ON : 11.04.2021											
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 Indx,%	Bulk Density (gm/cm3)	Natural Moisture Content (%)	Specific Gravity	Shear Test			Compression Index (C _c)			
		Obsr.		from	to								Type of Test	Cohesion, c (kg/cm ²)	Friction Angle, F°				
1.0			Yellowish silty clay, CI	0.0		3.0													
1.5	S1	6						39.4	21.2	18.2	1.96	28.6	2.70		0.30	3.6			
2.5																			
3.0	S2	11			3.0						2.01	25.4	2.70		0.51	5.1			
4.0			Yellowish silty clay, CL	3.0		6.0													
4.5	S3	14						31.1	19.6	11.5	2.01	25.3	2.70		0.61	5.1	0.136		
5.5																			
6.0	S4	16									2.02	24.7	2.70		0.65	5.1			
7.0																			
7.5	S5	18									2.02	24.7	2.70		0.69	5.2			
8.5																			
9.0	S6	20			9.0				2.02	24.6	2.70		0.73	5.2					
10.0			Yellowish silty clay, CL with grits	9.0		1.5													
10.5	S7	23			10.5			31.3	18.3	13.0	2.03	24.2	2.70		0.79	5.3			



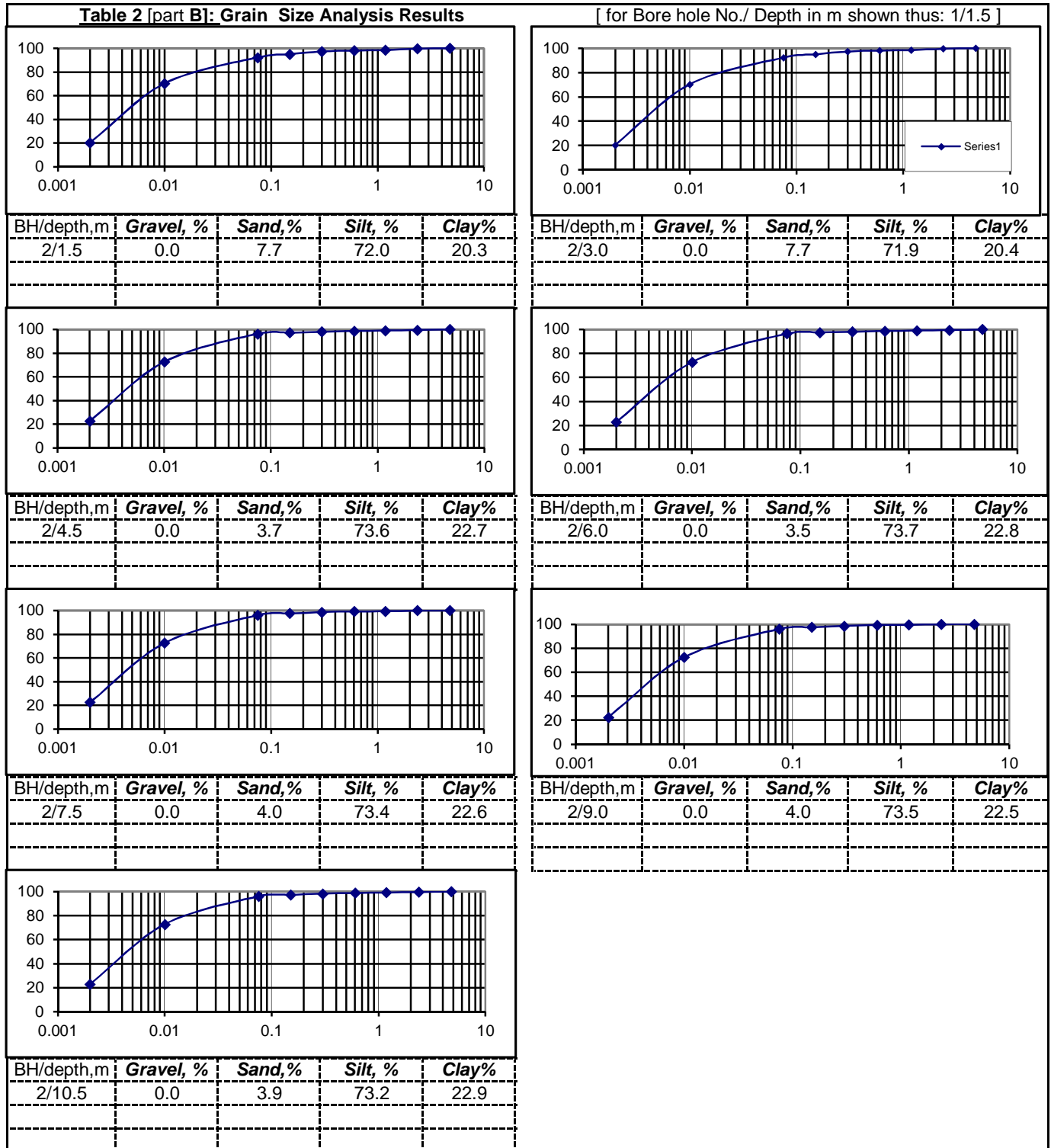
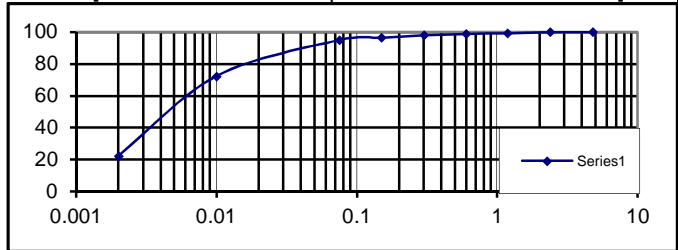
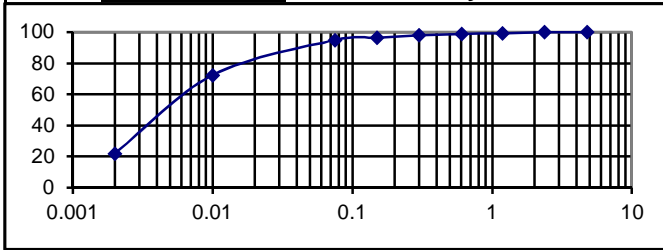


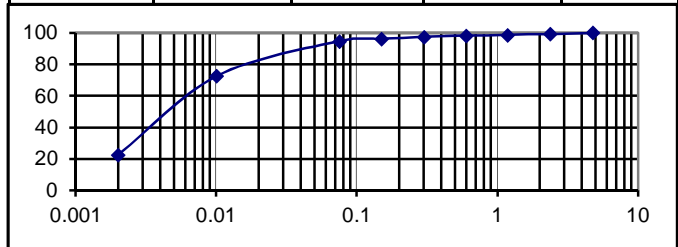
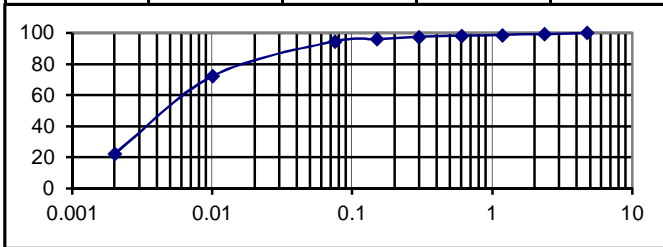
Table 2 [part B]: Grain Size Analysis Results

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



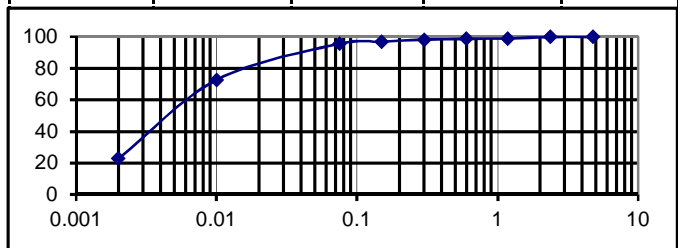
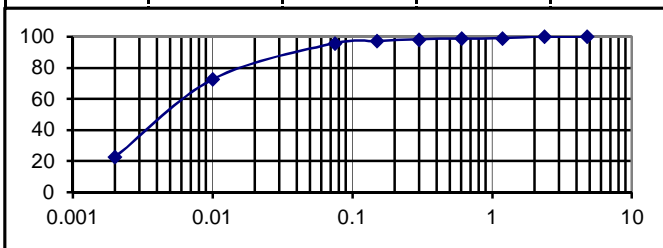
BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/1.5	0.0	5.1	72.9	22.0

BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/3.0	0.0	4.9	72.7	22.4



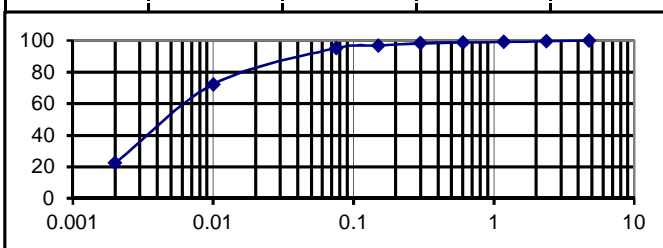
BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/4.5	0.0	5.4	72.4	22.2

BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/6.0	0.0	5.2	72.3	22.5



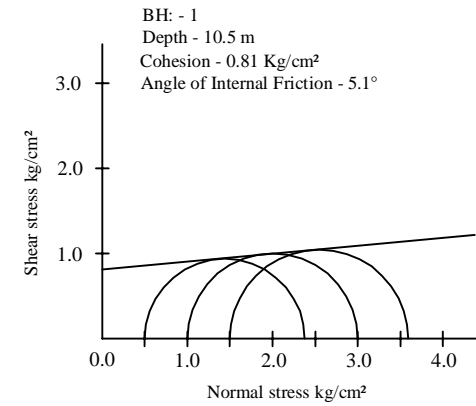
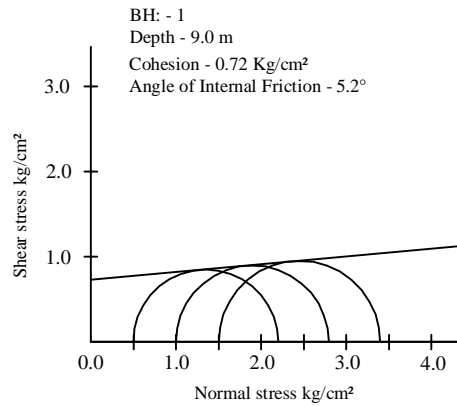
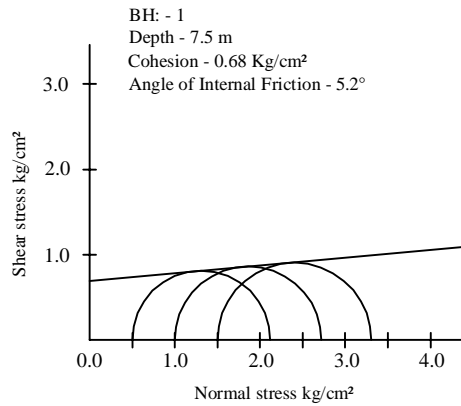
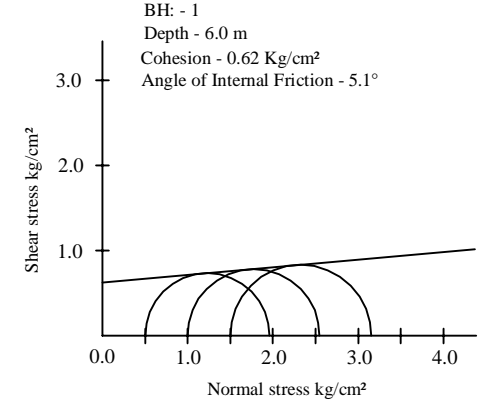
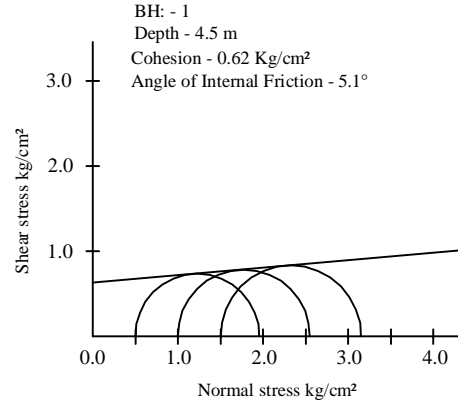
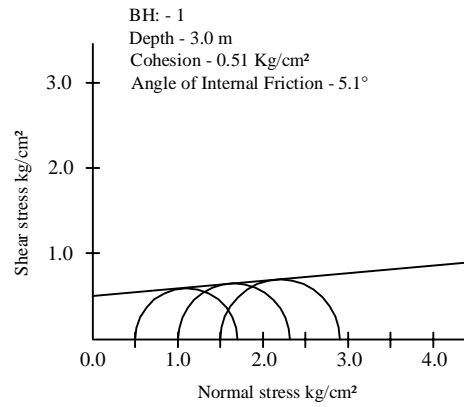
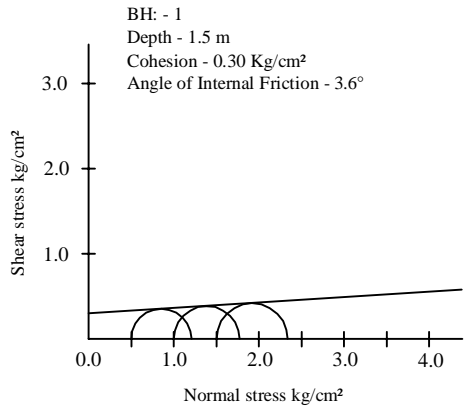
BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/7.5	0.0	4.1	73.3	22.6

BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/9.0	0.0	4.2	73.0	22.8



BH/depth.m	Gravel, %	Sand,%	Silt, %	Clay%
3/10.5	0.0	4.6	73.0	22.4

TRIAxIAL / DIRECT SHEAR TEST PLOTS



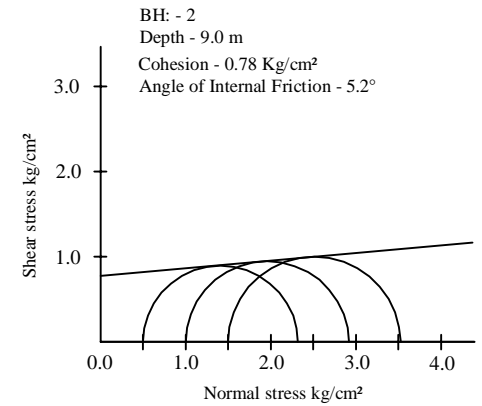
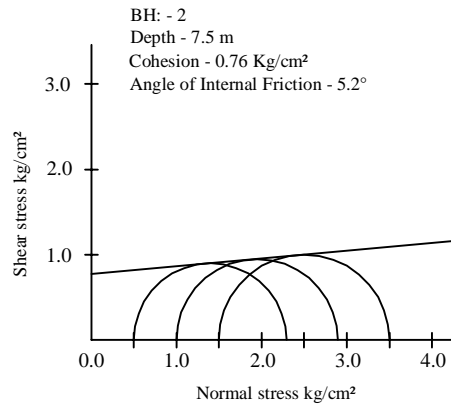
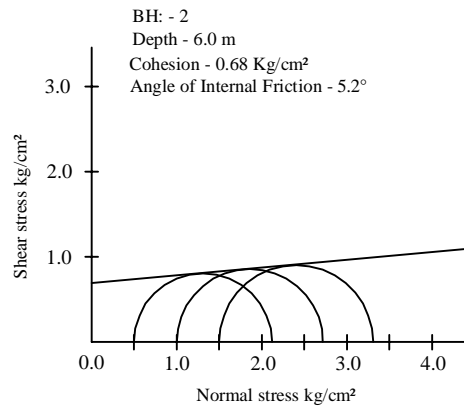
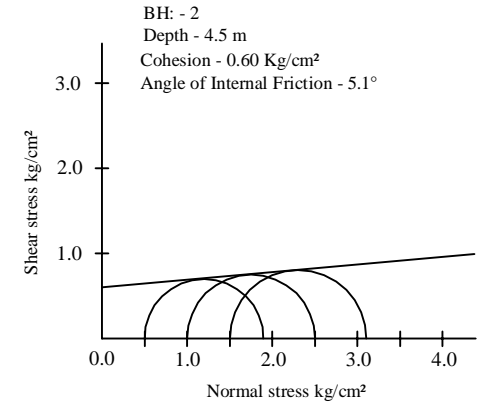
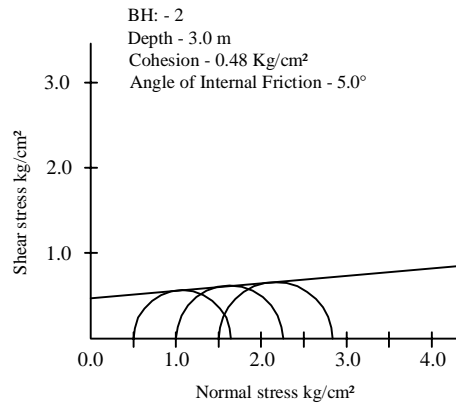
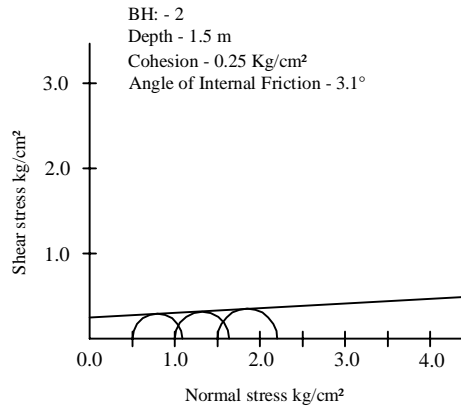
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TRIAXIAL / DIRECT SHEAR TEST PLOTS



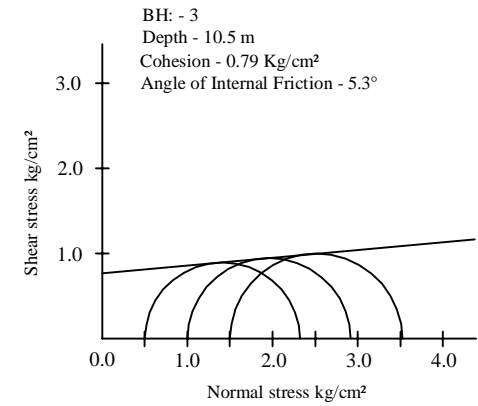
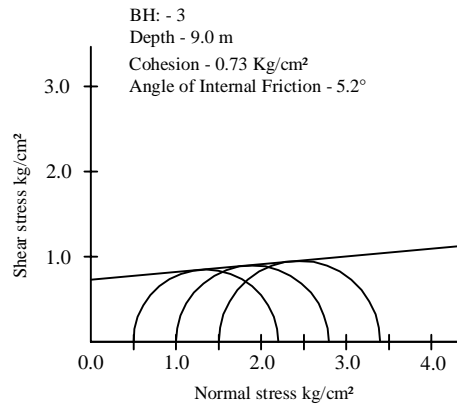
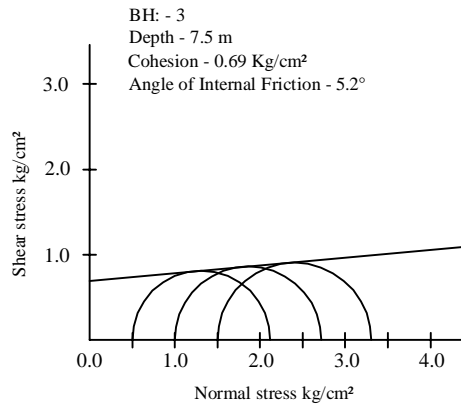
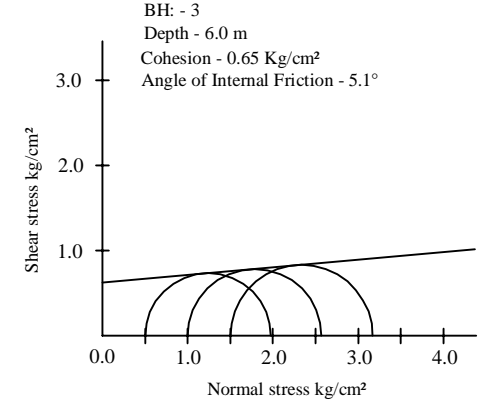
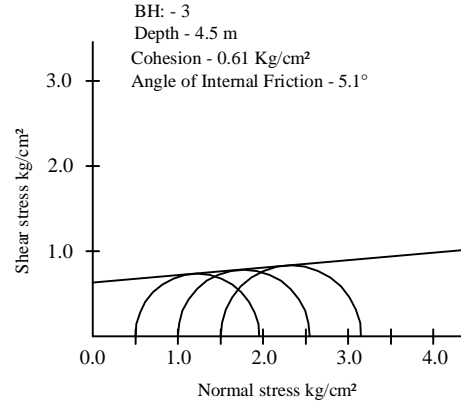
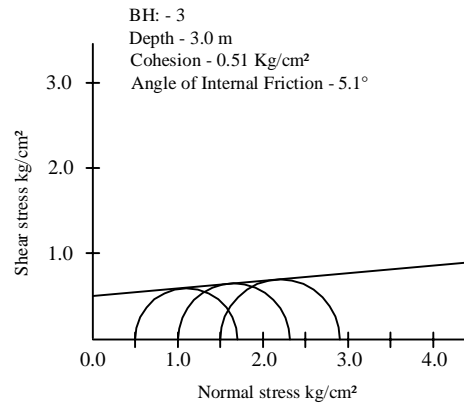
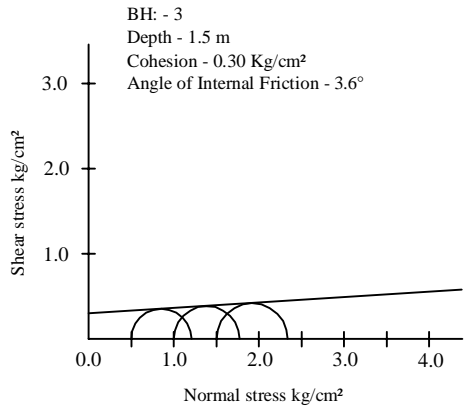
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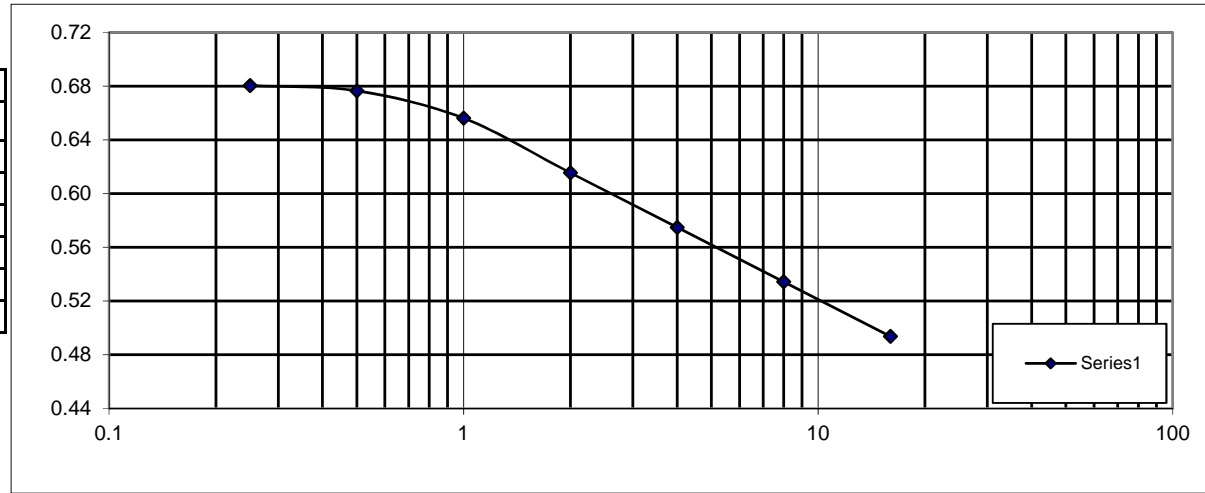
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Fig. e - log p Plots from Consolidation Tests

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
1/4.5	0.135	0.6831	Series1



BH No./	Initial V.R.		
Depth (m)	C_c	e_0	CURVE
3/4.5	0.136	0.6831	Series1

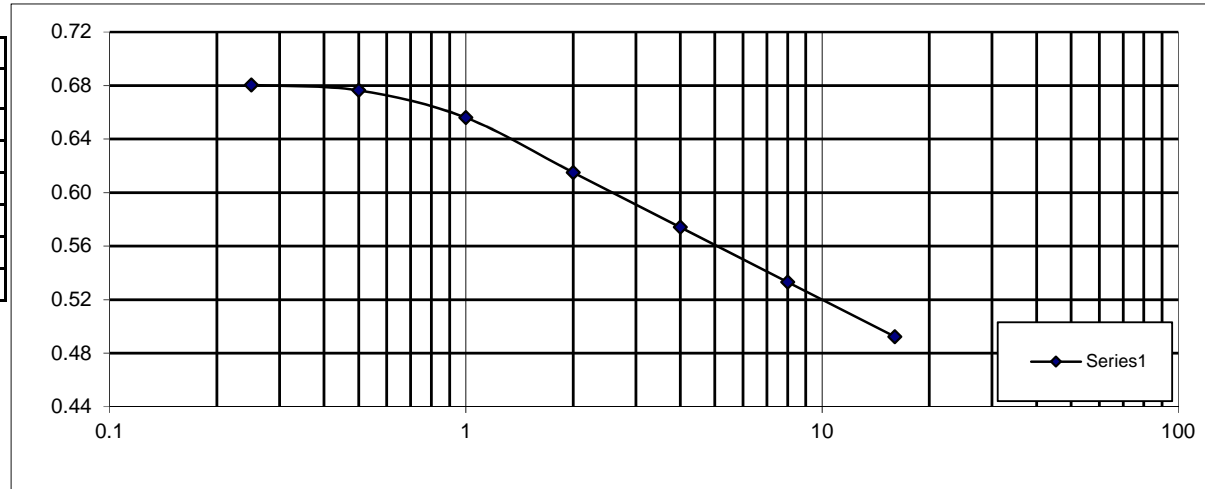
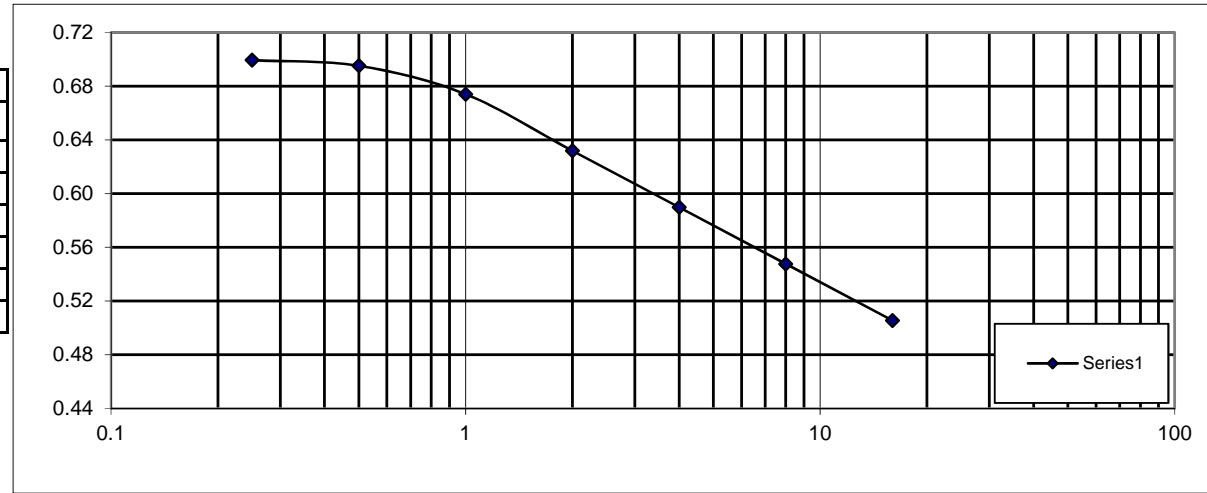


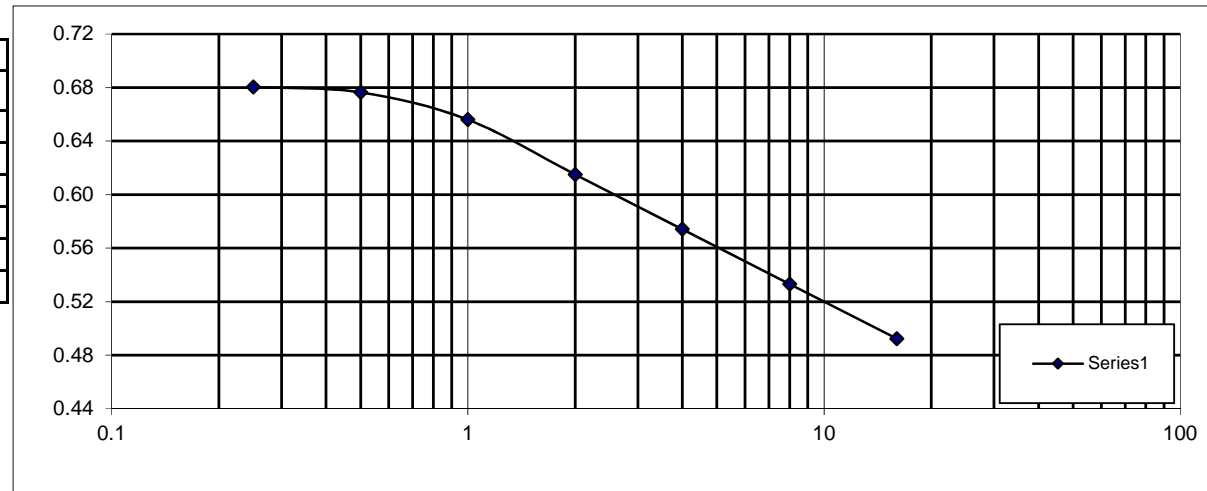
Fig. e - log p Plots from Consolidation Tests

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
2/3.0	0.140	0.7020	Series1



BH No./	Initial V.R.		
Depth (m)	C_c	e_0	CURVE
2/4.5	0.136	0.6831	Series1



Report on Sub Soil Investigations for the proposed Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger

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_γ, N_q = 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].

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	$d_c =$	$1 + 0.2 (N_f)^{0.5} D/B$	D_w at	G.L.	Fou'dn.Level
$s_q =$	1.2	1+0.2B/L	1	$d_q = d_\gamma =$	1	$w =$	0.5	1
$s_\gamma =$	0.8/0.6	1-0.4B/L	1	$d_q = d_\gamma =$	$1 + 0.1 (N_f)^{0.5} D/B$	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 © 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 :

$$s = [1000 H C_c \log (1 + \Delta p / p_o)] / (1 + e_o) \lambda$$

where H = thickness (in m) of the compressible layer
 C_c = compression index of the soil
 e_o = initial void ratio at mid-height of compressible soil layer = its m/c (m) x sp. Gravity
 p_o = 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

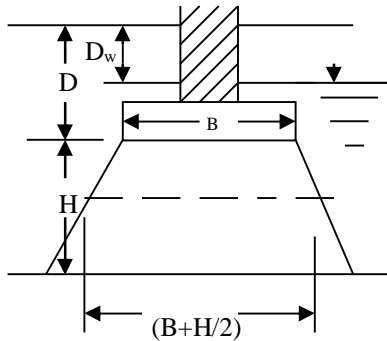
Report on Sub Soil Investigations for the proposed Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger

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_{ns} 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.

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



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.=	$\gamma, t/m^3 =$		$c =$	$\phi =$	$N_c =$	$N_q =$	$N_y =$	
STRIP		3	1.95		2.5	3.1	5.93	1.32	0.25	
D [m]	B [m]	dc	dq = dg	c	q	I Term	II Term	III Term	qnf	qnf /F
1.5	2	1.16	1	2.5	1.463	17.17	0.47	0.24	17.88	5.96

The net safe bearing capacity for the footing is to be seen in the last column of the above Table A. This value is checked for settlement as shown below.

Table B Calculation of Settlement

m = 0.293		$G_s = 2.7$		eo = 0.7911		Cc = 0.140		Dw = 0	
Depth	Width	qnf /F	po	H	Dp	log (1+ Dp/po)	s [mm]	λs mm	Remarks
D [m]	B [m]	t/m ²	t/m ²	m	t/m ²		mm	mm	
1.5	2.0	6.0	2.9	3.0	3.4	0.3	80.1	64.0	OK

Hence the **net allowable bearing pressure** for a strip footing of width 2.0 m and depth 1.5 m below ground level will be 6.0 t/m².

The calculations for footings of other sizes and depths are done similarly

Calculations of Capacity of U/R Pile for the proposed
Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger

U/R	<u>Pile Capacity Calculation</u>				L	D, stem	Du	No. of bulbs, n=	Qs		
	Qu =	Ap Nc cp + AaNc c'a +	[0.5]As ca + A's.ca'		4.0	0.25	0.50	1	5.6		
where	Ap =	area of base of pile =	pi D ² /4		4.0	0.25	0.50	2	6.9		
	Aa =	area of annular ring =	pi Du ² /4 - Ap		6.0	0.25	0.50	1	7.8		
	As =	area of stem =	pi D(L- 1.5 (n-1) Du-0.55-0.5)		6.0	0.25	0.50	2	9.4		
	As' =	area of cyl. bet. bulbs =	pi Du 1.5(n-1) Du		8.0	0.25	0.50	1	10.6		
aver. coh.					8.0	0.25	0.50	2	12.5		
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. Bet. Bulbs, ca'		Bulb dia =	2	x shaft dia							
Factor of safety =		2.50									
L	D	Du	No. of bulbs, n=	Ap	Aa	As	As'	cp	c'a	ca	ca'
m	m	m		m ²	m ²	m ²	m ²	t/m ²	t/m ²	t/m ²	t/m ²
4.0	0.25	0.50	1	0.05	0.15	2.32	0.00	5.60	5.60	3.60	
4.0	0.25	0.50	2	0.05	0.15	1.73	1.18	5.60	5.60	3.60	3.50
6.0	0.25	0.50	1	0.05	0.15	3.89	0.00	6.20	6.20	4.40	
6.0	0.25	0.50	2	0.05	0.15	3.30	1.18	6.20	6.20	4.40	4.40
8.0	0.25	0.50	1	0.05	0.15	5.46	0.00	6.90	6.90	5.20	
8.0	0.25	0.50	2	0.05	0.15	4.87	1.18	6.90	6.90	5.20	5.40
L	D	Du	No. of bulbs, n=	ApNc cp	AaNc ca'	[0.5]As ca	As' ca'	Qu	Qs		
m	m	m		t	t	t	t	t	t		
4.0	0.25	0.50	1	2.47	7.42	4.17	0.00	14.07	5.6		
4.0	0.25	0.50	2	2.47	7.42	3.11	4.12	17.13	6.9		
6.0	0.25	0.50	1	2.74	8.22	8.55	0.00	19.51	7.8		
6.0	0.25	0.50	2	2.74	8.22	7.26	5.18	23.40	9.4		
8.0	0.25	0.50	1	3.05	9.14	14.19	0.00	26.39	10.6		
8.0	0.25	0.50	2	3.05	9.14	12.66	6.36	31.22	12.5		

**Gandhi Memorial High School at Muzaffarganj,
Block - Khargpur, Dist. Munger**



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BIHAR STATE EDUCATIONAL INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(A Govt. of Bihar Undertaking)
ISO 9001:14001; OHSAS 18001

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गंगा दर्शन अपार्टमेंट फ्लैट नं०-403
सदाकत आश्रम के पश्चिम,
पटना- 800010

विषय:— निर्माण स्थल के मिट्टी जाँच हेतु।

प्रसंग:— भवन निर्माण विभाग का पत्र संख्या-2030, दिनांक-21.04.2006

महाशय,

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विश्वासभाजन


मुख्य अभियंता

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

Gandhi Memorial High School at Muzaffarganj, Block - Khargpur, Dist. Munger

Bihar State Educational Infrastructure Development Corporation Ltd.

List of Schools for Soil Test

Sl.No.	District	Block	Name of Vidyalay	Letter no. & Date of A/A	Name & Mobile no of Executive Engineer	
1	Jehanabad	Ratni Faridpur	High School, Rakasiya Dyaichak	11/भवन 08-02/2018-176 dt. 26.02.2020	Sri Binod Ranjan, 9661863636	
2	Arwal	Kurtha	Govt. High School, Kurtha		Sri Binod Ranjan, 9661863636	
3	Nawada	Hisua	High School, Pacharha		Sri Binod Ranjan, 9661863636	
4	Rohtas	Chenari	Gangotri Project High School, Chenari	11/वि.-11-48/2018 - 207 dt. 18.03.2020	Sri Ranvijay Kumar Sinha, 9934961293	
5	Kaimur	Durgawati	High School, Dhanechha	11/भवन 08-01/2017-217 dt. 20.03.2020	Sri Ranvijay Kumar Sinha, 9934961293	
6	Kaimur	Durgawati	Shatruharan High School, Kalyanpur		Sri Ranvijay Kumar Sinha, 9934961293	
7	Kaimur	Ramgarh	High School, Ramgarh		Sri Ranvijay Kumar Sinha, 9934961293	
8	Kaimur	Ramgarh	High School Rajendranagar, Deohallya		Sri Ranvijay Kumar Sinha, 9934961293	
9	Kaimur	Nuaon	Ramayan singh High School, Banka Bahuaara		Sri Ranvijay Kumar Sinha, 9934961293	
10	Kaimur	Nuaon	Sarvodya High School, Gurlyan		Sri Ranvijay Kumar Sinha, 9934961293	
11	Supaul	Chhatapur	Govt. Lalit Narayan Vidya Mandir, Balua Bazar		Sri Satish Prasad, 9523226037	
12	Munger	Dharhara	Bapu Peaveshika High School, Sundarpur		11/वि.-11-05/2019 - 219 dt. 20.03.2020 and 11/वि.-11-05/2019 -118 dt. 18.02.2021	Sri Surendra Kumar, 7903912972
13	Munger	Khargpur	Gandhi Memorial High School, Muzaffarganj			Sri Surendra Kumar, 7903912972
14	Munger	Khargpur	Inter High School, Lohachi			Sri Surendra Kumar, 7903912972
15	Munger	Jamalpur	Sardar Patel High School, Hanspuri		Sri Surendra Kumar, 7903912972	

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Appendix - G2