

DESIGN AND CONSTRUCTION OF CIVIL, STRUCTURES AND TRACK WORKS FOR SINGLE LINE RAILWAY INVOLVING FORMATION IN EMBANKMENTS/CUTTINGS, BALLAST ON FORMATION, TRACK WORKS, BRIDGES, STRUCTURES, BUILDINGS, YARDS, INTEGRATION WITH IR EXISTING RAILWAY SYSTEM AND TESTING & COMMISSIONING ON DESIGN-BUILD LUMP SUM BASIS FOR SAHNEWAL - PILKHANI SECTION OF EASTERN DEDICATED FREIGHT CORRIDOR

Contract Package: 301

ICB No. HQ/EN/EC/D-B/SAHNEWAL - PILKHANI

PART - 4 - REFERENCE DOCUMENT

GEO TECH DATA - VOLUME - 3

SAHNEWAL TO PILKHANI From Km. 360.200 to Km. 187.500

GEO TECH DATA

YAMUNA RIVER VOL 7/7

EMPLOYER
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISES)
MINISTRY OF RAILWAYS
COUNTRY: INDIA

	Yamuna River	
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PREFACE

This volume contains the report on detailed geotechnical investigation work for bridge on river Yamuna on the Dedicated Freight Corridor alignment.

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1. INTRODUCTION

Dedicated Freight Corridor Corporation India Limited (A Govt. of India Enterprise), Ambala awarded the Geotechnical investigation work along with preparation of GADs for 3 river locations vide their letter no.-UMB/EN/Tender.GI dated -04.08.2012 to M/S Arkitechno Consultants (India) Pvt. Ltd., Bhubaneswar. On receipt of the work order, ATCPL mobilized required resources at the site and carried out necessary field works. The samples collected during the field tests were sent to the testing laboratory of ATCPL of Bhubaneswar for testing.

2. SITE DESCRIPTION

The project site is located in the state of Haryana.

The project site is located in Zone-IV of Seismic zone of India as specified in IS-1893(PT-1).

3. METHODOLOGY OF INVESTIGATION

The geotechnical Investigation work broadly encompasses the following activities:-

Making boreholes, at specified locations, conducting SPT & collecting samples there form.

- Conducting various laboratory tests on samples to assess their physical/engineering properties.
- Tabulation of all observations made at the site as well as during laboratory tests in standard format.
- Analysis of observations / test results.

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4. SUMMARY OF FIELD WORK

4.1 Exploratory boreholes have been drilled at the following locations & their details are presented in Appendix-1 of this report.

Table No.- 1- Borehole location and depth

Borehole No's	Depth of Boring (m)
Yamuna	a River
BH-1(A2)	50.0
BH-2(P4)	50.0
BH-3(P5)	50.0
BH-4(A1)	50.0
BH-5(P6)	50.0
BH-6(P3)	50.0
BH-7(P2)	50.0
BH-8(P1)	50.0

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5. SUMMARY OF LABORATORY TESTS

Soil samples have been tested for various properties as per the provision of latest versions of I.S. codes. The particular of tests are presented in Table 2 of this report.

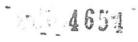
Table no-2

SL. NO.	PARTICULARS OF TEST	IS CODE REFERENCE
FOR SOIL SAM	/IPLE	
1.	Natural Moisture Content & Bulk Density	IS 2720 (Part - 7)
2.	Grain Size Analysis (Sieve)	IS 2720 (Part - 4)
3.	Liquid Limit and Plastic Limits	IS 2720 (Part - 5)
4.	Hydrometer Analysis	IS 2720 (Part -4)
5.	Specific Gravity	IS 2720 (Part -3)
6.	Direct Shear Test	IS 2720 (Part -13)
7.	Triaxial Shear Test	IS 2720 (Part -11)
8.	Shrinkage Limit	IS 2720 (Part -6)
9.	Free Swell Index	IS 2720 (Part - 40)
10.	Unconfined compressive strength of soil	IS 2720 (Part-10)
11.	Swell Pressure	IS 2720 (Part-40)
12.	Consolidation	IS 2720 (Part-15)

Summary of laboratory tests done on Soil samples are presented below in table no-3.

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	•	oitsЯ bioV							0.575			0.573	0.547	0.536	0.538	0.535	0.442	0.421	0.476	0.477	0.496	0.487
	One Dimensional Consolidation Test	C _v	t	1	ı	ı	1	1	Ę	1	1	1	1	1	I	1	1	I	1	1	1	1
i.	One Dim Conso	°၁	E	-	£	ı	Ī	f	ľ	ı	Ē	1	Ĩ	1	ī	I	ſ	Ī	ı	1	1	1
	SHEAR PARAMETERS	Angle of internal Friction (Degree)	L	f	1	I	Į.	ſ	Ě	ı	I	1	I	I	ī	1	ı	1	1	1	1	I
	PARAN	Cohesion (Kg/cm2)	L	ŧ	f	t	E	1	1.	1	ı	1	1	1	1	ī	1	1	1	1	1	1
	SHEAR	TYPE OF TEST	L	Г	1	ı	ı	ı	1	ı	t	ï	1	1	ī	1	ī	1	1	1	1	1
(F)		Unconfined Comp Strength (kg/c	Ë	ſ	I	1	Ĺ	ſ	Ü	1	ŗ	I	I	0.36	0.38	0.43	Ī	1	I	1	1	l
E NO	(%) x	Free Swell Inde	Ē	Ē	Ē	ΙΝ̈́	Ē	Ē	Ē	Ē	Ē	Ē	Ē	22	23	27	Ē	Z	Ē	Ē	Ē	Ē
TABI	(%) ti	Shrinkage Limi	ı	1	I,	E	t	L	1	L	T.	1	1	6.83	1	8.31	1	1	ı		1	1
PLE	vity	Specific grav	2.65	2.64	2.64	2.65	2.64	2.65	2.64	2.64	2.65	2.64	2.64	2.7	2.71	2.67	2.64	2.65	2.64	2.65	2.65	2.64
BORATORY TEST OF SOIL SAMPLE (TABLE NO3)	Soil	Description			Fine Sand				Tille Sarid With Glaver	7 C C C C C C C C C C C C C C C C C C C	בוופ אמום	lover of this back onia	odio odio	dimension of	Clay with Clayer	Clay	lover of this back original	בופ סמום אונו סומאפו	A COLOR	0000	Journal of the board on The Property of the board of the	בוופ ספום אותו פופאפו
ORY 1		IS Classification	SM	SM	SM	SM	SM	SM	SM	SM	MS	SM	SM	ō	C	Ö	NS	SM	SM	SM	SM	SM
ORAT	ıcy	(%) Iવ	_	1	1	1	Г	ı	ı	ſ	ſ	1	1	21	21	22	Ţ	1	1	1	1	1
	Consistency	(%) Ta	NP	МР	NP	NP	NP	N P	dN	NP	dN	NP	NP	16	15	18	NP	NP	NP	NP	NP	NP
ULTS	ŭ	רר (%)	14	15	15	14	15	15	16	14	15	14	14	37	36	40	15	14	15	15	14	15
T RES		Clay content (%)	17.43	8.97	10.75	14.61	11.16	13.47	12.44	13.81	12.94	13.3	12.81	56.49	54.04	79.42	10.77	13.06	15.7	15,49	12.1	11.79
SHEE	Gradation	Silt content (%)	17	80	10	14	11	13	12	13	12	13	12	13.26	14.58	18.94	10	13	#	15	17	1
SUMMERY SHEET RESULTS LA	Grad	Sand Content (%)	82.57	91.03	89.25	85.39	88.84	77.34	78.62	86.19	87.06	76.83	76.54	12.43	12.81	1.08	78.29	76.53	84.3	84.51	76.48	77.35
SUMI		Gravel content (%)	0	0	0	0	0	9.19	8.94	0	0	9.87	10.65	17.82	18.57	0.56	10.94	10.41	0	0	11.42	10.86
	Content	Natural Moisture (%)	12.27	11.61	11.72	12.49	11.96	12.35	12.16	11,58	11.44	12.60	11.34	14.91	15.76	20.17	12.50	12.08	11.23	11.49	11.81	11.53
	sity	Dry Density (gm/cc)	1.61	1.63	1.63	1.63	1.64	1.66	1.68	1.65	1.67	1.68	1.71	1.76	1.76	1.74	1.83	1.86	1.79	1.79	1.77	1.78
	Density	Bulk Density	1.81	1.82	1.82	1.83	1.84	1.86	1.88	1.84	1.86	1.89	1.9	2.02	2.04	2.09	2.06	2.09	1.99	2.00	1.98	1.98
	əjd	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
		Depth (m)	1.5	3.0	4.5	0.9	10.5	13.5	16.5	18.0	21.0	22.5	27.0	30.0	36.0	37.5	39.0	40.5	43.5	45.0	48.0	50.0
	op	N eloH elole			924							BH-1(Yamuna River-	Ambala)	-nd	ps-ex		16					

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(TARIF	
SAMPLE	
T OF SOIL	
ORY TES	
LABORAT	
RESULTS	
SHEET	
SUMMERY	

		oitsЯ bioV	1	1	1	1	1	0.577	ı	1	0.563	0.568	0.555	0.534	0.524	0.576	0.583	0.382	0.451	0.434	0.367	0.348
	One Dimensional Consolidation Test	(cm²/min)	ı	1	1	ı	1	,	1	ı	1	L	1	1	1	1	I	1	1	1	ı	1
	One Dir Conso	ာ၁	1	1	ı	1	1	1	1	ı	Ĺ	1	L	ı	ı	ı	ī	1	1	Ī	-	1
	SHEAR PARAMETERS	Angle of internal (espred)	1	1	1	1	1	I	ſ	1	ť	į.	1	ı	Ĩ	I	1	1	ı	I	1	1
	PARAI	Cohesion (Kg/cm2)	1	1	1	1	1	I	1	ı	1	ı	ı	1	Ī	1	1	1	1	1	1	i
	SHEAR	TYPE OF TEST	I	1	ī	1	Г	1	1	ı	ı	ı	- 1	I	ì	1	1	1	1	1	1	ī
?	(²m:	Unconfined Comp Strength (kg/c	1	1	1	1	1	1	1	1	ı	ı	1	0.37	0.38	0.41	0.42	1	1	I	ī	1
	(%) x	Free Swell Inde	ı	1	1	1	1	1	1	1	1	1.	22	21	22	24	25	1	1	1	1	1
ADL	(%)	Shrinkage Limi	ı	I	ı	ı	1	1	1	1	1	1	6.93	1	ı	8.34	1	1	1	1	1	I
	rity	Specific grav	2.64	2.64	2.65	2.65	2.64	2.65	2.64	2.64	2.64	2.65	2.71	2.71	2.7	2.67	2.68	2.64	2.65	2.65	2.64	2.65
BONATORT 1EST OF SOIL SAMPLE (TABLE NO3)	Soil	Description			Fine Sand			Fine Sand with Gravel	,	orie Salid	deline bearing or in	rine Sand With Grave		Clay with Gravel		Ç	Clay	C	rille Sarid		Fine Sand with Gravel	
		IS Classification	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	ਹ	ਹ	ਹ	CI	CI	SM	SM	SM	SM	SM
5	cy	(%) Ід	1	Ĭ.	1	1	1	1	1	1	ı	1	20	21	21	23	22	I.	£	ı	ı	1
	Consistency	(%) Ta	N P	ΝP	Ą	ďΝ	ď	ΝP	NP	NP	NP	NP	17	18	16	20	19	NP	NP	N N	N N	NP
SILELI NESOLIS LA	ŏ	(%) דר	15	15	14	14	14	15	16	15	15	14	37	39	37	43	41	15	14	16	15	41
I IVES		Clay content (%)	26.77	61	82	.64	55	89	32	48	26	27	58.25	61.15	58.77	81.08	79.71	98	48	1.1	7.1	99
1111	ation	Silt content (%)	26.	26.61	24.82	22.	21.55	11.89	25.32	26.48	10.97	10.27	14.18	16.53	14.74	17.27	18.4	17.86	16.48	15,71	12.71	11.66
	Gradation	Sand Content (%)	73.23	73.39	75.18	77.36	78.45	78.16	74.68	73.52	77.28	79.04	13.29	9.58	11.42	1.65	1.89	82.14	83.52	74.51	75.82	77.75
		Gravel content (%)	0	. 0	0	0	0	9.95	0	0	11.75	10.69	14.28	12.74	15.07	0	0	0	0	9.78	11.47	10.59
•	Content	Natural Moisture (%)	12.41	11.29	11.72	12.16	11.65	11.27	12.06	11.95	11.34	11.80	15.37	14.89	15,12	20.40	19.88	11.52	12.26	12.03	11.83	11.38
	ity	Dry Density (gm/cc)	1.61	1.63	1.63	1.61	1.63	1.68	1.63	1.65	1.69	1.69	1.74	1.77	1.77	1.69	1.69	1.91	1.83	1,85	1.93	1.97
	Density	(gm/cc) Bulk Density	1.81	1.81	1.82	1.81	1.82	1.87	1.83	1.85	1.88	1.89	2.01	2.03	2.04	2.04	2.03	2.13	2.05	2.07	2.16	2.19
	əjd	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
		Depth (m)	1.5	3.0	4.5	0.9	7.5	12.0	15.0	19.5	21.0	27.0	28.5	31.5	33.0	34.5	36.0	37.5	39.0	42.0	46.5	50.0
	op	N elote Hole N	1000		. · · · ·	ets						BH-2(Yamuna River-	Ambala)	goa *		46	5	6				

		oitsЯ bioV	1	1	1	1	I	1	0.577	1	1	0.563	1	1	0.54	0.52	0.48	0.52	0.52	0.49	0.51	0.48	0.48
	One Dimensional Consolidation Test	(cm²/min)	1	1	1	1	1	1	1	1	I.U.	ı	L	1	1	1	1	1	1	1	I	ı	6
	One Dim Consol	°၁	1	1	1	1	1	1	1	1	1	ī.	ī.	ı	1	ī	ī	ï	ı	ı	1	1	
	SHEAR PARAMETERS	Angle of internal Friction (Degree)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Ì
	PARA	Cohesion (Kg\cm2)	1	1	1	ı	1	L	1	t	ľ	ı	1	1	1	1	L	ı	ı	1	1	1	
	SHEAF	TYPE OF TEST	1	T	1	ı	1	1	ı	ı	ı	ſ	1	1	1	ī	E	ı	1	1	1	1	1(
(5)		Unconfined Comp Strength (kg/d	1	1	1	1	Ē	1	1	1	1	Ĩ	Î	1	0.38	0.41	Ĩ	0.44	0.45	1	1	1	
N N	(%) x	Free Swell Inde	1	1	1	ı	Γ	ı	t	ı	ı	I	Ī	1	24	26	Ĭ	22	23	1	1	1	
TABL	(%) 1	Shrinkage Limi	1	1	1	ı	I.	1	ı	ı	1	ı	1	1	9.32	8.96	1	4.37	3,81	1	1	1	1
PLE (vity.	Specific grav	2.65	2.64	2.65	2.64	2.64	2.65	2.64	2.64	2.64	2.65	2.64	2.65	2.67	2.67	2.65	2.71	2.72	2.64	2.65	2.64	2.64
BORATORY TEST OF SOIL SAMPLE (TABLE NO3)	Soil	Description		C C	Tille Sand			Fine Sand with Gravel		i C	rine sand	Fine Sand with Gravel	, co	בווב ספוום		Ciay	Fine Sand with Gravel	3	Ciay with Graver	Fine Sand with Gravel	Fine Sand	- Ather Area Control	Saild will Glave
JRY T		IS Classification	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	ਹ	ರ	SM	ਹ	ō	SM	SM	SM	SM
RATO	cy	(%) Id	ſ	1	1	1	ı	1	ı	1	1	ı	1	1	23	22	1	22	21	1	1	1	1
	Consistency	(%) Ta	МР	٩	₽.	AN M	ΔN	AN M	М	ΔN	₽.	₽ B	ΝD	Ν	20	20	М	15	17	ď	М	NP	₽ I
ULTS	ပိ	רר (%)	15	16	41	15	15	14	15	15	4	15	15	14	43	42	15	37	38	15	16	14	15
SUMMERY SHEET RESULTS LA		Silt content (%)	18.36	19.72	16.49	18.38	14.32	12.87	15.56	18.51	16.47	16.03	18.09	15.83	19.04 79.33	18.28 80.33	12.47	13.61 55.65	13,44 57.79	15.13	17.70	12.10	13.05
IERY S	Gradation	Sand Content (%)	81.64	80.28	83.51	81.62	76.38	76.92	74.57	81.49	83.53	71.64	81.91	84.17	1.63	1.39	76.25	12.32	11.83	75.12	82.3	77.36	75.89
SUMIN		Gravel content (%)	0	0	0	0	9.3	10.21	9.87	0	0	12.33	0	0	0	0	11.28	18.42	16.94	9.75	0	10.54	11.06
	Content	Natural Moisture (%)	11.28	12.15	12.09	11.54	13.01	12.68	12.3	11.21	11.34	12.05	11.47	11.73	21.62	20.97	11.38	14.18	15.09	12.51	11.94	11.57	11.62
	ity	(gm/cc)	1.62	1.61	1.62	1.63	1.64	1.65	1.67	1.65	1.65	1.70	1.65	1.66	1.73	1.75	1.79	1.79	1.79	1.77	1.75	1.78	1.78
	Density	Bulk Density	1,8	1.81	1.82	1.82	1.85	1.86	1.88	1.83	1.84	1.90	1.84	1.85	2.11	2.12	1.99	2.04	2.06	1.99	1.96	1.99	1.99
	əjd	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
		Depth (m)	1.5	3.0	4.5	0.0	0.6	10.5	13.5	16.5	18.0	22.5	24.0	25.5	28.5	30.0	31.5	37.5	39.0	40.5	43.5	45.0	48.0
	ol	A sloH ereB		·	**		88	•	•	•		•	BH-3(Yamuna River - Ambala	with	зда-т		46	57					

SUMMERY SHEET RESULTS LABORATORY TEST OF SOIL SAMPLE (TABLE NO.-3)

			1	-					1					_								
	oids Ratio						0.59			0.59		0.58	0.56	0.58	0.56	0.50	0.50		0,51	0.46	0.41	0.41
ensional idation st	Cv (cm ² /min)	1	ī	1	1	1	1	1	1	I,	1	L	ı	1	ı	1	1	1	1	ı	1	4
One Dimensional Consolidation Test	°c	1	1	1	1	ı	1	1	ı	1	1	1	ľ	ř	ı	1	I	ı	1	1	1	1
	Angle of internal Friction (Degree)	1	1	1	1	1	1	1	ı		ı	1	1	ı	ı	I	1	ı	1	1	1	1
SHEAR PARAMETERS	Cohesion (Kg/cm2)	1	ı	1	ı	ı	1	1	1	1	1	1	1	1	1	ī	1	1	1	ı	1	1
SHEAR	TYPE OF TEST	1	1	1	1	ı	ı	1	1	1	1	T	ı	ı	1	ı	I	I	1	1	I	1
(zm:	dmoo beniinoonU Strength (kg/c	1	1	1	1	1	1	1	1	1	1	1	1	0,44	0.45	Ī	1	ı	0.48	0.48	1	1
(%) x	Free Swell Inde	1	1	I	I	1	1	1	1	1	1	1	1	15	18	Î.	1	1	25	23	1	1
(%) ;	Shrinkage Limi	Ĩ	1	1	1	1	1	1	1	1	1	1	1	6.43	6.58	ı	1	1	8.73	7.84	1	1
vity	Specific grav	2.64	2.65	2.64	2.64	2.65	2.65	2.64	2.65	2.65	2.64	2.64	2.65	2.71	2.72	2.64	2.65	2.64	2.66	2.71	2.64	2.65
Soil	Description		Č	Tine oand		district dis	rine Sand With Glaver	0000	בווב ספות	Fine Sand with Gravel	Fine Sand	County Office Control	and value of aver	discontinuo de la constanta de	olay with olayer	Fine Sond with	The Sand Will Glave	Fine Sand	Clay	Clay with Gravel	44500 0000	ale Saild With Glave
	IS Classification	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	ō	ō	SM	SM	SM	CI	Ö	SM	SM
cy	(%)।ਰ	ı	1	1	1	1	ı	I	Î	1	1	1	Ī	22	22	1	ı	-	23	21	L	1
Consistency	(%) Td	ΔN	₽ B	МР	NP	NP	ΝD	NP	ď	₽ Q	ΑN	ď	Ą	16	18	Ā	Ā	Ν	19	17	ΝP	٩
ŭ	רר (%)	15	14	15	14	16	15	16	15	14	15	14	16	38	40	41	15	15	42	38	16	15
	Clay content (%)	15.38	12.69	15.66	14.04	12.39	15.30	17.93	16.60	10.19	13,63	13.50	14.98	.97 51.99	.6 55.75	11.72	12.94	15.76	6 79.19	1 55.24	12.09	12.67
Gradation	Silt content (%)	- 2	_			01		_			,			12	13				18.96	14.01		
υσ	Sand Content (%)	84.62	87.31	84.34	85.96	78.62	75.18	82.07	83.4	79.13	86.37	74.81	74.48	13.11	11.43	78.42	76.91	84.24	1.85	13.18	76.59	77.05
	Gravel content (%)	0	0	0	0	8.99	9.52	0	0	10.68	0	11.69	10.54	21.93	19.22	98.6	10.15	0	0	17.57	11.32	10.28
Content	Natural Moisture (%)	12.05	11.82	11.6	12.14	11.26	11.35	12.28	12.17	11.92	11.53	12.44	11.38	17.52	16.45	12.63	12.48	11.32	21.22	15.67	11.31	11.5
Density	Dry Density (gm/cc)	1.62	1.63	1.63	1.63	1.66	1.67	1.63	1.65	1.67	1.67	1.67	1.70	1.72	1.74	1.76	1.77	1.66	1.76	1.85	1.88	1.88
De	(đuycc) Bnlk Density	1.81	1.82	1.82	1.83	1.85	1.86	1.83	1.85	1.87	1.86	1.88	1.89	2.02	2.03	1.98	1.99	1.85	2.13	2.14	2.09	2.10
əjd	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
(Depth (m)	7,7	3.0	4.5	0.9	7.5	10.5	15.0	18.0	21.0	24.0	27.0	28.5	30.0	33.0	34.5	36.0	37.5	40.5	42.0	46.5	50.0
oh	N əloH ə10B			* **	Mar-	9		!			•	BH-4(Yamuna River- Saharanpur)	- ,		4	65	3			L		

				1	_	Г			1	1		Г	I	ĺ		1
		Void Ratio	0.50					0.44				0.50		0.61		0.49
	One Dimensional Consolidation Test	C _v														
	One D	ిం														
	SHEAR PARAMETERS	Angle of internal Friction (Degree)														
	R PARA	Cohesion (Kg/cm2)						6)								
	SHEA	TYPE OF TEST														
	ressive m²)	Unconfined Comp Strength (kg/c												4.22		
ଚା	(%) x	Free Swell Inde												10	18	
E NO.	(%) 1	Shrinkage Limi												4.26	6.81	
TABL	lty.	Specific grav	2.48		2.51			2.53				2.51		2.68		2.54
ABORATORY TEST OF SOIL SAMPLE (TABLE NO3)	Soil	Description			Fine Sand				rine sand with Grave	Fine Sand	Fine Sand With Gravel	Fine Sand	Fine Sand With Gravel	C days	olay with Gravel	Fine Sand With Gravel
TEST		IS Classification	SM	SM	SM	SM	WS	SW-SM		SW-SM	Sp	SW-SM	S.	ر ا	ō	SM
TORY	.	(%) Id	1	1	1	1	1	1		1	t	ı	ı	15	19	1
ABORA	Consistency	(%) 7d	Ā	ď	Α̈́	₽	₽	₽		δ	₽	₽ S	₽ Q	16	18	₽
LTS L	ō	רר (%)	18	16	16	15	19	17		91	8	16	16	31	37	18
SUMMERY SHEET RESULTS L		Clay content (%)	65	76	03	42	14	10	52	10	4	55	-	59	48.22	8.72
SHEET	ation	Silt content (%)	16,65	12.76	13.03	14.42	15,41	10.01	9.25	11.01	0.54	11.55	3,41	58.29	14.81	16.74
MERY	Gradation	Sand Content (%)	81.62	85.43	84.74	83.61	82.73	78.26	76.54	86.73	82.73	84.64	81.73	31.35	28.24	71.28
SUN		Gravel content (%)	1.73	1.81	2.23	1.97	1.86	11.73	14.21	2.26	16.73	3,81	14.86	10.36	8.73	3.26
	fnetnoO	Natural Moisture (%)	7.36	6.83	7.28	8,16	7.93	6.64		11.28		12.26		18.79		9.73
	Density	Dry Density (gm/cc)	1.66	1.67	1.66	1.72	1.68	1.75		1.65		1.67		1.67		1.70
	Der	Bulk Density (gm/cc)	1.78	1.78	1.78	1.86	1.81	1.87		1.84		1.88		1.98		1.87
	əld	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
		Depth (m)	1.5	3.0	4.5	6.0	9.0	13.5	16.5	18.0	22.5	24.0	30.0	33.0	39.0	42.0
	oh	Bore Hole I			ti.		(BH-5	(Yamuna River)		pth	gg- v1		46	30

	Void Ratio													
One Dimensional Consolidation Test	C _v (cm²/min)													
One Dirr Conso	ာ၁													
ETERS	Angle of internal Friction (Degree)													
SHEAR PARAMETERS	Cohesion (Kg/cm2)													
SHEA	TYPE OF TEST													
ressive m²)	Unconfined Comp Strength (kg/c										4.31	4.66		
(%) x	Free Swell Index											18		
(%) 3	Shrinkage Limit										4.21			
ίţλ	Specific grav		1.52	1.52		1.55		1.58			1.57			
Soil	Description			Fine Sand			i i	Fine Sand With Gravel	i.	rine sand		Clay with Gravei		Fine Sand
	IS Classification	SM	SM			SM	SW-SM	SW-SM	NS.	SM	ರ	귕	SM	-
'n	(%) Id	I	1		1	ī	1	ı	1	1	16	16	1	
Consistency	(%) ¬a	QN.	Ą		₽	₽ P	Ϋ́	Ā	₽	Ϋ́	16	15	ΔN	2
Ŏ	רד (%)	16	18		19	18	17	18	92	18	32	31	19	,
	(%) Sontent (%)	70	03	98		21	7	2	36	38	17	46.04	11	2
Gradation	Silt content (%)	15.70	16.03	14.08		15.21	9.17	8.95	14.86	15.68	59.17	14.57	15.41	14.42
Grad	(%) Sand Content (%)	82.71	81.93	84.16		82.87	77.59	78.37	83.50	82.49	30.97	29,14	82.46	00 64
	Gravel content (%)	1.59	2.04	1.76		1.92	13.24	12.68	1.64	1.83	98'6	10.25	2.13	1 06
Content	Natural Moisture ((%)	6.43	7.64	7.81	8.05			7.39			18,56	19.04		
Density	Dry Density (gm/cc)	1.58	1,64	1.65	1.65			1.73			1.66	1.67		
Den	Bulk Density	1.68	1.76	1.78	1.78			1.86		38	1.97	1.99		
əld	Type of Sam	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	FOX
	Depth (m)	1.5	3.0	4.5	6.0	7.5	13.0	15.0	18.0	21.0	30.0	33.0	39.0	200
oj	И өloН өтоВ				1 2		i ki	BH-6 (Yamuna River)	· •	4;		-	<i>j</i> =	

		oitsЯ bioV													
	One Dimensional Consolidation Test	C^ (cm²/min)													
	One Dir Consc	°°													
	SHEAR PARAMETERS	Angle of internal Friction (Degree)													
	R PARAI	noisehoO (Kg/cm2)													
	SHEA	TYPE OF TEST													
	evissare:	Unconfined Comp Strength (kg/c											3.88		
ମ	(%) x	Free Swell Inde													
E NO.	(%) 1	Shrinkage Limi													
(TABL	vity.	Specific grav	1.53		1.54		1.54		1.63		1.54			1.58	
ABORATORY TEST OF SOIL SAMPLE (TABLE NO3)	Soil	Description			Fine Sand			10 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rine sand with Gravel	0 0	ב פרי פרי פרי פרי פרי פרי פרי פרי פרי פרי	Fine Sand With Gravel	Clay With Gravel	Fine Sand With Gravel	Fine Sand
TEST (IS Classification	SM	SM	SM	SM	SW-SM	SW-SM	SW-SM	SM	SM	SW-SM	ō	SW-SM	SW-SM
TORY	· k	(%) Ід	t	1	ſ	1	ť	1	1	ı	1	ï	20	ı	1
ABORA	onsistency	(%) 7d	Ā	Ą	ΝP	dN	dN	ď	ΔN	ďΝ	ďN	ďΝ	18	NP	₽.
	0	רר (%)	19	19	18	18	19	16	15	19	19	16	38	18	18
RESU		Clay content (%)	43	23	28	03	93	6	6	11	38	eg.	53.24	o o	,
SUMMERY SHEET RESULTS	Gradation	Silt content (%)	12.43	14.23	13.28	16.03	17.93	8.73	5.19	15.11	14.68	5.83	18.48	62'6	8.71
IMERY	Gra	Sand Content (%)	85.73	83,51	84.74	81.56	79.22	76.56	78.53	81.43	83.51	81.73	19.77	78.93	87.53
SUN		Gravel content (%)	1.84	2.26	1.98	2.41	2.85	14.71	16.28	3.46	1.81	12.44	8.51	11.28	3.76
	tnetnoO	Natural Moisture (%)	7.32		6.89	7.51		6.44			7,44		18.71	8.21	9.44
	Density	Dry Density (gm/cc)	1.61		1.67	1.66	2003	1.77			1.76		1.67	1.74	1.75
	Der	Bulk Density (gm/cc)	1.73		1.79	1.78		1.88			1.89		1.98	1.88	1.91
	əld	ms2 to aqyT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
	(Depth (m)	1,5	3.0	4.5	0.9	0.6	12.0	15.0	18.0	21.0	24.0	33.0	36.0	42.0
	ol	Bore Hole I					83		BH-7 (Yamuna River)		sets	gs	• •	4	061

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lal	Void Ratio														
One Dimensional Consolidation	C _v (cm²/min)			-											
One	ిం														
ETERS	Angle of internal														
SHEAR PARAMETERS	Cohesion (Kg/cm2)														
SHEA	TYPE OF TEST														
essive (² n	Unconfined Compr Strength (kg/cn												3.86		
(%)	Free Swell Index					×							15		
(%)	Shrinkage Limit														
Αş	Specific gravi	1.55			1.56		1.61		1.61			1.58			1.56
Soil	Description		i	Fine Sand				Fine Sand With Gravel			Fine Sand With Gravel		Clay With Gravel	Fine Sand With Gravel	Fine Sand
	IS Classification	SM	SM	SM		SW-SM	SW-SM		SW-SM	SW-SM			ō	SW-SM	SM
3	(%) Id	1	ı	Ī		I	1		1	1	1		21	ı	1
Consistency	(%) ¬a	N D	Ā.	P N		ď	Ą		₽	₽	ΔN		18	P.	N D
Ö	רר (%)	16	19	16		18	16		16	9	16		39	18	19
	Clay content (%)	13.74	15.55	13.76	55	25	8		9	80	23	2	53,46	4	31
Gradation	Silt content (%)	13.	15.	13,	14.55	9.57	5.78		8.56	8.98	7.33	8.22	18.75	9.64	16,61
Gra	Sand Content (%)	84.61	82.97	84.32	83.38	78.14	80.74		76.88	79.15	90'08	78.83	19.81	77.14	81.73
	Gravel content (%)	1.65	1.48	1.92	2.07	12.29	13,48		14.56	11.87	12.61	12.95	7.98	13,22	1.66
juəjuo	Natural Moisture C (%)	7.48		8.92		6.42	7:37	8.01		7.17		6.89	18.92		8.83
Density	Dry Density (gm/cc)	1.76		1.66		1.75	1.76	1.75		1.83		1.85	1.66	8	1.82
Der	Bulk Density	1.89		1.81		1.86	1.89	1.89		1.96		1.98	1.98		1.98
əle	Type of Samp	SPT	SPT	SPT	SPT	SPT	SPT	IdS	SPT	SPT	SPT	SPT	SPT	SPT	SPT
	Depth (m)	1.5	3.0	4.5	6.0	10,5	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0
o					٠. ه ٠. چ	+ 4	8H-8	(Yamuna River)				4	3	4	

DESCRIPTION OF FIELD AND LABORATORY TESTS DONE AND DATA OBTAINED.

6.1 Standard Penetration Tests (SPT)

Standard Penetration Tests (SPT) is conducted at different depths in these boreholes. SPT split spoon sampler of standard dimensions was driven into the soil from the borehole bottom at the depth of testing using 63.5 kg hammer falling from 75 cm height. The SPT weight was manually lifted to the specified height and allowed to fall freely on the anvil with the use of cathead winch with one to one and half turn of the drum. In this ways the number of blows required to penetrate the last two 15cm penetration is considered as "N" values. Blow count for the penetration of every 15cm was recorded and the N is reported as the blow count for 30cm penetration of the sampler leaving the first 15cm penetration as seating drive. When the number of blows exceeded 50 to penetrate the first or second 15cm length of the sampler, the SPT N is regarded as more than 100 as described in IS2131-1981. The test is terminated in such case and a record of penetration of the sampler under 50 blows is made. SPT refusal is recorded when there is no penetration of the sampler at any stage and also when a rebound of the sounding system is recorded. These tests were conducted at close intervals of 1.5m at various depths so that a continuous SPT N profile is available.

6.2 Laboratory tests on soil sample

6.2.1 Bulk Density

Bulk densities of soil samples are determined as per I.S 2720 (Part-9).

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The in-situ bulk unit weight and dry unit weight of a soil sample is determined from the SPT sample collected from the site. It is the ratio of mass & volume. As per IS-2720 (Pt-II), the moisture content of the samples is determined.

Standard penetration tests have been conducted in bore hole locations at various depth. Split spoon samplers were used in SPT tests. The samples obtained from split spoon samplers were subjected to bulk unit weight and moisture content determination tests.

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6.2.2 Natural moisture content

Moisture content of a soil is the ratio of the weights of water to the weight of dry soil. It is usually expressed as a percentage. Water content of samples collected from pits was determined as per procedure laid down in the I. S. 2720 (Part – 9). The data have been presented in the Laboratory Investigation Sheets.

6.2.3 Grain size analysis

The soil aggregate comprises of particles of different sizes in the different proportion. For classification of soil met at various depths of the boreholes, grain size analysis was conducted as per I.S 2720 (Part-4). The test results are enclosed in this report as summery of the laboratory test.

6.2.4 Hydrometer analysis

The tests have been conducted to determine the particle size distribution of soil particles. The tests have been conducted as per guidelines of IS 2720 (Part - 4). The detail procedure has been elaborated in IS: 2720(Part-4) and the test results are enclosed in this report.

6.2.5 Liquid limit, Plastic limits & Plastic index

This test is conducted to determine the consistency behavior of soil. The detail procedure has been elaborated in IS: 2720(Part -5).120g of soil sample is taken and passing it through 425 micron sieve. Thoroughly mix the soil sample with water in the evaporating dish. Place a portion of the paste in the cup of the device. & Squeeze to about 1cm at the point of maximum thickness. Cut the groove using the grooving tool. Operate the device by turning the crank at the rate of two revolutions /sec .The specimens shall be of such consistency that the number of drops required to close the groove shall be between 15 & 35 & the points on the flow curve are evenly distributed in this range.

For determination of plastic limit of soil samples, about 20g of soil sample is taken and passing it through 425 micron sieve. Then the soil sample is mix with distilled water and a soil mass is obtained. The soil mass is rolled in between the figure till the threads are 3mm diameter. At this stage soil is crumbled & reaches its plasticity. From this crumble piece water content is determined which represents the plastic limit of the sample.

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6.2.6 Specific gravity

Specific gravity of the soil was determined as per I. S. (Part - 3). Values of the specific gravity of samples obtained during tests have been reported in the Laboratory Investigation Sheets.

6.2.7 Free swell index of soil

Free swell index is conducted to determine the free swell index of soil. The test is conducted as per IS 2720(Part-40). 2x10gms of oil sample taken in a two different graduated glass tube. One of the samples is filled with distilled water and another is filled with kerosene up to 60ml. & then it is allowed to attain equilibrium state of volume without change in the volume of soil. It is calculated as follows:

Free swell index, Percent = $\frac{V_{d-V_k}}{V_k}$ x 100,

Where Vd = Volume of soil in water, Vk = Volume of soil in Kerosene.

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7. Analysis of Results

a. Sub soil profile

Considering the bore log details of all boreholes, the sub-soil strata at proposed sites are presented in Fig no.-1.

b. The soil profile as observed from the borelog details mainly consists mostly of sandy soil strata with clayey soil strata at certain locations. However no rock bed has been encountered within the depth of exploration.

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SUB SOIL PROFILE OF YAMUNA RIVER Fig No.-1(a)

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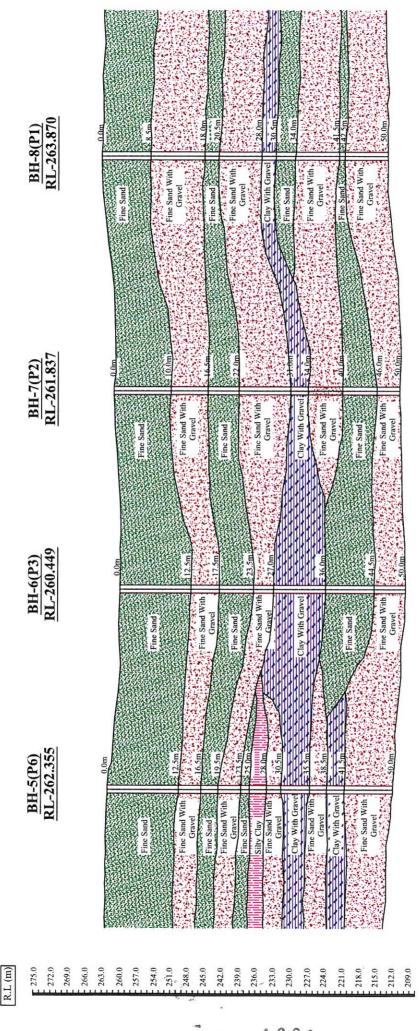
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SUB SOIL PROFILE OF YAMUNA RIVER Fig No.-1(b)

c. Ground water table

Ground water table has been encountered at the boreholes within the depth of boring during the period of exploration. However, seasonal & annual variation in the ground water table may occur. The depth of ground water is presented in table no.4.

<u>Table no. – 4</u>

<u>Yamuna River</u>

Borehole No's	Termination Depth (m)	Depth of Ground Water Table from E.G.L (m)
BH-1(A2)	50.0	7.55
BH-2(P4)	50.0	0.10
BH-3(P5)	50.0	2.95
BH-4(A1)	50.0	4.25
BH-5(P6)	50.0	1.20
BH-6(P3)	50.0	1.50
BH-7(P2)	50.0	0.20
BH-8(P1)	50.0	0.40

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8. DESIGN GEOTECHNICAL PARAMETER

The Design Geotechnical Parameters for all borehole locations have been arrived at by analyzing the subsoil profiles and the same are presented in Table no.-5.

DESIGN GEOTECHNICAL PARAMETERS

Table No.-5

Yamuna River

Reference Boreholes: BH-1(A2)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m²)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to 13.0m	16	-	32°	1
Layer-2	Fine Sand with gravel	13.0m to 22.0m	25**	-	35** (Restricted)	1
Layer-3	Fine Sand with gravel	22.0m to 29.5m	25**	-	35** (Restricted)	1
Layer-4	Clay with gravel	29.5m to 38.5m	41	20.00*	0	1
Layer-5	Fine Sand with gravel	38.5m to 50.0m	25**	-	35** (Restricted)	1

Note:-* Cohesion has been restricted to 20t/m2.

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^{**}The value of Ø has been restricted to 35° which corresponds to N value of 25.

Reference Boreholes: BH-2(P4)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m²)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to10.5m	7	-	30	1
Layer-2	Fine sand with gravel	10.5m to28.0m	25**	-	35** (Restricted)	1
Layer-3	Clay with Gravel	28.0m to 34.0m	N>50	20.00*	0	1
Layer-4	Clay	34.0m to 37.0m	49	20.00*	0	1
Layer-5	Fine Sand	37.0m to 50.0m	23	-	34	1

Note:-* Cohesion has been restricted to 20t/m2.

Reference Boreholes: BH-3(P5)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesio n, C (t/m²)	Angle of internal friction, Ø (degree)	Submerg ed density (t/m³)
Layer-1	Fine Sand	GL to 8.5m	9	-	30	1
Layer-2	Fine Sand with Gravel	8.5m to 26.5m	25**	-	35 ** (Restricted)	1
Layer-3	Clay	26.5m to 31.0m	46	20.00*	0	1
Layer-4	Fine Sand with Gravel	31.0m to 34.0m	25**	-	35** (Restricted)	1
Layer-5	Clay with Gravel	34.0m to 40.0m	N>50	20.00*	0	1
Layer-6	Fine Sand with Gravel	40.0m to 50.0m	25**	-	35** (Restricted)	1

Note:-* Cohesion has been restricted to 20t/m².

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^{**}The value of Ø has been restricted to 35° which corresponds to N value of 25.

^{**}The value of Ø has been restricted to 35° which corresponds to N value of 25.

Reference Boreholes: BH-4(A1)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m2)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Filled up Soil	GL to 1.0m	-	-		1
Layer-2	Fine Sand with gravel	1.0m to 7.0m	14	-	32	1
Layer-3	Fine Sand with gravel	7.0m to 20.5m	24	_	35	1
Layer-4	Fine Sand with gravel	20.5m to 29.5m	25**	-	35** (Restricted)	1
Layer-5	Clay with Gravel	29.5m to 34.0m	N>50	20.00*	0	1
Layer-6	Fine Sand with gravel	34.0m to 38.5m	25**	-	35** (Restricted)	1
Layer-7	Clay with gravel	38.5m to 46.0m	N>50	20.00*	0	1
Layer-8	Fine Sand with Gravel	46.0m to 50.0m	25**	-	35** (Restricted)	1

Note:-* Cohesion has been restricted to 20t/m².

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^{**}The value of Ø has been restricted to 35° which corresponds to N value of 25.

Reference Boreholes: BH-5(P6)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m2)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to 12.5m	10	-	30	1
Layer-2	Fine Sand with gravel	12.5m to 25.0m	24	-	35	1
Layer-3	Silty Clay	25.0m to 28.0m	32	20.00*	-	1
Layer-4	Fine Sand with gravel	28.0 to 30.5m	25**	-	35** (Restricted)	1
Layer-5	Clay with Gravel	30.5m to 35.5m	N>50	20.00*	-	1
Layer-6	Fine Sand with gravel	35.5m to 38.5m	25**	-	35** (Restricted)	1
Layer-7	Clay with gravel	38.5m to 41.5m	25**	-	35** (Restricted)	1
Layer-8	Fine Sand with Gravel	41.5m to 44.5m	25**	-1	35** (Restricted)	1
Layer-9	Fine Sand with Gravel	44.5m to 50.0m	25**	-	35** (Restricted)	1

Note: - *Cohesion has been restricted to 20t/m2.

**The value of Ø has been restricted to 35° which corresponds to N value of 25.

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Reference Boreholes: BH-6(P3)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m2)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to 12.5m	9	-	30	1
Layer-2	Fine Sand with gravel	12.5m to 23.5m	25**	-	35** (Restricted)	1
Layer-3	Fine Sand with gravel	23.5m to 27.0m	25**		35** (Restricted)	1
Layer-4	Clay with Gravel	27.0m to 36.0m	N>50	20.00*	-	1
Layer-5	Fine Sand	36.0m to 46.0m	23	-	34	1
Layer-6	Fine Sand with gravel	46.0m to 50.0m	25**	-	35** (Restricted)	1

Note:-* Cohesion has been restricted to 20t/m².

**The value of Ø has been restricted to 35° which corresponds to N value of 25.

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Reference Boreholes: BH-7(P2)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m2)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to 10.0m	9	-	30	1
Layer-2	Fine Sand with gravel	10.0m to 25.0m	25**	-	35 ** (Restricted)	1
Layer-3	Fine Sand with gravel	25.0m to 28.0m	25**	-	35** (Restricted)	1
Layer-4	Fine Sand with gravel	28.0m to 29.5m	25**	-	35** (Restricted)	1 0
Layer-5	Fine Sand with gravel	29.5m to 31.0m	25**	-	35** (Restricted)	1 O
Layer-6	Clay with Gravel	31.0m to 34.0m	N>50	20.00*	-	1
Layer-7	Fine Sand with gravel	34.0m to 47.5m	25**	-	35** (Restricted)	1 0
Layer-8	Fine Sand with gravel	47.5m to 50.0m	25**	-	35** (Restricted)*	1 0

Note:-* Cohesion has been restricted to 20t/m².

**The value of \varnothing has been restricted to 35° which corresponds to N value of 25.

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Reference Boreholes: BH-8(P1)

Layer	Sub-strata	Depth below GL (m)	SPT 'N' value (Avg)	Cohesion, C (t/m2)	Angle of internal friction,Ø (degree)	Submerged density (t/m³)
Layer-1	Fine Sand	GL to 8.5m	8	_	30	1
Layer-2	Fine Sand with gravel	8.5m to 28.0m	25**		35** (Restricted)	1
Layer-3	Clay with Gravel	28.0m to 30.5m	N>50	20.00*	-	1
Layer-4	Fine Sand	30.5m to 38.5m	25**	-	35** (Restricted)	1
Layer-5	Fine Sand with gravel	38.5m to 41.5m	25**	-	35** (Restricted)	1
Layer-6	Fine Sand	41.5m to 44.5m	25**	-	35** (Restricted)	1
Layer-7	Fine Sand with gravel	44.5m to 50.0m	25**	-	35** (Restricted)	1

Note:-* Cohesion has been restricted to 20t/m².

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^{**}The value of \varnothing has been restricted to 35° which corresponds to N value of 25.

9. RECOMMENDED FOUNDATION STRUCTURE

- 9.1 Considering the presence of clay soil & sandy soil layers & heavy weight transmitted by the bridg structure, it is recommended to provide well foundations to support the abutment & piers.
- 9.2 It is recommended to provide 9.0m dia well foundation at these locations.
- 9.3 The safe bearing capacity (considering shear failure) & safe bearing pressure (considering 50 & 75mmsettlement) of the well foundation structure have been computed as per the recommendations of IS-6403-1981 & IS-8009(Pt-1)-1976.
- 9.4 However the designer may adopted suitable foundation system considering the requirements of superstructure.

10. WELL FOUNDATION

- **10.1.1.** As per the directive from the client the soil samples obtained from boreholes drilled subsequently were given to M/s Dr. Ghuman and Gupta Geotech Consultants, Chandigarh for silt factor calculation .The reports presented by M/s Dr.Ghuman and Gupta Geotech Consultants, Chandigarh along with the copy of letter from the client dated-27.12.2013 are enclosed with this report vide appendix no-IV.
- **10.1.2** It is observed that silt factor data obtained from M/s Dr.Ghuman and Gupta Geotech Consultants do not cover all the borehole locations. In order to calculate the scour depth at the bridge site the minimum value of silt factor (0.71) as recommended by M/s Dr.Ghuman and Gupta Geotech Consultants has been adopted for calculation purposes in this report.
- **10.1.3** Considering the hydraulic data the maximum scour level has been found out & presented in table no.-6.In determination of SBC & SBP, soil strata in between EGL & maximum scour level has been taken to be ineffective.

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ARKITECHNO

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<u>Table No.-6</u> Yamuna River

Bore hole Location	Existing Ground Level(m)	Maximum Scour Depth(m)	Maximum Scour Level(m)	
BH-1(A2)	264.321	18.54	252.91	
BH-2(P4)	259.093	29.19	242.25	
BH-3(P5)	260.953	29.19	242.25	
BH-4(A1)	265.644	18.54	252.91	
BH-5(P6)	262.355	29.19	242.25	
BH-6(P3)	260.499	29.19	242.25	
BH-7(P2)	261.837	29.19	242.25	
BH-8(P1)	263.870	29.19	242.25	

10.2 Determination of the depth of the well foundation has been done considering the criteria of provision of minimum grip length as per clause no-705-3.1 of IRC -78:2000.Acordingly the depth of well foundation satisfying these criteria shall be as follows-

Abutments -22.0m

Piers-32.0m

10.3 The SBC (shear failure) & SBP (50mm & 75mm settlement) for each location have been computed & Presented in table no.-7.

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<u>Table No.-7</u> <u>Yamuna River</u>

Location	E.G.L (m)	Founding Depth	Founding RL(m)	Founding stratum	SBC (shear failure)	Safe Bearing Pressure Considering Settlement of	
		(m)			(t/m2)	50mm (t/m²)	75 mm (t/m²)
BH-1(A2)	264.321	22.0	242.321	Fine sand With Gravel	264.87	30.65	45.97
BH-2(P4)	259.093	32.0	227.093	Clay With Gravel	71.46	32.61	48.92
BH-3(P5)	260.953	32.0	228.953	Fine Sand with Gravel	438.86	20.83	31.25
BH-4(A1)	265.644	22.0	243.644	Fine Sand With Gravel	298.61	29.32	43.97
BH-5(P6)	262.355	32.0	230.355	Clay With Gravel	67.58	22.88	34.31
BH-6(P3)	260.499	32.0	228.499	Clay With Gravel	69.85	32.55	48.82
BH-7(P2)	261.837	32.0	229.837	Clay With Gravel	68.20	35.84	53.76
BH-8(P1)	263.870	32.0	231.870	Fine Sand	260.49	38.82	58.23

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11. RECOMMENDATIONS

Based on the field and laboratory investigations, the following recommendations are made.

- 11.1 The project area lies in the Zone-IV of the seismic zone as per IS.1893 (pt-1):2002.
- **11.2** Depending on the sub-surface formation, it is proposed to provide well foundation for the superstructure. It is recommended to provide well of 9.0m dia at all locations.
- **11.3** The allowable Bearing Pressure considering shear failure & settlement of 50mm/75mm for each location have been computed & presented in table no.-8.
- **11.4** However the designer may adopt suitable parameters for design of foundation considering the super structure requirements and economy aspects.

<u>Table No-8</u>

<u>Yamuna River</u>

Location	E.G.L (m)	Founding Depth (m)	Founding RL(m)	Considering s	aring Pressure hear failure and ment of
				50mm (t/m2)	75 mm (t/m2)
BH-1(A2)	264.321	22.0	242.321	30.0	45.0
BH-2(P4)	259.093	32.0	227.093	32.0	48.0
BH-3(P5)	260.953	32.0	228.953	20.0	31.0
BH-4(A1)	265.644	22.0	243.644	29.0	43.0
BH-5(P6)	262.355	32.0	230.355	22.0	34.0
BH-6(P3)	260.499	32.0	228.499	32.0	48.0

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Geotechnical Investigation Work for 3nos. Important Bridges on Dedicated Freight Corridor Corporation

Location	E.G.L (m)	Founding Depth (m)	Founding RL(m)	Considering sl	aring Pressure near failure and ment of
				50mm (t/m2)	75 mm (t/m2)
BH-7(P2)	261.837	32.0	229.837	35.0	53.0
BH-8(P1)	263.870	32.0	231.870	38.0	58.0



(Dr. P.K.DASH)

Senior Consultant Geo-Technical

M/s ARKITECHNO Consultants (I) Pvt. Ltd.

Bhubaneswar.

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Geotechnical Investigation Work for 3nos. Important Bridges on Dedicated Freight Corridor Corporation

12. REFERENCES

SI No	Code No	Title
1	IS: 1498 - 1970	Classification and Identification of Soils for general Engineering Purposes.
2	IS: 1892 - 1979	Code of Practice for Subsurface Investigation for Foundation.
3	IS: 1893 (P-1) - 2002	Criteria for earthquake Resistant Design of Structures
4	IS: 2131-1991 reaffirmed 1997)	Method of Standard Penetration Test for Soils.
5	IS: 2720 (Relevant parts)	Method of Test for Soils (Relevant Parts).
6	IS: 6403- 1981(Reaffirmed 1997)	Code of practice for determination of Bearing capacity of Shallow foundations.
7	IS: 8009 (Part-I)- 1976	Code of practice for calculation of settlements of foundations.
8	IS: 4968 (Part-III)	Method for Subsurface Sounding for Soils - Static Cone Penetration Test.
9	IRC 78-2000	Standard Specifications Code of Practice for Road Bridges Section - VII
10		Bowles, J.E, Foundation Analysis and design, McGraw-Hill, New York.
11		Nayak, N.V, Foundation design manual, Dhanpat Rai Publications, New Delhi.
12		Tomlinson , M.J, Foundation Design and Construction, ELBS, 5TH edition.

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Appendix -I

(Field Borelog Details and SPT 'N' Correction)

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BORE LOG DETAILS Existing Ground Lvl. (RL in Mtr)

Client : DFCC

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 264 321

Project Bore Hole No. : BH-1(A2)

Date of commencement

: 7.55 : 04.10.12

Location Type of Boring : Yamuna River, Near Abutment, Towards Ambala

Date of Completion

: 11.10.12

Dia of Bore

0

0 0

0

0

0

: Rotary Drilling : 150mm in soil

Conducted By

: T.K Das

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

	th(m)		: ODS/Spiit spoort Sa		100	npling			SPT					Deta	ils of Rock C	ore	
From	То	Length of Run	Description of Strata	Log of Bore		Туре		quired for F of depth		N value (Observed)	N Corected	Total Length	No of Pieces	Length of core greater	% of Core Recovery	RQD Value	Remarks
							0 - 15 cm	15 - 30 cm	30 - 45 cm			(cm)		than 10cm	envision tone, 🕏	(%)	
0.00	0.50	0.50			0.5	DS											DS Taken
0.50	1.00	0.50			1.0	DS											DS Taken
1.00	1.50	0.50			1.5	SPT	3	4	5	9	15						Sample Collec
1.50	2.00	0.50			2.0	DS											DS Taken
2.00	2.50	0.50			2.5	DS											DS Taken
2.50	3.00	0.50			3.0	SPT	5	5	6	11	15						Sample Collec
3.00	3.50	0.50			3.5	DS											DS Taken
3.50	4.00	0.50			4.0	DS								***			DS Taken
4.00	4.50	0.50			4.5	SPT	4	5	7	12	15						Sample Collect
4.50	5.00	0.50			5.0	DS											DS Taken
5.00	5.50	0.50			5.5	DS											DS Taken
5.50	6.00	0.50			6.0	SPT	4	6	9	15	16						Sample Collect
6.00	6.50	0.50			6.5	DS											DS Taken
6.50	7.00	0.50	Fine Sand		7.0	DS											DS Taken
7,00	7.50	0.50			7.5	SPT	6	9	10	19	18						Sample Collec
7.50	8.00	0.50			8.0	DS											DS Taken
8.00	8.50	0.50			8.5	DS											DS Taken
8.50	9.00	0.50			9.0	SPT	5	8	8	16	16						Sample Collec
9.00	9.50	0.50			9.5	DS											DS Taken
9.50	10.00	0.50			10.0	DS											DS Taken
10.00	10.50	0.50			10.5	SPT	9	11	12	23	19						Sample Collect
10.50	11.00	0.50			11.0	DS											DS Taken
11.00	11.50	0.50			11.5	DS											DS Taken
11.50	12.00	0.50			12.0	SPT	8	10	15	25	19						Sample Collect
12.00	12.50	0.50			12.5	DS											DS Taken
12.50	13.00	0.50			13.0	DS	9			-							DS Taken
13.00	13.50	0,50			13.5	SPT	11	15	22	37	25				_		Sample Collect
13.50	14.00	0.50			14.0	DS						-				30.55	DS Taken
14.00	14.50	0.50			14.5	DS					-						DS Taken
14.50	15.00	0.50	F 0 / 11 F		15.0	SPT	15	19	23	42	26						Sample Collect
15.00	15.50	0.50	Fine Sand with Gravel		15.5	DS											DS Taken
15.50	16.00	0.50			16.0	DS											DS Taken
6.00	16.50	0.50			16,5	SPT	14	22	29	51	29						Sample Collect

Client

: DFCC : G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

: 264.321

Project Bore Hole No.

: BH-1(A2)

Depth of Ground Water from EGL (in Mtr) : 7.55

Location : Yamuna River, Near Abutment, Towards Ambala Date of commencement

: 04.10.12 : 11.10.12

Type of Boring Dia of Bore

: Rotary Drilling

Date of Completion

: 150mm in soil

Conducted By

: T.K Das

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

50	th(m)	useu	: UDS/Split spoon Sa	mpier/C		rel	Ι		SPT					Dotai	ils of Rock C	oro	
Бер					Sali	ping	Blows Re	quired for F			I			Length	IIS OF ROCK C	ore	
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре		of depth	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	of core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
16.50	17.00	0.50			17.0	DS											DS Taken
17.00	17.50	0.50			17.5	DS						330		S AFERES			DS Taken
17.50	18.00	0.50		Big	18.0	SPT	16	21	26	47	26						Sample Collected
18.00	18.50	0.50	8		18.5	DS											DS Taken
18.50	19,00	0.50			19.0	DS											DS Taken
19.00	19,50	0.50	Fine Sand		19.5	SPT	15	25	33	58	30						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taken
20.00	20.50	0.50			20.5	DS											DS Taken
20.50	21.00	0.50			21.0	SPT	16	23	39	62	32						Sample Collected
21.00	21.50	0.50		2/4	21.5	DS											DS Taken
21.50	22.00	0.50			22.0	DS								10 11380			DS Taken
22.00	22.50	0.50			22.5	SPT	27	34	41	75	36						Sample Collected
22.50	23,00	0,50			23.0	DS											DS Taken
23.00	23.50	0.50			23.5	DS											DS Taken
23.50	24.00	0.50	9		24.0	SPT	24	40	43	83	37						Sample Collected
24.00	24.50	0.50			24.5	DS									3000000		DS Taken
24.50	25.00	0.50			25.0	DS											DS Taken
25.00	25,50	0.50			25.5	SPT	34	52	N>100 9cm Penetration								DS Taken
25.50	26.00	0.50	Fine Sand with Gravel		26.0	DS											DS Taken
26.00	26.50	0.50			26.5	DS						***					DS Taken
26.50	27.00	0.50			27.0	SPT	30	39	46	85	35	***************************************					Sample Collecte
27.00	27,50	0.50			27.5	DS			0.892			*			W-22000		DS Taken
27.50	28.00	0.50			28.0	DS											DS Taken
28.00	28.50	0.50			28.5	SPT	42	63	N>100 4cm Penetration								DS Taken
28.50	29,00	0,50			29.0	DS											DS Taken
29.00	29.50	0.50			29.5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	19	23	26	49							Sample Collecter
30,00	30.50	0.50			30.5	DS											DS Taken
30.50	31,00	0.50			31.0	DS											DS Taken
31.00	31.50	0.50			31.5	SPT	20	25	33	58							Sample Collected
31.50	32.00	0.50			32.0	DS		3351-22-3-31									DS Taken
32.00	32.50	0.50			32.5	DS											DS Taken
32.50	33,00	0.50			33.0	SPT	18	30	39	69							Sample Collected
33.00	33.50	0.50	Clay with Gravel		33.5	DS											DS Taken
33.50	34.00	0.50			34.0	DS											DS Taken
34.00	34.50	0.50			34.5	SPT	23	34	45	79							Sample Collected
34.50	35.00	0.50			35.0	DS											DS Taken
35.00	35.50	0.50			35.5	DS											DS Taken
35.50	36.00	0.50	3		36.0	SPT	20	34	38	72							Sample Collected
36.00	36,50	0.50			36.5	DS											DS Taken
36.50	37.00	0.50			37.0	DS					× ***			*			DS Taken

Client Project

Bore Hole No.

Type of Boring

Location

: DFCC

; G.I. for 3 nos Important Bridges

: BH-1(A2)

: Rotary Drilling

: Yamuna River, Near Abutment, Towards Ambala

Existing Ground Lvl. (RL in Mtr)

Depth of Ground Water from EGL (in Mtr)

Date of commencement

Date of Completion

: 264.321

: 7.55

: 04.10.12 : 11.10.12

: T.K Das

Dia of Bore : 150mm in soil

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

Depth(m) Sampli

Conducted By

Dep	th(m)				Sam	pling			SPT					Detai	ils of Rock C	ore	
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре	Blows Re	quired for F of depth 15 - 30 cm	Penetration 30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	Length of core greater than	% of Core Recovery	RQD Value (%)	Remarks
37.00	37.50	0.50			37.5	SPT	15	24	30	54				10cm		-	Sample Collected
37.50	38.00	0.50	Clay		38.0	DS											DS Taken
38.00	38.50	0.50			38.5	DS											DS Taken
38.50	39.00	0.50			39.0	SPT	21	34	40	74	29						Sample Collected
39.00	39.50	0.50			39.5	DS			- X 192								DS Taken
39.50	40.00	0.50			40.0	DS					10000						DS Taken
40.00	40.50	0.50			40.5	SPT	30	39	48	87	32						Sample Collected
40.50	41.00	0.50	Fine Sand with Gravel		41.0	DS				70.50							DS Taken
41.00	41,50	0.50			41.5	DS											DS Taken
41.50	42.00	0.50			42.0	SPT	43	N>100	9cm Penetration								DS Taken
42.00	42.50	0.50			42.5	DS											DS Taken
42.50	43.00	0.50			43.0	DS											DS Taken
43.00	43.50	0.50			43.5	SPT	25	34	42	76	29						Sample Collected
43.50	44,00	0.50			44.0	DS											DS Taken
44.00	44.50	0.50	Fine Sand		44.5	DS		1)									DS Taken
44.50	45.00	0.50			45.0	SPT	30	38	40	78	27						Sample Collected
45,00	45.50	0.50			45,5	DS											DS Taken
45.50	46.00	0.50			46.0	DS											DS Taken
46.00	46.50	0.50			46.5	SPT	43	52	N>100 2cm Penetration								DS Taken
46.50	47,00	0.50			47.0	DS											DS Taken
47.00	47.50	0.50			47.5	DS											DS Taken
47.50	48.00	0.50	Fine Sand with Gravel		48.0	SPT	39	50	N>100 6cm Penetration								DS Taken
48.00	48.50	0.50			48.5	DS											DS Taken
48.50	49.00	0.50			49.0	DS											DS Taken
49.00	49.50	0.50			49.5	DS											DS Taken
49.50	50.00	0.50			50.0	SPT	59	N>100	8cm Penetration								DS Taken

BORE LOG DETAILS

Client : DFCC Existing Ground Lvl. (RL in Mtr) : 259 093

Project G.I. for 3 nos Important Bridges

Bore Hole No BH-2(P4)

Location

16 00

16.50

0.50

16.5

SPT

12

: : Yamuna River, Near Pier, Towards Ambala

Type of Boring Rotary Drilling Dia of Bore 150mm in soil

Depth of Ground Water from EGL (in Mtr)

Date of commencement : 04.10.12 Date of Completion ; 11.10.12

: 0.10

Conducted By : T.K Das

Type of Sampler used UDS/Split spoon Sampler/Core barrel Depth(m) Sampling SPT Details of Rock Core Blows Required for Penetration of Length of depth RQD Description of Strata Total of % of Core of Run N value N No of core From To Depth Туре Length Value Remarks greater than 10cm (Observed) Corrected (cm) 0 - 15 cm 15 - 30 cm | 30 - 45 cm 0.00 0.5 DS 0.50 DS Taken 1,00 0.50 1.0 DS Sample 1.00 1.50 0.50 1.5 SPT 1 1 2 3 5 Collected 1.50 2.00 0.50 2.0 DS DS Taken 2.00 2.50 0.50 2.5 DS DS Taken Sample 2.50 3.00 0.50 3.0 SPT 2 2 4 6 1 Collected DS Taken 3.00 3.50 0.50 3.5 DS 3.50 4.00 0.50 4.0 DS DS Taken Sample Collected 4.00 4.50 0.50 4.5 SPT 2 2 4 6 7 4,50 5,00 DS Taken 0.50 5.0 DS DS Taken 5.00 5.50 0.50 Fine Sand 5.5 DS Sample 5.50 6.00 0.50 6.0 SPT 1 2 9 3 4 6.00 6.50 0.50 DS Taken 6.5 DS 6,50 7.00 0.50 DS Taken 7.0 DS Sample 7.00 7.50 0.50 7 7.5 SPT 3 3 4 8 Collected 7.50 8 00 0.50 8.0 DS DS Taken 8.00 8.50 0.50 DS Taken 8.5 DS 8.50 9.00 0.50 SPT 9.0 3 7 4 11 12 Collected 9.00 DS Taken 9.50 0.50 95 DS 9.50 10.00 0.50 10.0 DS DS Taken Sample 10.00 10.50 0.50 SPT 10.5 4 8 13 13 Collected Sample 10,50 11.00 0.50 11.0 SPT 9 14 19 33 24 Collected 11,00 11.5 DS Taken 11.50 0.50 DS Sample 11.50 12.00 0.50 Fine Sand with Gravel 12.0 SPT 13 26 28 12.00 12.50 0,50 12.5 DS Taken DS 12.50 13.00 0.50 DS Taken 13.0 DS Sample 13.00 13.50 0.50 13.5 SPT 10 16 18 34 23 Collected 13.50 14 00 0.50 14.0 DS DS Taken 14 00 14,50 0.50 14.5 DS DS Taken Sample 14.50 15.00 Fine Sand SPT 12 19 22 41 15.0 26 Collected 15.00 15.50 0.50 15.5 DS Taken DS 15.50 16.00 DS Taken 0.50 16.0 DS Sample

31

Client			: DFCC					Existing (Ground Lvl.	(RL in Mtr)	20		:	259.093			
Project			: G.I. for 3 nos Impor	tant Br	ridges			2002		ter from EGL	(in Mtr)		:	0.10			
Bore H			: BH-2(P4)						ommencem	ent				04.10.12			
Locatio	n f Boring		Yamuna River, NeaRotary Drilling	r Pier,	Toward	s Ambal	а	Date of C						11.10.12			
Dia of E			: 150mm in soil					Conducte	аву				:	T.K Das			
	f Sample	r used	: UDS/Split spoon Sa	ampler	Core ba	arrel											
Dep	th(m)				San	pling			SPT					Details	of Rock Co	re	
		Length	Description of Strata	Log of			Blows Red	uired for Pe depth	netration of	None		Total	No. of	Length of	0/ -/ 0	RQD	
From	То	of Run		Bore	Depth	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	N value (Observed)	N Corrected	Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	Value (%)	Remarks
16,50	17.00	0.50			17.0	DS											DS Taken
17.00	17.50	0.50			17.5	DS											DS Taken
17.50	18,00	0.50			18,0	SPT	17	29	38	67	34						Sample Collected
18,00	18.50	0.50	Fine Cond		18,5	DS											DS Taken
18,50	19.00	0,50	Fina Sand		19,0	DS											DS Taken
19.00	19.50	0.50			19.5	SPT	10	30	32	62	32						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taken
20.00	20.50	0.50			20.5	DS											DS Taken
20.50	21.00	0.50			21.0	SPT	31	40	44	84	40						Sample Collected
21.00	21.50	0.50			21.5	DS											DS Taken
21.50	22.00	0.50			22.0	DS											DS Taken
22.00	22.50	0,50			22.5	SPT	36	49	N>100 10cr	n Penetration							DS Taken
22.50	23,00	0.50			23.0	DS											DS Taken
23.00	23.50	0.50			23.5	DS					100						DS Taken
23,50	24.00	0.50			24.0	SPT	32	37	49	86	38						Sample Collected
24.00	24.50	0.50	Fine Sand with Gravel		24.5	DS											DS Taken
24.50	25.00	0.50			25.0	DS											DS Taken
25.00	25,50	0.50			25.5	SPT	29	35	38	73	33						Sample Collected
25.50	26.00	0.50			26.0	DS											DS Taken
26.00	26.50	0,50			26.5	DS	¥ 7 1.30										DS Taken
26.50	27.00	0.50			27.0	SPT	42	N>100	4cm Penetration			1000					DS Taken
27.00	27.50	0.50			27.5	DS				A CONTRACTOR	i i					4101	DS Taken
27.50	28,00	0,50			28.0	DS											DS Taken
28.00	28.50	0.50			28.5	SPT	17	22	24	46							Sample Collected
28.50	29.00	0.50			29.0	DS											DS Taken
29.00	29.50	0.50	Clay with Gravel		29.5	DS						0730					DS Taken
29.50	30.00	0.50			30.0	SPT	21	27	39	66							Sample Collected
30.00	30.50	0.50			30.5	DS											DS Taken

0.50

30.50

31.00

31.0

4638

37

DS Taken

Client : DFCC Existing Ground Lvl. (RL in Mtr) : 259.093 Project : 0.10

: G.I. for 3 nos Important Bridges Depth of Ground Water from EGL (in Mtr) Bore Hole No. : BH-2(P4)

Date of commencement : 04.10.12 Location : Yamuna River, Near Pier, Towards Ambala Date of Completion ; 11,10,12 Type of Boring : Rotary Drilling Conducted By : T.K Das

Dia of Bore : 150mm in soil

	f Sample th(m)	rused	: UDS/Split spoon Sa	mpler/	202	-0.00 A			- 444								
Dep	in (m)				Sam	pling	Blows Rec	uired for Pe	SPT netration of					Details	of Rock Co	re	
From	То	Length of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth	30 - 45 cm	N value (Observed)	N Corrected	Total Length (cm)	No of Pieces	Length of core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
31.00	31,50	0.50			31,5	SPT	16	29	43	72							Sample Collected
31.50	32.00	0.50			32,0	DS											DS Taken
32.00	32.50	0.50			32.5	DS											DS Taken
32.50	33.00	0,50	Clay with Gravel		33,0	SPT	18	31	42	73							Sample Collected
33.00	33.50	0.50			33.5	DS											DS Taken
33.50	34,00	0.50			34.0	DS							3				DS Taken
34.00	34.50	0.50			34.5	SPT	16	22	34	56							Sample Collected
34.50	35.00	0.50			35.0	DS					8 8						DS Taken
35.00	35,50	0,50	Clay		35.5	DS											DS Taken
35.50	36,00	0.50	Cidy		36.0	SPT	13	18	25	43							Sample Collected
36.00	36.50	0,50			36.5	DS											DS Taken
36,50	37.00	0.50			37.0	DS								700000000000000000000000000000000000000			DS Taken
37.00	37.50	0.50			37.5	SPT	15	16	19	35	17						Sample Collected
37.50	38.00	0.50			38.0	DS											DS Taken
38.00	38.50	0.50			38.5	DS											DS Taken
38.50	39.00	0.50			39.0	SPT	18	24	27	51	21						Sample Collected
39.00	39.50	0.50	Fine Sand		39.5	DS											DS Taken
39.50	40.00	0,50			40.0	DS					33 1/63	100					DS Taken
40.00	40.50	0.50			40.5	SPT	22	28	39	67	26						Sample Collected
10.50	41.00	0.50			41.0	DS											DS Taken
11.00	41.50	0,50			41.5	DS				112							DS Taken
11.50	42.00	0.50	y.		42.0	SPT	28	34	41	75	28						Sample Collected
2.00	42.50	0.50		no	42.5	DS		8									DS Taken
2.50	43.00	0.50			43.0	DS											DS Taken
3.00	43.50	0.50			43.5	SPT	29	31	36	67	25						Sample Collected
3.50	44.00	0.50			44.0	DS											DS Taken
4.00	44.50	0.50			44,5	DS				121838017							DS Taken
4.50	45.00	0.50			45.0	SPT	38		N>100 3cm Penetration				19				DS Taken
5.00	45.50	0.50			45.5	DS											DS Taken
5.50	46.00	0.50	Fine Sand with Gravel		46.0	DS											DS Taken
6.00	46.50	0.50			46,5	SPT	50	N>100	2cm Penetration								DS Taken
6.50	47.00	0,50			47.0	DS											DS Taken
7.00	47.50	0.50			47.5	DS											DS Taken
7.50	48.00	0.50			48.0	SPT	47	N>100	4cm Penetration								DS Taken
8.00	48.50	0.50			48.5	DS											DS Taken
8.50	49.00	0.50			49.0	DS											DS Taken
9.00	49.50	0.50			49.5	DS											DS Taken
9.50	50.00	0.50			50.0	SPT	62	N>100	2cm Penetration								DS Taken

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BORE LOG DETAILS

Client : DFCC

Bore Hole No.

Location

roject : G.I. for 3 nos Important Bridges

: BH-3(P5)

: Yamuna River, Near Pier, Towards Ambala

: Rotary Drilling

ype of Boring Dia of Bore : 150mm in soil Existing Ground Lvl. (RL in Mtr)

Depth of Ground Water from EGL (in Mtr)

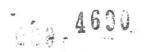
: 2.95 ; 12.10.12 Date of commencement Date of Completion : 15.10.12

: 260.953

Conducted By : T.K Das

ype of Sampler used : UDS/Split spoon Sampler/Core barrel

	f Sample th(m)	useu	: UDS/Split spoon Sa	inplei/	Г —	pling			SPT					Details	s of Rock Core		
				Log		ipiiiig	Blows Red	uired for Pe							S OF ROCK COTE		
From	То	Length of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	Length of core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
0.00	0.50	0.50			0.5	DS											DS Taken
0.50	1.00	0.50			1.0	DS											DS Taken
1.00	1.50	0.50			1.5	SPT	1	1	1	2	3						Sample Collected
1.50	2.00	0.50			2.0	DS											DS Taken
2.00	2.50	0.50			2.5	DS		77									DS Taker
2.50	3.00	0.50			3.0	SPT	2	2	3	5	7						Sample Collected
3.00	3.50	0.50			3.5	DS								Vascostation			DS Taker
3.50	4.00	0.50			4.0	DS				200000							DS Taker
4.00	4.50	0.50	Fine Sand		4.5	SPT	2	4	5	9	11						Sample Collected
4.50	5.00	0.50			5.0	DS											DS Taker
5.00	5.50	0.50			5.5	DS									W.		DS Take
5.50	6.00	0.50			6.0	SPT	3	5	6	11	13						Sample Collected
6.00	6.50	0.50			6.5	DS											DS Take
6.50	7.00	0.50			7.0	DS											DS Take
7.00	7.50	0.50			7.5	SPT	3	5	5	10	11						Sample
7.50	8.00	0.50			8.0	DS											DS Take
8.00	8.50	0.50			8.5	DS											DS Take
8,50	9.00	0.50		15.3	9.0	SPT	8	13	16	29	23						Sample Collected
9.00	9.50	0.50			9.5	DS											DS Take
9.50	10.00	0.50			10.0	DS			10								DS Take
10.00	10.50	0.50			10.5	SPT	11	17	21	38	26						Sample
10.50	11.00	0.50			11.0	DS											DS Take
11.00	11.50	0.50	Fine Sand with Gravel		11.5	DS											DS Take
11.50	12.00	0.50	THE Salla WILL GLAVEL		12.0	SPT	14	19	24	43	27						Sample Collected
12.00	12.50	0.50		THE	12.5	DS											DS Take
12.50	13.00	0.50			13.0	DS											DS Take
13.00	13.50	0.50			13.5	SPT	13	21	29	50	31						Sample Collected
13.50	14.00	0.50			14.0	DS											DS Take
14.00	14.50	0,50			14.5	DS											DS Taker
14.50	15.00	0.50			15.0	SPT	11	16	16	32	22						Sample
15.00	15.50	0.50	Eine Cond	NE AL	15.5	DS											DS Take
15.50	16.00	0.50	Fine Sand		16.0	DS											DS Take
16.00	16.50	0.50			16.5	SPT	13	14	22	36	22						Sample



Client

: DFCC

Existing Ground Lvl. (RL in Mtr)

: 260.953

Project

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 2.95

Bore Hole No. Location

: BH-3(P5)

Date of commencement

: 12.10.12

Type of Boring

: Yamuna River, Near Pier, Towards Ambala

Date of Completion

; 15,10.12

Dia of Bore

: Rotary Drilling : 150mm in soil

Conducted By

: T.K Das

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

	th(m)	Lucu	: UDS/Split spoon Sa	T		npling			SPT	- 10 A 10				Details	s of Rock Core		- (
	1	Longth		Log	- Cun	ipinig	Blows Red	uired for Pe							S OF ROCK CON		,
From	То	Length of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	Length of core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
16.50	17.00	0.50			17.0	DS											DS Taken
17.00	17.50	0.50			17.5	DS											DS Taker
17.50	18.00	0.50	Fine Sand		18.0	SPT	16	19	28	47	26						Sample Collected
18.00	18.50	0.50			18.5	DS											DS Taker
18.50	19.00	0.50			19,0	DS											DS Taker
19.00	19.50	0.50			19.5	SPT	25	31	40	71	36						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taker
20.00	20.50	0.50			20.5	DS											DS Taker
20.50	21.00	0,50			21.0	SPT	29	33	45	78	38						Sample Collected
21.00	21.50	0.50	Fine Sand with Gravel		21.5	DS											DS Taken
21.50	22.00	0.50			22.0	DS											DS Taken
22.00	22.50	0.50			22.5	SPT	27	39	51	90	41						Sample Collected
22.50	23.00	0.50			23.0	DS						12.1					DS Taken
23.00	23.50	0.50			23.5	DS											DS Taken
23,50	24.00	0.50			24.0	SPT	19	25	37	62	30						Sample Collected
24.00	24.50	0.50			24.5	DS											DS Taken
24.50	25.00	0.50	Fine Sand		25.0	DS											DS Taken
25.00	25.50	0.50	Fine Sand		25.5	SPT	23	32	35	67	31						Sample Collected
25.50	26.00	0.50			26,0	DS											DS Taker
26.00	26,50	0.50			26.5	DS											DS Taker
26,50	27.00	0.50			27.0	SPT	12	19	24	43							Sample Collected
27.00	27.50	0.50			27.5	DS											DS Taker
27.50	28.00	0.50			28.0	DS											DS Taker
28.00	28.50	0.50			28.5	SPT	15	22	25	47							Sample Collected
28,50	29.00	0.50	Clay		29.0	DS											DS Taker
29.00	29.50	0,50			29.5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	13	21	29	50							Sample Collected
30.00	30.50	0.50			30.5	DS											DS Taken
30.50	31.00	0.50			31.0	DS											DS Taken
31,00	31.50	0.50			31.5	SPT	30	55	N>100 7cm Penetration								DS Taken
31,50	32.00	0.50			32.0	DS											DS Taken
32.00	32,50	0.50	Fine Sand with Gravel		32.5	DS											DS Taken
32.50	33.00	0.50	Garia with Graver		33.0	SPT	37	69	N>100 4cm Penetration								DS Taken
33.00	33.50	0.50			33.5	DS											DS Taken
33.50	34.00	0.50			34.0	DS											DS Taken

Client

: DFCC

Existing Ground Lvl. (RL in Mtr)

: 260.953

Project ore Hole No. : G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr) Date of commencement

: 2.95

l_{1.ocation}

: BH-3(P5)

: 12.10.12 : 15.10.12

Type of Boring ia of Bore

: : Yamuna River, Near Pier, Towards Ambala

Date of Completion

Rotary Drilling 150mm in soil

Conducted By

: T.K Das

UDS/Split spoon Sampler/Core barrel Type of Sampler used

Dep	th(m)				Sam	pling			SPT					Details	s of Rock Core)	
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре	Blows Req	uired for Pe depth	netration of	N value	N	Total	No of	Length of core	% of Core	RQD Value	Domarke
1	ļ			Dole	Берш	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)	Corected	Length (cm)	Pieces	greater than 10cm	Recovery	(%)	Remarks
34.00	34.50	0.50			34.5	SPT	20	31	38	69							Sample Collected
34.50	35,00	0.50			35.0	DS											DS Taken
35.00	35,50	0.50			35.5	DS											DS Taken
35.50	36.00	0.50			36.0	SPT	23	30	43	73							Sample Collected
36.00	36.50	0.50			36.5	DS											DS Taken
36.50	37.00	0.50	Clay with Gravel		37.0	DS											DS Taken
37.00	37.50	0.50	oldy with oldvor		37.5	SPT	21	29	38	67							Sample Collected
37.50	38.00	0.50			38.0	DS											DS Taken
38.00	38.50	0.50			38,5	DS											DS Taken
38.50	39.00	0.50			39.0	SPT	22	32	45	77							Sample Collected
39.00	39.50	0.50			39.5	DS											DS Taken
39.50	40.00	0.50			40.0	DS											DS Taken
40.00	40,50	0.50			40.5	SPT	30	61	N>100 5cm Penetration								DS Taken
40.50	41.00	0.50	Fine Sand with Gravel		41.0	DS											DS Taken
41.00	41.50	0.50			41.5	DS											DS Taken
41.50	42.00	0.50	122 112		42.0	SPT	25	37	37	74	27						Sample Collected
42.00	42.50	0.50			42.5	DS											DS Taken
42.50	43.00	0.50			43.0	DS											DS Taken
43.00	43,50	0.50	Fine Sand		43.5	SPT	28	36	43	79	28						Sample Collected
43.50	44.00	0.50			44.0	DS											DS Taken
(4.00	44.50	0.50			44.5	DS											DS Taken
14.50	45.00	0.50		1	45.0	SPT	39	56	N>100 7cm Penetration								DS Taken
15.00	45.50	0.50			45.5	DS											DS Taken
15.50	46.00	0.50			46.0	DS											DS Taken
16.00	46.50	0.50			46.5	SPT	30	42	50	92	29						Sample Collected
46.50	47.00	0.50			47.0	DS											DS Taken
47.00	47.50	0.50	Fine Sand with Gravel		47.5	DS											DS Taken
1 47.50	48.00	0.50			48.0	SPT	44	69	N>100 4cm Penetration								DS Taken
1 48,00	48.50	0.50			48.5	DS											DS Taken
48.50	49.00	0.50			49.0	DS											DS Taken
49.00	49.50	0.50			49.5	DS											DS Taken
49.50	50.00	0.50			50.0	SPT	59	N>100	7cm Penetration								DS Taken
									2								

BORE LOG DETAILS

Client : DFCC

: G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

: 265.644

Project Bore Hole No.

Depth of Ground Water from EGL (in Mtr) Date of commencement

: 4.25 : 12.10.12

Location

BH-4(A1) : Yamuna River, Near Abutment, Towards Saharanpur

Type of Boring Dia of Bore

Rotary Drilling

Date of Completion Conducted By

: 15.10.12 : T.K Das

: 150mm in soil

		r used	: UDS/Split spoon Sa	ampler/	/Core ba	arrel	I.										
Dep	th(m)				San	npling			SPT					Details	s of Rock Cor	e	
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре	Blows Req	uired for Per depth		N value (Observed)	N Corected	Total Length	No of Pieces	Length of core greater	% of Core Recovery	RQD Value	Remarks
							0 - 15 cm	15 - 30 cm	30 - 45 cm			(cm)		than 10cm		(%)	
0,00	0.50	0.50	Filled up Bricks		0.5												
0.50	1,00	0.50			1.0												
1.00	1.50	0,50			1.5	SPT	2	3	3	6	10						Sample Collected
1.50	2.00	0.50			2.0	DS											DS Taken
2.00	2.50	0.50			2.5	DS											DS Taken
2.50	3.00	0.50		100	3.0	SPT	4	5	7	12	16						Sample Collected
3,00	3.50	0.50			3,5	DS											DS Taken
3.50	4.00	0.50	Fine Sand		4.0	DS		201				o. ob. ob					DS Taken
4.00	4.50	0.50			4.5	SPT	3	4	7	11	13						Sample Collected
4.50	5.00	0.50			5.0	DS											DS Taken
5.00	5.50	0.50			5.5	DS		18 - 18/00-508				NO.001 - 17 - 170					DS Taken
5,50	6.00	0.50			6.0	SPT	5	7	9	16	17						Sample Collected
6.00	6.50	0.50			6.5	DS											DS Taken
6.50	7.00	0.50			7.0	DS			10.00								DS Taken
7.00	7.50	0.50			7.5	SPT	10	13	17	30	24						Sample Collected
7.50	8.00	0.50			8.0	DS											DS Taken
8.00	8.50	0.50			8.5	DS											DS Taken
8.50	9,00	0.50			9.0	SPT	12	18	19	37	27						Sample Collected
9.00	9.50	0.50	Fine Sand with Gravel		9.5	DS											DS Taken
9.50	10,00	0.50			10.0	DS											DS Taken
10.00	10.50	0.50			10.5	SPT	15	15	20	35	25						Sample Collected
10.50	11.00	0.50			11.0	DS											DS Taken
11.00	11.50	0.50		STATE OF	11.5	DS											DS Taken
11,50	12.00	0.50			12,0	SPT	11	13	16	29	21						Sample Collected
12,00	12.50	0.50			12.5	DS						-00					DS Taken
12,50	13.00	0.50			13.0	DS											DS Taken
13.00	13.50	0.50			13.5	SPT	11	15	17	32	22						Sample Collected
13.50	14.00	0.50			14.0	DS											DS Taken
14.00	14.50	0.50	Fine Sand		14.5	DS											DS Taken
14.50	15.00	0.50			15.0	SPT	13	16	20	36	24						Sample Collected
15.00	15.50	0.50			15.5	DS											DS Taken
15.50	16.00	0.50			16.0	DS											DS Taken
16,00	16.50	0.50			16.5	SPT	10	19	21	40	24						Sample Collected



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Client : DFCC

: G.I. for 3 nos Important Bridges

: Yamuna River, Near Abutment, Towards Saharanpur

Existing Ground Lvl. (RL in Mtr)

: 265.644

Project Bore Hole No.

Depth of Ground Water from EGL (in Mtr) Date of commencement

: 4.25

Location

: BH-4(A1)

Date of Completion

: 12.10.12

Type of Boring

: Rotary Drilling

: 15.10.12

Dia of Bore

Conducted By

: 150mm in soil

: T.K Das

Type of Sampler used	:	UDS/Split spoon Sampler/Core barrel

Dep	th(m)				Sam	pling			SPT					Details	s of Rock Con	e	
-	-	Length of Run	Description of Strata	Log of			Blows Requ	uired for Per depth	netration of	N value	N	Total	No of	Length of core	% of Core	RQD	
From	То	or Atan		Bore	Depth	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm		Corected	Length (cm)	Pieces	greater than 10cm	Recovery	Value (%)	Remarks
16.50	17.00	0.50			17.0	DS											DS Taken
17.00	17.50	0.50			17.5	DS											DS Taken
17.50	18.00	0.50			18.0	SPT	14	23	26	49	27		-				Sample Collected
18.00	18,50	0.50			18.5	DS											DS Taken
18.50	19.00	0.50	Fine Sand		19.0	DS											DS Taken
19.00	19,50	0.50			19.5	SPT	16	21	30	51	28			22. 32.			Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taken
20.00	20.50	0.50			20.5	DS											DS Taken
20.50	21.00	0.50			21.0	SPT	24	32	39	71	35						Sample Collected
21.00	21.50	0.50	Fine Sand with Gravel		21.5	DS											DS Taken
21.50	22,00	0.50			22.0	DS											DS Taken
22.00	22.50	0.50	.5		22.5	SPT	17	23	31	54	28						Sample Collected
22.50	23.00	0.50			23.0	DS											DS Taken
23.00	23.50	0.50			23.5	DS											DS Taken
23.50	24.00	0.50			24.0	SPT	19	28	40	68	32						Sample Collected
24.00	24.50	0.50	Fine Sand		24.5	DS											DS Taken
24.50	25,00	0.50			25.0	DS				******							DS Taken
25.00	25.50	0.50			25.5	SPT	23	30	39	69	31						Sample Collected
25.50	26.00	0.50			26.0	DS											DS Taken
26.00	26.50	0.50			26.5	DS											DS Taken
26.50	27.00	0.50			27.0	SPT	27	38	42	80	34	3					Sample Collected
27.00	27,50	0.50			27.5	DS											DS Taken
27.50	28,00	0.50	Fine Sand with Gravel		28.0	DS				3. 1							DS Taken
28.00	28.50	0.50	File Sand with Graver		28.5	SPT	33	42	51	93	37						Sample Collected
28.50	29.00	0.50			29.0	DS											DS Taken
29.00	29.50	0.50			29.5	DS											DS Taken
29.50	30.00	0,50			30.0	SPT	21	26	32	58							Sample Collected
30.00	30,50	0.50			30.5	DS											DS Taken
30.50	31.00	0.50			31,0	DS											DS Taken
31.00	31.50	0.50			31,5	SPT	23	30	30	60							Sample Collected
31.50	32.00	0.50	Clay with Gravel		32,0	DS											DS Taken
32.00	32.50	0.50			32.5	DS											DS Taken
32.50	33.00	0.50			33,0	SPT	20	32	33	65							Sample Collected
33.00	33.50	0.50			33.5	DS											DS Taken
33.50	34.00	0.50			34.0	DS											DS Taken

Client : DFCC

Existing Ground Lvl. (RL in Mtr)

: 265.644

Project Bore Hole No

49.50

50.00

0.50

50.0

SPT

: G.I. for 3 nos Important Bridges

: Yamuna River, Near Abutment, Towards Saharanpur

Depth of Ground Water from EGL (in Mtr) Date of commencement

: 4.25 : 12.10.12

Location

: BH-4(A1)

Date of Completion

: 15.10.12

	-	11	Das	

Dia of I	f Boring Bore f Sample	ar lised	: Rotary Drilling : 150mm in soil : UDS/Split spoon Si	ampler	/Coro b	arral		Conducte	ed By				;	T.K Das			
-	th(m)	daeu	. ODS/Spill spoort Sc	ampiei,	T	npling		<u> </u>	SPT				<u> </u>	Detail	s of Rock Cor	e	
		Length	Description of Strata	Log			Blows Req	uired for Per depth	netration of	Modele		Total	No at	Length of		RQD	
From	То	of Run		Bore	Depth	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	Value (%)	Remarks
34.00	34.50	0.50			34.5	SPT	29	38	41	79	28						Sample Collected
34.50	35.00	0.50			35.0	DS	2010										DS Taken
35.00	35.50	0.50	F 0		35,5	DS											DS Taken
35.50	36,00	0.50	Fine Sand With Gravel		36.0	SPT	42	N>100	10cm Penetration								DS Taken
			1											100			

34.00	34.50	0.50		34.5	SPT	29	38	41	79	28			Sample Collected
34.50	35.00	0.50		35.0	DS								DS Taken
35.00	35.50	0.50	Fine Cond With Count	35,5	DS								DS Taken
35.50	36,00	0.50	Fine Sand With Gravel	36.0	SPT	42	N>100	10cm Penetration					DS Taken
36.00	36,50	0,50	1	36.5	DS							90,000	DS Taken
36,50	37.00	0.50		37.0	DS								DS Taken
37,00	37.50	0.50		37.5	SPT	30	30	40	70	27			Sample Collected
37.50	38.00	0.50	Fine Sand	38.0	DS								DS Taken
38.00	38.50	0.50		38.5	DS								DS Taken
38.50	39.00	0.50		39.0	SPT	19	27	32	59				Sample Collected
39.00	39.50	0.50		39,5	DS								DS Taken
39.50	40.00	0.50	Clay	40.0	DS								DS Taken
40.00	40.50	0.50	Clay	40.5	SPT	24	30	37	67				Sample Collected
40.50	41.00	0.50		41.0	DS								DS Taken
41.00	41.50	0.50		41.5	DS								DS Taken
41.50	42.00	0.50		42.0	SPT	29	36	40	76				Sample Collected
42.00	42.50	0.50		42.5	DS								DS Taken
42.50	43.00	0.50		43.0	DS								DS Taken
43.00	43.50	0.50		43.5	SPT	25	33	39	72				Sample Collected
43,50	44.00	0.50	Clay with Gravel	44.0	DS								DS Taken
44.00	44.50	0.50		44.5	DS								DS Taken
44.50	45.00	0.50		45.0	SPT	29	37	42	79				Sample Collected
45.00	45.50	0.50		45.5	DS								DS Taken
45.50	46.00	0.50		46.0	DS								DS Taken
46.00	46.50	0.50		46.5	SPT	38	58	N>100 6cm Penetration					DS Taken
46.50	47.00	0.50		47.0	DS								DS Taken
47.00	47.50	0.50		47.5	DS								DS Taken
47.50	48.00	0.50	Fine Sand with Gravel	48.0	SPT	69	N>100	9cm Penetration					DS Taken
48.00	48,50	0.50	, and Guind Witti Graver	48.5	DS								DS Taken
48.50	49.00	0.50		49.0	DS								DS Taken
49.00	49.50	0.50		49,5	DS								DS Taken

7cm Penetration

N>100

10

DS Taken

0

BORE LOG DETAILS

Client : DFCC

Project : G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

: 262.355 : 1.20

Depth of Ground Water from EGL (in Mtr)
Date of commencement

: 24.04,2013

Bore Hole No : BH-5(P6)

Date of Completion

: 27.04.2013

Type of Boring Dia of Bore : Rotary Drilling : 150mm in soil Conducted By

: Binayak Swain

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

	th(m)	useu	: UDS/Split spoon Sa	inpier		npling			SPT					Details	s of Rock Con	e	
		Length		Log			Blows Requ	uired for Per									
From	То	of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	Length of core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
0.00	0.50	0.50			0.5	DS											DS Taken
0.50	1.00	0.50			1.0	DS											DS Taken
1.00	1.50	0.50			1.5	SPT	1	1	1	2	3						Sample Collected
1.50	2.00	0.50			2.0	DS											DS Taken
2.00	2.50	0.50	2		2.5	DS					Civara						DS Taken
2.50	3.00	0.50			3.0	SPT	1	1	2	3	4						Sample Collected
3.00	3.50	0.50			3.5	DS											DS Taken
3.50	4.00	0.50			4.0	DS											DS Taken
4.00	4.50	0.50			4.5	SPT	1	2	3	5	6						Sample Collected
4.50	5.00	0.50			5.0	DS											DS Taken
5.00	5.50	0.50			5.5	DS											DS Taken
5.50	6.00	0.50			6,0	SPT	2	3	3	6	6						Sample Collected
6.00	6.50	0.50	Fine Sand		6,5	DS											DS Taken
6.50	7.00	0.50			7.0	DS											DS Taken
7.00	7.50	0.50			7.5	SPT	2	4	6	10	11						Sample Collected
7.50	8.00	0.50			8.0	DS											DS Taken
8.00	8.50	0.50			8.5	DS											DS Taken
8.50	9.00	0.50			9.0	SPT	3	7	12	19	17						Sample Collected
9.00	9.50	0.50			9.5	DS											DS Taken
9.50	10.00	0.50			10.0	DS											DS Taken
10.00	10.50	0.50			10.5	SPT	3	9	12	21	17				-		Sample Collected
10.50	11.00	0.50			11.0	DS											DS Taken
11.00	11.50	0.50			11.5	DS											DS Taken
11,50	12.00	0.50			12.0	SPT	9	15	17	32	22						Sample Collected
12.00	12.50	0.50			12.5	DS											DS Taken
12.50	13,00	0.50			13.0	DS											DS Taken
13.00	13,50	0.50			13.5	SPT	8	21	22	43	26						Sample Collected
13.50	14.00	0.50			14.0	DS											DS Taken
14.00	14.50	0.50	Fine Cond with Ora		14.5	DS											DS Taken
14.50	15.00	0.50	Fine Sand with Gravel		15.0	SPT	12	13	19	32	21						Sample Collected
15.00	15.50	0.50			15.5	DS											DS Taken
15,50	16.00	0.50		4 3	16,0	DS											DS Taken
16.00	16.50	0.50	•		16.5	SPT	13	18	18	36	22						Sample Collected

Client

: DFCC

: G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

: 262.355

Project Bore Hole No.

: BH-5(P6)

Depth of Ground Water from EGL (in Mtr)

: 1.20

Date of commencement

: 24.04.2013

Date of Completion

: 27.04.2013

Type of Boring Dia of Bore

: Rotary Drilling : 150mm in soil

Conducted By

: Binayak Swain

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

Den	th(m)		. ODS/Spiil spoort Sa		7.00				SPT					Dotaile	s of Rock Core		
		Length of Run	Description of Strata	Log of		pling	Blows Requ	uired for Pen depth		N value	N	Total	No of	Length of core	% of Core	RQD	
From	То	Or Run		Bore	Depth	Type	0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)		Length (cm)	Pieces	greater than 10cm	Recovery	Value (%)	Remarks
16.50	17.00	0.50	33.20.		17.0	DS											DS Taken
17.00	17.50	0.50			17.5	DS											DS Taken
17.50	18.00	0.50			18.0	SPT	11	13	15	28	18						Sample Collected
18.00	18.50	0.50	Fine Sand		18.5	DS											DS Taken
18.50	19.00	0.50			19.0	DS											DS Taken
19.00	19.50	0.50			19.5	SPT	13	14	17	31	19						Sample Collected
19.50	20.00	0.50			20.0	DS									A44		DS Taken
20,00	20.50	0.50			20,5	DS											DS Taken
20.50	21.00	0.50			21.0	SPT	12	25	28	53	27						Sample Collected
21.00	21.50	0.50			21.5	DS											DS Taken
21.50	22.00	0.50	Fine Sand with Gravel		22.0	DS											DS Taken
22.00	22.50	0.50			22.5	SPT	16	37	45	82	38						Sample Collected
22.50	23.00	0.50			23.0	DS						_					DS Taken
23.00	23.50	0.50			23.5	DS											DS Taken
23.50	24.00	0.50			24.0	SPT	11	24	32	56	27						Sample Collected
24.00	24.50	0.50	Fine Sand		24.5	DS											DS Taken
24.50	25.00	0.50			25.0	DS		77							The latest and the la		DS Taken
25.00	25.50	0.50			25.5	SPT	8	15	19	34							Sample Collected
25.50	26.00	0.50			26.0	DS						103					DS Taken
26.00	26.50	0.50	Silby Clay		26.5	DS								9000			DS Taken
26.50	27.00	0.50	Silty Clay		27.0	SPT	11	15	16	31							Sample Collected
27.00	27.50	0.50			27.5	DS											DS Taken
27.50	28.00	0.50			28.0	DS											DS Taken
28,00	28.50	0,50			28.5	SPT	12	27	40	67	29						Sample Collected
28.50	29.00	0.50			29.0	DS											DS Taken
29.00	29.50	0.50	Fine Sand With Gravel		29.5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	19	40	52	92	36						Sample Collected
30.00	30.50	0.50			30.5	DS				1000 1076 11.0000000							DS Taken
30.50	31.00	0.50			31.0	DS				3							DS Taken
31.00	31.50	0.50			31.5	SPT	13	23	30	53							Sample Collected
31.50	32.00	0.50			32.0	DS											DS Taken
32.00	32,50	0.50			32.5	DS											DS Taken
32.50	33.00	0.50	Clay with Cours		33.0	SPT	15	21	34	55							Sample Collected
33.00	33.50	0.50	Clay with Gravel		33.5	DS											DS Taken
33.50	34.00	0.50			34.0	DS								9			DS Taken
34.00	34.50	0.50			34.5	SPT	12	25	29	54							Sample Collected
34.50	35.00	0.50			35.0	DS											DS Taken
35.00	35.50	0.50			35.5	DS						82					DS Taken

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Client Project

: DFCC

: G.I. for 3 nos Important Bridges

: BH-5(P6)

Existing Ground Lvl. (RL in Mtr)

Depth of Ground Water from EGL (in Mtr)

Date of commencement Date of Completion

: 24.04.2013

: 262.355

: 1.20

: 27.04.2013

Type of Boring Dia of Bore

Bore Hole No.

: Rotary Drilling

: 150mm in soil

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

Conducted By : Binayak Swain

	th(m)	useu	: UDS/Split spoon Sa	inpier/		npling			SPT					Details	s of Rock Core		
Бер	(,	Length		Log	San	ipinig	Blows Requ	uired for Per	37300000					Length of	S OF ROCK COR		
From	То	of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
35,50	36,00	0,50			36.0	SPT	32	59	7cm Penetration N>100				35				DS Taken
36.00	36.50	0.50			36.5	DS											DS Taken
36.50	37.00	0.50	Fine Sand with Gravel		37.0	DS											DS Taken
37.00	37.50	0.50	Time dana with diaver		37.5	SPT	28	63	5cm Penetration N>100								DS Taken
37.50	38.00	0.50			38.0	DS									1		DS Taken
38.00	38.50	0.50			38.5	DS											DS Taken
38.50	39.00	0.50			39.0	SPT	15	25	32	57							Sample Collected
39,00	39,50	0.50			39.5	DS											DS Taken
39.50	40,00	0.50	Clay with Gravel		40.0	DS					60						DS Taken
40.00	40.50	0.50	Clay With Graver		40.5	SPT	19	29	31	60							Sample Collected
40.50	41.00	0.50			41.0	DS											DS Taken
41.00	41.50	0.50			41.5	DS									22		DS Taken
41.50	42.00	0.50			42.0	SPT	17	33	42	75	27						Sample Collected
42.00	42.50	0.50			42.5	DS											DS Taken
42.50	43.00	0.50			43.0	DS											DS Taken
43.00	43.50	0.50			43.5	SPT	29	39	53	92	30						Sample Collected
43.50	44.00	0.50			44.0	DS											DS Taken
44.00	44.50	0.50			44.5	DS											DS Taken
44.50	45.00	0.50			45.0	SPT	30	51	9cm Penetration N>100								DS Taken
45.00	45.50	0.50			45.5	DS											DS Taken
45.50	46,00	0.50	Fine Sand with Gravel		46.0	DS											DS Taken
46.00	46.50	0.50			46.5	SPT	42	62	N>100 4cm Penetration								DS Taken
46.50	47.00	0.50			47.0	DS											DS Taken
47.00	47.50	0.50			47.5	DS											DS Taken
47.50	48.00	0.50			48.0	SPT	65	N>100	6cm Penetration								DS Taken
48.00	48.50	0.50			48.5	DS											DS Taken
48.50	49,00	0.50			49.0	DS											DS Taken
49.00	49.50	0.50			49.5	DS											DS Taken
49.50	50.00	0.50			50.0	SPT	59	N>100	4cm Penetration								DS Taken

BORE LOG DETAILS

Client : DFCC

Project : G.I. for 3 nos Important Bridges Existing Ground Lvl. (RL in Mtr)

: 260.449 : 1.50

Bore Hole No. : BH-6(P3) Depth of Ground Water from EGL (in Mtr) Date of commencement

: 29.04.2013

Type of Boring Dia of Bore

Date of Completion

: 02.05.2013

: Rotary Drilling : 150mm in soil Conducted By

: Binayak Swain

Type of Sampler used	:	UDS/Split spoon Sampler/Core barrel
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Dep	th(m)	usea	: UDS/Split spoon Sa			npling			SPT					Detail	s of Rock Con	9	
		Length	*	Log			Blows Req	uired for Per						Length of	S OF FROM CON		
From	То	of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Correcte d	Total Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	RQD Value (%)	Remark
0.00	0.50	0.50			0.5	DS											DS Take
0.50	1.00	0.50			1,0	DS											DS Take
1,00	1.50	0.50			1.5	SPT	1	2	2	4	7						Sample
1.50	2.00	0.50			2.0	DS											DS Take
2,00	2.50	0.50			2.5	DS							,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				DS Take
2.50	3.00	0.50			3.0	SPT	1	2	3	5	7						Sample Collecte
3.00	3.50	0.50			3.5	DS											DS Take
3.50	4.00	0.50			4.0	DS			10 10 10 10								DS Take
4.00	4.50	0.50			4.5	SPT	3	3	4	7	8						Sample
4.50	5.00	0.50			5.0	DS											DS Tak
5.00	5.50	0.50			5.5	DS											DS Taki
5.50	6.00	0.50			6.0	SPT	2	3	6	9	10						Sampl Collecte
6,00	6.50	0.50	Fine Sand		6.5	DS											DS Tak
6.50	7.00	0.50			7.0	DS						7/					DS Tak
7.00	7.50	0.50			7.5	SPT	2	3	5	8	8						Sample
7.50	8,00	0.50			8.0	DS											DS Tak
8.00	8.50	0.50			8.5	DS											DS Tak
3.50	9.00	0.50			9.0	SPT	4	5	6	11	11						Sample
9.00	9.50	0.50			9.5	DS											DS Take
9.50	10,00	0.50			10.0	DS											DS Take
0.00	10.50	0.50			10.5	SPT	3	5	8	13	12						Sample
0.50	11.00	0.50			11.0	DS											DS Take
1.00	11.50	0.50			11.5	DS			o=#								DS Take
1.50	12.00	0.50			12,0	SPT	6	8	10	18	15						Sample
2.00	12,50	0.50			12.5	DS									7		DS Take
2.50	13,00	0.50			13.0	SPT	11	14	15	29	20						Sample
3.00	13.50	0.50			13.5	SPT	13	15	18	33	22						Sample
3.50	14.00	0.50			14.0	DS	at la										DS Take
4.00	14.50	0.50			14.5	DS											DS Take
4.50	15.00	0.50	Fine Sand W. C.		15.0	SPT	19	21	22	43	26						Sample
5.00	15.50	0.50	Fine Sand with Gravel		15.5	DS											DS Take
5.50	16.00	0.50			16.0	DS											DS Take
5.00	16.50	0.50			16.5	SPT	15	21	36	57	31	A. Iv.					Sample
6.50	17.00	0.50			17.0	DS											DS Take
7.00	17.50	0.50			17.5	DS										$\neg \uparrow$	DS Take

Client Project

: DFCC

: G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

Depth of Ground Water from EGL (in Mtr)

: 260.449 : 1.50 : 29.04.2013

Bore Hole No. : BH-6(P3)

Date of commencement Date of Completion

: 02.05.2013

Type of Boring

: Rotary Drilling

: Binayak Swain

Dia of Bore

: 150mm in soil

Conducted By

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

Type o	i Sample	rused	: UDS/Split spoon Sa	ampier	/Core b	arrei	2000			100000000000000000000000000000000000000			1000				
Dep	oth(m)				Sar	npling			SPT	·				Detail	s of Rock Core	e	
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре		uired for Per depth	ſ	N value (Observed)	N Correcte d	Total Length	No of Pieces	Length of core greater	% of Core Recovery	RQD Value	Remarks
							0 - 15 cm	15 - 30 cm	30 - 45 cm	10 MAGES		(cm)		than 10cm	•	(%)	
17.50	18.00	0.50			18.0	SPT	21	21	24	45	25						Sample Collected
18.00	18.50	0.50			18.5	DS											DS Taken
18,50	19.00	0.50			19.0	DS											DS Taken
19.00	19.50	0.50			19.5	SPT	23	23	26	49	26						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taken
20.00	20.50	0.50	Fine Sand		20.5	DS											DS Taken
20.50	21.00	0.50	Fille Sand	TO THE	21.0	SPT	20	28	29	57	29						Sample Collected
21.00	21.50	0.50			21.5	DS											DS Taken
21.50	22.00	0.50		1	22.0	DS											DS Taken
22.00	22,50	0.50			22.5	SPT	21	27	32	59	29						Sample Collected
22.50	23,00	0.50			23.0	DS											DS Taken
23.00	23.50	0.50			23,5	DS				***							DS Taken
23.50	24.00	0.50			24.0	SPT	29	38	47	85	38						Sample Collected
24.00	24.50	0.50			24.5	DS											DS Taken
24.50	25.00	0.50			25.0	DS				Д.					l de verse	,	DS Taken
25.00	25.50	0.50	Fine Sand With Gravel		25.5	SPT	31	37	43	80	35						Sample Collected
25.50	26.00	0.50			26.0	DS											DS Taken
26.00	26.50	0.50			26.5	DS											DS Taken
26.50	27.00	0.50			27.0	SPT	33	43	6cm Penet	rationN>100			270.				DS Taken
27.00	27.50	0.50			27.5	SPT	19	23	26	49							Sample Collected
27.50	28.00	0.50			28.0	DS											DS Taken
28.00	28.50	0.50			28.5	SPT	13	19	22	41							Sample Collected
28.50	29.00	0.50			29,0	DS								4			DS Taken
29.00	29.50	0.50			29.5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	21	22	26	48							Sample Collected
30.00	30.50	0.50			30.5	DS											DS Taken
30.50	31.00	0,50			31.0	DS											DS Taken
31.00	31.50	0,50	Clausett Control		31.5	SPT	19	28	29	57							Sample Collected
31.50	32.00	0.50	Clay with Gravel		32.0	DS											DS Taken
32.00	32.50	0.50			32.5	DS											DS Taken
32.50	33.00	0.50			33.0	SPT	21	29	32	61							Sample Collected
33.00	33,50	0.50			33.5	DS											DS Taken
33.50	34.00	0.50			34.0	DS					37 - 42						DS Taken
34.00	34.50	0.50			34.5	SPT	27	34	25	59							Sample Collected
34.50	35.00	0.50			35.0	DS											DS Taken
35.00	35.50	0.50			35.5	DS											DS Taken
35.50	36.00	0.50			36.0	SPT	19	32	40	72							Sample Collected
				R/		Control Control	the second second	0.000	Very comment of the last								Collected

Client Project : DFCC

Existing Ground Lvl. (RL in Mtr)

: 260.449

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 1.50 : 29.04.2013

Type of Boring

Date of commencement Date of Completion

Conducted By

: 02.05.2013

Dia of Bore

Bore Hole No.

: Rotary Drilling : 150mm in soil

: Binayak Swain

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

: BH-6(P3)

	th(m)	1000	. Oboropiit spooti sa	T	1	npling			SPT					Details	s of Rock Core	9	
		Length of Run	Description of Strata	Log			Blows Requ	uired for Per depth		N value	N	Total	No of	Length of core	% of Core	RQD	
From	То	or Run		Bore	Depth	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)	Correcte d	Length (cm)	Pieces	greater than 10cm	Recovery	Value (%)	Remarks
36.00	36.50	0.50			36.5	SPT	12	23	29	52	22						Sample Collected
36.50	37,00	0.50			37.0	DS											DS Taken
37.00	37.50	0.50			37.5	SPT	19	21	24	45	20						Sample Collected
37.50	38.00	0.50			38,0	DS											DS Taken
38.00	38.50	0.50			38.5	DS											DS Taken
38.50	39.00	0.50			39.0	SPT	17	25	28	53	22						Sample Collected
39.00	39.50	0.50			39.5	DS											DS Taken
39.50	40.00	0.50			40.0	DS											DS Taken
40.00	40.50	0.50	Fine Sand		40.5	SPT	21	25	42	67	25						Sample Collected
40.50	41.00	0.50			41,0	DS											DS Taken
41.00	41.50	0.50			41.5	DS									70.00 10 - 100 - 1		DS Taken
41.50	42,00	0.50			42.0	SPT	23	25	44	69	25						Sample Collected
42.00	42,50	0.50			42.5	DS											DS Taken
42.50	43,00	0.50			43.0	DS	201122										DS Taken
43.00	43.50	0.50			43.5	SPT	19	31	33	64	23						Sample Collected
43.50	44.00	0.50			44.0	DS											DS Taken
44.00	44.50	0.50			44.5	DS											DS Taken
44.50	45.00	0.50			45.0	SPT	24	39	51	90	29						Sample Collected
45.00	45.50	0.50			45.5	DS											DS Taken
45.50	46,00	0.50			46.0	DS											DS Taken
46.00	46,50	0.50			46.5	SPT	32	35	N>100 9cm	Penetration							DS Taken
46.50	47.00	0.50			47.0	DS											DS Taken
47.00	47.50	0.50	Fine Sand With Gravel	1	47.5	DS											DS Taken
47.50	48.00	0.50			48.0	SPT	30	61	N>100 6cm	Penetration							DS Taken
48,00	48.50	0.50			48.5	DS											DS Taken
48.50	49.00	0.50			49.0	DS											DS Taken
49.00	49.50	0.50			49.5	DS											DS Taken
49.50	50.00	0.50			50.0	SPT	41		N>100 11cm	n Penetration							DS Taken

BORE LOG DETAILS

Existing Ground Lvl. (RL in Mtr)

Client : DFCC

Project : G.I. for 3 nos Important Bridges

: BH-7(P2)

Depth of Ground Water from EGL (in Mtr)

: 0.20 Date of commencement : 03.05.2013 Date of Completion

Type of Boring Dia of Bore

Bore Hole No.

: Rotary Drilling

: 150mm in soil

Conducted By

: 06.05.2013 : Binayak Swain

: 261.837

Type of Sampler used UDS/Split spoon Sampler/Core barrel

				Sam	pling			SPT					Details	s of Rock Core	е	
To	Length of Run	Description of Strata	Log of	Denth	Type	Blows Requ	uired for Per depth	netration of	N value	N	Total	No of	Length of core	% of Core	RQD	Demode
			Bore	Берит	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)	Corected	(cm)	Pieces	greater than 10cm	Recovery	(%)	Remarks
0.50	0.50			0.5	DS											DS Taken
1.00	0.50			1.0	DS											DS Taken
1.50	0.50			1.5	SPT	1	. 2	2	4	7						Sample Collected
2.00	0.50			2.0	DS											DS Taken
2.50	0.50			2.5	DS											DS Taken
3,00	0.50			3,0	SPT	1	3	4	7	9						Sample Collected
3.50	0.50			3.5	DS											DS Taken
4.00	0.50			4.0	DS											DS Taken
4.50	0.50			4.5	SPT	2	3	3	6	7		8				Sample Collected
5.00	0.50	Fire Cond		5.0	DS											DS Taken
5,50	0.50	Fine Sand		5.5	DS											DS Taken
6.00	0.50			6,0	SPT	2	3	5	8	9						Sample Collected
6.50	0.50			6.5	DS											DS Taken
7.00	0.50			7.0	DS											DS Taken
7.50	0.50			7.5	SPT	4	5	7	12	13						Sample Collected
8.00	0.50			8.0	DS											DS Taken
8,50	0.50			8.5	DS											DS Taken
9.00	0.50			9.0	SPT	3	5	6	11	11						Sample Collected
9.50	0.50			9.5	DS											DS Taken
10.00	0.50			10.0	DS											DS Taken
10.50	0.50			10.5	SPT	12	15	19	34	24						Sample Collected
11.00	0.50			11.0	DS											DS Taken
11.50	0.50			11.5	DS											DS Taken
12.00	0.50			12,0	SPT	13	19	20	39	25						Sample Collected
12.50	0.50			12.5	DS											DS Taken
13.00	0.50			13.0	DS											DS Taken
13.50	0.50	Fine Sand With Gravel		13.5	SPT	16	21	27	48	29				-		Sample
14.00	0.50			14.0	DS											Collected DS Taken
14.50	0.50			14.5	DS											DS Taken
15.00	0.50			15,0	SPT	19	21	25	46	27						Sample
15.50	0.50			15,5	DS											Collected DS Taken
16.00	0.50			16.0	DS											DS Taken
16.50	0.50			16.5	SPT	21	23	30	53	29						Sample Collected
	1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 6.00 6.50 7.00 8.00 8.50 9.00 10.00 11.50 11.50 12.50 13.00 14.50 14.50 15.00 15.00	To of Run 0.50 0.50 1.00 0.50 2.00 0.50 2.50 0.50 3.50 0.50 4.50 0.50 5.50 0.50 5.50 0.50 6.50 0.50 7.50 0.50 8.00 0.50 8.50 0.50 9.50 0.50 10.00 0.50 10.50 0.50 11.00 0.50 12.00 0.50 13.50 0.50 14.50 0.50 15.50 0.50	To of Run Description of Strata 0.50 0.50 1.00 0.50 1.50 0.50 2.00 0.50 3.00 0.50 3.50 0.50 4.50 0.50 5.00 0.50 5.50 0.50 6.50 0.50 7.00 0.50 7.00 0.50 8.00 0.50 8.00 0.50 9.00 0.50 9.00 0.50 10.00 0.50 11.00 0.50 11.50 0.50 12.50 0.50 13.50 0.50 14.50 0.50 14.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50 15.50 0.50	To of Run of Run Description of Strata of Bore 0.50	To of Run of Run Description of Strata Description of Strata 0.50	To Control Description of Strata of Bore Depth Type 0.50 0.50 0.50 1.0 DS 1.50 0.50 1.5 SPT 2.00 0.50 2.5 DS 3.00 0.50 3.0 SPT 3.50 0.50 4.0 DS 4.50 0.50 4.5 SPT 5.00 0.50 5.5 DS 6.50 0.50 5.5 DS 6.50 0.50 6.5 DS 7.00 0.50 7.0 DS 7.50 0.50 7.5 SPT 8.00 0.50 8.5 DS 9.00 0.50 9.0 SPT 9.00 0.50 9.0 SPT 9.5 DS 10.0 DS 10.00 0.50 11.0 DS 11.50 0.50 11.5 DS 12.0 0.50 11.5 <td> Length of Run</td> <td> Length of Run</td> <td>To Congression of Rivata Sort Bore Rose Depth Page 1 Type Type Rose Rose Rose Rose Rose Rose Rose Ros</td> <td>To of Part of</td> <td> Paring the first of the firs</td> <td> Part</td> <td> Part</td> <td> Part</td> <td> </td> <td> Mathematical part</td>	Length of Run	Length of Run	To Congression of Rivata Sort Bore Rose Depth Page 1 Type Type Rose Rose Rose Rose Rose Rose Rose Ros	To of Part of	Paring the first of the firs	Part	Part	Part		Mathematical part

4702

Client : DFCC Existing Ground Lvl. (RL in Mtr)

: 261.837

Project

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 0.20 : 03.05.2013

Bore Hole No. BH-7(P2) Date of commencement

: 06.05.2013

Type of Boring Dia of Bore

: Rotary Drilling 150mm in soil

Date of Completion Conducted By

: Binayak Swain

Type of Sampler used : UDS/Split spoon Sampler/Core barrel

-	th(m)		: UDS/Split spoon Sa			pling			SPT					Detail:	s of Rock Core		
From	То	Length of Run	Description of Strata	Log of Bore	Depth	Туре	Blows Req	uired for Per depth		N value	N	Total Length	No of	Length of core	% of Core	RQD Value	Remarks
							0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)	Corected	(cm)	Pieces	greater than 10cm	Recovery	(%)	
16,50	17.00	0.50			17.0	SPT	13	19	22	41	24			177			Sample Collected
17.00	17.50	0.50			17,5	DS											DS Taken
17.50	18.00	0,50			18.0	SPT	14	18	21	39	23						Sample Collected
18.00	18.50	0.50			18,5	DS											DS Taken
18.50	19.00	0.50			19.0	DS											DS Taken
19.00	19.50	0.50	Fine Sand		19.5	SPT	13	21	21	42	23						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taker
20,00	20,50	0.50			20.5	DS										- 1	DS Taken
20.50	21.00	0.50			21.0	SPT	17	23	28	51	27						Sample Collected
21.00	21.50	0.50			21,5	DS											DS Taker
21.50	22.00	0.50			22.0	DS											DS Taker
22.00	22.50	0,50	*		22.5	SPT	17	29	33	62	30						Sample Collected
22.50	23.00	0.50			23.0	DS											DS Taker
23.00	23.50	0.50			23.5	DS											DS Taker
23,50	24.00	0.50			24.0	SPT	24	34	43	77	35						Sample Collected
24.00	24.50	0.50			24.5	DS											DS Taker
24.50	25.00	0,50			25.0	DS											DS Taker
25.00	25.50	0.50			25.5	SPT	35	49	10 cm Pene	etrationN>100							DS Taker
25.50	26.00	0.50			26.0	DS									26 - 26 - 26 - 27		DS Taker
26,00	26.50	0.50	Fine Sand With Gravel		26.5	DS											DS Taker
26.50	27.00	0.50	The oal a Thai Glate.		27.0	SPT	33	54	8cm Penet	ration N>100							DS Taker
27.00	27.50	0.50			27.5	DS			1900 THE TOTAL TO SERVE								DS Taker
27.50	28.00	0.50			28.0	DS											DS Taker
28.00	28.50	0.50			28.5	SPT	27	39	54	93	37						Sample Collected
28.50	29.00	0.50			29.0	DS											DS Taken
29.00	29.50	0.50			29.5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	41	64	N>100 6cm	Penetration							DS Taken
30.00	30.50	0.50		55 65	30.5	DS											DS Taken
0.50	31,00	0.50			31.0	DS											DS Taker
1.00	31,50	0.50			31,5	SPT	14	24	28	52							Sample Collected
1.50	32,00	0.50			32.0	DS											DS Taken
2.00	32,50	0.50	Clay With Count		32.5	DS											DS Taken
2.50	33,00	0.50	Clay With Gravel		33.0	SPT	13	21	29	50							Sample Collected
3.00	33.50	0.50			33.5	DS											DS Taken
3.50	34.00	0.50			34.0	DS											DS Taken

Client Project

41.00

41.50

42.50

43.00

43,50

44.00

44.50

45.00

45.50

46.00

46.50

47.00

47.50

48.00

48.50

49.50

41,50

42,00

42.50

43.00

43.50

44.00

44,50

45,00

45.50

46.00

46.50

47.00

47.50

48.00

48.50

49.00

49.50

50.00

0.50

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0.50

0.50

0.50

0.50

Fine Sand

Fine Sand With Gravel

: DFCC

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 261.837 : 0.20

Date of commencement

Existing Ground Lvl. (RL in Mtr)

: 03.05,2013

Type of Boring

Bore Hole No.

: Rotary Drilling

Date of Completion

: 06.05.2013

: BH-7(P2)

Conducted By

: Binayak Swain

Dia of I	Bore		: 150mm in soil														
-	Sample	r used	: UDS/Split spoon Sa	ampler	T	0.00	r										
Dep	th(m)	Length	Description of Strata	Log	San	npling	Blows Req	uired for Per depth	SPT netration of			Total		Details Length of	s of Rock Cor	RQD	
From	То	of Run	Description or Strata	of Bore	Depth	Туре	0 - 15 cm		30 - 45 cm	N value (Observed)	N Corected	Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	Value (%)	Remarks
34.00	34.50	0.50			34.5	SPT	19	34	44	78	31						Sample Collected
34,50	35.00	0.50			35.0	DS											DS Taker
35.00	35.50	0.50			35.5	DS											DS Taker
35.50	36.00	0.50			36.0	SPT	28	41	48	89	33						Sample Collected
36.00	36,50	0.50			36.5	DS											DS Take
36.50	37,00	0.50	100		37.0	DS											DS Taker
37.00	37.50	0.50	Fine Sand With Gravel		37.5	SPT	31	43	49	92	33						Sample Collected
37.50	38.00	0.50			38.0	DS											DS Taker
38.00	38,50	0.50			38.5	DS											DS Taker
38.50	39.00	0.50			39.0	SPT	27	43	47	90	32						Sample Collected
39.00	39,50	0.50			39.5	DS											DS Taker
39.50	40.00	0.50			40.0	DS											DS Taker
10.00	40.50	0.50			40.5	SPT	23	31	52	83	30						Sample Collected
40.50	41.00	0.50			41.0	DS											DS Taker
			I	C. C. C.													

DS

SPT

DS

SPT

DS

DS

SPT

DS

SPT

DS

DS

SPT

DS

DS

DS

20

29

25

31

33

33

32

44

37

40

46

54

N>100 5cm Penetration

N>100 4cm Penetration

70

73

78

98

25

25

26

30

41.5

42.0

42.5

43.0

43.5

44.0

44.5

45.0

45.5

46.0

46.5

47.0

47.5

48.0

48.5

49.0

49.5

4704

DS Taken Sample

Collected

DS Taken

DS Taken

Sample Collected

DS Taken

DS Taken

Sample

Collected

DS Taken

DS Taken Sample

DS Taken

BORE LOG DETAILS

: DFCC Client

; G.I. for 3 nos Important Bridges

Existing Ground Lvl. (RL in Mtr)

: 263.870

Bore Hole No.

Project

Depth of Ground Water from EGL (in Mtr)

: 0.40 : 07.05.2013

: BH-8(P1)

Date of commencement

: 10.05,2013

Type of Boring Dia of Bore

: Rotary Drilling : 150mm in soil

Date of Completion Conducted By

: Binayak Swain

	th(m)		: UDS/Split spoon Sa		1	npling			SPT					Details	of Rock Con	8	
		Length		Log			Blows Red	uired for Pe	6900000					Length of			
rom	То	of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	RQD Value (%)	Remark
0.00	0.50	0,50			0.5	DS											DS Take
0.50	1.00	0.50			1.0	DS											DS Take
1.00	1.50	0,50			1.5	SPT	1	1	2	3	5						Sample
1.50	2.00	0.50			2.0	DS											DS Take
2.00	2.50	0.50			2.5	DS											DS Take
2.50	3.00	0.50			3.0	SPT	2	2	3	5	7						Sample Collecte
3.00	3,50	0.50			3.5	DS											DS Take
3.50	4.00	0.50	0		4,0	DS											DS Take
4.00	4.50	0.50	Fine Sand		4.5	SPT	2	4	5	9	10)		Sample
4.50	5.00	0.50			5.0	DS											DS Take
5.00	5.50	0.50		WA.	5,5	DS											DS Take
5.50	6.00	0.50			6,0	SPT	2	4	4	8	9						Sample
6.00	6.50	0.50			6.5	DS											DS Take
6.50	7.00	0.50			7.0	DS											DS Take
7.00	7.50	0.50			7.5	SPT	3	4	7	11	12						Sample
7,50	8.00	0.50			8.0	DS											DS Take
8.00	8.50	0.50			8.5	DS											DS Take
8.50	9.00	0.50			9.0	SPT	9	14	15	29	22						Sample
9.00	9.50	0.50			9.5	DS											DS Take
9.50	10.00	0.50			10.0	DS											DS Take
10.00	10.50	0.50			10,5	SPT	11	15	18	33	23						Sample
10,50	11,00	0.50			11.0	DS											DS Take
11.00	11.50	0.50			11.5	DS						(10.		DS Take
11.50	12.00	0.50			12.0	SPT	9	16	16	32	22						Sample
12.00	12.50	0.50			12.5	DS											DS Take
12.50	13.00	0.50			13.0	DS											DS Take
13.00	13,50	0.50	Fine Sand With Gravel		13.5	SPT	13	20	22	42	26						Sample
13.50	14.00	0.50			14.0	DS											DS Take
14.00	14.50	0.50			14.5	DS											DS Take
14.50	15.00	0.50			15.0	SPT	19	19	25	44	26						Sample
15.00	15,50	0.50			15.5	DS											DS Take
15.50	16,00	0.50			16.0	DS											DS Take
16.00	16,50	0.50			16.5	SPT	21	25	32	57	31						Sample
16.50	17.00	0.50			17.0	DS									0.400		DS Take
17.00	17.50	0.50			17.5	DS											DS Take
17.50	18.00	0.50			18.0	SPT	21	29	33	62	32						Sample

Client

: DFCC

Project

: G.I. for 3 nos Important Bridges

: BH-8(P1)

Depth of Ground Water from EGL (in Mtr)

Existing Ground Lvl. (RL in Mtr)

Date of commencement

: 07.05.2013 : 10.05.2013

: 263.870

; 0,40

Date of Completion Conducted By

Type of Boring

Bore Hole No.

: Rotary Drilling : 150mm in soil

Type of Sampler used

: UDS/Split spoon Sampler/Core barrel

: Binayak Swain

	th(m)			Γ		pling			SPT					Details	s of Rock Core		
From	То	Length of Run	Description of Strata	Log	Donth	Tuno	Blows Red	uired for Per depth	netration of	N value	N	Total	No of	Length of core	% of Core	RQD	B
Pion	10			Bore	Depth	Туре	0 - 15 cm	15 - 30 cm	30 - 45 cm	(Observed)	Corected	Length (cm)	Pieces	greater than 10cm	Recovery	Value (%)	Remarks
18.00	18,50	0.50			18.5	SPT	14	19	21	40	23						Sample Collected
18.50	19.00	0.50			19.0	DS											DS Taken
19,00	19.50	0.50	Fine Sand		19.5	SPT	17	22	26	48	26						Sample Collected
19.50	20.00	0.50			20.0	DS											DS Taken
20.00	20.50	0.50			20.5	DS											DS Taken
20.50	21.00	0.50			21.0	SPT	19	26	29	55	28						Sample Collected
21.00	21.50	0.50			21.5	DS											DS Taken
21.50	22.00	0.50			22.0	DS											DS Taken
22.00	22.50	0.50			22.5	SPT	18	30	33	63	31						Sample Collected
22.50	23.00	0.50			23.0	DS											DS Taken
23.00	23.50	0.50			23.5	DS								William 1			DS Taken
23.50	24.00	0.50			24.0	SPT	27	32	46	78	35						Sample Collected
24.00	24,50	0.50	Fine Sand With Gravel		24.5	DS											DS Taken
24.50	25.00	0.50			25.0	DS	XX.53										DS Taken
25.00	25.50	0.50			25.5	SPT	29	33	39	72	32						Sample Collected
25.50	26.00	0.50			26.0	DS											DS Taken
26.00	26.50	0.50			26.5	DS											DS Taken
26.50	27.00	0.50			27.0	SPT	31	38	43	81	35						Sample Collected
27.00	27.50	0.50			27.5	DS											DS Taken
27.50	28.00	0.50			28.0	DS											DS Taken
28,00	28.50	0.50			28,5	SPT	16	23	25	48							Sample Collected
28.50	29.00	0.50			29.0	DS				38.00							DS Taken
29.00	29.50	0.50	Clay Wth Gravel		29,5	DS											DS Taken
29.50	30.00	0.50			30.0	SPT	17	22	34	56			-				Sample Collected
30.00	30.50	0.50			30.5	DS											DS Taken
30.50	31.00	0.50			31.0	SPT	20	20	30	50	24						Sample Collected
31,00	31.50	0.50	4		31.5	SPT	19	22	26	48	22						Sample Collected
31.50	32.00	0.50			32.0	DS											DS Taken
32.00	32,50	0.50	Fine Sand		32.5	DS											DS Taken
32.50	33.00	0.50			33.0	SPT	22	27	30	57	25						Sample Collected
33.00	33,50	0.50			33.5	DS						200			200		DS Taken
33.50	34.00	0.50			34.0	DS											DS Taken

Client

: DFCC

Existing Ground Lvl. (RL in Mtr)

: 263.870

Project

: G.I. for 3 nos Important Bridges

Depth of Ground Water from EGL (in Mtr)

: 0.40

Bore Hole No.

: BH-8(P1)

Date of commencement Date of Completion

: 07.05.2013 : 10.05.2013

Type of Boring

: Rotary Drilling

Conducted By

Dia of Bore Type of Sampler used : UDS/Split spoon Sampler/Core barrel

: 150mm in soil

: Binayak Swain

Lanna -	th(m)	used	: UDS/Split spoon Sa	mpier/	T	npling	l	Ai-	SPT					Details	of Rock Core		
		Length		Log			Blows Rec	uired for Pe						Length of			-
From	То	of Run	Description of Strata	of Bore	Depth	Туре	0 - 15 cm	depth 15 - 30 cm	30 - 45 cm	N value (Observed)	N Corected	Total Length (cm)	No of Pieces	core greater than 10cm	% of Core Recovery	RQD Value (%)	Remarks
34.00	34.50	0.50			34.5	SPT	22	32	45	77	30						Sample Collected
34.50	35,00	0.50			35.0	DS											DS Taken
35.00	35.50	0.50			35.5	DS											DS Taken
35.50	36.00	0.50			36.0	SPT	29	44	44	88	33						Sample Collected
36.00	36.50	0.50			36,5	DS											DS Taken
36.50	37.00	0.50			37.0	DS											DS Taken
37.00	37.50	0.50			37.5	SPT	25	35	47	82	30						Sample Collected
37.50	38.00	0.50	Fine Sand With Gravel		38.0	DS											DS Taken
38.00	38.50	0.50			38,5	DS											DS Taken
38,50	39.00	0.50			39.0	SPT	35	57	N>100 9cn	n Penetration							DS Taken
39.00	39.50	0.50			39.5	DS											DS Taken
39.50	40.00	0.50			40.0	DS											DS Taken
40.00	40.50	0.50			40.5	SPT	41	67	N>100 7cn	n Penetration							DS Taken
40.50	41.00	0.50			41.0	DS											DS Taken
41.00	41.50	0.50			41.5	DS											DS Taken
41,50	42.00	0.50	Fine Sand		42.0	SPT	27	38	39	77	27						Sample Collected
42.00	42.50	0.50	Fille Salid		42.5	DS						83					DS Taken
42.50	43.00	0.50			43.0	SPT	30	41	48	89	30						Sample Collected
43.00	43.50	0.50			43.5	SPT	28	46	51	97	31						Sample Collected
43.50	44,00	0.50			44.0	DS											DS Taken
44.00	44.50	0.50			44.5	DS											DS Taken
44.50	45.00	0.50			45.0	SPT	38	57		0 11 cm etration							DS Taken
45.00	45.50	0.50			45.5	DS											DS Taken
45.50	46.00	0.50			46.0	DS											DS Taken
46.00	46.50	0.50	Fine Sand With Gravel		46.5	SPT	34	61	N>100 8 cm	n Penetration		34 sh -45					DS Taken
46.50	47.00	0.50			47.0	DS											DS Taken
47.00	47.50	0.50			47,5	DS											DS Taken
47.50	48.00	0.50			48.0	SPT	52		N>100 9cn	n Penetration							DS Taken
48.00	48,50	0.50			48.5	DS											DS Taken
48.50	49,00	0.50			49.0	DS											DS Taken
49.00	49.50	0.50			49.5	DS											DS Taken
49.50	50.00	0.50			50.0	SPT	59		N>100 5cm	Penetration							DS Taken

	CA	LCULATION	ONS FOR CO	RRECTED SI	PT (N) VALU	JES	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (Vm2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.0		30.210				1000
	1.5	1.00	1.50	1.72	9	15	15
	3.0	1.00	3.00	1.40	11	15	15
	4.5	1.00	4.50	1.22	12	15	15
	6.0	1.00	6.00	1.18	15	18	16
	7.5	1.00	7.50	1.10	19	21	18
	9.0	1.00	9.00	1.06	16	17	16
	10.5	1.00	10.50	0.98	23	23	19
	12.0	1.00	12.00	0.92	25	23	19
	13.5	1.00	13.50	0.93	37	34	25
	15.0	1.00	15.00	0.90	42	38	26
BH-1(A2)	16.5	1.00	16.50	0.83	51	42	29
	18.0	1.00	18.00	0.80	47	38	26
	19.5	1.00	19.50	0.79	58	46	30
	21.0	1.00	21.00	0.78	62	48	32
	22.5	1.00	22.50	0.75	75	56	36
	24.0	1.00	24.00	0.72	83	60	37
	27.0	1.00	27.00	0.64	85	54	35
	39.0	1.00	39.00	0.59	74	44	29
	40.5	1.00	40.50	0.57	87	50	32
	43.5	1.00	43.50	0.56	76	43	29
	45.0	1.00	45.00	0.50	78	39	27

	<u>C</u> A	LCULATION	ONS FOR CO	RRECTED SE	PT (N) VALU	JES	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (t/m2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.0						10
	1.5	1.00	1.50	1.72	3	5	5
	3.0	1.00	3.00	1.40	4	6	6
	4.5	1.00	4.50	1.22	6	7	7
	6.0	1.00	6.00	1.18	3	4	4
	7.5	1.00	7.50	1.10	7	8	8
	9.0	1.00	9.00	1.06	11	12	12
	10.5	1.00	10.50	0.99	13	13	13
	11.0	1.00	11.00	0.98	33	32	24
	12.0	1.00	12.00	0.92	44	40	28
	13.5	1.0	13.5	0.93	34	32	23
BH-2(P4)	15.0	1.00	15.00	0.90	41	37	26
B11-2(1 4)	16.5	1.00	16.50	0.83	56	46	31
	18.0	1.00	18.00	0.80	67	54	34
	19.5	1.00	19.50	0.79	62	49	32
	21.0	1.00	21.00	0.78	84	66	40
	24.0	1.00	24.00	0.72	86	62	38
	25.5	1.00	25.50	0.69	73	50	33
	37.5	1.00	37.50	0.55	35	19	17
	39.0	1.00	39.00	0.52	51	27	21
	40.5	1.00	40.50	0.56	67	38	26
	42.0	1.00	42.00	0.54	75	41	28
	43.5	1.00	43.50	0.51	67	34	25

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	<u>C</u>	LCULATION	ONS FOR CO	RRECTED SE	PT (N) VALU	JES	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (t/m2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.0						
	1.5	1.00	1.50	1.72	2	3	3
	3.0	1.00	3.00	1.40	5	7	7
	4.5	1.00	4.50	1.22	9	11	11
	6.0	1.00	6.00	1.18	11	13	13
	7.5	1.00	7.50	1.10	10	11	11
	9.0	1.00	9.00	1.06	29	31	23
	10.5	1.00	10.50	0.98	38	37	26
	12.0	1.00	12.00	0.92	43	40	27
	13.5	1.00	13.50	0.93	50	47	31
BH-3(P5)	15.0	1.00	15.00	0.90	32	29	22
B11-3(1 3)	16.5	1.00	16.50	0.83	36	30	22
	18.0	1.00	18.00	0.80	47	38	26
	19.5	1.00	19.50	0.79	71	56	36
	21.0	1.00	21.00	0.78	78	61	38
	22.5	1.00	22.50	0.75	90	68	41
	24.0	1.00	24.00	0.72	62	45	30
	25.5	1.00	25.50	0.69	67	46	31
	42.0	1.00	42.00	0.54	74	40	27
	43.5	1.00	43.50	0.51	79	40	28
	46.5	1.00	46.50	0.47	92	43	29

	<u>C</u> A	LCULATION	ONS FOR CO	RRECTED SF	PT (N) VALU	J <u>ES</u>	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (Vm2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.00						
	1.5	1.00	1.50	1.72	6	10	10
	3.0	1.00	3.00	1.40	12	17	16
	4.5	1.00	4.50	1.22	11	13	13
	6.0	1.00	6.00	1.18	16	19	17
	7.5	1.00	7.50	1.10	30	33	24
	9.0	1.00	9.00	1.06	37	39	27
	10.5	1.00	10.50	0.99	35	35	25
	12.0	1.00	12.00	0.92	29	27	21
	13.5	1.00	13.50	0.93	32	30	22
	15.0	1.00	15.00	0.90	36	32	24
BH-4(A1)	16.5	1.00	16.50	0.83	40	33	24
	18.0	1.00	18.00	0.80	49	39	27
	19.5	1.00	19.50	0.79	51	40	28
	21.0	1.00	21.00	0.78	71	55	35
	22.5	1.00	22.50	0.75	54	41	28
	24.0	1.00	24.00	0.72	68	49	32
	25.5	1.00	25.50	0.69	69	48	31
	27.0	1.00	27.00	0.66	80	53	34
	28.5	1.00	28.50	0.63	93	59	37
	34.5	1.00	34.50	0.59	70	41	28
	37.5	1.00	37.50	0.55	70	39	27

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	CA	LCULATION	ONS FOR CO	RRECTED SE	PT (N) VALU	JES .	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (Vm2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.00						***
	1.5	1.00	1.50	1.75	2	4	3
	3.0	1.00	3.00	1.40	3	4	4
	4.5	1.00	4.50	1.22	5	6	6
	6.0	1.00	6.00	1.16	6	7	6
	7.5	1.00	7.50	1.10	10	11	11
	9.0	1.00	9.00	1.04	19	20	17
	10.5	1.00	10.50	0.98	21	21	17
	12.0	1.00	12.00	0.94	32	30	22
	13.5	1.00	13.50	0.90	43	39	26
BH-5(P6)	15.0	1.00	15.00	0.87	32	28	21
	16.5	1.00	16.50	0.83	36	30	22
	18.0	1.00	18.00	0.80	28	22	18
	19.5	1.00	19.50	0.79	31	24	19
	21.0	1.00	21.00	0.77	53	41	27
	22.5	1.00	22.50	0.75	82	62	38
	24.0	1.00	24.00	0.72	56	40	27
	28.5	1.00	28.50	0.65	67	44	29
	30.0	1.00	30.00	0.64	92	58	36
	42.0	1.00	42.00	0.52	75	39	27
	43.5	1.00	43.50	0.50	92	46	30

	CA	LCULATION	ONS FOR CO	RRECTED SE	PT (N) VALU	JES	
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (t/m2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")
	0.00						
	1.5	1.00	1.50	1.75	4	7	7
	3.0	1.00	3.00	1.40	5	7	7
	4.5	1.00	4.50	1.22	7	9	8
	6.0	1.00	6.00	1.16	9	10	10
	7.5	1.00	7.50	1.10	8	9	8
	9.0	1.00	9.00	1.04	11	11	11
	10.5	1.00	10.50	0.98	13	13	12
	12.0	1.00	12.00	0.94	18	17	15
	13.0	1.00	13.00	0.92	29	27	20
	13.5	1.00	13.50	0.90	33	30	22
	15.0	1.00	15.00	0.87	43	37	26
	16.5	1.00	16.50	0.83	57	47	31
BH-6(P3)	18.0	1.00	18.00	0.80	45	36	25
2.1 0(1 0)	19.5	1.00	19.50	0.79	49	38	26
	21.0	1.00	21.00	0.77	57	44	29
	22.5	1.00	22.50	0.75	59	44	29
	24.0	1.00	24.00	0.72	85	61	38
	25.5	1.00	25.50	0.70	80	56	35
	36.5	1.00	36.50	0.58	52	30	22
	37.5	1.00	37.50	0.57	45	26	20
	39.0	1.00	39.00	0.56	53	29	22
	40.5	1.00	40.50	0.54	67	36	25
8	42.0	1.00	42.00	0.52	69	36	25
	43.5	1.00	43.50	0.50	64	32	23
	45.0	1.00	45.00	0.49	90	44	29

CALCULATIONS FOR CORRECTED SPT (N) VALUES										
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (t/m2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")			
	0.00									
	1.5	1.00	1.50	1.75	4	7	7			
	3.0	1.00	3.00	1.40	7	10	9			
	4.5	1.00	4.50	1.22	6	7	7			
	6.0	1.00	6.00	1.16	8	9	9			
	7.5	1.00	7.50	1.10	12	13	13			
	9.0	1.00	9.00	1.04	11	11	11			
	10.5	1.00	10.50	0.98	34	33	24			
	12.0	1.00	12.00	0.94	39	37	25			
· ·	13.5	1.00	13.50	0.90	48	43	29			
	15.0	1.00	15.00	0.87	46	40	27			
	16.5	1.00	16.50	0.83	53	44	29			
	17.0	1.00	17.00	0.82	41	34	24			
	18.0	1.00	18.00	0.80	39	31	23			
BH-7(P2)	19.5	1.00	19.50	0.79	42	33	23			
	21.0	1.00	21.00	0.77	51	39	27			
	22.5	1.00	22.50	0.75	62	47	30			
	24.0	1.00	24.00	0.72	77	55	35			
	28.5	1.00	28.50	0.65	93	60	37			
	34.5	1.00	34.50	0.61	78	48	31			
	36.0	1.00	36.00	0.59	89	52	33			
	37.5	1.00	37.50	0.57	92	52	33			
	39.0	1.00	39.00	0.56	90	50	32			
	40.5	1.00	40.50	0.55	83	45	30			
	42.0	1.00	42.00	0.52	70	36	25			
	43.5	1.00	43.50	0.50	73	37	25			
	45.0	1.00	45.00	0.49	78	38	26			
	46.5	1.00	46.50	0.47	98	46	30			

CALCULATIONS FOR CORRECTED SPT (N) VALUES										
BOREHOLE NO	DEPTH OF SAMPLE	BULK / SUB DENSITY (t/m3) y	OVERBURDEN PRESSURE (t/m2)	OVERBURDEN CORRECTION FACTOR (Cn)	OBSERVED SPT 'N' VALUE (N)	CORRECTED SPT (N') VALUE (FOR OVERBURDEN)	FINAL CORRECTED VALUE AFTER DILATANCY CORRECTION (N")			
×	0.00									
	1.5	1.00	1.50	1.75	3	5	5			
	3.0	1.00	3.00	1.40	5	7	7			
	4.5	1.00	4.50	1.22	9	11	10			
	6.0	1.00	6.00	1.16	8	9	9			
	7.5	1.00	7.50	1.10	11	12	12			
	9.0	1.00	9.00	1.04	29	30	22			
	10.5	1.00	10.50	0.98	33	32	23			
	12.0	1.00	12.00	0.94	32	30	22			
	13.5	1.00	13.50	0.90	42	38	26			
	15.0	1.00	15.00	0.87	44	38	26			
	16.5	1.00	16.50	0.83	57	47	31			
	18.0	1.00	18.00	0.80	62	50	32			
	18.5	1.00	18.50	0.80	40	32	23			
	19.5	1.00	19.50	0.79	48	38	26			
BH-8(P1)	21.0	1.00	21.00	0.77	55	42	28			
	22.5	1.00	22.50	0.75	63	47	31			
	24.0	1.00	24.00	0.72	78	56	35			
	25.5	1.00	25.50	0.70	72	50	32			
	27.0	1.00	27.00	0.68	81	55	35			
	31.0	1.00	31.00	0.68	50	34	24			
	31.5	1.00	31.50	0.62	48	30	22			
	33.0	1.00	33.00	0.62	57	35	25			
	34.5	1.00	34.50	0.61	77	47	30			
	36.0	1.00	36.00	0.59	88	51	33			
	37.5	1.00	37.50	0.57	82	47	30			
	42.0	1.00	42.00	0.52	77	40	27			
	43.0	1.00	43.00	0.51	89	45	30			
	43.5	1.00	43.50	0.50	97	49	31			

Appendix –II

(Sample Calculation)

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