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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED DEVELOPMENT
PALGHAR, BHOISAR (E)
FOR M/S. U.S. HOLIDAY REALTY PVT. LTD.

Submitted to,
M/S. U.S. HOLIDAY REALTY PVT. LTD.

GEOTEK CONSORTIUM

Office No. 3, Ground Floor,
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GEOTECHNICAL INVESTIGATION REPORT
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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED DEVELOPMENT
PALGHAR, BHOISAR (E)
FOR M/S. U.S. HOLIDAY REALTY PVT. LTD.

1.0 INTRODUCTION

M/s. U. S. Holiday Realty Pvt. Ltd. plans development of a plot in Bhoisar (E). The work of geotechnical investigation was awarded to M/s. Drill Tech Engineers. The field work and laboratory tests for the geotechnical investigation were completed by M/s. Drill Tech Engineers in January 2008. This report prepared by Geotek Consortium presents results of the geotechnical investigation along with foundation recommendations for the proposed development.

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Eight Boreholes (BH-1 to BH-8) were completed for the project as illustrated on the Borehole Location Plan in the Annexure.

2.2 Subsurface Conditions

Subsurface profile at this site generally consists of residual soils underlain by completely weathered bedrock and then Bedrock. Encountered soil/rock layers are described below;

LAYER I: RESIDUAL SOILS

Residual soils, consisting mostly of yellowish brown clay, were encountered directly from the ground surface in the boreholes. This layer is formed by the complete in-place disintegration of parent bedrock material to texture of soil. Based on Standard Penetration Tests (SPT), consistency of the cohesive soils, was very stiff. The lower boundary of this layer was encountered at depths between 2.0m and 3.0m below ground surface.

LAYER III: COMPLETELY WEATHERED BEDROCK (HARD MURRUM)

Completely weathered bedrock was encountered at depths between 2.0m and 3.0m below ground surface. This layer is formed by the complete in-place disintegration of parent bedrock material, but still partially retains the original rock mass structure and is also locally known as hard murrum. Core Recoveries and Rock Quality Designation (RQD) were nil. SPT tests conducted in this layer encountered refusals. The lower boundary of this layer was encountered at depths between 2.0m and 6.0m below ground surface.

LAYER III: BASALT BEDROCK

Brownish Gray Basalt bedrock was encountered at depths between 2.0m and 6.0m below ground surface in the boreholes. The bedrock was highly weathered to sound, generally improving with depth. Core Recoveries varied between 20% and 98%, while Rock Quality Designation (RQD) ranged between 0% and 98%. Compressive strength of rock core samples ranged between 400 kg/cm2 and 775 kg/cm2. The boreholes were terminated in this bedrock layer at depths between 7.0m and 15.50m below ground surface.

2.3 Ground water Levels

Groundwater accumulation in boreholes was monitored during and after completion of drilling activities. Groundwater was observed in boreholes at a depth of approximately 5.0m below ground surface. Seasonal and annual fluctuations in ground water levels can be expected.

3.0 FOUNDATION RECOMMENDATIONS

Completely weathered bedrock (hard murrum) was encountered at depths typically between 2.0m and 3.0m below ground surface. Spread/raft foundations for the proposed structures, supported on this strata at a depth of 3.0m below ground surface, or on bedrock if encountered earlier, can be designed for a maximum net allowable bearing pressure of 40 t/m^2.

Minimum footing width should be 1.0m. Maximum settlement of foundations will be less than 10mm. A modulus of subgrade reaction of 4,000 t/m3 can be utilized for design of foundations.

Excavation sides should be sloped at a maximum slope of 1:2 (horizontal:vertical) or flatter. Dewatering will be required in footing excavations. Excavations should not be kept exposed for prolonged periods of time prior to pouring of PCC. Excavated soils are suitable for use as footing backfill.

3.1 Foundation Protection

Results of chemical analysis on groundwater samples enclosed in the Annexure, indicate that the site falls under Class 1 for sulphate and chloride concentrations (As per IS456 and as per CIRIA Sp. Publication No. 31). A 'moderate' Exposure Condition was assigned to this site. Therefore only following normal precautions are recommended to protect subsurface concrete and reinforcement.

Type of Cement:	OPC or PPC
Minimum Grade of Reinforced Concrete:	M25
Minimum Cement Content for spread footings:	300 kg/m^3
Maximum Water Cement Ratio:	0.50
Minimum Cover to Reinforcement:	50mm

4.0 FIELD EXPLORATION PROCEDURES

The sub-surface investigation was completed generally as per IS: 1892-1979. The field investigation was carried out using a rotary machine. Casing was used to support sides of borehole until sufficiently stiff strata was encountered. Standard Penetration Tests (i.e. SPT) were carried out in soil in accordance with IS 2131-1981. Using this procedure, a 2" outside diameter split-barrel sampler is driven into the soil by 63.5 kg. weight falling through 75 cm height. After an initial set of 15cm, the number of blows required to drive the sampler an additional 30 cm, is known as the "penetration resistance" or "N value".

When SPT refusal was obtained in hard strata, rock coring was done using diamond bit and double tube core barrel to obtain rock samples. Percent Rock Core Recovery and Rock Quality Designation (%RQD) were determined. % RQD = 100 x Sum of length of rock pieces in cms, each having lengths greater than 10cms/Total length of core run.

Sincerely,

GEOTEK CONSORTIUM

Jaydeep Wagh
B.E., M.S., P.E. (Geotechnical)

REFERENCES

1) Foundation Analysis and Design, J.E. Bowles, McGraw Hill Publication, 5th Edition, 1996.

2) Canadian Foundation Engineering Manual.

3) Soil Mechanics in Engineering Practice, 2nd Edition, Terzaghi K. and Peck R. B., John Willey and Sons, 1967.

4) Foundation Design Manual, N. V. Nayak, 5th Edition, 1996.

5) IS:6403-1981, Code of Practice for Design and Construction of Shallow Foundations on Soils.

CLIENT : **U S HOLIDAY REALITY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -02 | Date:-28/10/2008 TO 31/10/2008

Rock Started at 6.00M | Water Level at : 4.90M | Final Depth 7.00M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50									
				1.75	DS-1 SPT1	15	10 17	50		N 750			
2.00													
3.00				3.00	1-3						39%	8%	
4.00			BROWNISH GRAY BESALT ROCK	4.50	4-7						47%	45%	
5.00													
6.00				6.00	8-12						35%	NIL	
7.00				7.00	13-17						55%	30%	
8.00													
9.00													
10.00													

SPT N = STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 7.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

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SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY FOR FOUNDATIONS ON COMPLETELY WEATHERED BEDROCK

GL +0.0m

Layer I, Residual soils (Clay)

-2.0m to -3.0m

Layer II, Completely weathered Bedrock

-2m to -6.0m

Layer III, Basalt Bedrock

(Assuming Completely weathered Bedrock to be a very dense granular soil.)

Net Ultimate Bearing Capacity = $q_u = cNc + q\,(N_q - 1) + 0.5\,B\,\gamma N\gamma\, s\gamma$ (Refn. 5, Table 4-1)

Where,

q = Overburden Pressure (i.e. submerged unit weight x depth of foundation)
c = Cohesion
B = Minimum Width of foundation = 1m
γ' = submerged unit weight of soil = 0.80
N_c, N_q, N_γ = Terzaghi's Bearing capacity factors
Sc, sq, s_γ = Shape factors = 1, 1, and 0.8, respectively
D = Minimum Depth of Footing = 2.0m

Minimum SPT N value obtained in the completely weathered bedrock = 50
Corresponding friction angle = 40° (Reference No. 5)
Corresponding Nc=75, Nq=64, N_γ=109 (Reference 5, IS:6403-1981);

Substituting these values in the above equation;
q ultimate =q_u =[0x75x1]+[2x0.8x(64-1)x1]+[0.5x1x0.8x109x0.6]= 0+100+25 = 125 t/m^2
q safe = q_u/F.S. = 125/3 = 41 t/m^2

CALCULATION OF SETTLEMENTS OF FOUNDATIONS (3M X 3M) EXERTING PRESSURE OF 40 T/M2:

From Reference No. 1:

$$\text{Settlement} = S = q_0 B' \frac{1-\mu^2}{E_s} m I_s I_f$$

Where,
q_0 = Footing Pressure = 40 t/m2
B' = B/2 (Where B is the width of pressure distribution
μ = Poisson's ratio = 0.3
E = Modulus of Elasticity
I_s = Influence Factor (Obtained from Table 5-2, Reference No. 1)
I_f = Depth Factor (Obtained from Figure 5-7, Reference No. 1)
m = 4 for center of footing

Very conservatively assuming weathered bedrock within the full influence zone of footings:
E value for over-consolidated sand = 105(N)+4000 (Reference No. 1)
Therefore, for a SPT N value of 50, E=9,250 t/m2

L' = 3/2 =1.50, B' = 3/2 = 1.5, H=6m, and D=2.0m
Therefore, M=L/B=1; and N=H/B'=4 and D/B=0.67
Corresponding, I_s = 0.43, Conservative I_f = 1.0 (From Table 5-2, Reference 1)

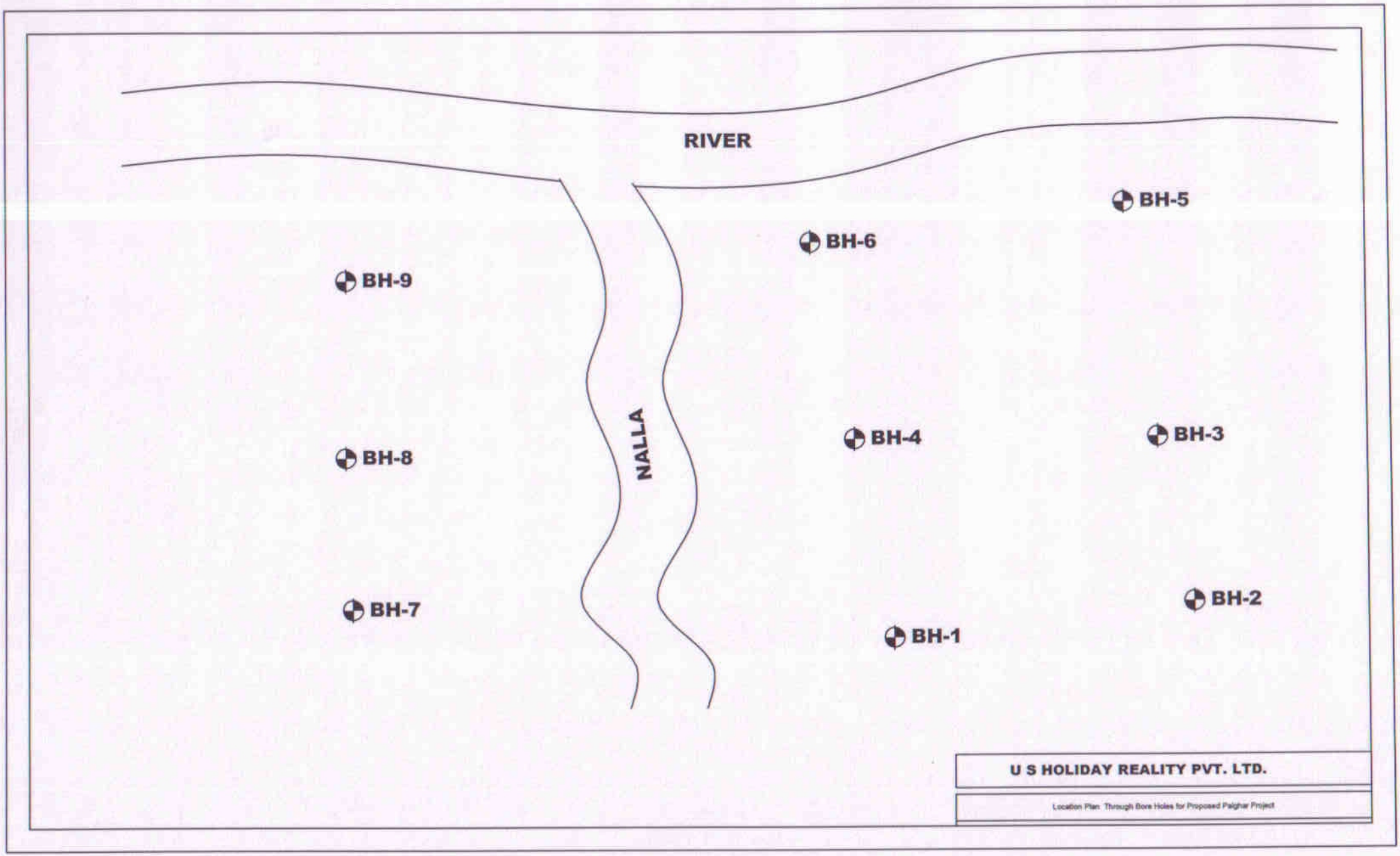
Settlement of Layer = $S_1 = 40x1.5x\frac{1-0.3^2}{9250}x4x0.43x1.0$ = 0.011m = 11mm

From IS8009:
Due to Footing Rigidity Factor, Settlement = 0.8 x 11mm = 9mm

Therefore, Total Settlement = 9mm

ANNEXURES

BOREHOLE LOCATION PLAN


RIVER
BH-5
BH-6
BH-9
NALLA
BH-4
BH-3
BH-8
BH-2
BH-7
BH-1
U S HOLIDAY REALITY PVT. LTD.
Location Plan Through Bore Holes for Proposed Palghar Project

BOREHOLE LOGS

SUBSURFACE PROFILE

CLIENT : **U S HOLIDAY REALITY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT :PALGHAR BOISAR(E)

BORE HOLE NO. : BH NO -01 | Date:- 22/10/2008 TO 24/10/2008

Rock Started at 1.70M | Water Level at :5.00M | Final Depth 6.80M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25 50 75 100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50	DS-1					
				1.70	SPT1	15 10 18 52	N >50			
2.00			BROWNISH GRAY WEATHERED BESALT ROCK	3.00	1-3			23%	NIL	
3.00										
4.00			BROWNISH GRAY BESALT ROCK	4.50	4-10			42%	NIL	
5.00										
6.00				6.00	11-13			49%	13%	
7.00				6.80	14-16			69%	55%	
8.00										
9.00										
10.00										

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 6.80M BELOW G.L

SCALE : 1: 50

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CLIENT : **U S HOLIDAY REALITY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -03 | Date:-28/10/2008 TO 31/10/2008

Rock Started at 6.00M | Water Level at : 4.90M | Final Depth 7.00M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50	DS-1	15	15	05		N	71%		
2.00				1.85	SPT1	10	13	50		>50			
3.00				3.00	DS-1								
				3.20	SPT2	15 18	05 50			N >50	75%		
4.00			BROWNISH STIFF SILTY CLAY WITH MURRUN	4.50	DS-1								
5.00				4.75	SPT3	15 13	10 52			N >50	80%		
6.00				6.00									
7.00			BROWNISH GRAY WEATHERED BESALT ROCK	7.00	1-2						25%	NIL	
8.00			BROWNISH GRAY BESALT ROCK	8.00	3-6						87%	85%	
9.00				9.00	7-8						64%	64%	
10.00				10.00	9-10						86%	83%	
				11.00	11-15						72%	59%	

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 11.00M BELOW G.L

SCALE : 1: 50

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CLIENT : **U S HOLIDAY REALITY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT ATBOISAR(E)

BORE HOLE NO. : BH-03 | Date:. 28/10/2008 TO 31/10/2008

Rock Started at 6.00M | Water Level at : 4.90 | Final Depth 7.00 G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		BROWNISH GRAY BESALT ROCK	11.00	11-15						72%	59%	
12.00													
13.00													
14.00													
1500													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE | ROD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 11.00M BELOW G.L

SCALE : 1: 50

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CLIENT : **U S HOLIDAY REALITY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -04 | Date:-2/11/2008 TO 4/11/2008

Rock Started at 3.10M | Water Level at :5.00M | Final Depth 8.00M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50									
					DS-1	15	15	15	05	N			
2.00				2.00	SPT1	7	8	50	52	18			
3.00				3.00	DS-1								
				3.10	SPT2	10 52				N >50	80%		N
4.00			BROWNISH GRAY WEATHERED ROCK	4.50	1-2						NIL	NIL	
5.00													
6.00			BROWNISH GRAY WEATHERED BESALT ROCK	6.00	3-6						70%	67%	
7.00				7.00	7-9						67%	49%	
8.00				8.00	10-11						88%	88%	
9.00													
10.00													

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 8.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

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CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT :PALGHAR BOISAR(E)

BORE HOLE NO. : BH NO -05 | Date:- 6/11/2008 TO 8/11/2008

Rock Started at 3.00M | Water Level at :5.00M | Final Depth 9.00M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50									
					DS-1	15	15	15	15	N			
2.00				2.10	SPT1	8	7	13	12	20			
3.00				3.00									
4.00				4.50							17%	NIL	
5.00													
6.00				6.00	1-3						23%	NIL	
7.00			BROWNISH GRAY BESALT ROCK	7.00	4-5						78%	36%	
8.00				8.00	8-9						56%	36%	
9.00				9.00	9-11						53%	25%	
10.00													

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 9.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

Tel.: 2500 4921 / 2500 4922 • Fax : 2500 4923 • Mobile : 98203 05051

CLIENT : **U S HOLIDAY REALTY PVT LTD**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -06 | Date:- 9/11/2008 TO 11/11/2008

Rock Started at 2.00M | Water Level at : 5.20M | Final Depth 7.00M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	2.00									
2.00			BROWNISH GRAY FACTHRED BASALT ROCK	3.50	1-2						20%	NIL	
3.00													
4.00			BROWNISH GRAY BESALT ROCK	5.00	3-4						28%	NIL	
5.00													
6.00				6.00	4-7						38%	NIL	
7.00				7.00	8-15						63%	48%	
8.00													
9.00													
10.00													

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS:- BORE HOLE IS TERMINATED AT DEPTH 7.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

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CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -07 | Date:-12/11/2008 TO 14/11/2008

Rock Started at 6.00M | Water Level at : 5.50M | Final Depth 11.00MG.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50									
					DS-1	15	15	15	15	N			
2.00				2.10	SPT1	7	8	11	13	19			
3.00			BROWNISH CLAY WITH MURRUM & BOULDERS	3.00							NIL	NIL	
4.00				4.50									
5.00													
6.00				6.00									
7.00			BROWNISH GRAY WEATHERED BESALT ROCK	7.50							15%	NIL	
8.00			BROWNISH GRAY BESALT ROCK										
9.00				9.00	1-4						33%	NIL	
10.00				10.00	5-10						88%	80%	
				11.00	11-16						67%	54%	

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 11.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

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CLIENT : **U S HOLIDAY REALTY PVT LTD**

PROJECT : SOIL INVESTIGATION REPORT ATBOISAR(E)

BORE HOLE NO. : BH-07 | Date:. 12/11/200/ TO 14/11/2008

Rock Started at 6.00M | Water Level at : 5.50 | Final Depth 11.00 G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		BROWNISH GRAY BESALT ROCK	11.00	11-16						67%	54%	

12.00
13.00
14.00
1500
16.00
17.00
18.00
19.00
20.00

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 11.00M BELOW G.L

SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

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CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -08 | Date:-16/11/2008 TO 18/11/2008

Rock Started at 6.00M | Water Level at :5.50M | Final Depth 15.50MG.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50									
2.00					DS-1	15	15	15	05	N			
				2.00	SPT1	8	10	13	52	23			
3.00			BROWNISH GRAY WITH MURRUM	3.00	-						NIL	NIL	
4.00			BROWNISHMURRUM WITH BOULDERS	4.50	-						NIL	NIL	
5.00													
6.00				6.00	-						NIL	NIL	
7.00			BROWNISH GRAY HIGHLY WEATHERED ROCK	7.50	1-2						8%	NIL	
8.00					small pcs								
9.00			HIGHLY TOMODERATLY WEATHERED ROCK	9.00							13%	NIL	
10.00					small pcs								
				10.50							19%	NIL	
				12.00	3-4						22%	NIL	

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY

RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE

UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 15.50M BELOW G.L

SCALE : 1: 50
JOB NO. :

DRILLTECH ENGINEERS

Tel.: 2500 4921 / 2500 4922 • Fax : 2500 4923 • Mobile : 98203 05051

CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT ATBOISAR(E)

BORE HOLE NO. : BH-08 | Date:. 19/11/2008 TO 18/11/2008

Rock Started at 6.00M | Water Level at : 5.50 | Final Depth 15.50M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25 50 75 100	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		HIGHLY TOMODERATETLY WEATHERED ROCK	12.00	3-4			22%	NIL	
12.00										
13.00			BROWNISH GRAY BASALT ROCK	13.50	5-12			25%	NIL	
14.00										
1500				15.00	13-17			43%	27%	
				15.50	18			98%	98%	
16.00										
17.00										
18.00										
19.00										
20.00										

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 15.50M BELOW G.L

SCALE : 1: 50
JOB NO. :

DRILLTECH ENGINEERS
Tel.: 2500 4921 / 2500 4922 • Fax : 2500 4923 • Mobile : 98203 05051

CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT AT BOISAR(E)

BORE HOLE NO. : ,BH NO -09 | Date:20/11/2008 TO 22/11/2008

Rock Started at 6.00M | Water Level at : 5.00M | Final Depth 12.50MG.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
1.00	NX		BROWNISH SANDY CLAY WITH GRAVELS	1.50	DS-1								
				1.70	SPT1	15	13	05	52	N >52			
2.00													
3.00				3.00							NIL	NIL	
4.00			BROWNISH MURRUM WITH BOULDERS	4.50							NIL	NIL	
5.00													
6.00				6.00							NIL	NIL	
7.00			BROWNISH GRAY HIGHLY WEATHERED ROCK	7.50	1-2						12%	NIL	
8.00													
9.00				9.00	3-5						17%	NIL	
10.00			BROWNISH GRAY BESALT ROCK	10.50	6-9						23%	NIL	
				12.00	10-12						39%	10%	

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 12.50M BELOW G.L

SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

Tel.: 2500 4921 / 2500 4922 • Fax : 2500 4923 • Mobile : 98203 05051

CLIENT : **U S HOLIDAY REALTY PVT LTD.**

PROJECT : SOIL INVESTIGATION REPORT ATBOISAR(E)

BORE HOLE NO. : BH-09 | Date:. 20/11/2008 TO 22/11/2008

Rock Started at 6.00M | Water Level at : 5.00M | Final Depth 12.50M G.W.L.

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 25	50	75	100	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		BROWNISH GRAY BASALT ROCK	12.00	10-12						39%	10%	
12.00				12.50	13/14						90%	90%	
13.00													
14.00													
1500													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST

REMARKS : BORE HOLE IS TERMINATED AT DEPTH 12.50M BELOW G.L

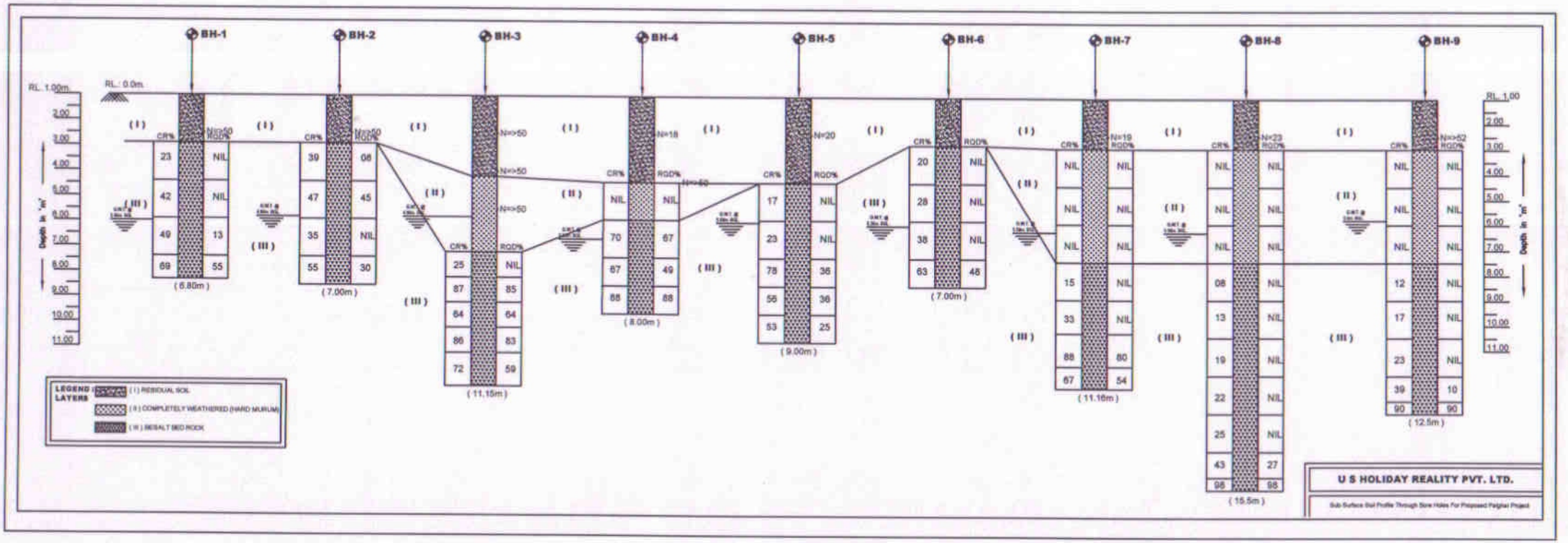
SCALE : 1: 50

JOB NO. :

DRILLTECH ENGINEERS

Tel.: 2500 4921 / 2500 4922 • Fax : 2500 4923 • Mobile : 98203 05051

SUBSURFACE PROFILE


BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-7
BH-8
BH-9
RL. 1.00m
RL.: 0.0m.
Depth in "m"
CR%
RQD%
N>=50
N=18
N=20
N=19
N=23
N>=52
(6.80m)
(7.00m)
(11.15m)
(8.00m)
(9.00m)
(7.00m)
(11.16m)
(15.5m)
(12.5m)
LEGEND :
LAYERS
(I) RESIDUAL SOIL
(II) COMPLETELY WEATHERED (HARD MURUM)
(III) BASALT BED ROCK
U S HOLIDAY REALITY PVT. LTD.
Sub Surface Soil Profile Through Bore Holes For Proposed Peighai Project

LABORATORY TEST RESULTS

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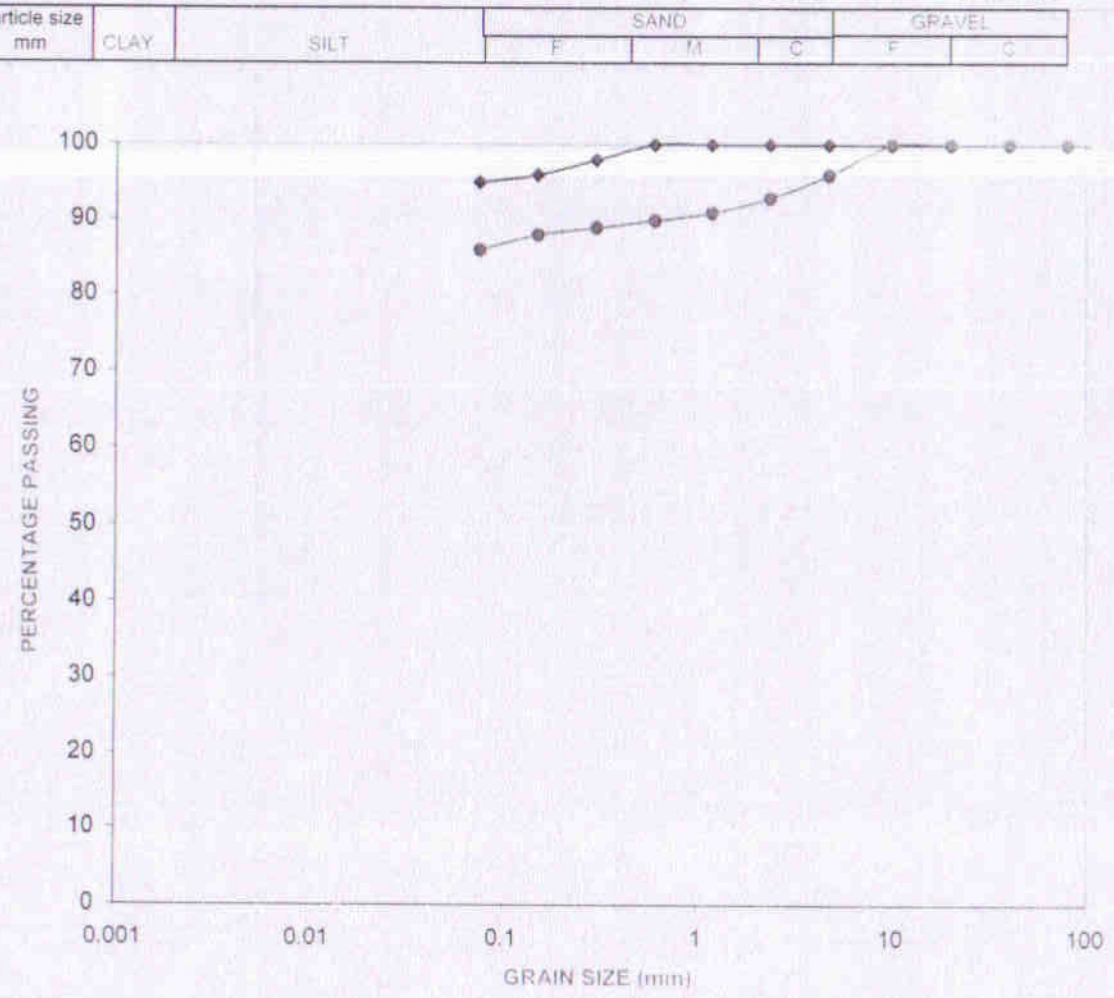
GRAIN SIZE ANALYSIS

Project: Laboratory testing for U S Holidays, Boisar (E)

Job No. GSL-413 **Date:** 2/1/2009

Symbol	◆	●	▲	■
Bore Hole No.	BH-3	BH-8		
Depth (m)	3.00-3.20	0.00-1.50		
Sample Type	SPT	DS-1		
Classific-ation	CH	CH		
Gravel %	0	4		
Sand %	5	10		
Silt %	95	86		
Clay %	<---->	<---->		
D60 mm	---	---		
D30 mm	---	---		
D10 mm	---	---		
Cu	---	---		
Cc	---	---		
Liquid Limit %	78	58		
Plastic Limit %	24	25		
Plasticity Index	54	33		



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SOIL TEST DATA SHEET

Project: Laboratory testing for U S Holidays, Boisar (E)

Job No.: GSL-413 Date: 2/1/2009

Bore Hole No.	Depth (m)	Sample type	Bulk density (gm/cc)	N.M.C. (%)	Dry density (gm/cc)	Soil Classification	Gravel (%)	Sand (%)	silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Triaxial Test			Consolidation Test			Remarks
														Type	c (kg/cm^2)	Φ°	Initial Voids ratio	Cc	PCP (kg/cm2)	
BH-3	3.00-3.20	SPT	---	---	---	CH	0	5	95	<---->	78	24	54	---	---	---	---	---	---	---
BH-8	0.00-1.50	DS-1	---	---	---	CH	4	10	86	<---->	58	25	33	---	---	---	---	---	---	---

UDS:Undisturbed sample
NMC: Natural moisture content
C: Cohesion
Φ°: Angle of internal friction

UU: Unconsolidated Undrained triaxial test
CU: Consolidated Undrained triaxial test
CD: Consolidated Drained triaxial test
UC: Unconfined Compressive strength test
DST: Direct Shear Test

PCP : Preconsolidation Pressure
<----> : Combined percentage of silt & clay
NP : Non Plastic

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ROCK TEST RESULTS

Name of the Client : Laboratory testing for U S Holidays — Date : 2/1/2009

Location : Boisar (E) — Job No.: GSL-413

Sr. No.	Bore Hole no.	Core No.	Depth	Diameter	Height	H/D	Crushing Load	Point Load Index	UCS	Water absorption	Porosity	Dry density	Remarks
			(m)	(cm)	(cm)		(kg)	(kg/cm^2)	(kg/cm^2)	(%)	(%)	(gm/cc)	
1	BH-1	3	3.00-4.50	5.21	---	---	50	1.84	---	1.86	4.20	2.26	---
2	BH-1	14	6.80	5.64	---	---	950	29.87	---	0.21	0.49	2.32	---
3	BH-2	3	3.00	5.47	8.11	1.48	12000	---	473.74	0.68	1.57	2.31	---
4	BH-3	2	6.00-7.00	5.41	7.61	1.41	19500	---	775.35	0.26	0.61	2.35	---
5	BH-4	3	4.50-6.00	5.41	10.79	1.99	14500	---	630.15	0.31	0.72	2.31	---
6	BH-5	8	7.00-8.00	5.40	10.78	2.00	16500	---	719.87	0.27	0.63	2.33	---
7	BH-6	15	6.00-7.00	5.41	7.51	1.39	13000	---	514.92	1.02	2.35	2.30	---
8	BH-7	14	10.00-11.00	5.97	9.11	1.53	20500	---	684.82	0.68	1.57	2.31	---
9	BH-8	10	13.50-15.00	5.47	10.86	1.99	9500	---	403.44	1.72	3.94	2.29	---
10	BH-9	6	10.50-12.00	5.41	9.12	1.69	14500	---	605.48	0.81	1.86	2.30	---

DRILLTECH ENGINEERS

Date: 2/1/2009

Project: **Laboratory testing for U S Holidays**

Site: **Boisar (E)**

Job No.: **GSL –413**

CHEMICAL ANALYSIS OF SOIL SAMPLE

	BH-3	BH-8
	3.00-3.20	0.00-1.50
pH value	7.64	7.68
Sulphate as So3 (%)	0.039	0.052
Chloride as cl (%)	0.083	0.128

CHEMICAL ANALYSIS OF WATER SAMPLE

	BH-1	BH-7
pH value	7.63	7.62
Sulphate as So3 (ppm)	58	52
Chloride as cl (ppm)	127	112

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