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RELIABLE ENGINEERING

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GEOTECHNICAL INVESTIGATION REPORT

GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

CLIENT
M/s. MASTERS AND ASSOCIATES

GEOTECHNICAL INVESTIGATION AND REPORT SUBMITTED BY

M/s. RELIABLE ENGINEERING
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REPORT NO. 121 DATED 07 December 2022

RE

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GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA FORMASTER AND ASSOCIATES

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WHERE YOU CAN RELY ON.....

GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA FORMASTER AND ASSOCIATES

1.0 INTRODUCTION

Master and Associates plans to construct a material testing lab at Worli, Mumbai, Maharashtra. The proposed building will consist of double basement + Ground +7 upper floors. The work of geotechnical investigation was awarded to Reliable Engineering. The field work for the geotechnical investigation was completed by Reliable Engineeringin December 2022. This report presents results of the geotechnical investigation, along with foundation engineering recommendations for the proposed building.

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Threeboreholes (BH-1 to BH-3) 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 fill overlying residual soil underlain bybasalt bedrock. Encountered soil/rock layers are described below;

LAYER I: FILL

Fill, consisting mostly of clay with boulders were encountered at ground surface in the boreholes. The lower boundary of this layer was encountered at a depth of 1.5m below existing ground surface.

LAYER II: RESIDUAL SOIL

Residual soils, consisting mostly of brownish stiff clay were encountered at existing ground surface in the boreholes. Based on Standard Penetration Tests (SPT) conducted within this layer, the consistency of cohesive soils was medium stiff to stiff. The lower boundary of this layer was encountered at depths of 6.2m to 6.45m below the existing ground surface.

LAYER III: BRECCIA BEDROCK

Brownish breccia bedrock was encountered at depths of 6.2m to 6.45m below existing ground surface in the boreholes. The bedrock was completely weathered to sound, generally improving with depth. Core Recoveries in the bedrock layer varied between 25% and 43%, and Rock Quality Designations (RQDs) varied between 0% and 13%. Uni-axial

compressive strength of rock core sample varied from 95kg/cm^2 to 106kg/cm^2. The boreholes were terminated in this layer at depths of 10.0m to 13.0mbelow existing ground surface.

2.3 Ground Water Table

Ground water accumulation in the borehole was monitored during and following completion of drilling activities. Groundwater was observed in boreholesat depths of 3.0m and 5.5m below ground. Seasonal and annual fluctuations in ground water levels can be expected.

3.0 FOUNDATION RECOMMENDATIONS

Completely weathered bedrock was encountered atdepths of6.21m to 6.45mbelow existing ground surface in the boreholes. Spread/raft foundations for proposed building with double basement (at a depth of 8.0m below existing ground surface) supported on this weathered bedrock can be designed for a maximum gross allowable bearing capacity of 40 t/m^2.

Maximum settlement of foundations will be less than 12mm. A Modulus of subgrade reaction of3333 t/m^3 can be utilized for design of foundations.

Uniformity in the sub-stratum can be delineated upon completion of foundation excavations. It is recommended to verify the subsurface soil stratum by an experienced practicing geotechnical engineer before the completion of footings/foundations.

3.1 Basement Construction

Excavation sides should be sloped at a maximum slope of 1:1 (horizontal:vertical) or flatter within top 6.5m and 1:2 (horizontal:vertical) below this depth. If adequate space is not available for this side sloping, then excavation side shoring with bored piles should be provided.

Basement floors and walls should be adequately water-proofed. Adequate uplift resistance in the form of dead weight should be provided. Maximum groundwater table for uplift design should be taken at 1.0m below ground surface.

3.2Lateral Earth Pressures

Basement walls and pile shoring walls, if any, will be subjected to lateral earth pressures. A soil submerged unit weight (r_{sub}) and coefficient of active lateral earth pressure (k_a) of 0.8 t/m^3 and 0.5, respectively, should be utilized for design of basement walls installed without adjacent pile shoring walls. Lateral earth pressure parameters for design of pile shoring walls are given in Table A below. Hydrostatic pressures and surcharge pressures, if any, should also be considered.

TABLE A
LATERAL EARTH PRESSURE PARAMETERS
FOR DESIGN OF PILE SHORING WALLS

Depth	Soil Type	Unit weight	Active earth pressure coefficient	Passive earth pressure coefficient	Cohesion
0.0m- 1.5m	FILL	1.8	0.4	2.5	0 t/m^2
1.5m to 6.45m	Residual Soil	1.8	0.3	3.0	0 t/m^2
Below 6.45m	Breccia bedrock	2.1	1	1	66t/m^2

3.3 Foundation Protection

Results of chemical analysis on soil and groundwater samples enclosed in the Annexure, indicate that the site falls under Class 1 for sulphate concentrations and chloride concentrations (As per IS456 and as per CIRIA Sp. Publication No. 31). A 'severe' 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:	M30
Minimum Cement Content for spread foundation:	320 kg/m^3
Maximum Water Cement Ratio:	0.45
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 rotary rigs (Calyx, 8 HP, Engine). Casing was used to support sides of borehole until sufficiently stiff strata was encountered. Standard Penetration Tests (i.e. SPT) were carried out at every 1.5m vertical interval up to bedrock, in accordance with IS 2131-1981. Using this procedure, a 5 cm 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”.

After SPT refusal was obtained, NX sized rock coring was done in maximum of 1.5m runs, using diamond bit and double tube core barrel. Percent Rock Core Recovery and percent 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 in cms.

Sincerely,

Reliable Engineering.

Mrs. Rupa Jagadale
B.E (Civil) M.Tech (Geotechnical)

REFERENCES

1) IS 456: 2000, Plain & Reinforced Concrete – Code of Practice, Fourth Revision

2) IS 12070: 1987, Code of Practice for Design and Construction of Shallow Foundations on Rocks

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

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

_____ GL +0.0m

Layer I, Fill

_____ -1.5m

Layer II, Residual Soil

_____-6.21m to -6.45m

Layer III, Completely Weathered Breccia Bedrock

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

Net Ultimate Bearing Capacity = $q_u = cNcs_c + q\,(N_q - 1)s_q + 0.5\,B\,\gamma N\gamma\, s_\gamma$ (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 = Conservatively assumed as 1, 1, and 0.6
D = Depth of Footing Below Basement top = 1.5m

Minimum SPT N value obtained in boreholes = 50
Corresponding friction angle = 42^o (Reference No. 5)
Corresponding Nc=100, Nq=92, N_γ=174 (Reference 5, IS:6403-1981);

Substituting these values in the above equation;
q ultimate =q_u =[0x100x1]+[1.5x0.8x(92-1)x1]+[0.5x1x0.8x174x0.6]= 0+109+42 = 151 t/m^2
q safe = q_u/F.S. = 151/3 = 50 t/m^2

<u>Restricted to 40 t/m^2 to limit settlement as shown below.</u>

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

From Reference No. 1:

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

Where,
q_0 = Footing Pressure = 40 t/m^2
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

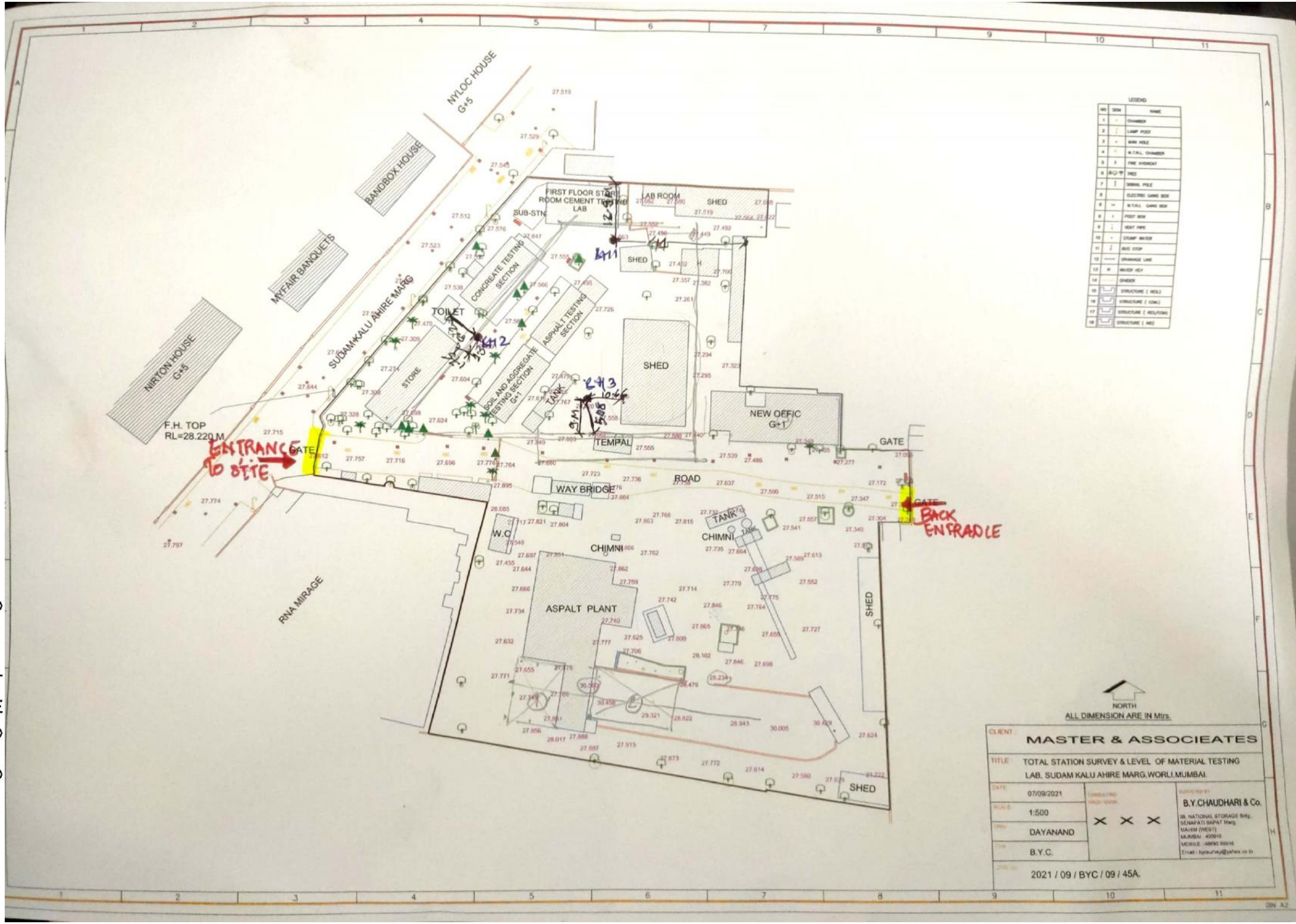
Very conservatively assuming completely weathered bedrock to be over-consolidated sand:
E value for over-consolidated sand = 105(N)+4000 (Reference No. 1)
Therefore, for a SPT N value of 50, E=9250 t/m^2

L' = 3/2 =1.50, B' = 3/2 = 1.5, H=6m, and D=8.0m
Therefore, M=L/B=1; and N=H/B'=4, and D/B=2.67
Corresponding, I_s = 0.43, Conservative I_f = 1 (From Table 5-2, Reference 1)

Settlement of Layer =S_1= $40x1.5x\frac{1-0.3^2}{9250}x4x0.43x1$ = 0.012m = 12mm

ANNEXURE

LOCATION MAP



BOREHOLE LOGS

CLIENT	: M/s. MASTERS AND ASSOCIATES	BH NO.	: 01
PROJECT	: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA	SHEET NO.	: 1 of 1
LOCATION	: --	**DATE**	: 30-11-2022 TO 01-12-2022
CO-ORDINATES	: --	**METHOD**	: ROTARY DRILLING
GROUND R.L.	: --	**CASING**	: 3.00 MTR NX CASING
GROUND W.T.	: 1.90 MTR BELOW E.G.L		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	Elevation (m)	TYPE OF SAMPLE	BLOWS 15cm	15cm	15cm	15cm	SPT N	C R %	RQD %	Gravels %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity index	UCS kg/cm2	PL
1.00	Pit Excavation		Backfilled Soil consisting of FILL	1.50		DS																
2.00				2.10		SPT1	05	05	06	09	11											
3.00				3.00																		
				3.60		SPT2	05	06	06	10	12											
4.00			Brownish Stiff Silty Sandy CLAY	4.50																		
5.00				5.10		SPT3	06	07	07	09	14											
6.00				6.00		SPT4	31	52	--	--	R											
				6.21																		
7.00				7.50								25	NIL									
8.00	NX size ↓		Brownish Highly weathered TUFFICIOUS BRECCIA Rock	9.00								28	NIL									
9.00																						
10.00				10.00								23	NIL									

SPT N =STANDARD PENETRATION TEST VALUE | RQD = ROCK QUALITY DESIGNATION | UDS = UNDISTURBED SOIL SAMPLE | UCS = UNCONFINED COMPRESSIVE STRENTGH
CR = CORE RECOVERY | DS = DISTURBED SOIL SAMPLE | VST = VANE SHEAR TEST | PL = POINT LOAD

REMARKS : BH-01 is terminated at 10.00 mtr below G.L.

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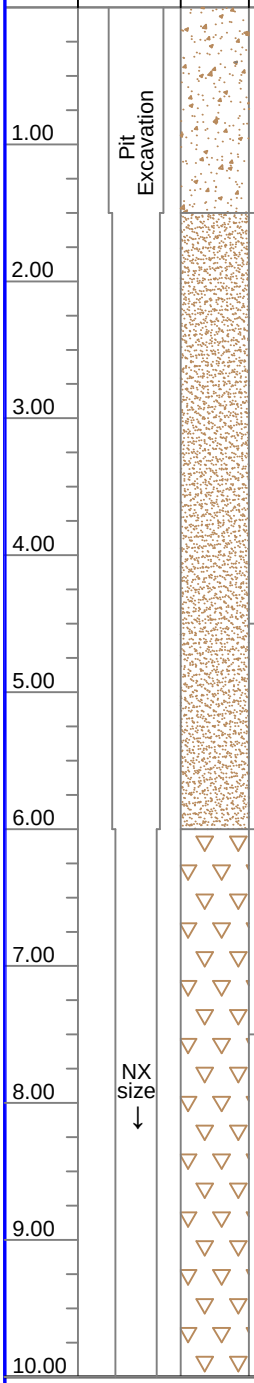
reliableeng7@gmail.com +91-9172214249

TYPE OF BARREL = DOUBLE TUBE
TYPE OF BIT = NX DIAMOND BIT
REFERENCE STANDERD = IS 1892-1979
DRILLING MACHINE = (CALYX, 8 HP ENGINE).

DRAWN BY : RAJENDRA MAHAJAN | JOB NO. 121

CLIENT	: **M/s. MASTERS AND ASSOCIATES**	BH NO.	: 02
PROJECT	: **GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA**	SHEET NO.	: 1 of 2
LOCATION	: --	**DATE**	: **28-11-2022 TO 29-11-2022**
CO-ORDINATES	: --	**METHOD**	: **ROTARY DRILLING**
GROUND R.L.	: --	**CASING**	: **3.00 MTR NX CASING**
GROUND W.T.	: **1.70 MTR BELOW E.G.L**		



DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	Elevation (m)	TYPE OF SAMPLE	BLOWS 15cm	15cm	15cm	15cm	SPT N	C R %	RQD %	Gravels %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity index	UCS kg/cm2	PL
			Backfilled Soil consisting of FILL	1.50		DS																
			Brownish CLAY and Boulder	4.50																		
			Brownish Stiff Silty Sandy CLAY	5.10		SPT1	06	06	08	09	14											
				6.00		SPT2	15	36	52	--	R											
			Brownish Moderately weathered TUFFICIOUS BRECCIA Rock	6.40																		
				7.50								43	NIL									
			Brownish Highly weathered TUFFICIOUS BRECCIA Rock	9.00								27	NIL									
												28	09									

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

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

REMARKS : Continued on next page.....

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TYPE OF BIT = NX DIAMOND BIT
REFERENCE STANDERD = IS 1892-1979
DRILLING MACHINE = (CALYX, 8 HP ENGINE).

DRAWN BY : RAJENDRA MAHAJAN | JOB NO. 121

CLIENT	: **M/s. MASTERS AND ASSOCIATES**	BH NO.	: 02
PROJECT	: **GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA**	SHEET NO.	: 2 of 2
LOCATION	: --	**DATE**	: **28-11-2022 TO 29-11-2022**
CO-ORDINATES	: --	**METHOD**	: **ROTARY DRILLING**
GROUND R.L.	: --	**CASING**	: **3.00 MTR NX CASING**
GROUND W.T.	: **1.70 MTR BELOW E.G.L**		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	Elevation (m)	TYPE OF SAMPLE	BLOWS 15cm	15cm	15cm	15cm	SPT N	C R %	RQD %	Gravels %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity index	UCS kg/cm2	PL
10.50																						
11.00	NX size ↓		Brownish Highly weathered TUFFICIOUS BRECCIA Rock																			
12.00				12.00								33	10									
13.00				13.00								35	13									
14.00																						
15.00																						
16.00																						
17.00																						
18.00																						
19.00																						
20.00																						

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

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

REMARKS : BH-02 is terminated at 13.00 mtr below G.L.

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TYPE OF BARREL = DOUBLE TUBE
TYPE OF BIT = NX DIAMOND BIT
REFERENCE STANDERD = IS 1892-1979
DRILLING MACHINE = (CALYX, 8 HP ENGINE).

DRAWN BY : RAJENDRA MAHAJAN | JOB NO. 121

CLIENT	: M/s. MASTERS AND ASSOCIATES	BH NO.	: 03
PROJECT	: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA	SHEET NO.	: 1 of 1
LOCATION	: --	**DATE**	: 02-12-2022 TO 03-12-2022
CO-ORDINATES	: --	**METHOD**	: ROTARY DRILLING
GROUND R.L.	: --	**CASING**	: 3.00 MTR NX CASING
GROUND W.T.	: PARTIAL WATER LOSS		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	DEPTH (m)	Elevation (m)	TYPE OF SAMPLE	BLOWS 15cm	15cm	15cm	15cm	SPT N	C R %	RQD %	Gravels %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity index	UCS kg/cm2	PL
1.00	Pit Excavation		Backfilled Soil consisting of FILL	1.50		DS																
2.00				2.10		SPT1	06	06	08	10	14											
3.00				3.00																		
4.00			Brownish Stiff Silty Sandy CLAY	3.60		SPT2	07	07	08	11	15											
5.00				4.50																		
6.00				5.10		SPT3	06	08	08	12	16											
7.00	NX size ↓		Light Brownish Highly weathered TUFFICIOUS BRECCIA Rock	6.00		SPT4	12	36	52	--	R											
8.00				6.45								37	NIL									
9.00				7.50								40	NIL									
10.00				9.00								36	NIL									
				10.00																		

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

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

REMARKS : BH-03 is terminated at 10.00 mtr below G.L.

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TYPE OF BARREL = DOUBLE TUBE
TYPE OF BIT = NX DIAMOND BIT
REFERENCE STANDERD = IS 1892-1979
DRILLING MACHINE = (CALYX, 8 HP ENGINE).

DRAWN BY : RAJENDRA MAHAJAN | JOB NO. 121

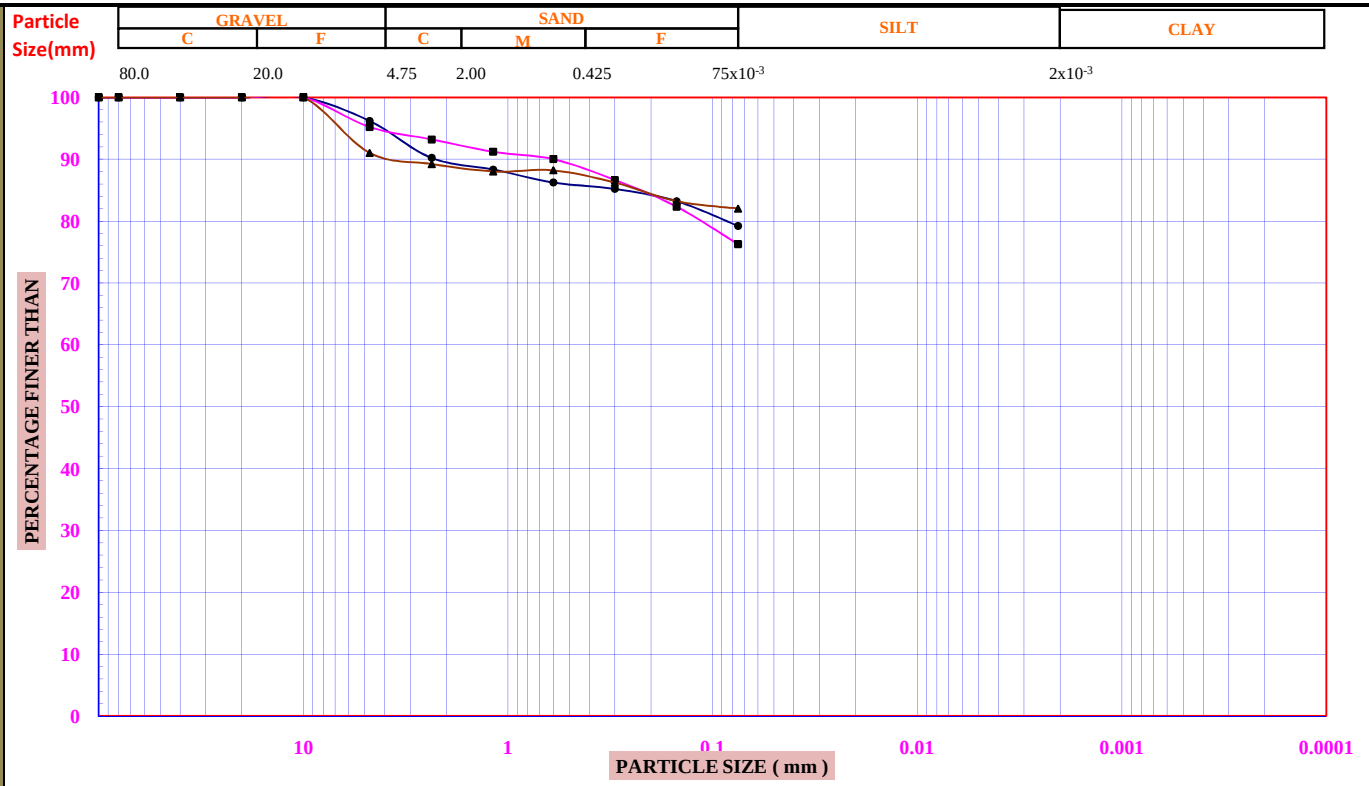
LABORATORY TESTS

GRAIN SIZE DISTRIBUTION ANALYSIS

CLIENT: M/s. MASTERS AND ASSOCIATES

PROJECT : GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED)
AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

GEO ENGINEERS, KALYAN



Symbol	Bore Hole No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$f_{10\%}$ mm	$f_{30\%}$ mm	$f_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●–●	BH-01	1.50-2.10	CH	4	17	79		-----	-----	-----	-----	-----	62	24	38	SPT 1
■–■	BH-02	4.50-5.10	CH	5	19	76		-----	-----	-----	-----	-----	59	22	37	SPT 1
▲–▲	BH-03	3.00-3.60	CH	9	9	82		-----	-----	-----	-----	-----	61	24	37	SPT 2
✱–✱																
◆–◆																

SOIL TEST DATA SHEET

IS 2720 Part 4, 5, 6

PROJECT : GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

CLIENT: M/s. MASTERS AND ASSOCIATES

DATE: 06.12.2022

Bore Hole No.	Depth in m.	Sample Type UD / D	Density gm/cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits				Shear Strength Test			Unconfined Compression Test Kg/cm²	free swell index	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Shrinkage Limit %	Shrinkage Ratio	Cohesion C_u kg/cm²	Degree f			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH-01	1.50-2.10	SPT 1	-----	-----	-----	CH	4	17	79		62	24	38		-----	-----	-----	-----	-----	-----	-----	-----	
BH-02	4.50-5.10	SPT 1	-----	-----	-----	CH	5	19	76		59	22	37		-----	-----	-----	-----	-----	-----	-----	-----	
BH-03	3.00-3.60	SPT 2	-----	-----	-----	CH	9	9	82		61	24	37		-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

f : Angle of Internal Friction
Cc : Undrained Cohesion
f' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

GEO ENGINEERS, KALYAN

TEST RESULTS OF ROCK CORES As per IS 9143, 8764, 13030

CLIENT: M/s. MASTERS AND ASSOCIATES

PROJECT: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

DATE: 06-12-2022

Sr. No.	Bore Hole No.	Core piece No.	Depth, m	Diameter, cm	Height, cm	H : D (1:H/D)	Correction Factor	Condition of Test	Failure Load	Uniaxial Compressive Strength	Point load index	Porosity	Water Absorption	Dry Density	Specific Gravity	P
				cm	cm				kN	kg/cm2	kg/cm2	%	%	gm/cm		
1	BH-01	5	7.50-9.00	5.40	6.25	1.16	0.86	Soaked	0.8	--	3	4.11	1.89	2.18		
2	BH-02	6	9.00-10.50	5.41	6.10	1.13	0.85	Soaked	0.8	--	3	4.86	2.24	2.17		
3	BH-03	8	6.45-7.50	5.41	6.05	1.12	0.85	Soaked	0.9	--	3	3.80	1.72	2.21		

GEO ENGINEERS, KALYAN

CHEMICAL TEST RESULT OF GROUND WATER SAMPLES.

As per IS 3025 Part 11, 24, 32

CLIENT: M/s. MASTERS AND ASSOCIATES **DATE** 06.12.2022

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SR NO.	BH NO.	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 ppm	CHLORIDE AS Cl ppm	REMARKS
				* Limit between 6.3 to 8.5	* Limit <400ppm Maximum	* Limit <2000ppm Maximum	
1	BH-02	1.70	Water	7.01	158	289	

GEO ENGINEERS, KALYAN

PHOTOS

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BH-1

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BH NO. – 1

CORE BOX NO. 01 OF 01

DEPTH 0.00 TO 10.00 METER

CLIENT: M/s. MASTER AND ASSOCIATES

PROJECT: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

BH-2

CLIENT: M/s. MASTER AND ASSOCIATES

PROJECT: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

BH NO. – 2

CORE BOX NO. 01 OF 01

DEPTH 0.00 TO 13.00 METER

CLIENT: M/s. MASTER AND ASSOCIATES

PROJECT: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

BH-3

CLIENT: M/s. MASTER AND ASSOCIATES

PROJECT: GEOTECHNICAL INVESTIGATION FOR PROPOSED MATERIAL TESTING LAB (2 BASEMENTS + G + 7 STORIED) AT SUDAM KALU AHIRE MARG, WORLI, MUMBAI, MAHARASHTRA

BH NO. – 3

CORE BOX NO. 01 OF 01

DEPTH 0.00 TO 10.00 METER