Corrigendum - 6

uploaded on 13/10/2023

T&CP Div. / MMRDA

Sub: Minutes of Pre-Bid Meeting for Lease of 2 Commercial Plots (i.e., Plot No. C-13 and C-19) in 'G' Block of Bandra-Kurla Complex through e-tendering.

Tender No.: e-Tender No. 2023_MMRDA_904333_1 *(for plot no. C-13)*
e-Tender No. 2023_MMRDA_904375_1 *(for plot no. C-19)*

---

1. The Pre-Bid Meeting regarding **Lease of 2 Commercial Plots (i.e., Plot No. C-13 and C-19) in 'G' Block of Bandra-Kurla Complex through e-tendering;** was held **on 01.06.2023 at 03.00 PM in 4th Floor Committee Room, New MMRDA Building, Bandra-Kurla Complex, Mumbai** as well as through Video Conference.

2. The meeting was held to discuss queries raised by the prospective Bidders and their corresponding responses or suggestions. The meeting was attended by the representatives of prospective Bidders' and concerned officials of MMRDA. The Attendance Sheet is enclosed as **Annexure – A.**

3. At the outset, officials from MMRDA welcomed all the participants/ prospective Bidders' and briefed them about MMRDA's views with respect to leasing of the said two commercial plots.

   Subsequently, MMRDA made a detailed presentation on the said topic; wherein points like:

   - Why BKC is Numer Uno destination for investment interms of business opportunity;
   - MMRDA's vision and expectations from leasing of said two plots;
   - along with key highlights/ features/ connectivity to BKC;

   where elaborated. Further, the tender process and the its evaluation criteria were explained to the participants.

4. Following to the above, each prospective Bidder was called out to put forth their queries and suggestions. MMRDA officials addressed to their queries pertaining to the Tender Documents.

5. The gist of discussions held during the meeting are as below:

SNo.	Point of Discussions	Clarifications provided
1.	24M wide road abutting Plot C19 to be included in IFSC.	Noted. It was informed to the prospective Bidders to share the query to MMRDA formally
2.	Access to Plot C-19 from the existing abutting roads situated on the three sides of the plot boundary.	
3.	Floor to Floor height of the proposed building of 3.6m (as shown in Schematic Drawings of the RFP) is too low for international standard (A class) commercial building;	
4.	Extension of time period w.r.t. submission of drawings for approval.	
5.	Applicability of GST	
6.	Plot No. C13 currently being used for parking	
7.	Car parking in basement and will habitable use be allowed in the 1st basement by counting in BUA.	
8.	Sub-letting of the premises	
9.	**Last Date of submission of queries** Last date of submission of queries was decided as 08/06/2023.	

Annexure A- Attendance Sheet

SNo.	Name	Designation/ Organization	Mode of Attendance
A. MMRDA Representative			
1.	**Dr. K.H.Govinda Raj**	Additional Metropolitan Commissioner	
2.	**Mr. S. Ramamoorthy** (on his behalf Mr. S.M. Bhatt attended the meeting)	Jt. Metropolitan Commissioner & Chief L&E Cell – Member	**In-person**
3.	**Mr. Ankush R. Nawale** (on his behalf Mr. R. Gotaphode attended the meeting)	Financial Advisor, MMRDA – Member	**In-person**
4.	**Mr. Sunil Wandhekar** (on his behalf Mr. Pravin Bhandekar attended the meeting)	Engineering-in-Chief, Engg. Div. MMRDA – Member	**In-person**
5.	**Mr. S.C. Deshpande**	Chief T&CP, MMRDA – Convener	**In-person**
6.	Mr. Sanmukh Desai	Sr. Planner, T&CP Div. MMRDA	**In-person**
7.	Mr. Ankit Das	Planner, T&CP Div. MMRDA	**In-person**

SNo.	Name	Designation/ Organization	Mode of Attendance
8.	Mr. Avirat Inamdar	Planner, T&CP Div. MMRDA	**In-person**
9.	Ms. Manisha Patel	Jr. Architect, T&CP Div. MMRDA	**In-person**
10.	Mr. Sudarshan Shinde	Dy. Planner, T&CP Div. MMRDA	**In-person**
11.	Mr. Anuj Nautyal	Dy. Planner, T&CP Div. MMRDA	**In-person**
B. Prospective Bidders			
12.	Mr. Soichiko Okada	AGM, GOISU Realty Pvt. Ltd.	**In-person**
13.	Mr. Atsushi Yamazaki	AGM, GOISU Realty Pvt. Ltd.	**In-person**
14.	Mr. Hironori Kawahara	AGM, GOISU Realty Pvt. Ltd.	**In-person**
15.	Ms. Sakshi Gupta	M/s Godrej Fund Management and Investment Advisers Pvt. Ltd.	**In-person**
16.	Mr. Sharat Mathur	M/s Provenance Land Pvt. Ltd.	**In-person**
17.	Mr. Adarsh Jatia	M/s Provenance Land Pvt. Ltd.	**In-person**
18.	Ms. Priyanka Choksi	M/s RMZ Corp Pvt. Ltd.	**In-person**
19.	Ms. Kamna Anand	M/s RMZ Corp Pvt. Ltd.	**In-person**
20.	Mr. Mayur Gujare	Creative Director, Saga Design	**In-person**
21.	Mr. Karan Rego	Capital Markets, India, JLL.	**Online**
22.	Mr. Siddhant Surana	M/s K. Raheja Corp.	**Online**
23.	Mr. Gaurav Saini	Real Estate – Mirae Asset.	**Online**
24.	Mr. Bhavin Pandya	Shree Naman Group.	**Online**
25.	Mr. Tomoki I.	GOISU Realty Pvt. Ltd.	**Online**

The Meeting ended with Thanks to the Chair.

x-x-x

SITE VISIT REPORT

for

Lease of Commercial Plot no. C-13 and Plot No. C-19 at G-Block of Bandra-Kurla Complex, Mumbai.

Site Visit Dated: 30th May 2023

Tender No.: e-Tender No. 2023_MMRDA_904333_1 ***(for plot no. C-13)***
e-Tender No. 2023_MMRDA_904375_1 ***(for plot no. C-19)***

एम एम आर डी ए
MMRDA

Site Visit Report:

Pre-Bid Site Visit for Lease of Commercial Plot no. C-13 and Plot No. C-19 at G-Block of Bandra-Kurla Complex, Mumbai.

Tender No. : e-Tender No. 2023_MMRDA_904333_1 *(for plot no. C-13)*
e-Tender No. 2023_MMRDA_904375_1 *(for plot no. C-19)*
Date of Visit : 30th May 2023
Location : G-Block, Bandra Kurla Complex, Bandra East, Mumbai.

Introduction:

The site visit was organized by Town & Country Planning Division, MMRDA to provide a detailed insight about the commercial plots (i.e., plot no. C13 & C19) which will be available to Successful Bidder for development of commercial office building in G-Block of Bandra Kurla Complex.

The purpose of the visit was to give the prospective Bidders an actual understanding of both the plots with respect to its location, dimensions, existing situation etc. The plots are e-tender with an objective that commercial office buildings will be developed on the said plots by the successful bidder.

The visit was attended by representatives of four prospective bidding company (viz. M/s GOISU Realty Pvt. Ltd., JLL, Mumbai Pvt. Ltd., M/s Nirlon MS Pvt. Ltd. And M/s K. Raheja Corp. Pvt. Ltd.) alongwith officers of MMRDA. The Attendance Sheet is enclosed as Annexure – A.

Site Inspection:

The site inspection began with a brief overview of the G-Block of BKC and objective of floating the tender. Subsequently, Mr. Sanmukh Desai (Sr. Planner, T&CP Div., MMRDA) alonwith Mr. Ankit Das (Planner, T&CP Div., MMRDA) took the prospective Bidders for a site visit to Plot No. C-13 & Plot No. C-19 in G-Block of BKC, Bandra East, Mumbai.

The officers of MMRDA provided a detailed explanation of the plot location, plot area and plot boundaries, on-site constraints, existing situations and natural features on the site etc. The officers of MMRDA also highlighted that Plot C13 is being currently used for temporary parking and the same shall be removed before handing over of the Plot No. C13 to the Successful Bidder.

The team also showed the prospective Bidders the Plot no. C-19 and elaborated on the information related to site features, access roads, RG, neighbouring plots and other development details.

Photograph of Site Visit:

Conclusion:

Overall, the site visit provided the prospective Bidders with a clear understanding of both the plots and their on-ground situation. The visit ended with a question-and-answer session, where-in the Officers of T&CP Div., MMRDA and Land Cell, MMRDA have clarified all the doubts or queries of the prospective Bidders.

Annexure A- Attendance Sheet

SNo.	Name	Designation/ Organization
1.	Mr. Sanmukh Desai	Sr. Planner, T&CP Div., MMRDA
2.	Mr. Ankit Das	Planner, T&CP Div., MMRDA
3.	Mr. Sudarshan Shinde	Dy. Planner, T&CP Div., MMRDA
4.	Mr. Dinesh Tandel	Head Surveyor, L&E Cell, MMRDA
5.	Mr. Soichipo Okada	(AGM) M/s GOISU Realty Pvt. Ltd.
6.	Mr. Atsushi Kamazaki	M/s GOISU Realty Pvt. Ltd.
7.	Mr. Karan Rego	(Asstt. Manager) M/s JLL, Mumbai Pvt. Ltd.
8.	Mr. Yash Motlani	M/s JLL, Mumbai Pvt. Ltd.
9.	Mr. IP Singh	M/s Nirlon MS Pvt. Ltd.
10.	Mr. D.A. Pandya	M/s Nirlon MS Pvt. Ltd.

x-x-x

T&CP Division/MMRDA

Sub: Details of Prospective Bidders & their queries w.r.t. Lease of 2 Commercial Plots (Plot No. C-13 and C-19) in 'G' Block of Bandra-Kurla Complex through e-tendering.

Ref: e-Tender No. 2023_MMRDA_904333_1 *(for plot no. C-13)*
e-Tender No. 2023_MMRDA_904375_1 *(for plot no. C-19)*

With reference to the **Leasing of 2 Commercial Plots (Plot No. C-13 and C-19) in 'G' Block of Bandra-Kurla Complex through e-tendering** following is the summary of the Prospective Bidders with respect to Pre-Bid, Site Visit and Queries:

SNo.	Description	No.s	Name
A	Prospective Bidders who **Attended the Site Visit**	4 (four)	1. K Raheja Corp. 2. GOISU Realty Pvt. Ltd. 3. JLL, Mumbai 4. Nirlon MS Pvt. Ltd.
B	No. of Prospective Bidders who **Attended the Pre-Bid Meeting**	9 (nine)	1. MIRAE Asset 2. GOISU Realty Pvt. Ltd. 3. Godrej Funds Management & Advisors Pvt. Ltd. 4. Provenance Land Pvt. Ltd. 5. RMZ Corp Pvt. Ltd. 6. Saga Design 7. JLL, Mumbai 8. K. Raheja Corp. 9. Shree Naman Group.
C	No. of Prospective Bidders who **submitted their Queries**	2 (two)	1. MIRAE Asset 2. GOISU Realty Pvt. Ltd.

Continued …

Bidder-wise details of No.s of queries received.

SNo.	Description	No.s
D.	**Total No. of Queries received**	**29 No.s**
D.1.	1. MIRAE Asset	16 No.s
D.2.	2. GOISU Realty Pvt. Ltd.	13 No.s

Subject-wise details of No.s of queries received.

SNo.	Description	No.s
E.	**Total No. of Queries received**	**29 No.s**
1.	List of Approved Category	4 No.s
2.	MMRDA's Land Disposal Regulation and Lease Deed	1 No.s
3.	Lease Period	1 No.s
4.	EMD & Eligibility Criteria	1 No.s
5.	EMD & Furnishing of Bank Guarantee	5 No.s
6.	Instruction to Bidders	2 No.s
7.	Payment of Other Charges	1 No.s
8.	Eligibility Criteria	1 No.s
9.	Particulars of Land	3 No.s
10.	Particulars of Land & Schematic Drawings	2 No.s
11.	Location Plan	1 No.s
12.	Measurement Plan	2 No.s
13.	E-tendering Guidelines for MMRDA	1 No.s
14.	General	3 No.s

--- X --- X---

MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY
Bandra-Kurla Complex, Bandra (East), Mumbai-51. Tel: 26591236/4078. Fax: 91-022-26594178
Website: http//www.mmrda.maharashtra.gov.in

(uploaded on 13/10/2023)

Standard Set of Deviations

(To be an Integral Part of e-Tender)

Tender No	**:**	e-Tender No. 2023_MMRDA_904333_1 *(for plot no. C-13)* e-Tender No. 2023_MMRDA_904375_1 *(for plot no. C-19)*
Division	**:**	Town & Country Planning Division
Name of Tender	**:**	**Lease of 2 Commercial Plots (Plot No. C-13 and C-19) in 'G' Block of Bandra-Kurla Complex through e-tendering.**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
1	Clause No. 4.8. Table 1. NOTE; **Eligibility Criteria (Category wise)** Page No. 57-58	Agencies in Categories (1), (2), (3) and (5) mentioned above can assign upto only 40% of Built Up Area to other Agencies falling under all the Categories as mentioned in Table 2 at sub-clause 4.8.1 below, within 5 years from completion of Building Construction (Post Occupation Certificate) and balance 60% can be assigned after 5 years. Provided that the said 40% Floor Space for assignment to other agencies shall be preferably demarcated on the drawings submitted to MMRDA	Can a Category 1 - Agency Rent out the entire premises on Leave and License basis, to another company (ies) falling under the categories mentioned in Table 2 (attached for reference) at sub-clause 4.8.1 of the tender document, after construction completion and receipt of Occupation Certificate?	Renting out the premises on Leave & License Basis is allowed with prior approval of Hon. Metropolitan Commissioner and on payment of applicable processing fee + GST. **Tender Condition Prevails**
			Can a Category 1 - Agency Rent out the entire premises on Sub-Lease basis, to another company (ies) falling under the categories mentioned in Table 2 (attached	Only upto 40% of Built Up Area can be assigned/ sub-lease within 5 years from the date of issuance of Occupation Certificate with prior approval of Hon.

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
	Form D **Lease Deed** Page No. 77-85	point no. 3(p) Not to assign - Not to sell, mortgage, assign, underlet or sublet or part with the possession of the demised premises or any part thereof or any interest therein without the previous written consent of the Metropolitan Commissioner, Consent may be granted by the Metropolitan Commissioner subject to payment by the Lessee of a sum equal to 10 percent of the stamp duty chargeable on the instrument of intended transfer under the Bombay Stamp Act, 1958 and further subject to such conditions as he may impose in public interest.	for reference) at sub-clause 4.8.1 of the tender document, after construction completion and receipt of Occupation Certificate?	Metropolitan Commissioner and on payment of applicable processing fee + GST. **Tender Condition Prevails**
			If the bidder applies under Category-1 (Financial Services), can it fully sub-lease the constructed space right after completion?	No **Tender Condition Prevails**
			Is there any restriction/ cooling period on transfer/ assignment of lease deed? What are the applicable charges for the same?	Restriction to transfer to be as per Clause 4.8. Table 1 NOTE: of the Tender Booklet. Transfer Charges are applicable as mentioned in the Lease Deed clause 3(p) **Tender Condition Prevails**
2	Clause No. 5.1. **MMRDA's Land Disposal Regulation** Form D **Lease Deed** Page No. 69 & 77-85	Chapter 5, Form D, MMRDA Special Terms and Conditions of Leasing, Covenants by the Lessee – point no. 3(a) to pay rates and taxes - To pay all existing and future taxes, rates and assessments, land revenue and out goings of every description for the time being payable either by landlord or the tenant or by the occupier in respect of the demised premises and anything for the time being thereon. The stamp duty and the registration charges and all other charges payable in connection with the execution of the Deed of Lease shall be borne wholly and exclusively by the Lessee. point no. 3(p) Not to assign - Not to sell, mortgage, assign, underlet or sublet or	Is lease agreement going to attract any transfer charges over stamp duty?	**Tender Condition Prevails**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
		part with the possession of the demised premises or any part thereof or any interest therein without the previous written consent of the Metropolitan Commissioner, Consent may be granted by the Metropolitan Commissioner subject to payment by the Lessee of a sum equal to 10 percent of the stamp duty chargeable on the instrument of intended transfer under the Bombay Stamp Act, 1958 and further subject to such conditions as he may impose in public interest.		
3	Clause No. 3.4 **Lease period** **Page No. 39** Point 3(o) Form D Clause No. 5.1 **MMRDA Special Terms and conditions of leasing** **Page No. 83**	Lease period As per MMRDA's Land Disposal Regulation, 1977 as amended from time to time the lease period for the given plot is 80 years from the date of signing of Lease Deed. ***3(o) Delivery of possession after expiration:*** At the expiration or sooner determination of the said terms, quietly to deliver unto the Lessor the demised premises and all erections and buildings then standing or being thereon PROVIDED always that the Lessee shall be at liberty if he shall have paid the rent and all Municipal and other taxes, rates and assessments then due and shall have performed and observed the covenants and conditions herein contained prior to the expiration of the said term, to remove and appropriate to himself all buildings, erection and structures and materials from the said plot of land but so nevertheless that the Lessee shall deliver up as aforesaid to the Lessor leveled and put in good order and condition to the satisfaction of the Lessor all land from which the buildings, erection or structures may have been	What are the conditions for lease renewal after 80 years? Is there a provision to transfer land title after lease expiry?	**Tender Condition Prevails** (refer 3(o) of Form D MMRDA Special Terms and conditions of leasing Clause 5.1 of Chapter 5)

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
		removed. Provided further that after the possession of the demised premises has been delivered to or obtained by the Lessor, such building, erection or structure shall stand forfeited to the Lessor.		
4	Clause No. 4.2 **Earnest Money Deposit** & Clause no. 4.8 **Eligibility Criteria** Page No. 48-58	a. The EMD shall be non-transferable. b. The EMD shall be forfeited: • If a Bidder withdraws its bid. • If successful Bidder fails to sign the Lease deed within specified time in accordance with the format given in the tender. • If during the bid process, a Bidder indulges in any such deliberate act as would jeopardise or unnecessarily delay the process of bid evaluation and finalisation. The decision of MMRDA regarding forfeiture of the Bid Security shall be final and binding upon Bidders. • If during the bid process, any information is found false/fraudulent/ malafide, then MMRDA shall reject the bid and, if necessary, initiate appropriate action. c. The Proposal not submitted in accordance with the procedure and formats prescribed in this document and adhering to the timeline shall be treated as non-conforming Proposal.	In case where a newly constituted SPV (subsidiary) or step-down subsidiaries act as bidder/agency, can the promoter entity provide EMD BG and suffice technical eligibility (net-worth and gross turnover) on behalf of the bidder entity?	In case of an existing subsidiary company of a promoter company bids for the plot, the EMD is required to be submitted by the subsidiary company. The Promoter company should give an undertaking of its majority control on the subsidiary company as defined in Indian Company Act. In such a scenario, the technical eligibility of the promoter company can be considered. **Tender Condition Clarified.**
5	Clause No. 1.2, 4.2, 7.2 **Earnest Money Deposit** Page 30, 48 & 118	**Clause No. 1.2 page 30;** **Clause No. 4.2 page 48;** **Clause No. 7.2 page 118.** Rs. 30,05,00,000/- (Rs. Thirty Crores and Five Lakhs only) – Rs. 5,00,000/- (Rs. Five Lakh only) by electronic	The tender document says that Payment of EMD "has to be paid by electronic transfer through Mahatender portal", and "can be paid by two methods". 1) Using online payment gateway (i.e. Debit Card/Credit Card/ Net-Banking) 2) RTGS/NEFT mode using the system Generated Unique Challan	**Modification to** **Clause No. 1.2 page 30;** **Clause No. 4.2 page 48;** **Clause No. 7.2 page 118.** Rs. 30,05,00,000/- (Rs. Thirty Crores and Five Lakhs only) as Bank Guarantee –

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
		transfer through Mahatender portal a) Online payment gateway (i.e. Debit Card/ Credit Card/ Net-Banking.) b) RTGS / NEFT mode using the System Generated Unique Challan (Account No. for EMD transaction for this particular Tender is mentioned in the Challan) AND	Even though the tender document says that, however helpdesk of Mahatender portal says that Bidder can make the tender payment through "Net-Banking only".	Rs. 5,00,000/- (Rs. Five Lakh only) by electronic transfer through Mahatender portal Online payment gateway (i.e. Net-Banking) ~~RTGS / NEFT mode using the System Generated Unique Challan (Account No for EMD transaction for this particular Tender is mentioned in the Challan)~~ **(cut and marked red is deleted)**
	Clause No. 4.3 **Earnest Money Deposit** Page 49	**Clause No. 4.3 page 49;** Payment procedure for NEFT/RTGS Partial EMD Payment of Rs.5,00,000/- (Online) as mentioned above has to be made through RTGS / NEFT mode using the System Generated Challan. Bidders should ensure that the payment of the EMD is made at-least 5 working days prior to the last date of Bid Preparation and Submission of the Tender Schedule to have seamless submission. Bidders need to upload scanned copies of receipt of EMD paid online and Bank guarantee (BG) during bid preparation. Bidders failing to complete the payment of EMD using the above mentioned process will not be able to submit their bids.	The tender document says that Payment of EMD "has to be paid by electronic transfer through Mahatender portal", and "can be paid by two methods". 1) Using online payment gateway (i.e. Debit Card/Credit Card/ Net-Banking) 2) RTGS/NEFT mode using the system Generated Unique Challan Even though the tender document says that, however helpdesk of Mahatender portal says that Bidder can make the tender payment through "Net-Banking only".	**Modification to** **Clause No. 4.3 page 49;** ~~Partial EMD Payment of Rs.5,00,000/- (Online) as mentioned above has to be made through RTGS / NEFT mode using the System Generated Challan. Bidders should ensure that the payment of the EMD is made at-least 5 working days prior to the last date of Bid Preparation and Submission of the Tender Schedule to have seamless submission.~~ ~~Bidders need to upload scanned copies of receipt of EMD paid online and Bank guarantee (BG) during bid preparation.~~ ~~Bidders failing to complete the payment of EMD using the above mentioned process will not be able to submit their bids.~~ **(cut and marked red is deleted)**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
	Clause No. 6.7 **Earnest Money Deposit** Page 110	Clause No. 6.7 page 110; Earnest Money Deposit: EMD can be paid by using two Mode of Payment: a) Online payment gateway (i.e. Debit Card/Credit Card/Net-Banking) b) RTGS / NEFT mode using the System Generated Unique Challan (Account No for EMD transaction for this particular Tender is mentioned in the Challan) Payment procedure for NEFT/RTGS EMD Payment as mentioned above has to be made through RTGS / NEFT mode using the System Generated Challan. Bidders should ensure that the payment of the EMD is made at-least 5 working days prior to the last date of Bid Preparation and Submission of the Tender Schedule to have seamless submission. Bidders need to upload scanned copy of EMD paid receipt during bid preparation. Bidders failing to complete the payment of EMD using the above mentioned process of RTGS / NEFT or Online payment gateway after downloading the system generated challan will not be able to submit their bids.	The tender document says that Payment of EMD "has to be paid by electronic transfer through Mahatender portal", and "can be paid by two methods". 1) Using online payment gateway (i.e. Debit Card/Credit Card/ Net-Banking) 2) RTGS/NEFT mode using the system Generated Unique Challan Even though the tender document says that, however helpdesk of Mahatender portal says that Bidder can make the tender payment through "Net-Banking only".	**Modification to** **Clause No. 6.7 page 110;** Earnest Money Deposit: Out of the total EMD of Rs. 30Crores and 5Lakhs, Rs. 30 Crores is to be submitted as Bank Guarantee and Rs. 5lakhs is to be paid by using the Online payment gateway (i.e. Net-Banking) ~~a) RTGS / NEFT mode using the System Generated Unique Challan (Account No for EMD transaction for this particular Tender is mentioned in the Challan)~~ ~~Payment procedure for NEFT/RTGS EMD Payment as mentioned above has to be made through RTGS / NEFT mode using the System Generated Challan. Bidders should ensure that the payment of the EMD is made at-least 5 working days prior to the last date of Bid Preparation and Submission of the Tender Schedule to have seamless submission.~~ ~~Bidders need to upload scanned copy of EMD paid receipt during bid preparation.~~ ~~Bidders failing to complete the payment of EMD using the above mentioned process of RTGS / NEFT or Online payment gateway after downloading~~

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
				~~the system generated challan will not be able to submit their bids.~~ **(cut and marked red is deleted)**
	Clause 6.6 **Regarding Furnishing of Bank Guarantee** Page No. 48 & 108	Regarding Furnishing of Bank Guarantee Following points are to be considered while furnishing Bank Guarantees for MMRDA: • Bank Guarantee from Nationalized Banks only should be furnished. Under no circumstances, Bank Guarantees from Co-operative Banks should be accepted. • As per RBI guidelines, all Bank Guarantees should be issued by the issuing bank through SFMS mode. For the purpose, the bank details in respect of MMRDA for opening Bank Guarantee through SFMS mode are as follows: **Bank Name:** Bank of Maharashtra **Branch:** Kalanagar, Bandra (East) **A/c No:** 60259778998 **IFSC Code:** MAHB0000164 • BG Should be payable at any branch in Mumbai • List of Bank stated in the RFP document pg 108	Can we submit EMD BG issued by a scheduled bank as listed on Page 108 of bid document?	Yes **Tender Condition Prevails**
			We have only account of SMBC (Sumitomo Mitsui Bank). Do you have any process that we can pay from our account of SMBC?	**Tender Condition Prevails**
			Bidder is allowed to pay Tender Fee or EMD by a) Net-Banking, b) Debit or Credit card, c) Bank transfer(RTGS etc.) by using the challan to pay, however, on the Maha tender portal, it is allowed the only method of payment by Net-Banking through specific designated Banks. We request you enable all the methods of payment. Further, as for payment of Net-Banking, we request you to enable the bidders to pay from all kinds of banks bidders have their accounts Although we are considering of using the Challan to make the payment of EMD, Cannot I make the tender payment by such any method other than Net-Banking only? (2) In case we have to pay by Net-Banking through the Mahatender portal, We have no account of bank which is in the list of on Mahatender portal.	**Tender Condition Prevails**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
6	Clause no. 4.1(8) **Instruction to bidders** & Clause no. 4.8 **Eligibility Criteria** & Clause No. 5.1. Form D **Lease Deed** Page No. 51-58 & 77-85	Clause no. 4.1(8) No change in, or supplementary information to a Bid shall be accepted once submitted. However, MMRDA reserves the right to seek additional information from the Bidders, if found necessary, during the course of evaluation of the Bid.	In case where the promoter entity act as bidder/agency, can its SPV or step-down subsidiaries enter into definitive documents/ lease agreement? Also, will it attract any additional charges?	No **Tender Condition Prevails**
		Clause no. 4.8. Bidder shall be a Company Registered under The Companies Act, 2013 AND Bidder shall be Competent to enter into contract under The Indian Contract Act, 1872.	In case where SPV is bidding entity, is there any restriction/ charges on transfer of its ownership?	Change in Bidder status is not allowed during tendering process **Tender Condition Prevails**
7	Clause no. 1.2 **Payment of Other Charges** Page No. 28-29	Payment of other charges In addition to the Premium payable by the allottee, the following charges will have to be paid separately: a) Legal documentation charges. b) Stamp Duty leviable on each document under the Bombay Stamp Act, 1958. c) Charges for the registration of any document under The Indian Registration Act. d) Fees and charges including Development Charge payable to the Metropolitan Authority and to the Municipal Corporation of Greater Mumbai along with the application for permission to erect the intended building or buildings. e) Charges payable to the MCGM for application to obtain supply of water etc., f) Municipal taxes, Non-Agricultural Assessment and any other taxes leviable on the tendered plot will also be paid by the Lessee. g) All rates, taxes, charges, claims and outgoings including electricity and water charges chargeable	Computation of other charges payable along with the lease Premium as listed on Page 28-29 of the bid document.	**Tender Condition Prevails**

<table>
<tr><th>SNo.</th><th>Clause No.
Page No.</th><th>Clause as appearing in the published tender</th><th>Queries/Clarification sought by the bidders</th><th>Clarification/ Remarks</th></tr>
<tr><td></td><td></td><td>against the Lessee or occupier in respect of the said land or any building erected thereon.
h) The Land Revenue and Cess assessed or which may be assessed on the said land.
i) The Annual Rent payable by successful Bidder shall be Re. 1/- per sq. mtr. of the Plot Area for the 1st year and will be increased by 10% over the rent of the previous year.</td><td></td><td></td></tr>
<tr><td>8</td><td>Clause no. 4.8 Eligibility Criteria (Turnover & Networth)

Page No. 51-58</td><td>Turnover and Networth
• Audited Financial Statement for last three Financial Years i.e. 2021-22, 2020-2021, 2019-20; and
• Statutory Auditor’s Certificate/ Certificate from Chartered Accountant of the Bidder clearly specifying the Gross Turnover for the last three Financial Years i.e 2021-22, 2020-21, 2019-20.
• Statutory Auditor Certificate/ Certificate from Chartered Accountant of Bidder specifying the Networth for the last three Financial Years i.e 2021-22, 2020-21, 2019-20.</td><td>Bidder is an Indian company but publishes annual report at Calendar Year interval instead of Financial Year. Can it fulfil technical eligibility basis audited financials of last three calendar years instead of financial years?</td><td>Equivalent Certificate be obtained by Chartered Accountant.</td></tr>
<tr><td>9</td><td>Clause no. 3.2 Particulars of Lands

Page No. 38-39</td><td>Details of the Commercial Plot being offered on 80-year lease are as follows: -
<table>
<tr><th>Plot No.</th><th>Plot Area in sq.m.</th><th>Permissible BUA in sq.m.</th><th>Permissible User</th><th>Access Road Width (in m)</th></tr>
<tr><td>C19</td><td>6096.67</td><td>40,000.00</td><td>Commercial (30% Mixed Residential Use may be permitted on receipt of Government Approval)</td><td>30m (North Side), 30m (West Side), *24m (East Side)</td></tr>
</table></td><td>At the time of the Pre-bid meeting, there was a comment that the 24m access road from the east side of plot No. C-19 is part of the proposed International Finance Services Centre (IFSC) in BKC, and it shall be discontinued once the proposed IFSC is declared in BKC under SEZ Act, 2005.

In that case, including the existing building on plot No.C-20, the west side road can be used. However, given the current situation on the site, the west side road seems not enough for two-way traffic, we would appreciate it if you</td><td>For Plot C19
Access from 30M road North side and 24M road from East side will be allowed.

Tender Condition Clarified</td></tr>
</table>

<table>
<tr><th>SNo.</th><th>Clause No.
Page No.</th><th>Clause as appearing in the published tender</th><th>Queries/Clarification sought by the bidders</th><th>Clarification/ Remarks</th></tr>
<tr><td></td><td></td><td>Note:
a. Plot area might undergo minor changes after demarcation. However, the maximum permissible Built-Up Area (BUA) will remain same. The Bidder will have to quote lease premium rate per sq.m for permissible Built-Up Area. (No fungible FSI is permitted for this plot)
b. *The 24m access road from east side of the plot No. C-19 as mentioned above is part of the proposed International Finance Services Centre (IFSC) in BKC and it shall be discontinued once the proposed IFSC is declared in BKC under SEZ Act, 2005.</td><td>could let us know the detailed information in this regard.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>In case the 24m access road from east side of the plot No. C-19 is discontinued, what happens after that? We would like to know about whether that will be restricted road or the site on which the building will be erected or any situations.</td><td>For Plot C19
Access from 30M road North side and 24M road from East side will be allowed.
Tender Condition Clarified</td></tr>
<tr><td></td><td></td><td></td><td>Is there a defined tolerance in area change?</td><td>Tender Condition Prevails</td></tr>
<tr><td>10</td><td>Clause no. 3.2 Particulars of Lands

Page No. 38-39

&

Clause no. 6.5 Schematic drawings

Page No. 107</td><td>Details of the Commercial Plot being offered on 80-year lease are as follows: -

<table>
<tr><th>Plot No.</th><th>Plot Area in sq.m.</th><th>Permissible BUA in sq.m.</th><th>Permissible User</th><th>Access Road Width (in m)</th></tr>
<tr><td>C19</td><td>6096.67</td><td>40,000.00</td><td>Commercial (30% Mixed Residential Use may be permitted on receipt of Government Approval)</td><td>30m (North Side), 30m (West Side), *24m (East Side)</td></tr>
</table>
Note:
a. Plot area might undergo minor changes after demarcation. However, the maximum permissible Built-Up Area (BUA) will remain same. The Bidder will have to quote lease premium rate per sq.m for permissible Built-Up Area. (No fungible FSI is permitted for this</td><td>Is there any reason for the permissible BUA to be given larger/bigger compared to the past Tender?
C13 Plot Area 7,071.9 m2 (The ratio of BUA against Plot Area, 6.4)

C19 Plot Area 6,096,67 m2
BUA: 40,000 m2
(The ratio of BUA against Plot Area, 6.6) i.e.
C65 Plot Area 12,486 m2 BUA:65,000 m2
(The ratio of BUA against Plot Area, 5.2)
C44&48 Plot Area 6,018 m2 BUA:30.000 m2
(The ratio of BUA against Plot Area, 5.0)
C69C Plot Area 5,807.5 m2 BUA:30,000 m2
(The ratio of BUA against Plot Area, 5.2)
C69D Plot Area 6,077.7 m2 BUA:30,000 m2
(The ratio of BUA against Plot Area, 4.9)</td><td>Tender Condition Prevails</td></tr>
<tr><td></td><td></td><td></td><td>This time, since the proposed FSI is increased, so there might be possibility that</td><td>The schematic drawing at Clause 6.5 page 107 of RFP is indicative. The</td></tr>
</table>

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
		plot)	some design criteria or development quality should be compromised to consume the proposed full FSI. Would you consider the way that the transactional FSI should be 5 at first, then in case more FSI availability is confirmed by the bidder in future after several practical studies, such an additional area would be sold by MMRDA?	BUA offered on individual plot can be consumed as per DCR. It is the responsibility of the Bidder to do the due diligence before submission of the bid. **Tender Condition Prevails**
11	Clause no. 5.3.1 **Location Plan** Page No. 95	Location Plan of Plot C19 at page 95 of the RFP document	There seems to be inconsistency between the Location & Measurement plan in the Tender booklet of C19 and the map in the Club house tender. Kindly please provide the detailed information.	**No Change**
12	Clause no. 5.3.2 **Measurement Plan** Page No. 96	Measurement Plan of Plot C19 at page 96 of the RFP document	We humbly request you to provide the coordinates along with both plots. We are aware that the physical joint survey would be done before the execution of the leased deed and it may be different from the current one. However, kindly please provide the coordinates as a basis of the measurement plan in the Tender booklet. Please share AutoCAD of the plot.	The AutoCAD drawing of the plot will be shared with the bidders as attachment / email.
13	Clause no. 6.7 **E-tendering guidelines for MMRDA**	E-Tendering Guidelines for MMRDA 1. Bidders should have valid class 3 Digital Signature Certificate (DSC) having both Signing and Encryption Certificates obtained from any Certifying Authorities empanelled by Controller of	There is a description that bidders have to use DSC, which has a function of "Signing and Encryption". However, on the Maha Tender portal, it seems that it is not allowed to register DSC	Bidder should have Class 3 DSC; so please contact helpdesk MahaTender Portal for the same.

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
	Page No. 109	Certifying Authorities India. 2. In case of requirement of DSC, Bidders should go to https:// https://mahatenders.gov.in/nicgep/app. and follow the procedure mentioned in the document Procedure for Digital Certificate. 3. Bidders who are participating in e-tendering for the first time will have to register and obtain User ID & Password from the above mentioned portal. 4. In case of any queries, Bidders may contact MMRDA's e-tendering service desk at support-eproc@nic.in on any working day from 10am to 5.30pm. (Phone No. 022-26597445) 5. The tenders shall be received online on E-Tendering Mahatender Portal https://mahatenders.gov.in/nicgep/app and opened by the Office In-Charge (OIC) on scheduled date and time. 6. If there is any amendment in the tender, the same shall be published on following MMRDA's official e-Tender portals / website : **Mahatender Portal:** https://mahatenders.gov.in/nicgep/app **MMRDA Website:** https://mmrda.maharashtra.gov.in 7. The detailed e-Tender notice along with the subsequent corrigendum, addendum etc. shall form part of the tender document. 8. The acceptance of tender will be intimated by email or otherwise by the authority competent to accept the tender or by the higher Authority of MMRDA, to the Bidder, which shall be deemed to be an intimation of the tender given by the Authority Competent to accept the tender. 9. Bid shall be submitted online on the e-tendering portal in 'three electronic envelopes system' within prescribed schedule.	which has the above function. i.e. Only the "Signing" function is allowed. We request you to clarify whether it is okay to use DSC which has only a Signing function.	**Tender Condition Prevails**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
14	Clause no. 9.1 **Form C – Financial Proposal** Page No. 159-161	Envelope 'C' - Financial Bid Clause No. 9.1 Form C – Financial Proposal Point No. 3 I/We have enclosed scanned copy of acknowledgement of payment of **Rs. 30,05,00,000/- (Rs. Thirty Crores and Five Lakhs Only)** being Earnest Money Deposit (in e-Envelope-A) towards our offer for **plot under reference.** No interest on this Earnest Money Deposit is payable to me/us;	-----	**Modification to** **Envelope 'C' - Financial Bid** **Clause No. 9.1** **Form C – Financial Proposal** **Point No. 3** I/We have enclosed scanned copy of acknowledgement of payment of **Rs. 30,05,00,000/- (Rs. Thirty Crores and Five Lakhs Only)** being Earnest Money Deposit (wherein Rs. 5 lakhs by online transfer and Rs. 30 Crores as Bank Guarantee, in e-Envelope-A) towards our offer for **plot under reference.** No interest on this Earnest Money Deposit is payable to me/us;
15	General	General	Can we commence approvals process once the offer letter is received? Requisite NOCs form MMRDA will be required for approvals documentation.	The bidder may start the process for procurement of building approvals/ permissions as per his decision. However, building approvals will be issued once all the premium is paid along with interest if any and on signing of lease agreement with MMRDA.
			Is The first sub-lease counted in first transfer i.e. will it attract any charges by MMRDA over stamp duty.	Yes, Refer the FORM-D Mumbai Metropolitan Region Development Authority Special Terms and Conditions of leasing Lease Deed Clause 3(p) at page-83. **Tender Condition Prevails**

SNo.	Clause No. Page No.	Clause as appearing in the published tender	Queries/Clarification sought by the bidders	Clarification/ Remarks
			Will MMRDA grant extension of construction timeline in below listed scenarios: - force majeure events such as natural disasters, health outbreak such as Covid - delay in approvals from MMRDA - delay in approvals from other government departments	**Tender Condition Prevails**
16	General	General	Please provide the information of geological info (boring investigation data, etc.) soil contamination data. In the event that there is no data on Plot C13/C19, it is not limited to the data on the said Plots. Kindly please provide the referable data, such as the data in the vicinity/neighbor of the Plots.	The soil investigation report for the neighboring plots are kept as **Annexure A** Disclaimer: This is as per given report. MMRDA donot take any responsibility of the soil data of the plots under reference. You are required to undertake your own soil investigation report.

----- X ----- X ----- X -----

Annexure - A

GEOTECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C -8(A) BANDRA KURLA COMPLEX-MUMBAI

No. BJAK/07/2022/004

MONTH & YEAR: Aug– 2022

SUBMITTED TO,

BHARAT PETROLEUM CORPORATION LIMITED, MUMBAI

SUBMITTED BY,

BHASKRAM JYOTISH ANUSANDHAN KENDRA

OFFICE NO.03, GOKULDHAM CHS LTD, SUKAPUR, NEW PANVEL,

DISTRICT-RAIGAD, MAHARASHTRA-410206

Email-bhaskramjyotish1@gmail.com, Mob:09867158937

INDEX

1.0 INTRODUCTION:

Bharat Petroleum Corporation limited, Mumbai has proposed Geotechnical Investigation for Commercial Plot C -8(A) Bandra Kurla Complex-Mumbai. The purpose of the investigation was to determine the sub soil stratification, geotechnical information & safe bearing capacity, so as to provide information that will assist the structural engineers in the design of the foundations and the relevant works. The work was awarded to M/s Bhaskram Jyotish Anusandhan Kendra LOI issued vide reference No. HRS.WR.ADM.19.BKC.GEO dated 26.07.2022

The objective of the sub soil/rock exploration was-

- To determine the probable sub surface conditions such as stratification, denseness or hardness of the strata, position of ground water table etc.
- To give probable range of safe bearing capacity for the structure. To accomplish these purposes, the study was conducted in the following phases.
- Drilling boreholes in order to determine site stratification and to collect disturb & undisturbed soil samples and rock core samples for laboratory testing.
- Testing on selected soil/rock samples in the laboratory to determine physical and engineering properties of the soil/rock.
- Analyzing all field and laboratory data in order to develop engineering recommendations for foundation design and construction.

Field work of borehole and other tests are summarized as under.

Table No.-1 (Boreholes)

Description	Termination depth(m)	Date of Field work	Coordinates		Water Table (bgl)(m)
			Easting	Northing	
BH-01	25.50	16-08-22 to 19-08-22	19000	71300	2.80
BH-02	26.00	19-08-22 to 22-08-22	24000	47800	2.75
BH-03	25.00	13-08-22 to 16-08-22	24000	22300	2.50
BH-04	27.00	18-08-22 to 22-08-22	46500	22300	2.90

The Job was carried out under the guidance and supervision of the officials of BPCL, Mumbai, (India) and authorized representative of M/s Bhaskram Jyotish Anusandhan Kendra.

2.0 GEOLOGY

2.1 Geography: : Bandra Kurla Complex, Mumbai covers 370 hectares of once low-lying land on either side of the Mithi river, Vakola Nalla and Mahim Creek.. One of the important features of the channelization of Mithi river and Vakola nalla was to improve water carrying capacity and reduce pollution. mithi River for about 4.5 km of its length from Mahim Causeway to C.S.T. Road Bridge.

2.2. Climate: : The Climate change of Bandra kurla complex, Mumbai is a tropical, wet and dry climate. Mumbai's climate can be best described as moderately hot with high level of humidity. This climate is considered to be Aw according to the Köppen-Geiger climate classification. Its coastal nature and tropical location ensure temperatures do not fluctuate much throughout the year. The mean average is 27.2 °C. The mean maximum average temperatures are about 32 °C in summer and 30 °C in winter, while the average minimums are 25 °C in summer and 18 °C in winter. Mumbai experiences three distinct seasons. The month with the highest relative humidity is July (88.93 %). The month with the lowest relative humidity is March (55.81 %). The month with the highest number of rainy days is July.

2.3. Geology: The rock formation in the region is derived mainly from Deccan Basalt rock was observed in different stages of weathering, from highly-weathered to slightly-weathered. The general tendency of weathering observed throughout the investigation is an upper layer consisting of highly- to moderately-weathered basalt with the severity of weathering changing to moderately- and slightly-weathered with increasing depth.

2.4 Seismicity: The Mumbai region, which includes Bandra Kurla complex Mumbai, falls under moderately seismic zone 3 with a possibility of earthquake between 6 and 6.5 magnitude. This is moderate damage risk zone.

3. FIELD WORK:

3.1 Boreholes

Four boreholes were drilled up to the depth of 25.50m,26.00m, 25.00m and 27.00m respectively from the existing ground level (EGL). The work was carried out in accordance with IS: 1892 – 1979. The location of the borehole was identified in due consultation with concerned officials of the Client.

3.2 Disturbed Samples

Disturbed representative samples were collected, logged, labelled and placed in polythene bags.

3.3 Undisturbed Samples

Undisturbed soil samples are collected in 100mm diameter thin walled sampler from the borehole at various depth

3.4 Water Samples

The water table below the general ground level is measured in all the boreholes. Ground Water samples were collected for further examination in Laboratory. The table was encountered in the borehole as indicated above at the time of Sub surface investigation carried out in the month of July-August, 2022. The observations from the boreholes at "SITE" indicated the presence of water table from 2.50m to 2.90m of depth the existing ground level. However, water Table has been considered at GL for design calculation.

3.5 Standard Penetration Test

The standard penetration tests were conducted in bore by using SPT Hammer as per IS: 2131: 1981 (Reaffirmed 1987). The split spoon sampler resting on the bottom of bore hole is allowed to sink under its own weight, then the split spoon sampler is seated 15 cm with the blows of hammer falling through 750mm. The driving assembly consists of a driving head and a 63.5 kg weight. It is ensured that the energy of the falling weight is not reduced by friction between the drive weight and the guides or between ropes. The rods to which the sampler is attached for driving are straight, tightly coupled and straight in alignment. Thereafter the split spoon sampler is further driven by 30cm. The number of blows required to drive each 15cm penetration is recorded. The first 15cm of drive considered as seating drive. The total blows required for the second and third 15cm penetration is termed as a penetration resistance - N value.

3.6 Drilling in Rocks:

When rock was encountered, Nx sized TC/Diamond bits are used for drilling and recovering rock cores. Recovered rock cores were numbered serially and preserved in wooden core boxes. Rock core recovery and Rock Quality Designation (RQD) were computed for every run length drilled. Detailed core logs of boreholes were prepared by geologist at site.

Rock classification in terms of weathering and state of fractures and strength is carried out in the following manner. Tabulations given in below explain it briefly.

Scale of Weathering Grades of Rock Mass (As per IS: 4464)

Terms	Description	Grade	Interpretation
Fresh	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.	I	CR > 90 %
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering.	II	CR between 70 % to 90 %
Moderately Weathered	Less than half of the rock material is decomposed or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III	CR between 50 % to 70 %
Highly Weathered	More than half of the rock material is decomposed or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as core stones	IV	CR between 10 % to 50 %
Completely Weathered	All rock material is decomposed and / or disintegrated to soil. The original mass structure is still largely intact.	V	CR between zero to 10 %
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI	CR = Zero % But N > 50

It should be understood that all grades of weathering may not be seen in a given rock mass and that in some cases a particular grade may be present to a very small extent. Distribution of the various weathering grades of rock material in the rock mass may be related to the porosity of the rock material and presence of open discontinuities of all types in the rock mass.

Rock quality is further measured by frequency of natural joints in rock mass. Rock Quality Designation (RQD) is used to define state of fractures or massiveness of rock. Following table defines the quality of rock mass.

Relation between RQD and in-situ Rock Quality

RQD Classification	**RQD (%)**
Excellent	90 to 100
Good	75 to 90
Fair	50 to 75
Poor	25 to 50
Very Poor	00 to 25

Rock is also classified by strength of intact rock cores collected during drilling. Rock compressive strength (UCS) is used to define strength of rock. Following table summarizes classification of rock based on strength.

Classification of Rock as per Compressive Strength

ROCK STRENGTH	**COMPRESSIVE STRENGTH (Kg/cm^2)**
Extremely weak	< 20
Very Weak	20 to 100
Weak	101 to 250
Average	251 to 500
Strong	501 to 1000
Very Strong	1001 to 2500
Extremely Strong	> 2500

4.0 LABORATORY TESTING

4.1 The following laboratory tests were performed on undisturbed and disturbed soil samples as per relevant Indian Standards for identification, classification purposes and to obtain other relevant Engineering properties of the sub-surface formation.

Summary of IS code to be carried out for the Project		
Sl. No.	**Type of Test**	**Standard Code followed for carrying out the test**
A	**Field Test**	
1	Standard Penetration Test	IS: 2131: 1981
2	Undisturbed Sample IS : 1892:1979	IS : 1892:1979
B	**Tests on Soil Samples (Laboratory Test)**	
1	Particle Size Distribution	IS 2720; P-4
2	Atterberg Limits	IS 2720; P-5 & 6
3	Specific Gravity	IS 2720; P-3
4	Moisture content	IS 2720; P-2
5	Shrinkage Limit	IS 2720 (Part 6)
6	Free swell Index	IS 2720 (Part 40)
7	Direct Shear Test	IS 2720 (Part 13)
8	UU Triaxial test	IS 2720 (Part 11)
9	Chemical analysis of Soil	
10	pH	IS 2720; P-26
11	Sulphate & Sulphite	IS 2720; P-27
12	Chemical analysis of Water	
13	pH	IS 3025; P-11
14	Chloride	IS 3025; P-32
15	Sulphate & Sulphite	IS 3025; P-24
C	**Tests on Rock Samples (Laboratory Test)**	
1	Dry Density	IS 13030: 1991
2	Specific gravity	IS 13030: 1991
3	Porosity	IS 13030: 1991
4	Water absorption	IS 13030: 1991
5	Point Load Strength Index	IS 8764
6	Uniaxial Compressive Strength (UCS) Test	IS 9143: 1979

5.0 SOIL STRATIFICATIONS

Field and laboratory test data reveal the borehole vise stratification as under:

Soil Stratification of borehole

Bore-hole No	Depth (m)	Stratification	Observed SPT value
BH-1	0.0-3.00	Brownish medium dense medium-plastic silty sand(SM)	-
	3.00-5.50	Brownish dense clayey sand having medium plasticity(SC)	REF,8
	5.50-10.00	Brownish very stiff to hard clay having high plasticity(CH)	REF,13,15
	10.00-13.50	Brownish highly weathered to moderately very poor to poor quality rock having CR=(40-70)% & RQD=(20-57)%	-
	13.50-25.5	Greyish Slightly weathered to Fresh Fair to Good quality rock having CR=(69-94)% & RQD=(70-91)%	-
BH-2	0.00-3.00	Brownish medium dense highly-plastic silty sand(SM)	-
	3.00-5.50	Brownish dense clayey sand having high plasticity(SC)	REF,9
	5.50-8.00	Brownish very stiff to hard clay having high plasticity(CH)	REF,13, REF
	8.00- 14.00	Brownish highly weathered to moderately poor to very poor quality rock having CR=(47-65)% & RQD=(24-48)%	-
	14.00-26.00	Greyish Slightly weathered to Fresh Fair to Good quality rock having CR=(70-97)% & RQD=(52-88)%	-
BH-3	0.00-3.00	Brownish medium dense highly-plastic silty sand(SM)	-
	3.00-5.50	Brownish dense clayey sand having high plasticity(SC)	REF,9
	5.50-8.00	Brownish very stiff to hard clay having high plasticity(CH)	REF,12,18
	8.00- 10.00	Brownish highly weathered to highly very poor to poor quality rock having CR=(21-50)% & RQD=(0-28.5)%	-
	10.00-27.00	Greyish Moderately weathered to Fresh poor to Good quality rock having CR=(61-97)% & RQD=(46-90)%	-

BH-4	0.00-3.00	Brownish medium dense medium-plastic silty sand(SM)	-
	3.00-5.50	Brownish dense clayey sand having high plasticity(SC)	7
	5.50-8.00	Brownish very stiff to hard clay having high plasticity(CH)	REF,11,14
	8.00-10.00	Brownish very dense high-plastic silty sand(SM)	REF
	10.50- 18.00	Brownish highly weathered to Highly very poor to very poor quality rock having CR=(0-41)% & RQD=(0-23)%	-
	18.00-27.00	Greyish Highly weathered to Fresh weathered Very poor to Good quality rock having CR=(30-97)% & RQD=(10-89)%	-

6.0 FOUNDATION ANALYSIS

TYPICAL CALCULATIONS FOR SAFE BEARING CAPACITY:

Bearing Capacity (Based on RMR) of as per IS 13365 (P-1), 1998 at 13m Depth on rock layer BH-01

Sr. No.	Description	Condition	Rating as Per IS:13365 (Part I) Annex B
1.	Strength of intact rock Material	Weak	2
2.	Rock Quality Designation	Poor	8
3.	Spacing of Discontinuities	Considering Very close	5
4.	Condition of Discontinuity	Assuming 5mm thick gauge	0
5.	Ground Water Condition	Considering wet	7
6.	Orientation of discontinuity	Considering Fair	-7
		RMR	**15**

As per IS: 12070-1987, Table 3,

RMR: 0 q_{ns} = 40 t/m^2

RMR:20 q_{ns} = 55 t/m^2

By interpolation for RMR value = 15 the net safe bearing capacity is obtained as **50.0 t/m^2** without exceeding total settlement 12mm.

TYPICAL CALCULATION FOR SHALLOW FOUNDATION ON ROCK

(AS PER IS: 12070-1987)

CALCULATION FOR RAFT

Design Borehole considered: BH-02

Safe Bearing capacity for shallow foundation on Rock is worked out based on the uniaxial Compressive strength of rock cores and the relevant clause No. 6 of IS: 12070 – 1987.

As per clause No. 6 of IS: 12070 – 1987,

qs = qc * N1

where

qs = safe bearing pressure;

qc = uniaxial strength of rock core, taken as 9.87 N/mm2 (value at 12.50m)

N1 = the empirical coefficient depending on the spacing of discontinuities

from Table no. 4 of IS: 12070 – 1987, with the discontinuities, N1 is taken as 0.1

qs = qc * N1

= 9.87 * 0.10

= 0.987 N/mm2

SAY 100 T /m2

Summary of Net Safe Bearing Capacity

Sr. No.	Depth (m)	Description	SBC based on RMR (t/m^2)	SBC based on UCS value (t/m^2)	Recommended SBC (t/m^2)
1.	13.00	BH-1	50	118	50
2.		BH-2	45	100	45
3.		BH-3	55	80	55
4.		BH-4	45	53	45
5.	14.00	BH-1	55	121	55
6.		BH-2	50	103	50
7.		BH-3	55	101	55
8.		BH-4	45	53	45
9.	15.00	BH-1	55	130	55
10.		BH-2	55	118	55
11.		BH-3	55	101	55
12.		BH-4	45	53	45

General Recommendation for foundation resting on rock:

These recommended safe bearing capacities on rock criterion given in the above table are applicable for all size of isolated foundation. It also considers maximum permissible settlement of 12mm as per IS. Also, there is no significant effect of size for foundation resting on rock having penetration as refusal. The safe bearing capacity mentioned in the above table is for vertical static loading only.

The above bearing capacity values are based on boreholes data of soil/rock obtained during investigation. The safe uniaxial compressive strength of lean concrete levelling course shall be higher than recommended bearing pressure. Sufficient care shall be taken to remove loosened pieces of rock from foundation, washing and air jetting has been done, so that foundation rests on practically undisturbed rock mass. If at the time of actual excavation major cavities are found, the depth of foundation shall be taken to a level such that 80% rock area is available. It must be ensured that any part of footing / raft does not overhang. If loose pockets of disintegrated rock are found at few places same shall be cleaned and backfilled with lean concrete. If deep observation pits or existing pits are encountered the same shall be backfilled by lean concrete up to the foundation level.

Excavations through rock may be cut nearly vertical. Wedges of soft disintegrated rock should be removed for safety purpose. During the dry season with no surficial flow, even steeper slopes may remain stable. The engineer should monitor the slopes to ensure stability. If excessive sloughing or caving occurs, the slopes may be flattened to ensure stability.

Foundation Level Preparation:

The exposed foundation bearing surface should be compacted properly using light manual rammers / rollers. The surface should then be protected from disturbances due to construction activities so that the foundations may bear on the natural undisturbed ground. For all shallow foundations, we recommend the placement of a 75 to 100mm thick “bedding layer” of lean concrete to facilitate placement of reinforcing steel and to protect the soils from disturbance.

For foundations resting on rock all loose, weathered or fragmented rock should be removed so that foundations may bear on the firm rock. The foundation should be seated at least 1.00m into the rock formation.

Also, there is possibility of undulation in bed rock levels. In such condition for open foundation adjacent by each other the level difference shall be adjusted by provision of lean concrete layer below the footing wherever required.

7.0 CONCLUSIONS AND RECOMMENDATIONS:

7.1. "Geotechnical Investigation for Commercial Plot C -8(A) Bandra Kurla Complex-Mumbai" is found to consist of Brownish/Greyish/ clayey Sand and clay followed by brownish/ greyish Highly weathered to Fresh, Very poor to excellent quality of rock up to termination depth below Existing Ground Level (EGL).

7.2 The ground water table was encountered in the borehole at the time of investigation and the same has been reported in relevant borehole details. However, water Table has been considered at GL for design calculation. Considering site strata, well-point method may be adopted for dewatering; if required.

7.3. Based on the chemical test results, the solids are within permissible limit as per is 456-2019, Table no. 1.

7.4 Other Laboratory test results are given in later part of report.

For BHASKRAM JYOTISH ANUSANDHAN KENDRA

Prepared by

(Nilesh Bhoi)
M. Tech (Geotechnical Engineering)
National Institute of Technology, Agartala

(Sagar Kharate)
M.Tech (Soil Mechanics & Foundation Engineering)
National Institute of Technology, Kurukshetra

For BHASKRAM JYOTISH ANUSANDHAN KENDRA

AUTHORIZED SIGNATORY

8.0 ABBREVIATION

DS	Disturbed Sample
UDS	Undisturbed Sample
SPT	Standard Penetration Test
REF	Refusal
SBC	Safe Bearing Capacity
PI	Plasticity Index
LL	Liquid Limit
PL	Plastic Limit
UCS	Unconfined compressive strength
FS	Filled up Soil
***	Indicates test done on disturbed sample
RQD	Rock Quality Designation
CR	Core Recovery

9.0 CHEMICAL ANALYSIS OF WATER & SOIL

Chemical Test on Water

Borehole No.	pH	Chloride (mg/l)	Sulphates (mg/l)
BH-1	7.68	399.21	399.21
BH-2	7.88	365.48	345.21
BH-3	7.65	289.23	278.63
BH-4	7.77	284.65	284.21

Chemical Test on Soil

Borehole No.	pH	Chloride (mg/l)	Sulphates (mg/l)
BH-1	7.68	371.27	387.25
BH-2	7.88	362.45	345.26
BH-3	7.65	285.26	365.25
BH-4	7.77	285.63	234.12

10.0

LAB SHEET OF BOREHOLES

BHASKRAM JYOTISH ANUSANDHAN KENDRA

OFFICE NO.03, GOKULDHAM CHS LTD, SUKAPUR, NEW PANVEL, DIST-RAIGAD, MAHARASHTRA-410206

SOIL CHARACTERISTICS FOR BOREHOLE NO. – BH- 1

Project Name: Geotechnical Investigation for Commercial Plot C -8(A) at Bandra Kurla Complex.

W.T. below G.L. (m):2.80

Termination depth (m): 25.50

Name of the Client: Bharat Petroleum Corporation Limited (BPCL).

SR. No.	Depth In mt.	Type of Sample	N value Observed	Free Swell Index (%)	Specific Gravity	Grain Size Analysis					Atterbergs Limits			Soil Group	Natural Density		Natural Water Content (%)	Shear Parameters		
						Gravel (%)	Sand (%)			Silt & Clay (%) (Hydrometer)	LL (%)	PL (%)	PI (%)		Bulk Density (g/cc)	Dry Density (g/cc)		*Types* of Test	*C* (kg/cm^2)	*angle of* int. friction *(degree)*
							C	M	F											
1	0.00	DS			2.67	13.30	16.51	15.31	8.51	46.37	46.37	29.36	17.01	SM						
2	0.50	SPT	REF	SAMPLE NOT FOUND																
3.	1.50	SPT	REF	SAMPLE NOT FOUND																
4	2.50	UDS	REF																	
5	3.00	SPT	REF	SAMPLE NOT FOUND																
6	4.50	SPT	8		2.67	7.08	8.51	34.51	5.13	44.76	42.36	23.54	18.82	SC						
7	5.50	UDS	REF																	
8	6.00	SPT	13		2.72	0.51	1.91	3.74	4.60	89.24	68.53	28.56	39.97	CH						
9	7.50	SPT	15			1.71	2.51	6.50	2.61	86.67	62.78	27.58	35.20	CH						
10	8.50	UDS	REF																	
11	10.00	SPT	REF	SAMPLE NOT FOUND																
12	11.50	CR	Brownish highly weathered very poor quality rock having CR=41.60% & RQD=21.50%																	
13	12.00	CR	Brownish highly weathered poor quality rock having CR=50.00% & RQD=24.88%																	
14	13.50	CR	Brownish moderately weathered poor quality rock having CR=62.50% & RQD=43.69%																	
15	15.00	CR	Greyish slightly weathered fair quality rock having CR=70.00% & RQD=57.00%																	

16	16.50	CR	Greyish slightly weathered fair quality rock having CR=82.00% & RQD=64.60%
17	18.00	CR	Greyish moderately weathered fair quality rock having CR=69.10% & RQD=52.20%
18	19.50	CR	Greyish slightly weathered good quality rock having CR=85.10% & RQD=76.00%
19	21.00	CR	Greyish slightly weathered good quality rock having CR=82.15% & RQD=75.10%
20	22.50	CR	Greyish slightly weathered fair quality rock having CR=80.00% & RQD=69.99%
21	24.00	CR	Greyish fresh weathered good quality rock having CR=91.15% & RQD=81.78%
22	25.50	CR	Greyish fresh weathered good quality rock having CR=96.00% & RQD=87.34%

BHASKRAM JYOTISH ANUSANDHAN KENDRA

OFFICE NO.03, GOKULDHAM CHS LTD, SUKAPUR, NEW PANVEL, DIST-RAIGAD, MAHARASHTRA-410206

SOIL CHARACTERISTICS FOR BOREHOLE NO. – BH- 2

Project Name: Geotechnical Investigation for Commercial Plot C -8(A) at Bandra Kurla Complex.

W.T. below G.L. (m):2.756

Termination depth (m): 26.00

Name of the Client: Bharat Petroleum Corporation Limited (BPCL).

SR. No.	Depth In mt.	Type of Sample	N value Observed	Free Swell Index (%)	Specific Gravity	Grain Size Analysis					Atterbergs Limits			Soil Group	Natural Density		Natural Water Content (%)	Shear Parameters		
						Gravel (%)	Sand (%)			Silt & Clay (%) (Hydrometer)	LL (%)	PL (%)	PI (%)		Bulk Density (g/cc)	Dry Density (g/cc)		*Types* of Test	*C* (kg/cm^2)	*angle of* int. friction *(degree)*
							C	M	F											
1	0.00	DS			2.66	10.74	17.93	19.75	10.73	40.85	51.25	29.56	21.69	SM						
2	0.50	SPT	SAMPLE NOT FOUND																	
3	1.50	SPT	SAMPLE NOT FOUND																	
4	2.50	UDS	REF																	
5	3.00	SPT	SAMPLE NOT FOUND																	
6	4.50	SPT	9		2.68	8.47	9.31	30.72	8.73	42.77	44.53	25.37	19.16	SC						
7	5.50	UDS	REF																	
8	6.00	SPT	13		2.73	1.56	0.78	1.68	4.82	91.16	70.78	29.56	41.22	CH						
9	7.50	SPT	REF			0.51	0.25	3.19	6.57	89.48	65.61	30.88	34.73	CH						
10.	8.00	SPT	REF	SAMPLE NOT FOUND																
11	9.50	CR	Brownish highly weathered poor quality rock having CR=47.00% & RQD=29.00%																	
12	11.00	CR	Brownish moderately weathered poor quality rock having CR=56.10% & RQD=41.39%																	
13	12.50	CR	Brownish highly weathered poor quality rock having CR=49.15% & RQD=24.88%																	
14	14.00	CR	Brownish moderately weathered poor quality rock having CR=65.00% & RQD=48.20%																	
15	15.50	CR	Greyish slightly weathered fair quality rock having CR=70.00% & RQD=54.12%																	

16	17.00	CR	Greyish moderately weathered fair quality rock having CR=67.31% & RQD=52.21%
17	18.50	CR	Greyish moderately weathered fair quality rock having CR=65.00% & RQD=54.28%
18	20.00	CR	Greyish slightly weathered fair quality rock having CR=72.00% & RQD=59.00%
19	21.50	CR	Greyish slightly weathered fair quality rock having CR=80.15% & RQD=68.90%
20	23.00	CR	Greyish moderately weathered poor quality rock having CR=65.00% & RQD=49.00%
21	24.50	CR	Greyish slightly weathered fair quality rock having CR=89.00 % & RQD=74.14%
22	26.00	CR	Greyish fresh weathered good quality rock having CR=97.00% & RQD=88.00%

BHASKRAM JYOTISH ANUSANDHAN KENDRA

OFFICE NO.03, GOKULDHAM CHS LTD, SUKAPUR, NEW PANVEL, DIST-RAIGAD, MAHARASHTRA-410206

SOIL CHARACTERISTICS FOR BOREHOLE NO. – BH- 3

Project Name: Geotechnical Investigation for Commercial Plot C -8(A) at Bandra Kurla Complex.

W.T. below G.L. (m):2.50

Termination depth (m): 25.00

Name of the Client: Bharat Petroleum Corporation Limited (BPCL).

SR. No.	Depth In mt.	Type of Sample	N value Observed	Free Swell Index (%)	Specific Gravity	Grain Size Analysis					Atterbergs Limits			Soil Group	Natural Density		Natural Water Content (%)	Shear Parameters		
						Gravel (%)	Sand (%)			Silt & Clay (%) (Hydrometer)	LL (%)	PL (%)	PI (%)		Bulk Density (g/cc)	Dry Density (g/cc)		*Types* of Test	*C* (kg/cm^2)	*angle of* int. friction *(degree)*
							C	M	F											
1	0.00	DS			2.65	17.25	15.18	25.17	19.27	23.13	48.21	28.37	19.84	SM						
2	0.50	SPT	SAMPLE NOT FOUND																	
3	1.50	SPT	SAMPLE NOT FOUND																	
4	2.50	UDS	REF																	
5	3.00	SPT	SAMPLE NOT FOUND																	
6	4.50	SPT	9		2.68	7.40	12.72	11.36	22.51	46.01	46.35	24.62	21.73	SC						
7	5.50	UDS	REF																	
8	6.00	SPT	12			1.22	1.63	8.08	4.60	84.47	58.26	27.04	42.18	CH						
9	7.50	SPT	16			0.51	1.93	4.73	2.61	90.23	64.78	28.65	36.13	CH						
10	8.00	SPT	SAMPLE NOT FOUND																	
11	8.50	CR	Brownish highly weathered very poor quality rock having CR=21.50% & RQD=0%																	
12	10.00	CR	Brownish highly weathered poor quality rock having CR=49.50% & RQD=28.90%																	
13	11.50	CR	Greyish moderately weathered poor quality rock having CR=61.50% & RQD=46.39%																	
14	13.00	CR	Greyish moderately weathered fair quality rock having CR=69.10% & RQD=53.10%																	
15	14.50	CR	Greyish moderately weathered fair quality rock having CR=70.00% & RQD=58.89%																	

16	16.00	CR	Greyish slightly weathered fair quality rock having CR=80.15% & RQD=65.50%
17	17.50	CR	Greyish slightly weathered fair quality rock having CR=76.19% & RQD=60.39%
18	19.00	CR	Greyish slightly weathered good quality rock having CR=85.00% & RQD=76.89%
19	20.50	CR	Greyish slightly weathered good quality rock having CR=90.00% & RQD=80.00%
20	22.00	CR	Greyish slightly weathered fair quality rock having CR=81.50% & RQD=74.00%
21	23.50	CR	Greyish fresh and good quality rock having CR=91.80% & RQD=85.39%
22	25.00	CR	Greyish fresh and good quality rock having CR=97.00% & RQD=90.00%

BHASKRAM JYOTISH ANUSANDHAN KENDRA

OFFICE NO.03, GOKULDHAM CHS LTD, SUKAPUR, NEW PANVEL, DIST-RAIGAD, MAHARASHTRA-410206

SOIL CHARACTERISTICS FOR BOREHOLE NO. – BH- 4

Project Name: Geotechnical Investigation for Commercial Plot C -8(A) at Bandra Kurla Complex.

W.T. below G.L. (m):2.90

Termination depth (m): 27.50

Name of the Client: Bharat Petroleum Corporation Limited (BPCL).

SR. No.	Depth In mt.	Type of Sample	N value Observed	Free Swell Index (%)	Specific Gravity	Grain Size Analysis					Atterbergs Limits			Soil Group	Natural Density		Natural Water Content (%)	Shear Parameters		
						Gravel (%)	Sand (%)			Silt & Clay (%) (Hydrometer)	LL (%)	PL (%)	PI (%)		Bulk Density (g/cc)	Dry Density (g/cc)		*Types* of Test	*C* (kg/cm^2)	*angle of* int. friction *(degree)*
							C	M	F											
1	0.00	DS	-		2.69	15.04	16.31	21.50	17.07	30.08	38.62	25.07	13.55	SM						
2	0.50	SPT	REF	SAMPLE NOT FOUND																
3	1.50	SPT	REF	SAMPLE NOT FOUND																
4	2.50	UDS	REF																	
5	3.00	SPT	SAMPLE NOT FOUND																	
6	4.50	SPT	7		2.67	4.72	11.36	30.46	6.19	47.27	41.56	22.08	19.48	SC						
7	5.50	UDS	REF																	
8	6.00	SPT	11			0.83	1.91	10.53	7.30	79.43	51.26	27.05	24.21	CH						
9	7.50	SPT	14		2.71	0.61	1.62	3.94	3.44	90.38	69.45	29.08	40.37	CH						
10	8.50	UDS	-			0.00	1.25	5.11	3.67	89.97	72.41	24.90	47.51	CH						
11	10.00	SPT	REF		2.68	13.87	17.13	28.22	13.62	27.16	60.48	35.88	24.61	SM						
12	10.50	CR	Rock in Disintegrated Form																	
13	10.50	SPT	SAMPLE NOT FOUND																	
14	12.00	CR	Brownish highly weathered very poor quality rock having CR=9.00% & RQD=0%																	
15	12.00	SPT	SAMPLE NOT FOUND																	

16	13.50	CR	Brownish highly weathered very poor quality rock having CR=10.00% & RQD=0%	
17.	15.00	SPT	REF	SAMPLE NOT FOUND
20	16.50	CR	Brownish highly weathered very poor quality rock having CR=30.00% & RQD=10.50%	
21	18.00	CR	Brownish highly weathered very poor quality rock having CR=41.15 % & RQD=22.33%	
22	19.50	CR	Greyish highly weathered poor quality rock having CR=49.19% & RQD=31.50%	
23	21.00	CR	Greyish moderately weathered poor quality rock having CR=64.00% & RQD=46.50%	
24	22.50	CR	Greyish slightly weathered fair quality rock having CR=70.00% & RQD=57.00%	
25	24.00	CR	Greyish slightly weathered fair quality rock having CR=85.50% & RQD=66.13%	
26	25.50	CR	Greyish fresh good quality rock having CR=90.00% & RQD=77.30%	
5	27.00	CR	Greyish fresh good quality rock having CR=96.81% & RQD=88.87%	

11.0 PROPERTY OF ROCK

BH No.	Depth (m.)	Dry Density of Rock (g/cc)	Porosity of Rock (%)	Water Absorption of Rock (%)	Modulus of Elasticity (N/mm^2)	Point Load Index (N/mm^2)	UCS of Soaked Rock (N/mm^2)
BH-1	11.50	2.38	5.33	3.60	3.2	-	9.09
	12.00	2.40	5.05	3.45	3.7	-	11.84
	13.50	2.41	4.85	2.65	5.1	-	12.15
	15.00	2.42	4.66	2.63	4.8	-	12.88
	16.50	2.43	4.55	2.66	4.0	-	13.57
	19.50	2.44	3.85	2.45	6.7	-	17.58
	21.00	2.45	3.45	1.78	6.2	-	18.56
	25.50	2.47	3.12	1.65	7.4	-	18.91
BH-2	9.50	2.37	6.01	5.65	3.5	-	8.87
	11.00	2.40	5.66	4.20	4.1	-	9.11
	12.50	2.41	5.12	3.65	5.6	-	9.87
	14.00	2.42	4.07	3.40	5.3	-	10.25
	15.50	2.44	3.89	2.54	4.4	-	11.78
	18.50	2.45	3.56	2.41	7.4	-	12.54
	21.50	2.43	3.45	2.34	6.8	-	13.23
	24.50	2.48	3.03	2.07	8.1	-	14.26
BH-3	8.50	2.38	8.03	5.69	4.2	5.17	-
	10.00	2.40	7.85	5.27	3.7	-	6.87
	11.50	2.41	7.65	4.65	4.1	-	7.29
	13.00	2.40	6.58	4.23	4.5	-	7.95
	14.50	2.42	5.45	3.88	4.0	-	10.10
	16.00	2.45	4.37	3.45	4.7	-	13.55
	19.00	2.48	3.07	3.15	5.0	-	15.69
	22.00	2.51	3.12	2.89	5.2	-	16.23
	25.00	2.50	3.07	2.14	5.5	-	18.26
BH 04	12.00	2.32	4.68	5.07	4.5	4.55	-
	13.50	2.34	4.55	4.56	5.2	5.25	-
	16.50	2.36	3.87	4.17	4.9	-	6.23
	19.50	2.40	3.65	3.80	5.1	-	7.25
	22.50	2.43	3.55	2.98	5.5	-	8.58
	25.50	2.45	3.02	2.65	5.9	-	10.34

12.0 N-TABLE

BH No.	Depth	Type of sample	N - VALUE			N - Value for last 300mm
			N1	N2	N3	
BH-1	0.50	SPT	51(2cm)	-	-	REF
	1.50	SPT	54(3cm)	-	-	REF
	2.50	UDS	-	-	-	REF
	3.00	SPT	50(4cm)	-	-	REF
	4.50	SPT	4	3	5	8
	5.50	UDS	-	-	-	REF
	6.00	SPT	3	6	7	13
	7.50	SPT	5	8	7	15
	8.50	UDS	-	-	-	REF
	10.00	SPT	55(3cm)	-	-	REF
BH-02	0.50	SPT	54(2cm)	-	-	REF
	1.50	SPT	60(3cm)	-	-	REF
	2.50	UDS	-	-	-	REF
	3.00	SPT	55(4cm)	-	-	REF
	4.50	SPT	3	5	8	13
	5.50	UDS	-	-	-	REF
	6.00	SPT	4	5	8	13
	7.50	SPT	19	60(4cm)	-	REF
	8.00	SPT	60(3cm)	-	-	REF
BH-03	0.50	SPT	50(2cm)	-	-	REF
	1.50	SPT	55(3cm)	-	-	REF
	2.50	UDS	-	-	-	REF
	3.00	SPT	51(4cm)	-	-	REF
	4.50	SPT	3	4	5	9
	5.50	UDS	-	-	-	REF
	6.00	SPT	4	5	7	12
	7.50	SPT	5	7	9	16
	8.00	SPT	54(4cm)	-	-	REF
BH-04	0.50	SPT	52(2cm)	-	-	REF
	1.50	SPT	50(4cm)	-	-	REF
	2.50	UDS	-	-	-	REF
	3.00	SPT	55(3cm)	-	-	REF
	4.50	SPT	3	3	4	7
	5.50	UDS	-	-	-	REF
	6.00	SPT	4	5	6	11
	7.50	SPT	5	6	8	14
	8.50	UDS	-	-	-	REF
	10.00	SPT	25	56(4cm)	-	REF

13.0

BORE LOG OF BOREHOLES, & GRAIN SIZE DISTRIBUTION GRAPHS

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 01	

GROUND WATER TABLE BELOW(m)	2.80
TERMINATION DEPTH (m)	25.50
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-					
0.50	SPT	51 2cm	-	-	REF	SM		Brownish medium dense medium-plastic silty sand(SM)		
1.50	SPT	54 3cm	-	-	REF			3.00		3.00
2.50	UDS	-	-	-	REF					
3.00	SPT	50 4cm	-	-	REF				3.00	
4.50	SPT	4	3	5	8	SC		Brownish dense clayey sand having medium plasticity(SC)		
5.50	UDS	-	-	-	REF			2.50		2.50
6.00	SPT	3	6	7	13	CH		Brownish very stiff to hard clay having high plasticity(CH)	5.50	
7.50	SPT	5	8	7	15					4.50
8.50	UDS	-	-	-	REF			4.50		
10.00	SPT	55 3cm	-	-	REF					
11.50	CR	-	-	-	-	HWR		Brownish Highly Weathered very poor quality rock CR=41.60% & RQD=21.50%	10.00	2.00
12.00	CR	-	-	-	-			2.00 CR=50.00% & RQD=24.88%		

= SC
= SM
= HWR
CH

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Unditurbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 01	

GROUND WATER TABLE BELOW(m)	2.80
TERMINATION DEPTH (m)	25.50
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
12.00	CR	-	-	-	-					
13.50	CR	-	-	-	-	MWR		Brownish Moderately Weathered poor quality rock CR=62.50% & RQD=43.69%		3.00
15.00	CR	-	-	-	-			Greyish Moderately Weathered fair quality rock CR=70.00% & RQD=57.00%	15.00	
16.50	CR	-	-	-	-	SWR		Greyish Slightly Weathered fair quality rock CR=82.00% & RQD=64.60%	16.50	1.50
18.00	CR	-	-	-	-	MWR		Greyish Moderately Weathered fair quality rock CR=69.10% & RQD=52.20%	18.00	1.50
19.50	CR	-	-	-	-	SWR		Greyish Slightly Weathered good quality rock CR=85.10% & RQD=76.00%		4.50
21.00	CR	-	-	-	-			CR=82.15% & RQD=75.10%		
22.50	CR	-	-	-	-			Greyish Slightly Weathered fair quality rock CR=80.00% & RQD=69.99%	22.50	
24.00	CR	-	-	-	-	FR		Greyish Fresh good quality rock CR=91.15% & RQD=81.78%		3.00
25.50	CR	-	-	-	-			CR=96.00% & RQD=87.34%		

= MWR
= SWR
= FR

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail.com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 02	

GROUND WATER TABLE BELOW(m)	2.75
TERMINATION DEPTH (m)	26.00
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-					
0.50	SPT	54 2cm	-	-	REF	SM		Brownish medium dense highly-plastic silty sand(SM)		
1.50	SPT	60 3cm	-	-	REF					3.00
2.50	UDS	-	-	-	REF					
3.00	SPT	55 4cm	-	-	REF				3.00	
4.50	SPT	3	5	8	13	SC		Brownish dense clayey sand having high plasticity(SC)		2.50
5.50	UDS	-	-	-	REF				5.50	
6.00	SPT	4	5	8	13	CH		Brownish very stiff to hard clay having high plasticity(CH)		
7.50	SPT	19	60 4cm	-	REF					2.50
8.00	SPT	60 3cm	-	-	REF				8.00	
9.50	CR	-	-	-	-	HWR		Brownish Highly Weathered poor quality rock CR=47.00% & RQD=29.00%		1.50
11.00	CR	-	-	-	-	MWR		Brownish Moderately Weathered poor quality rock CR=56.10% & RQD=41.39%	9.50	1.50
12.50	CR	-	-	-	-	HWR		Brownish Highly Weathered very poor quality rock CR=49.15% & RQD=24.88%	11.00	1.50

= SC
= SM
= HWR
= MWR
CH

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 02	

GROUND WATER TABLE BELOW(m)	2.75
TERMINATION DEPTH (m)	26.00
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
12.50	CR	-	-	-	-					
14.00	CR	-	-	-	-	MWR		Brownish Moderately Weathered poor quality rock CR=65.00% & RQD=48.20%		
15.50	CR	-	-	-	-			Greyish Moderately Weathered fair quality rock CR=70.00% & RQD=54.12% (6.00)		6.00
17.00	CR	-	-	-	-			CR=67.31% & RQD=52.21%		
18.50	CR	-	-	-	-			CR=65.00% & RQD=54.28%	18.50	
20.00	CR	-	-	-	-	SWR		Greyish Slightly Weathered fair quality rock CR=72.00% & RQD=59.00% (3.00)		3.00
21.50	CR	-	-	-	-			CR=80.15% & RQD=68.90%	21.50	
23.00	CR	-	-	-	-	MWR		Greyish Moderately Weathered poor quality rock CR=65.00% & RQD=49.00% (1.50)		1.50
24.50	CR	-	-	-	-	SWR		Greyish Slightly Weathered fair quality rock CR=89.00 % & RQD=74.14% (1.50)	23.00	1.50
26.00	CR	-	-	-	-	FR		Greyish Fresh good quality rock CR=97.00% & RQD=88.00% (1.50)	24.50	1.50

= MWR
= SWR
= FR

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 03	

GROUND WATER TABLE BELOW(m)	2.50
TERMINATION DEPTH (m)	25.00
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-					
0.50	SPT	50 2cm	-	-	REF	SM		Brownish medium dense highly-plastic silty sand(SM)		
1.50	SPT	55 3cm	-	-	REF			3.00		3.00
2.50	UDS	-	-	-	REF					
3.00	SPT	51 4cm	-	-	REF				3.00	
4.50	SPT	3	4	5	9	SC		Brownish dense clayey sand having high plasticity(SC)		
5.50	UDS	-	-	-	REF			2.50		2.50
6.00	SPT	4	5	7	12	CH		Brownish very stiff to hard clay having high plasticity(CH)	5.50	
7.50	SPT	5	7	9	16			2.50		2.50
8.00	SPT	54 4cm	-	-	REF				8.00	
8.50	CR	-	-	-	-	HWR		Brownish Highly Weathered very poor quality rock CR=21.50% & RQD=0%		
10.00	CR	-	-	-	-			Brownish Highly Weathered poor quality rock CR=49.50% & RQD=28.90% 2.00		2.00
11.50	CR	-	-	-	-	MWR		Greyish Moderately Weathered poor quality rock CR=61.50% & RQD=46.39% 1.50	10.00	1.50

= SC
= SM
= HWR
= MWR
CH

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 03	

GROUND WATER TABLE BELOW(m)	2.50
TERMINATION DEPTH (m)	25.00
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
11.50	CR	-	-	-	-					
13.00	CR	-	-	-	-	MWR		Greyish Moderately Weathered fair quality rock CR=69.10% & RQD=53.10%		3.00
14.50	CR	-	-	-	-			Greyish Moderately Weathered fair quality rock CR=70.00% & RQD=58.89%	14.50	
16.00	CR	-	-	-	-	SWR		Greyish Slightly Weathered fair quality rock CR=80.15% & RQD=65.50%		7.50
17.50	CR	-	-	-	-			CR=76.19% & RQD=60.39%		
19.00	CR	-	-	-	-			Greyish Slightly Weathered good quality rock CR=85.00% & RQD=76.89%		
20.50	CR	-	-	-	-			CR=90.00% & RQD=80.00%		
22.00	CR	-	-	-	-			Greyish Slightly Weathered fair quality rock CR=81.50% & RQD=74.00%	22.00	
23.50	CR	-	-	-	-	FR		Greyish Fresh good quality rock CR=91.80% & RQD=85.39%		3.00
25.00	CR	-	-	-	-			CR=97.00% & RQD=90.00%		

= MWR
= SWR
= FR

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail. com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 04	

GROUND WATER TABLE BELOW(m)	2.90
TERMINATION DEPTH (m)	27.00
JOB NO.	

BORELOG

DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFCATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
0.00	DS	-	-	-	-					
0.50	SPT	52 2cm	-	-	REF	SM		Brownish medium dense medium-plastic silty sand(SM)		
1.50	SPT	50 4cm	-	-	REF			3.00		3.00
2.50	UDS	-	-	-	REF					
3.00	SPT	55 3cm	-	-	REF				3.00	
4.50	SPT	3	3	4	7	SC		Brownish dense clayey sand having high plasticity(SC)		
5.50	UDS	-	-	-	REF			2.50		2.50
6.00	SPT	4	5	6	11	CH		Brownish very stiff to hard clay having high plasticity(CH)	5.50	
7.50	SPT	5	6	8	14			2.50		2.50
8.50	UDS	-	-	-	-				8.00	
10.00	SPT	25	56 4cm	-	REF	SM		Brownish very dense high-plastic silty sand(SM)		
10.50	SPT	60 4cm	-	-	REF			2.00		2.00
12.00	CR	-	-	-	-	HWR		Brownish Highly Weathered very poor quality rock CR=9.00% & RQD=0.00%	10.50	10.50
								1.50		

= SC
= SM
= HWR
CH

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery

PROJECT= **GEO-TECHNICAL INVESTIGATION FOR COMMERCIAL PLOT C-8 (A) AT BANDRA KURLA COMPLEX.**

CLIENT= BHARAT PETROLEUM CORPORATION LTD., MUMBAI.

CONSULTANT- BHASKRAM JYOTISH ANUSANDHAN KENDRA
Office No.03, Gokuldham CHS Ltd., Sukapur, New Panvel, Dist-Raigad, Maharashtra-410206.
Email-bhaskramjyotish1@gmail.com Mob-9867158937

METHOD OF BORING	ROTARY
DIA. OF BORE	150 mm
BORE HOLE NO. BH 04	

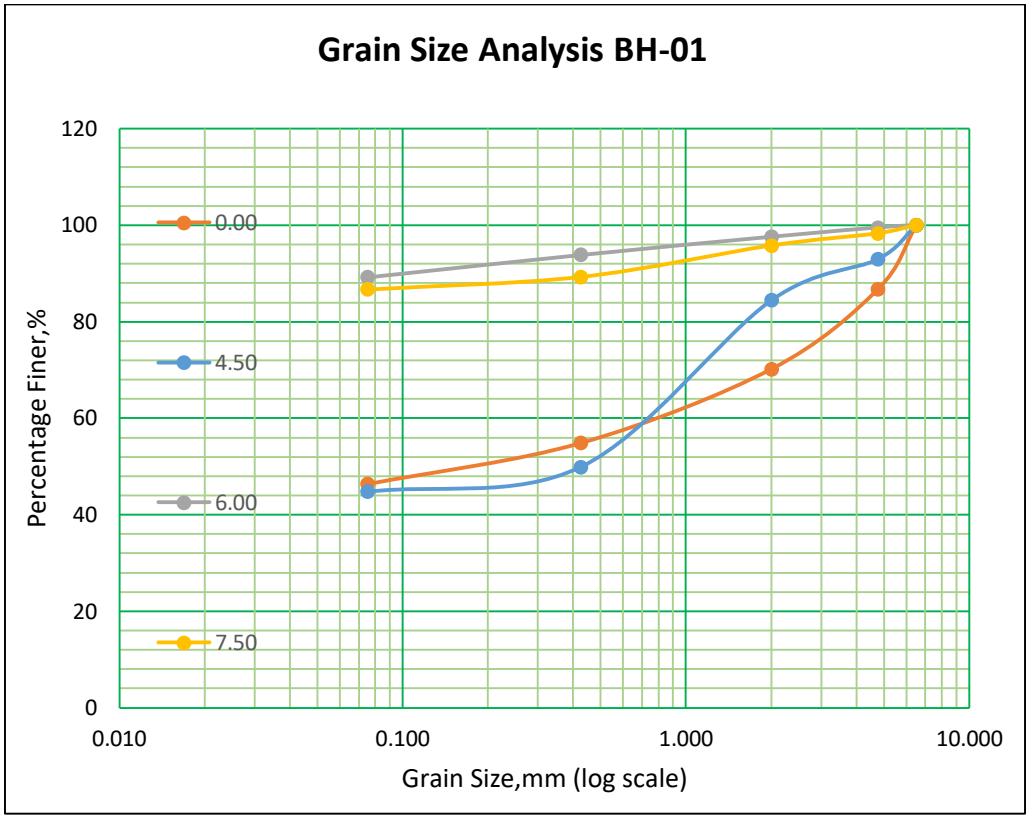
GROUND WATER TABLE BELOW(m)	2.90
TERMINATION DEPTH (m)	27.00
JOB NO.	

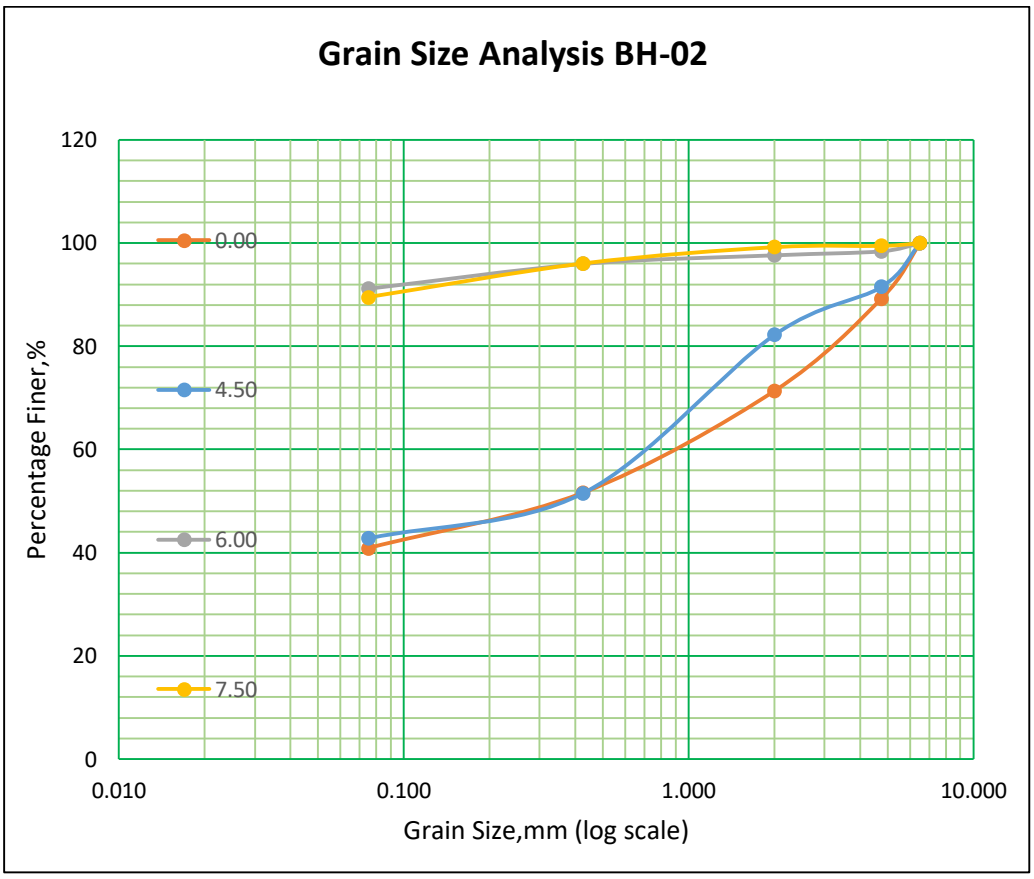
BORELOG

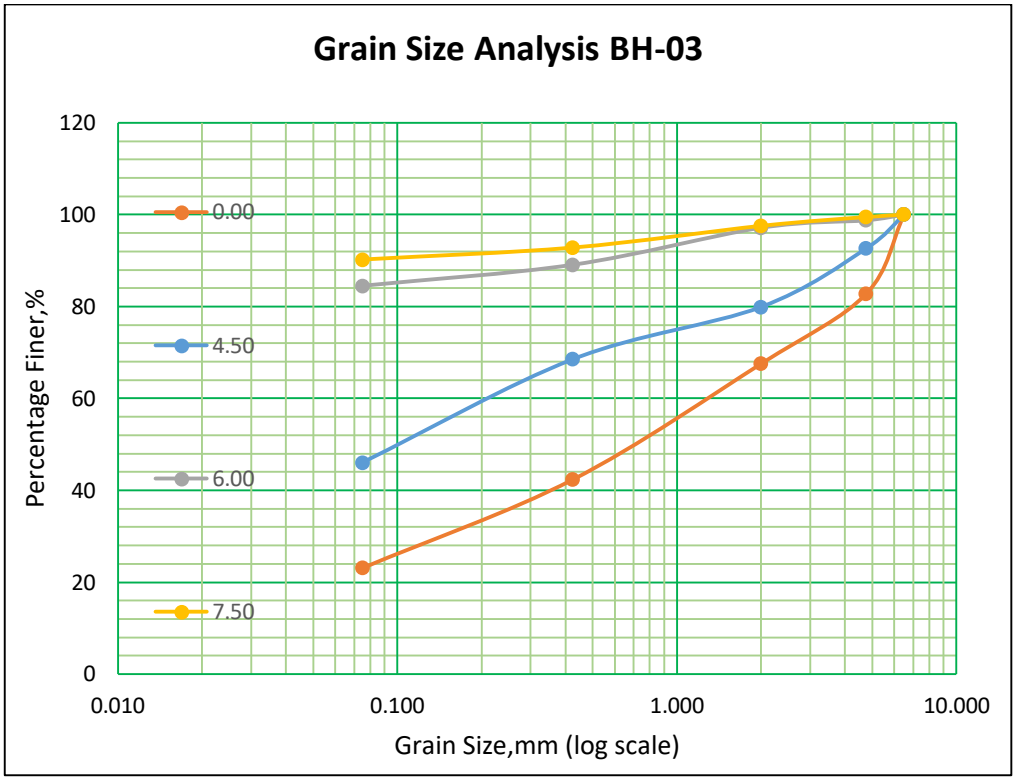
DEPTH (m)	TYPE OF SAMPLE	SPT - NO. OF BLOWS 0-15cm	15-30cm	30-45cm	SPT: N-VALUE	SOIL CLASSIFICATION	LEGEND	VISUAL DESCRIPTION	DEPTH IN (m)	LAYER THICKNESS (m)
12.00	CR	-	-	-	-					
13.50	CR	-	-	-	-	HWR		Brownish Highly Weathered very poor quality rock CR=10.00% & RQD=0.00%		
15.00	CR	-	-	-	-			CR=0.00% & RQD=0.00%		
16.50	CR	-	-	-	-		7.50	CR=30.00% & RQD=10.50%		7.50
18.00	CR	-	-	-	-			CR=41.15 % & RQD=22.33%		
19.50	CR	-	-	-	-			Greyish Highly Weathered poor quality rock CR=49.19% & RQD=31.50%	19.50	
21.00	CR	-	-	-	-	MWR		Greyish Moderately Weathered poor quality rock CR=64.00% & RQD=46.50%		
22.50	CR	-	-	-	-		3.00	Greyish Moderately Weathered fair quality rock CR=70.00% & RQD=57.00%	22.50	3.00
24.00	CR	-	-	-	-	SWR		Greyish Slightly Weathered fair quality rock CR=85.50% & RQD=66.13%		
25.50	CR	-	-	-	-		3.00	Greyish Slightly Weathered good quality rock CR=90.00% & RQD=77.30%	25.50	3.00
27.00	CR	-	-	-	-	FR	1.50	Greyish Fresh good quality rock CR=96.81% & RQD=88.87%		1.50

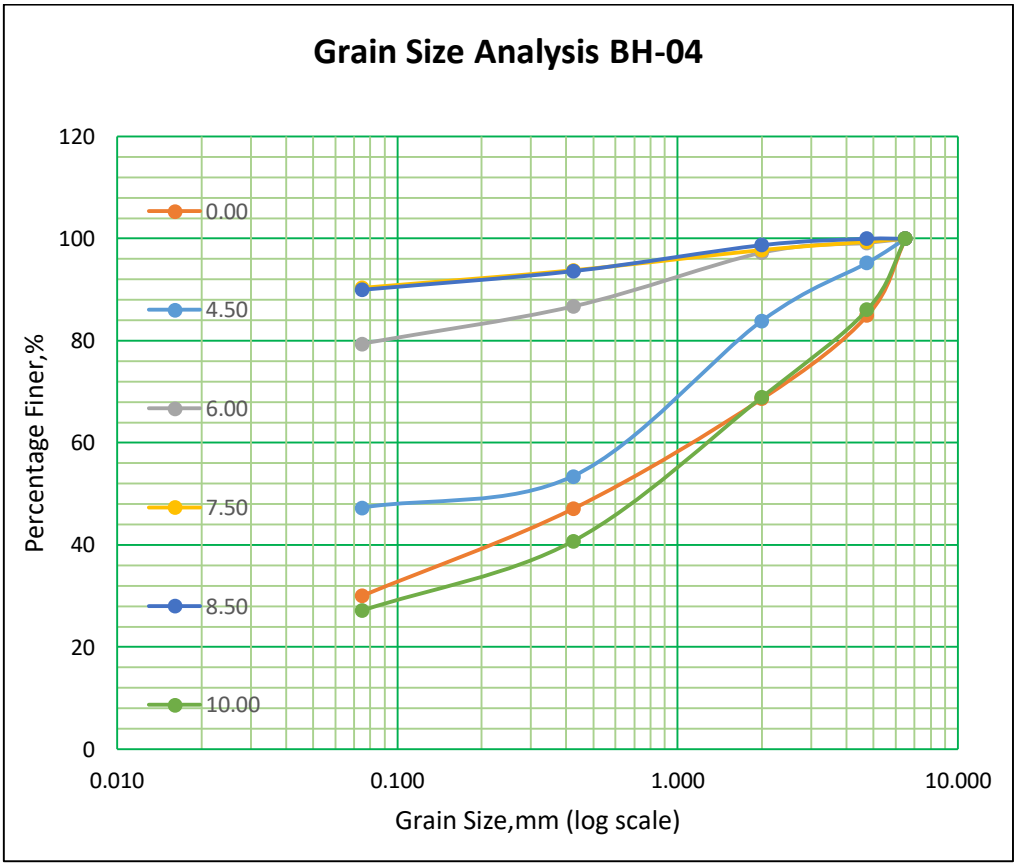
= HWR
= MWR
= SWR
= FR

SPT = Standard Penetration Test
DS = Disturbed Sample
UDS = Undisturbed Disturbed Sample
REF = Refusal
CR = Core Recovery


Grain Size Analysis BH-01
120
100
80
60
40
20
0
Percentage Finer,%
0.00
4.50
6.00
7.50
0.010
0.100
1.000
10.000
Grain Size,mm (log scale)

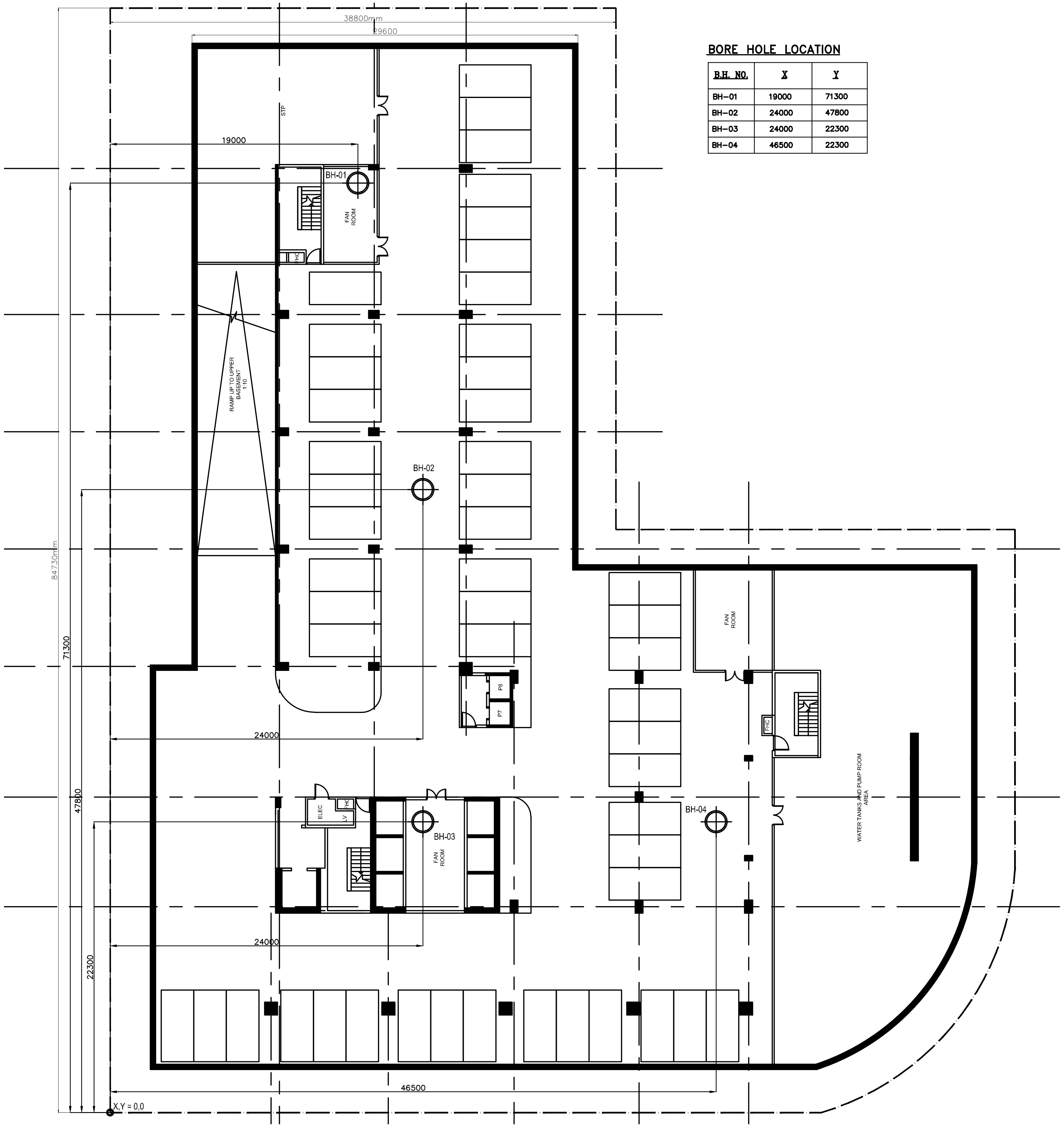

Grain Size Analysis BH-02
120
100
80
60
40
20
0
Percentage Finer,%
0.00
4.50
6.00
7.50
0.010
0.100
1.000
10.000
Grain Size,mm (log scale)


Grain Size Analysis BH-03
120
100
80
60
40
20
0
Percentage Finer,%
0.00
4.50
6.00
7.50
0.010
0.100
1.000
10.000
Grain Size,mm (log scale)


Grain Size Analysis BH-04
120
100
80
60
40
20
0
Percentage Finer,%
0.00
4.50
6.00
7.50
8.50
10.00
0.010
0.100
1.000
10.000
Grain Size,mm (log scale)

14.0

SITE LAYOUT PLAN



BORE HOLE LOCATION

BORE HOLE LOCATION

B.H. NO.	X	Y
BH-01	19000	71300
BH-02	24000	47800
BH-03	24000	22300
BH-04	46500	22300

0 2m 4m 6m 8m 10m
SCALE

NOTES:-

1) KEEP SENDING BORE LOGS TO VMS PRIOR TO THE SHIFTING OF THE RIGS.
2) BORE HOLE DEPTHS SHALL BE AS MENTIONED IN BOQ.

REVISION	DATE	REVISION DESCRIPTION	DRAWN BY	CHK'D BY	APPD. BY
R0	27-06-22	FOR APPROVAL	PSY	ABHI	

ISSUED FOR

- [x] APPROVAL
- [ ] MUNICIPAL
- [ ] ADVANCE
- [ ] CONSTRUCTION

VMS CONSULTANTS PVT.LTD.
83/84, Sakhar Bhavan,
230,Nariman Point,
MUMBAI-400 021
Ph.No.022-61725200
Web site : www.vakilmehtasheth.com
Email : vmsb@vakilmehtasheth.com
CIN No.U74140MH1978PTC020578

ARCH
SNK
SOMAYA & KALAPPA CONSULTANTS

CLIENT

PROJECT
BPCL
BANDRA BKC
MUMBAI

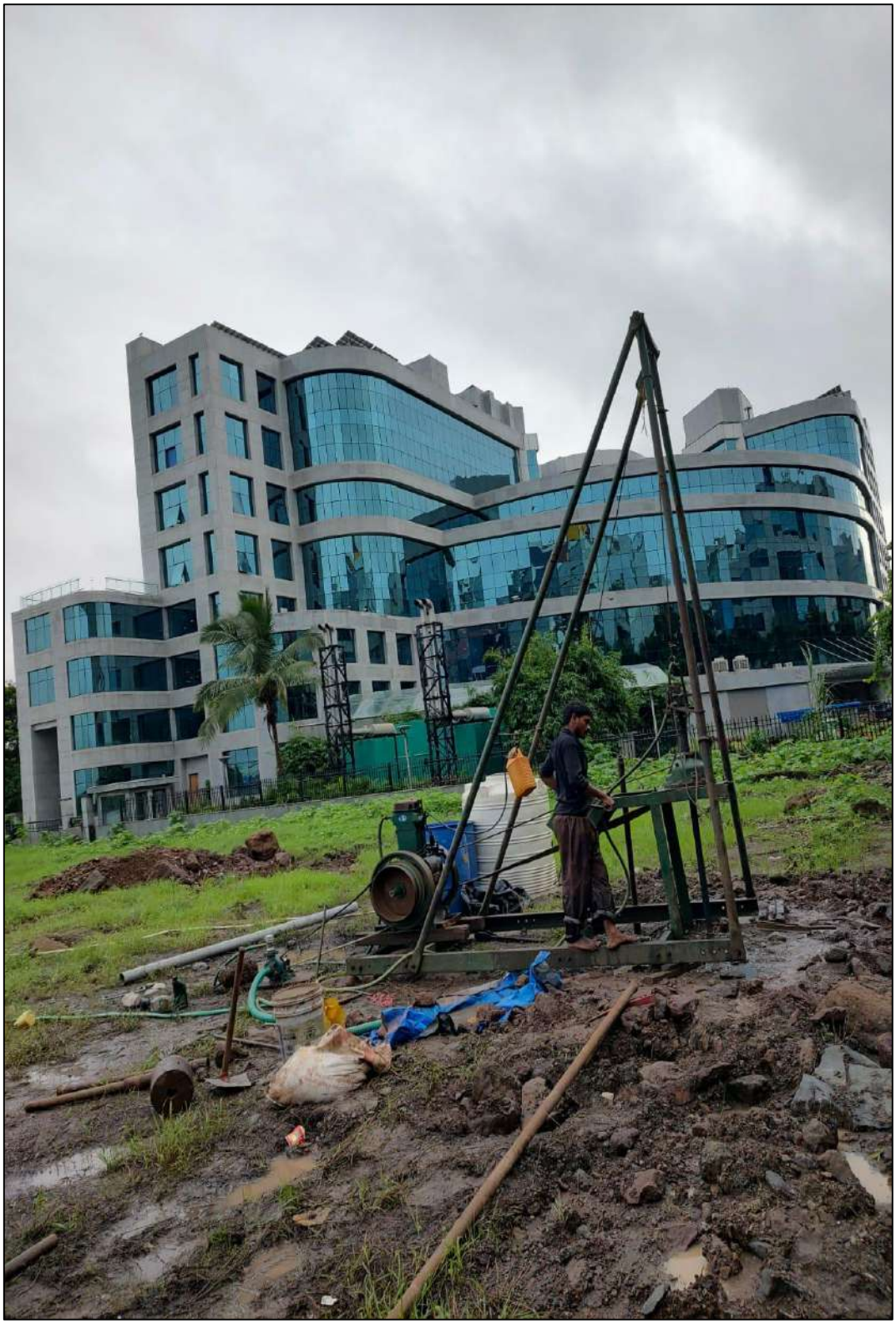
TITLE
BORE HOLE LOCATION DETAILS

SCALE 1:100 | SHEET SIZE A1 | SHEET NUMBER 01 OF 01

JOB NUMBER	DRAWING NUMBER	REVISION
02-22	BH-01	R0

15.0
SITE PHOTOGRAPHS


NSE




SBI


SBI
SBI

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD.

Regd. Office : B/301, Centaur House, Shantinagar Industrial Estate, Near Grand Hyatt Hotel,
Vakola, Santacruz (East), Mumbai - 400 055.
Tel.: 91-22-55042336-40 • Fax: 91-22-55042334
Web Site : http://www.dbmgeotech.com
E-mail: dbm@bom3.vsnl.net.in / design@dbmgeotech.com

1563/ enam /dbm/drg /1573

Date: 29/05/2006

To,
Enam Financial Consultants Pvt. Ltd.
Khatau Bldg. 2nd Floor,
44, Bank Street, Fort,
Mumbai-400 023

Kind Attn. : Mr. Mayur Kadakia

Sub.: Final Geotechnical Investigation Report for Proposed Commercial Building on Plot No.C-20,G-Block at Bandra-Kurla Complex, Mumbai.

Dear Sir,

We are pleased to submit herewith the ***Final Geotechnical Investigation Report*** for the above mentioned project for your reference and record.

We hope that you will find the same in order.

Thanking you,

Yours Faithfully,
for **DBM Geotechnics & Constructions Pvt. Ltd.**

P.S. Bansod
Director-Technical

Encl. : As above
(1 Copy)

For any clarifications on report following personnel may be contacted
Mr. Jaydeep Wagh (Geotechnical Consultant)
Ph. 022- 24448985 Mob. 9820094574
Mr. V. Charles (Geotechnical Engineer)
Ph. -022-67042336 - 40

C.C. To : **Mr. Kaushal Sabuwala**
Panora Infrastructure
209, Sumer Kendra
Behind Mahindra Tower
Pandurang Budhkar Marg
Worli, Mumbai- 400018

GEOTEK
CONSORTIUM
Off. No. 3 , Joybelle Apts., Mori Road,
Mahim (W), Mumbai - 400 016.
Phone : 24448985
Fax : 24445370

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED COMMERCIAL BUILDING
PLOT NO. C-20, G BLOCK, BANDRA KURLA COMPLEX, MUMBAI
FOR ENAM FINANCIAL CONSULTANTS PVT. LTD.

Table of Contents

GEOTEK
CONSORTIUM
Off. No. 3 , Joybelle Apts., Mori Road,
Mahim (W), Mumbai - 400 016.
Phone : 24448985
Fax : 24445370

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED COMMERCIAL BUILDING
PLOT NO. C-20, G BLOCK, BANDRA KURLA COMPLEX, MUMBAI
FOR ENAM FINANCIAL CONSULTANTS PVT. LTD.

Table of Contents

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED COMMERCIAL BUILDING
PLOT NO. C-20, G BLOCK, BANDRA KURLA COMPLEX, MUMBAI
FOR ENAM FINANCIAL CONSULTANTS PVT. LTD.

1.0 INTRODUCTION

Enam Financial Consultants Pvt. Ltd. plans construction of a multi-storied commercial building on Plot No. C-20, in G Block, Bandra Kurla Complex, Mumbai. M/s. Panora India is Consultant for the project. The work of geotechnical investigation, was awarded to DBM Geotechnics and Construction Pvt. Ltd. The field work and laboratory testing work for the geotechnical investigation was completed in May 2006. This report prepared by Geotek Consortium presents results of the geotechnical investigation, along with foundation engineering recommendations for the proposed building.

2.0 EXPLORATION PROGRAM

2.1 Exploration Scope

Five boreholes (BH-1 to BH-5) were completed within planned building location. The borehole locations are shown on the Borehole Location Map (Figure 1) in the Annexure.

2.2 Subsurface Conditions

Subsurface soil profile at this site consists of fill overlying marine clay underlain by Breccia bedrock. The encountered soil/rock layers are described in detail below;

LAYER I: FILL

Fill, consisting mostly of clay with boulders, debris and gravel, was encountered in the boreholes. Consistencies of the cohesive soils, as determined in field from Standard Penetration Tests (SPT), ranged between stiff and very stiff. The thickness of the fill layer ranged between 4.0m and 5.0m in the boreholes.

LAYER II: MARINE CLAY

Brown marine clay was encountered below the fill layer in the boreholes. Consistencies of the marine clay soils, as determined in field from Standard Penetration Tests (SPT), ranged between very stiff and hard. The lower boundary of the marine clay layer was encountered at depths between 5.5m and 7.5m below ground surface in the boreholes.

LAYER III: BRECCIA BEDROCK

Brownish gray Breccia bedrock was encountered below the marine clay soils (Layer II) in the boreholes at depths between 5.5m and 7.5m below ground surface. The top 1m of bedrock in few boreholes was highly weathered. The remaining bedrock was typically sound. Core

Recoveries varied between 57 and 100 percent, and Rock Quality Designations (RQDs) ranged between 36 and 100 percent. Compressive strength of rock samples ranged typically between 90 kg/cm^2 and 186 kg/cm^2. Boreholes were terminated in this layer at depths between 15.5m and 17.0m below ground surface.

2.3 Ground Water Table

Ground water table was measured at a depth of approximately 2.5m below ground surface in the boreholes. Annual and seasonal fluctuations in ground water levels can be expected to occur. For the purpose of our analysis, groundwater was assumed to be at the ground surface.

3.0 ENGINEERING REVIEW

3.1 Project Data:

Enam Financial Consultants Pvt. Ltd. plans construction of a multi-storied commercial building on Plot No. C-20, in G Block, Bandra Kurla Complex, Mumbai. The building will consist of a double basement, ground, plus eleven upper floors. The bottom of basement raft will be at a minimum depth of 8m below ground surface. The basement walls will be only 1.5m from property boundaries.

3.2 Foundation Recommendations:

As mentioned previously, bedrock was encountered at depths between 5.5m and 7.5m below ground surface. This bedrock is capable of providing adequate support for proposed building. Open spread/raft foundations for the proposed building installed on the bedrock, at a minimum depth of 7.5m below ground surface, can be designed to exert a maximum net allowable bearing pressure of 250 t/m^2.

Maximum settlement of spread/raft foundations will be less than 12mm. Raft foundations can be designed for a modulus of subgrade reaction of 20,000 t/m3. Minimum footing width should be 1.0m.

3.3 Basement Excavation:

Excavations of more than 7.5m deep will be required to complete proposed double basement. Hard bedrock was encountered at depths below 6.5m to 7.5m below ground surface. Excavations in bedrock will require extensive rock breaking with poclain equipped with rock breaking points.

Sides of the excavation should be sloped at a maximum slope of 1:1 (horizontal:vertical) to minimize side sloughing and collapse. If adequate space is not available for this side sloping, side shoring with bored piles with or without tieback anchors, should be provided. Lateral earth pressure parameters for design of shoring system walls are given in the next section of this report. Rotary methods should be utilized for completing piles.

Adequate uplift resistance in the form of dead weight or uplift anchors should be provided on basement raft at all times. Uplift anchors can be designed for an allowable grout/rock bond stress of 30 t/m2. Adequate water proofing should be provided on basement raft and walls. Dewatering will be required in basement excavations.

3.4 Lateral Earth Pressures

Shoring system walls and basement walls will be subjected to lateral earth pressures. Soil shear strength and lateral earth pressure parameters for design of shoring systems are provided below:

TABLE A
Soil Parameters for Design of Shoring System Walls

Depth Below Ground (m)	Strata	Soil Total Unit Weight (t/m3)	Soil Cohesion (t/m2)	Active Earth Pressure Coefficient (Ka)	Passive Earth Pressure Coefficient (Kp)
0m – 5.0m	Fill	1.8	---	0.3	---
5m – 7.5m	Marine Clay	1.8	---	0.2	---
Below 7.5m	Bedrock	2.0	120 t/m2	1.0	1.0

Basement walls installed without shoring system should be designed for a soil submerged unit weight (γ_{sub}) and lateral earth pressure coefficient (Ko) of 0.8 t/m3 and 0.5, respectively. Basement walls installed adjacent to shoring walls should be designed for a residual lateral earth pressure coefficient of 0.2. Surcharge pressures, if any, and groundwater pressures, should also be accounted for.

3.5 Foundation Protection

Based on results of chemical analysis on groundwater samples, the site falls under Class 2 for sulphates (As per IS456-2000) and Class 1 for chlorides (As per CIRIA Spl. Publication No. 31). A severe exposure condition was assigned to this site due to proximity to creek/coast. Therefore, following precautions are recommended to protect subsurface concrete and reinforcement:

Type of Cement:	Ordinary Portland Cement
Minimum Grade of Concrete:	M30
Minimum Cement Content for Open Foundations:	330 kg/m^3
Minimum Cement Content for Piles:	400 kg/m^3
Maximum Water Cement Ratio:	0.5
Minimum Cover to Reinforcement:	50mm

4.0 FIELD EXPLORATION PROCEDURES

The sub-surface investigation was completed generally as per IS: 1892-1979 and as per project specifications. The field investigation was carried out using rotary drilling machines. 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 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 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 good quality rock samples. 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,

GEOTEK CONSORTIUM

For.

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) Soil Mechanics and Foundation Engineering, K.R. Arora, Standard Publishers Distributors, Fourth Edition, 1997.

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

4) IS:6403-1981, Code of Practice for Determination of Bearing Capacity of Shallow Foundation.

5) Bored Piling in Mumbai Region, K. R. Datye, IGC1990.

6) Foundation Design Manual, N.V. Nayak, 1996.

7) Geotechnical Engineering and Evaluation, R.F. Hunt, 1992

SAMPLE CALCULATION OF ALLOWABLE BEARING CAPACITY OF SPREAD / RAFT FOUNDATIONS

FROM REFERENCE NO. 6:

Allowable Capacity = $q_{end} = KQ_uD$
Where K = Empirical coefficient = 0.1 to 0.4 (Adopted as 0.4 for fresh bedrock encountered at this site)
Qu = Minimum Compressive strength of rock = 900 t/m2
D = depth factor = 0.8+(0.2)(embedment length/footing width) = 0.8 for no embedment

Allowable capacity = 0.4x900 = 360 t/m2

Conservatively restricted to 250 t/m2 to limit settlements as shown in the next section.

B) SETTLEMENT OF RAFT FOUNDATION (50m x 50m) EXERTING PRESSURE OF 250 t/m2

I) SETTLEMENT OF BRECCIA BEDROCK:

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

Where,
q_0 = Footing Pressure = 250 t/m^2
B' = B/2 (Where B is the width of footing)
U = Poisson's ratio= 0.25
E = Modulus of Elasticity
I_s = Influence Factor
I_f = Depth Factor

E value reported for Breccia bedrock = 700,000 t/m2 [Reference No. 6]

L' = 50/2 =25, B' = 50/2 = 25, H=250m, and D=7.5m
Therefore, M=L/B=1; and N=H/B'=10, and D/B=0.15
Corresponding, I_s = 0.53, I_f = 1.0 (From Table 5-2, Reference 1)

Settlement of Layer = S_1 = 250x25x (0.96)x4x0.53x1/ 700,000 = 0.018m=18mm

From IS8009:
Due to footing rigidity factor, settlement = 0.8 x 18mm = 14mm
Due to Footing Depth Factor, Settlement = 0.9 x 14mm = 12mm

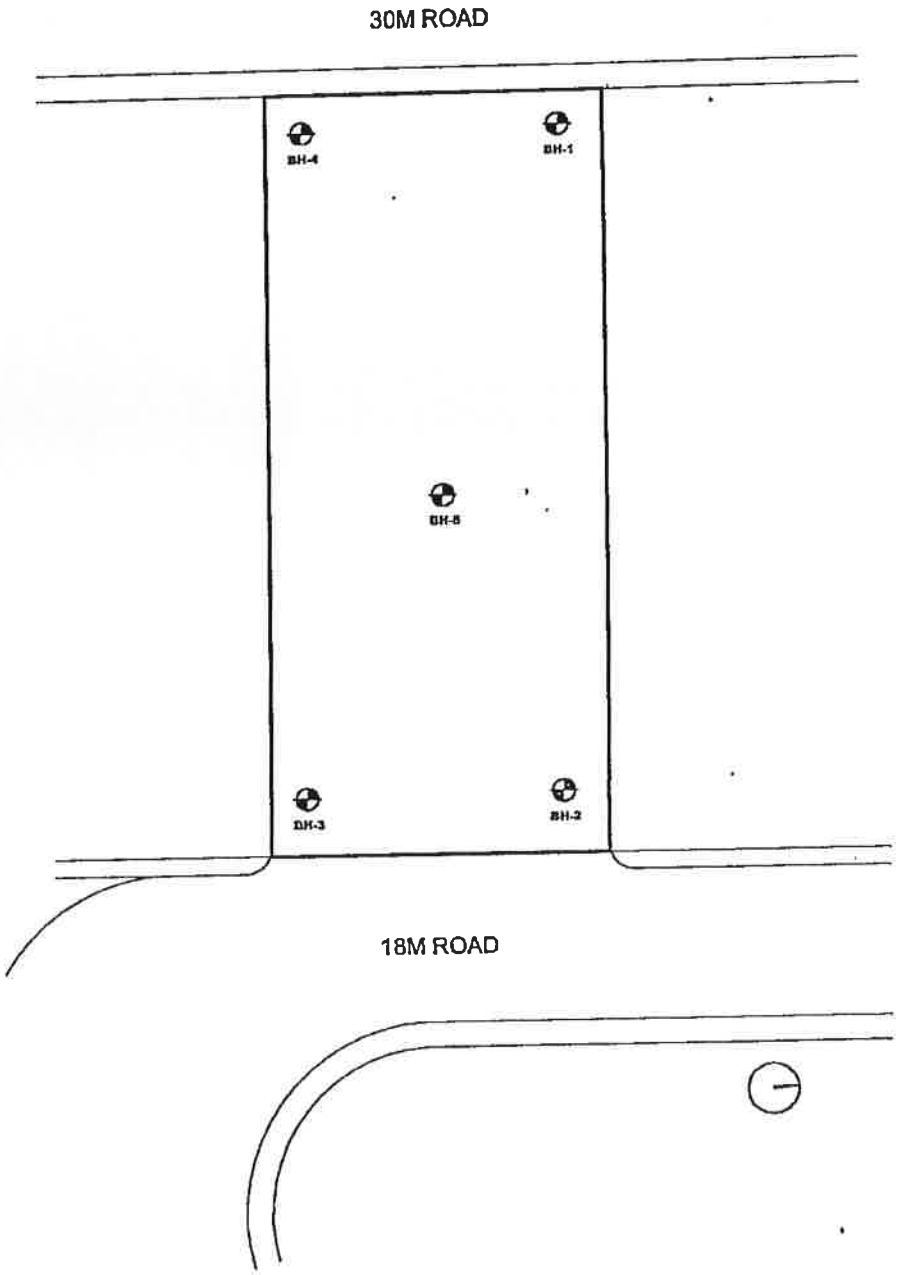
THEREFORE, TOTAL SETTLEMENT = 12mm

DBM

ANNEXURES

DBM

LOCATION PLAN



LEGEND :
BORE HOLES ⊕

ENAM FINANCIAL CONSULTANTS PVT.LTD.	
Location Plan of Bore Holes for Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.	
DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD B/301, Centaur House, Santacruz (E), Mumbai- 55	
Drawn By : S.M. Varadkar	Date : May - 2006
Checked By : Mr. B.S. Telang	Scale : NTS
Approved By : Mr. V. Charles	DRG . No. dbm/drg/1563/EFPCL/LP1

DBM

BOREHOLE LOGS

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO.	: BH- 01	SHEET NO.	: 1 OF 2
LOCATION	: –	DATE	: 15/5/06 To 19/05/06.
CHAINAGE	: –	METHOD	: ROTARY DRILLING
GROUND R. L.	: –	CASING	: 6.50m Below G.L.
GROUND W. T.	: 2.60m Below GL		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	CR %	RQD %	OTHER TESTS
1.00	100 mm Ø		Backfilled matreial consisting of construction debris,BOULDERS Gravels,murrum etc.	0.50/ 0.70	DS1								
2.00				1.50/ 2.10	SPT1	05	07	10	14	17			
3.00				3.00/ 3.60	SPT2	08	11	18	22	29			
4.00				4.50/									
5.00			Hard greyish brown CLAY with gravel	4.75 5.10 5.50	SPT3	09	12	20	26	32			
6.00			Moderately weathered brownish volcanic BRECCIA	6.50							50	NIL	
7.00	NX			7.50							60	37	
8.00			Slightly weathered brownish grey volcanic BRECCIA	8.50							77	46	
9.00											80	65	
10.00				10.00									

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 : CONTINUED ON NEXT PAGE

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO. : BH- 01 | SHEET NO. : 2 OF 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		Slightly weathered brownish volcanic BRECCIA	11.50							84	82	
12.00													
13.00			Fresh brownish grey BRECCIA	13.00							90	90	
14.00				14.50							95	89	
15.00				15.00							100	90	
			Fresh grey BRECCIA	15.50									
16.00													
17.00													
18.00													
19.00													
20.00													
21.00													

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 TERMINATED AT DEPTH 15.50m BELOW G.L.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO.	: BH- 02	SHEET NO.	: 1 OF 2
LOCATION	: --	DATE	: 5/5/06 To 08/05/06.
CHAINAGE	: --	METHOD	: ROTARY DRILLING
GROUND R. L.	: --	CASING	: 7.50m Below G.L.
GROUND W. T.	: 2.50m Below GL		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm				SPT N	CR %	RQD %	OTHER TESTS
				0.40/									
				0.60	DS1								
1.00				1.50/									
			Filled up materials consisting of debris BOULDERS , GRAVEL etc. in soft CLAY		SPT1	04	05	07	09	12			
2.00				2.10									
				3.00/		15	-	-	-	N			
3.00	100 mm Ø			3.15	SPT2	54	-	-	-	R	16	NIL	
				3.40									
4.00				4.00									
				4.50/									
			Very stiff brownish CLAY with GRAVEL		SPT3	06	08	11	18	19			
5.00				5.10									
				6.00/		12	-	-	-	N			
6.00				6.12	SPT4	53	-	-	-	R			
											30	16	
7.00			Highly weathered brownish grey volcanic BRECCIA	7.00		15	25	-	-	N			
	NX			7.25	SPT5	31	54	-	-	R			
8.00				8.00							57	36	
				8.45									
9.00			Slight weathered to fresh brownish grey volcanic BRECCIA	9.00							75	75	
10.00				10.00							85	72	

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 : CONTINUED ON NEXT PAGE

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO. : BH- 02 | SHEET NO. : 2 OF 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		Slightly weathered to fresh brownish grey volcanic BRECCIA	11.00							90	90	
12.00				12.00							93	90	
13.00				13.00							96	89	
14.00				14.00							100	100	
15.00				15.50							98	98	
16.00													
17.00													
18.00													
19.00													
20.00													
21.00													

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 TERMINATED AT DEPTH 15.00m BELOW G.L.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO.	: BH- 03	SHEET NO.	: 1 OF 2
LOCATION	: --	DATE	: 8/5/06 To 11/05/06.
CHAINAGE	: --	METHOD	: ROTARY DRILLING
GROUND R. L.	: --	CASING	: 7.35m Below G.L.
GROUND W. T.	: 2.40m Below GL		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	CR %	RQD %	OTHER TESTS
1.00	100 mm Ø		Filling material blackish grey CLAY with gravels,bricks pieces pebbles	0.30/ 0.60	DS1								
2.00				1.50/ 2.10	SPT1	05	07	09	12	16			
3.00				3.00/ 3.60	SPT2	07	09	11	14	20			
4.00				4.50/ 5.10	SPT3	07	10	12	18	22			
5.00													
6.00			Vrey stiff to hard greyish brown CLAY with Gravels	6.00/ 6.60	SPT4	08	10	13	21	23			
7.00				7.50/		15	15	05	-	N			
8.00	NX		Moderately weathered brownish grey volcanic BRECCIA	7.85 9.00	SPT5	10	34	52	-	R	70	70	
9.00													
10.00			Slightly weathered grey volcanic BRECCIA	10.00							78	67	

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 : CONTINUED ON NEXT PAGE

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO. : BH- 03 | SHEET NO. : 2 OF 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		Slightly weathered grey volcanic BRECCIA	10.00 – 11.50							84	74	
12.00													
13.00				13.00							88	80	
14.00			Fresh brownish grey BRECCIA	14.50							91	85	
15.00													
16.00				16.00							95	95	
17.00				17.50							98	92	
18.00													
19.00													
20.00													
21.00													

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 TERMINATED AT DEPTH 17.50m BELOW G.L.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1:50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO.	: BH- 04	SHEET NO.	: 1 OF 2
LOCATION	: --	DATE	: 12/05/06 TO 14/05/06
CHAINAGE	: --	METHOD	: ROTARY DRILLING
GROUND R. L.	: --	CASING	: --
GROUND W. T.	: 2.25m Below GL		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %	OTHER TESTS
1.00	100 mm Ø		Very stiff blackish grey CLAY with Gravels,pebbles,bricks pieces debris (Filling Material)	0.30/ 0.60	DS1								
2.00				1.50/ 2.10	SPT1	05	07	09	12	16			
3.00				3.00/ 3.60	SPT2	06	08	10	14	18			
4.00				4.50/ 5.10	SPT3	07	10	14	19	24			
5.00			5.00										
			Greyish brown CLAY with gravels,pebbles	5.60									
6.00				6.00/		15	10	--	--	N	60	NIL	
7.00	NX			6.25 7.00	SPT4	28	54	--	--	R	62	62	
8.00			Moderately weathered to slightly weathered brownish grey BRECCIA	8.50							82	76	
9.00											84	84	
10.00				10.00									

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 : CONTINUED ON NEXT PAGE

SCALE : 1: 50 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

JOB NO. : 1563

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO. : BH- 04 | SHEET NO. : 2 OF 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	C R %	RQD %	OTHER TESTS
11.00	NX		Moderately weathered to slightly weathered brownish grey BRECCIA	10.00 – 11.00							86	80	
12.00 – 13.00	NX		Slightly weathered to fresh grey BRECCIA	13.00							88	88	
14.00	NX			14.50							93	87	
16.00	NX			16.00							98	94	
17.00 – 21.00													

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 TERMINATED AT DEPTH 16.00m BELOW G.L.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO.	: BH- 05	SHEET NO.	: 1 OF 2
LOCATION	: --	DATE	: 20/05/06 TO23/05/06
CHAINAGE	: --	METHOD	: ROTARY DRILLING
GROUND R. L.	: --	CASING	: 7.50m. Below G.L.
GROUND W. T.	: 2.60m Below GL		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N	CR %	RQD %	OTHER TESTS
1.00	100 mm Ø		Backfilled material consisting of Gravels,pebbles,bricks pieces SAND,cobbles,BOULDERS dribes etc, in greyish brown CLAY	0.50/0.70	DS1								
				1.50/1.95	SPT1	15	15	15	--	N/R			
2.00													
3.00				3.00/3.40	SPT2	15	15	10	--	N/R			
4.00													
5.00				4.50/4.80	SPT3	15	15	--	--	N/R			
			5.25										
			Hard greyish brown CLAY with Gravels 5.70										
6.00			Moderately weathered brownish grey volcanic BRECCIA	7.00							73	39	
7.00													
8.00	NX		Sligtly weathered brownish grey volcanic BRECCIA	8.50							80.	74	
9.00			8.90										
			Sligtly weathered brownish grey BRECCIA								83	70	
10.00				10.00									

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 : CONTINUED ON NEXT PAGE

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

CLIENT : **ENAM FINANCIAL CONSULTANTS PVT.LTD.**

PROJECT : Geotechnical Investigation for Proposed Commercial Building on Plot No.C-20,G-Block At BKC,Bandra Mumbai.

BORE HOLE NO. : BH- 05 | SHEET NO. : 2 OF 2

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	15	15	15	SPT N.	C R %	RQD %	OTHER TESTS
11.00	NX		Slightly weathered brownish grey volcanic BRECCIA	10.00 – 11.50							86	80	
12.00													
13.00			Fresh brownish grey volcanic BRECCIA	13.00 – 14.50							92	80	
14.00													
15.00				14.50 – 16.00							93	93	
16.00													
17.00											97	97	
18.00													
19.00													
20.00													
21.00													

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 TERMINATED AT DEPTH 16.00m BELOW G.L.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI.

SCALE : 1: 50 | JOB NO. : 1563 | Checked By : SAVITRI DEVI | Drawn By: Dhanashri

DBM

LABORATORY TEST RESULTS

SOIL TEST DATA SHEET

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai. FLB 04

Location : ----- DATE: 26.05.2006

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			Swelling Pressure Kg/cm²	Free Swell Index %	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH - 1	1.50 - 2.10	SPT-1	-----	-----	-----	SM	33	29	38		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
BH - 1	3.00 - 3.60	SPT-2	-----	-----	-----	SM	23	53	24		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	

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

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

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD. Job. No. : 1563

GRAIN SIZE DISTRIBUTION ANALYSIS

Project :	Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.
Location	-----

Symbol	Bore Hole No.	Depth in m.	Classification. (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ 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 - 1	1.50 - 2.10	SM	33	29	38		-----	-----	-----	-----	-----	-----	-----	-----	SPT-1
■	BH - 1	3.00 - 3.60	SM	23	53	24		-----	-----	-----	-----	-----	-----	-----	-----	SPT-2
▲																
✳																
◆																

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job No. : 1563

SOIL TEST DATA SHEET

FLB 04

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

DATE: 09.05.2006

Location : -----

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			Swelling Pressure Kg/cm²	Free Swell Index %	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH - 2	1.50 - 2.10	SPT-1	-----	-----	-----	Cl	6	34	32	28	43	21	22	-----	-----	-----	-----	-----	-----	-----	2.66	

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

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

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job. No. : 1563

GRAIN SIZE DISTRIBUTION ANALYSIS

Project :	Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.
Location	-----

Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ 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 - 2	1.50 - 2.10	CI	6	34	32	28	-----	-----	-----	-----	-----	43	21	22	SPT-1
■																
▲																
✳																
◆																

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job No. : 1563

SOIL TEST DATA SHEET

FLB 04

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

DATE: 21.05.2006

Location : -----

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			Swelling Pressure Kg/cm²	Free Swell Index %	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH - 3	1.50 - 2.10	SPT-1	----	----	----	SM	21	41	38		----	----	----	----	----	----	----	----	----	----	----	
BH - 3	4.50 - 5.40	SPT-3	----	----	----	CI	6	34	36	24	42	20	22	----	----	----	----	----	----	----	2.65	
BH - 3	6.00 - 6.60	SPT-4	----	----	----	CI	19	20	34	27	45	22	23	----	----	----	----	----	----	----	2.66	

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 (Consolidaled 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

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

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job. No. : 1563

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

Location : -----

Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ 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 - 3	1.50 - 2.10	SM	21	41	38		-----	-----	-----	-----	-----	-----	-----	-----	SPT-1
■—■	BH - 3	4.50 - 5.40	Cl	6	34	36	24	-----	-----	-----	-----	-----	42	20	22	SPT-3
▲—▲	BH - 3	6.00 - 6.60	Cl	19	20	34	27	-----	-----	-----	-----	-----	45	22	23	SPT-4
✳																
◆																

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job No. : 1563

SOIL TEST DATA SHEET

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

FLB 04

Location : -----

DATE: 21.05.2006

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			Swelling Pressure Kg/cm²	Free Swell Index %	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH - 4	1.50 - 2.10	SPT-1	-----	-----	-----	SM	21	46	33		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	

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

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

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job. No. : 1563

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

Location : -----

Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	10% mm	30% mm	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 - 4	1.50 - 2.10	SM	21	46	33		----	----	----	----	----	----	----	----	SPT-1
■																
▲																-
✱																
◆																

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job No. : 1563

SOIL TEST DATA SHEET

FLB 04

Project : Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.

DATE: 26.05.2006

Location : -----

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			Swelling Pressure Kg/cm²	Free Swell Index %	Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ			Comp. Index C_{cv} (Lab)	Initial Void Ratio		
BH - 5	3.00 - 3.40	SPT-2	----	----	----	GM	42	20	38		----	----	----	----	----	----	----	----	----	----	----	
BH - 5	4.50 - 4.80	SPT-3	----	----	----	SM	30	36	34		----	----	----	----	----	----	----	----	----	----	----	

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

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

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job. No. : 1563

GRAIN SIZE DISTRIBUTION ANALYSIS

Project :	Geotechnical Investigations at Plot No C-20, G-Block BKC, Mumbai.
Location	-----

Symbol	Bore Hole No.	Depth in m.	Classification (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ 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 - 5	3.00 - 3.40	GM	42	20	38		-----	-----	-----	-----	-----	-----	-----	-----	SPT-2
■	BH - 5	4.50 - 4.80	SM	30	36	34		-----	-----	-----	-----	-----	-----	-----	-----	SPT-3
▲																
✳																
◆																

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

Job No. : 1563

CHEMICAL TEST RESULT OF SOIL SAMPLES.

FLB 10

SITE : Geotechnical Investigation at Plot No. C-20 G- Block BKC, Mumbai.

DATE: 29.05.2006

SR NO.	BORE HOLE NO.	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
1	BH - 1	3.00 - 3.60	SPT -2	7.57	0.014	0.04	
2	BH - 2	1.50 - 2.10	SPT -1	7.62	0.031	0.090	
3	BH - 3	4.50 - 5.10	SPT -3	7.86	0.240	0.580	
4	BH - 4	1.50 - 2.10	SPT -1	7.75	0.072	0.210	
5	BH - 5	4.50 - 4.80	SPT -3	7.82	0.016	0.050	

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD | Job No. | 1563

CHEMICAL TEST RESULT OF WATER SAMPLES.

SITE : Geotechnical Investigation at Plot No. C-20 G- Block BKC, Mumbai.

DATE: 26.05.2006

SR NO.	BORE HOLE NO.	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 ppm	CHLORIDE AS Cl ppm	REMARKS
1	BH - 1	-----	-----	7.46	17.17	59.98	
2	BH - 2	-----	-----	7.95	30.90	109.97	
3	BH - 3	-----	-----	8.07	394.83	1389.57	
4	BH - 4	-----	-----	8.05	24.03	79.98	
	BH - 5	-----	-----	7.82	29.18	99.97	
DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD						Job No.	1563

TEST RESULTS OF ROCK CORES

Site : Geotechnical Investigation at Plot No. C-20 G- Block BKC, Mumbai.

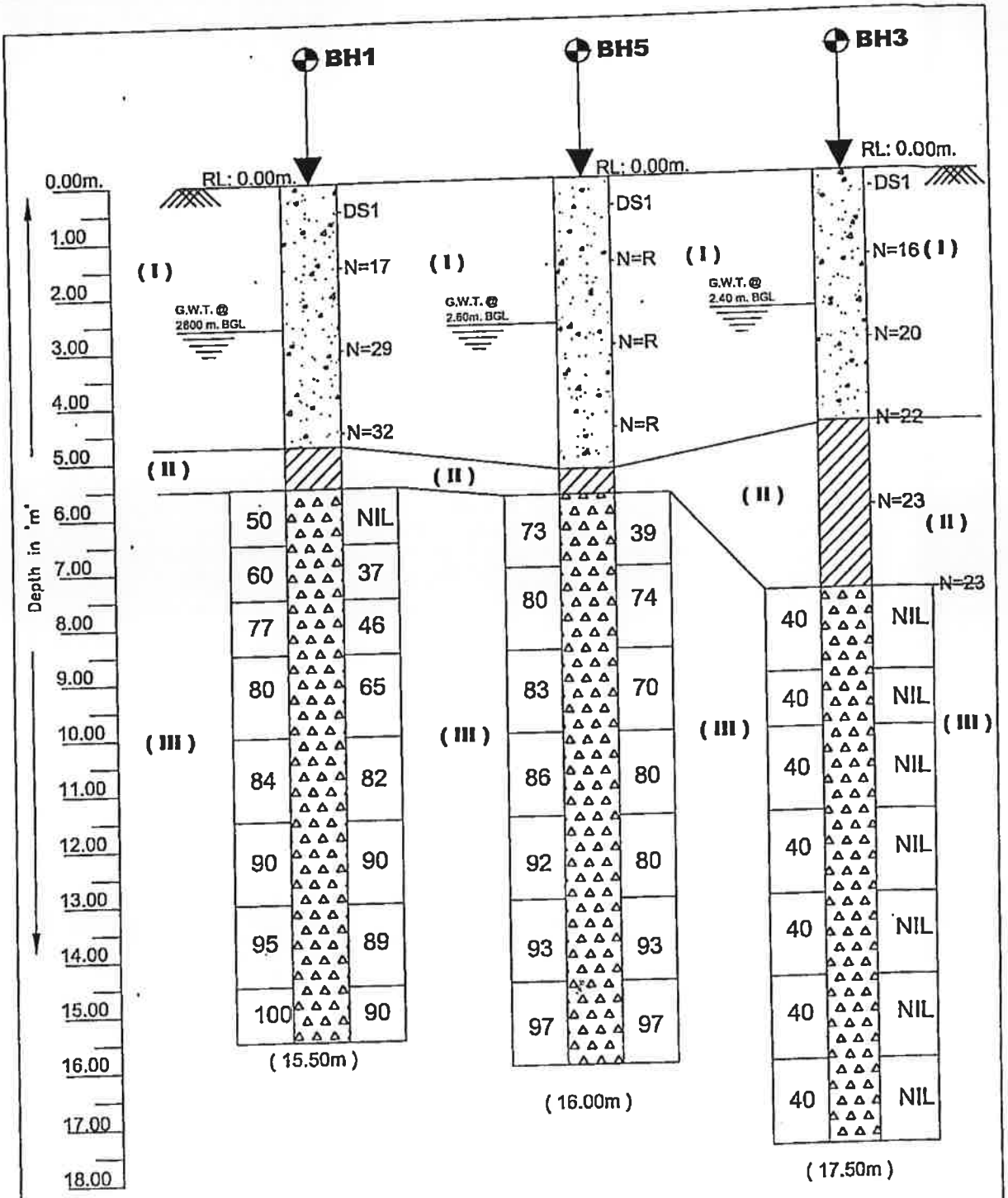
FLB 09 DATE 23.05.2006

Sr. No.	Bore Hole No.	Core No.	Depth, m		Diameter, cm	Height, cm	H : D (1:H/D)	Correction Factor	Condition of Test	Failure Load	Uniaxial Compressive Strength	Modulus of Elasticity	Point Load Index	Brazilian Test	Porosity	Water Absorption	Dry Density	Specific Gravity	Remarks
			From	To	cm	cm				kN	kg/cm^2	kg/cm^2	kg/cm^2	kg/cm^2	%	%	gm/cm^3		
1	BH- 1	18	7.50	8.50	5.40	11.00	2.04	1.004	Soaked	22.80	102	-----	-----	-----	14.61	7.03	2.08	-----	
2	BH- 1	27	8.50	10.00	5.40	11.10	2.06	1.006	Soaked	24.80	111	-----	-----	-----	14.13	6.69	2.11	-----	
3	BH- 1	36	11.50	13.00	5.40	11.00	2.04	1.004	Soaked	21.20	95	-----	-----	-----	10.55	4.86	2.17	-----	
4	BH- 2	3	6.00	7.00	5.50	11.00	2.00	1.000	Soaked	21.00	90	-----	-----	-----	15.53	7.28	2.13	-----	
5	BH- 2	13	9.00	10.00	5.40	11.00	2.04	1.004	Soaked	39.00	174	-----	-----	-----	18.81	8.98	2.09	-----	
6	BH- 2	24	12.00	13.00	5.40	11.00	2.04	1.004	Soaked	32.00	143	-----	-----	-----	21.31	10.34	2.06	-----	
7	BH- 3	2	7.50	9.00	5.50	11.00	2.00	1.000	Soaked	33.00	142	-----	-----	-----	11.03	5.24	2.10	-----	
8	BH- 3	8	10.00	11.50	5.40	11.00	2.04	1.004	Soaked	36.00	161	-----	-----	-----	14.19	6.80	2.09	-----	
9	BH- 3	23	13.00	14.50	5.40	11.00	2.04	1.004	Soaked	42.00	188	-----	-----	-----	5.22	2.04	2.56	-----	
10	BH- 4	10	7.00	8.50	5.40	11.10	2.06	1.006	Soaked	38.00	170	-----	-----	-----	20.33	9.83	2.07	-----	
11	BH- 4	13	8.50	10.00	5.40	11.00	2.04	1.004	Soaked	28.00	125	-----	-----	-----	20.27	9.85	2.06	-----	
12	BH- 4	24	10.50	13.00	5.40	11.00	2.04	1.004	Soaked	34.00	152	-----	-----	-----	21.76	10.81	2.01	-----	
13	BH- 5	10	7.00	8.50	5.40	11.00	2.04	1.004	Soaked	36.00	161	-----	-----	-----	12.49	5.95	2.10	-----	
14	BH- 5	28	11.50	13.00	5.40	11.00	2.04	1.004	Soaked	41.00	183	-----	-----	-----	14.20	6.80	2.09	-----	

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD. Job. No. : 1563

DBM

SUBSURFACE PROFILE



SECTION :- I (BH1- BH5 & BH3)

LEGEND :
LAYERS

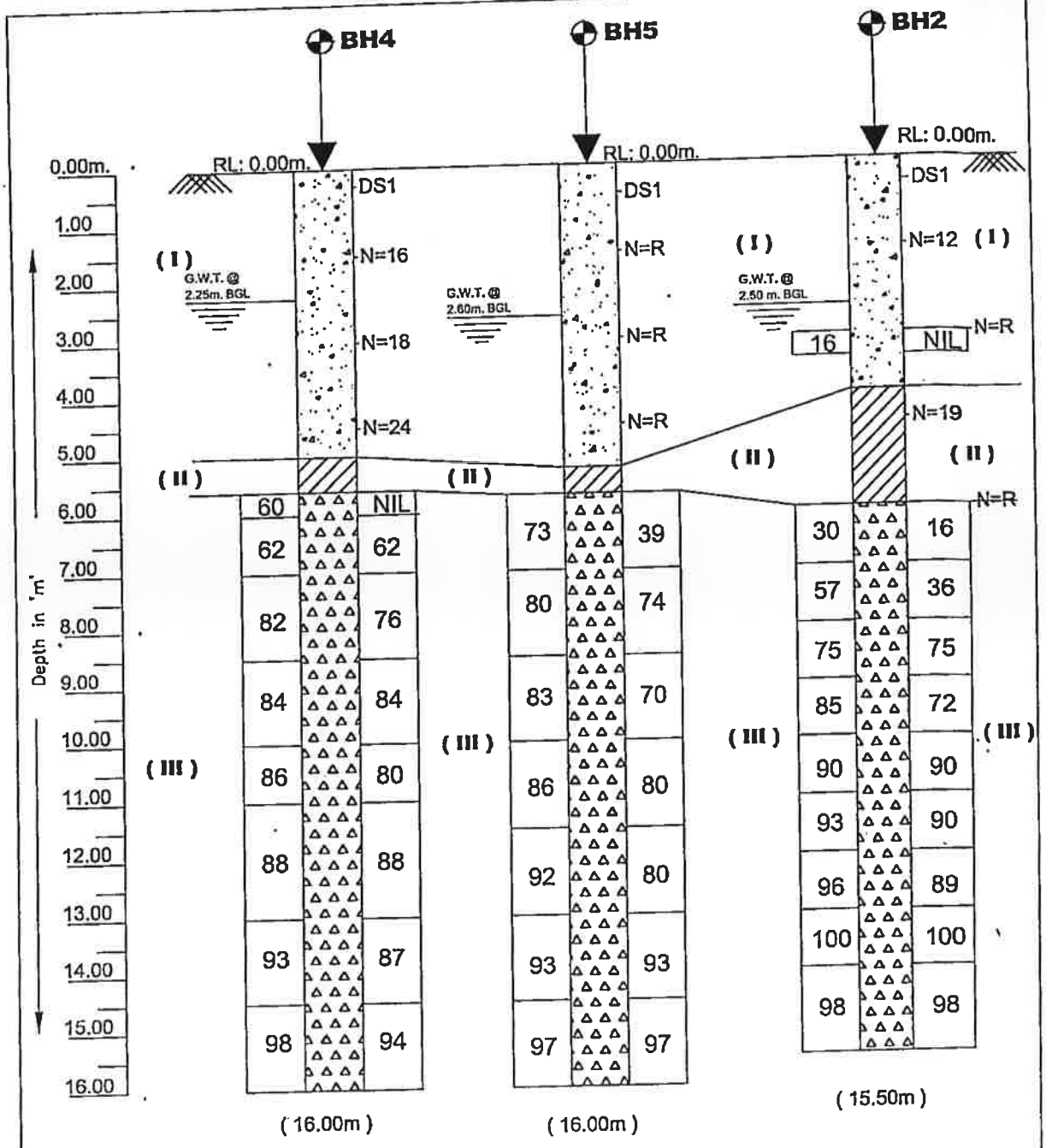
- I) FILL
- II)-MARIN CLAY
- II) BRECCIA BEDROCK

ENAM FINANCIAL CONSULTANTS PVT. LTD.

SUB-SURFACE PROFILE THROUGH BORE HOLES FOR PROPOSED COMMERCIAL BUILDING ON PLOT NO.C-20,G-BLOCK AT BKC,BANDRA MUMBAI.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD.
B/301, Centaur House, Santacruz (E), Mumbai- 55

Drawn By : S.M. Varadkar	Date : MAY -2006
Checked By : Mr. B.S. Telang	Scale : H:- NTS, V:- NTS
Appr. by. : Mr.V.Charles	Drg. No. : DBM / 1563 / EFCPL/ SSP-1



SECTION :- II (BH4- BH5 & BH2)

LEGEND :
LAYERS

- I) FILL
- II) MARIN CLAY
- II) BRECCIA BEDROCK

ENAM FINANCIAL CONSULTANTS PVT. LTD.

SUB-SURFACE PROFILE THROUGH BORE HOLES FOR PROPOSED COMMERCIAL BUILDING ON PLOT NO.C-20,G-BLOCK AT BKC,BANDRA MUMBAI.

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD.
B/301, Centaur House, Santacruz (E), Mumbai- 55

Drawn By : S.M. Varadkar	Date : MAY-2006
Checked By : Mr. B.S. Telang	Scale : H:- NTS, V:- NTS
Appr. by. : Mr.V.Charles	Drg. No. : DBM / 1563 / EFCPL/ SSP-2