MINUTES OF THE PRE-BID MEETING FOR INTEGRATED SEWERAGE SYSTEM FOR IMPHAL CITY PHASE-II (SH: IMPHAL SEWERAGE PROJECT PHASE II FOR IMPHAL CITY ZONE 2, 3, 4 & 5 PACKAGE:ISP P-V(W)) WITH NDB HELD ON 05-05-2022

Ref. No. CE/PHE/3-94/NDB (S-W)/P-V/2022/229, dated : 25/04/2022.

The pre-bid meeting for Integrated Sewerage System for Imphal City Phase II (SH: Imphal Sewerage Project Phase II for Imphal city zone 2, 3, 4 & 5 Package: ISP P-V(W)) was chaired by Chief Engineer, PHED and assisted by Superintending Engineer (Urban) and Superintending Engineer (Planning and Monitoring). Representatives of Sl. No. 1, 2, 9, 11, 12, 14 & 16 were present in the said meeting and the following firms have submitted their queries through e-mail:-

1. Eco-Protection Engineers Pvt Ltd, Chennai
2. Vishvaraj Environment Pvt. Ltd, Mumbai
3. Annu Projects Pvt Ltd, New Delhi
4. M/S Aquatech Solution Pvt Ltd, Pune
5. Chevrox Construction Pvt Ltd, Gujarat
6. East India Udyog Ltd, New Delhi
7. Enviro-Infra Engineers Pvt Ltd, New Delhi
8. M/S Badri Rai &Co, Assam
9. Pulkit Projects Private Limited, New Delhi
10. Triveni Engineering and Industries Limited, Uttar Pradesh
11. Zetwerk Manufacturing Businesses Pvt. Ltd, Karnataka
12. Keystone Infra Pvt. Ltd, Hyderabad
13. Griffin Infratech, Hyderabad
14. LC Infra Projects Pvt Ltd, Ahmedabad
15. SPML Infra Ltd, Kolkata
16. Navkar Builders Ltd, Ahmedabad

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The original queries submitted by the bidders and departments responses are as below:-

Sl. No	Reference	Description as Per Tender/ IFB	Queries/ Clarification of the bidder	Departments response
1	Section No. III Page No. 13 Para No/ Clause No. 3	The Agency shall have a tie-up with a technology provider for Designing, Providing Key Equipments and Performance Guarantee for SBR technology and submit the affidavit to the Department regarding the tie-up with the technology provider. The technology provider must have provided technology for at least one Sewage Treatment Plant of min. 15.00 MLD Capacity based on SBR technology during the last seven years in India or Abroad and are working satisfactorily for at least three years as on date of calling of tenders and achieving the outlet parameters as per the tender requirement	We understand outlet parameters achieved and mentioned in Technology Provider's experience certificate shall be as per latest NGT guideline, as this is Tender requirement. Kindly confirm.	Clarified as:- Yes, outlet parameters achieved and mentioned in Technology Provider's experience certificate shall be as per latest NGT guidelines
2	Section No. II, Appendix -9 Page No. 28 to 30 Para No./Clause No.1	Providing and Laying of DI Sewer Pipes (K-9) conforming to IS 8329: 2000 and IS 12288:2002 specifications including utility shifting, excavation, transporting the excavated earth, sand bedding, concreting, jointing, backfilling with proper compaction, shoring, timbering, sheet piling, dewatering etc complete by all means and necessary road restoration as previous condition including blacktopping, providing and laying of DI fittings (specials) and	Bidders request to provide the NGL , Finished Ground Level and Invert level of incoming sewer network.	Clarified as:- Attached as Annexure-I.

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		suitable DI valves as per relevant IS Code. Provision of 2.0 m high temporary barricading with all the necessary arrangement for traffic diversion materials. Design, drawing and construction of pipe crossing steel truss bridges across rivers(if any), nallah (if any), etc. and RCC manhole including inside ladder with DI cover(if necessary) including testing of pipe joints(if any), fittings(if any), valves(if any) etc. and disinfection of all pipes, trial run and commissioning etc. complete.	The Bidder's scope of work shall be limited to Items given in the tender BOQ, However bidder will execute the other works as a extra cost on mutually agreed terms. Please confirm.	Clarified as: The bidder's scope of work shall be as per the NITs requirement.
3	Section No. II, Appendix-9 Page No. 30 to 61 Para No./Clause No.2A to 2S	Design, Drawing, construction, Testing and Commissioning of different capacity intermediate pumping station Civil, Mechanical & Electrical works with all necessary requirements including joining with inlet and outlet mains etc.	Please confirm the given flow rate whether peak flow or average flow to design the MPS/IPS pumping station.	Clarified as:- The given flow rate indicated in BOQ in respective items are peak flows.
			Bidders request to provide Raw sewage water parameters for all MPS/IPS station.	Clarified as: Attached as Annexure-II.
			The Bidder's scope of work shall be limited to Items given in the tender BOQ, However, bidder will execute the other works as a extra cost on mutually agreed terms. Please confirm	The bidder's scope of work shall be as per the NITs requirement.
			Bidders request to provide the site plan with details of MPS & IPS Location, area requirement and their	Attached as Annexure-III & IV

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			Levels such as NGL, Finished Ground Level and Invert level.	
4	Section No. II, Appendix-9 Page No.7 Para No./Clause No.3	Design, Drawing, Construction, Commissioning and trial run of different units of Sewage Treatment Plant 16 MLD (including Civil, Mechanical, Electrical, Area-2 hectare) at Uchekon Loukol as per specification mentioned in the schedule and meeting effluent characteristics by NGT and as per items:	Bidders Request to kindly confirm the Inlet parameters of STP Plant to design the same. Also provide HFL / Disposal level of treated sewage at final disposal location. Distance of final disposal point from STP boundary.	Clarified as:- Attached as Annexure II and Annexure-V. The treated effluent will be discharged at the nearby drains/canal for further discharging to the river within 3 km radius range from STP. Outlet treated sewage parameters

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			Outlet treated sewage parameters shall be as per latest National Green Tribunal (NGT) Order dtd. 30.04.2019, which is being mandatorily followed in India as follows: Item/ Parameter/ Description Units Values pH - 5.5-9.0 BOD mg/L ≤ 10 COD mg/L ≤ 50 TSS mg/L ≤ 20 Phosphorus (TP) mg/L ≤ 1 Total Nitrogen (TN) mg/L ≤ 10 Fecal Coliform (MPN/100ml) ≤ 100 Kindly confirm.	shall be as per latest National Green Tribunal (NGT) requirements.
5	Section No.II, Appendix-9 Page No. 61 Para No./Clause No. 3	(ii) Design, drawing, construction and testing of biological treatment units such as SBR basin (suitable with one standby).	Bidder confirm to provide two no. of Basin both are working. Since SBR operation is a batch and cyclic process. So stand by basin will not be require. Please confirm	Clarified as:- Number and size of SBR basin to be provided shall be designed by the bidder as per the NITs requirements.
6	Section No.II, Appendix-9	vi) Supply, Installation and testing of instruments such as Pressure Gauges:	Bidders recommended to provide VFD Drive for	Clarified as:- As per the actual requirement and

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	Page No. 63 Para No./Clause No.3 and sub clause No. iii	Diaphragm Type (suitable.), DO Meters: Immersion Type (suitable), Level Indicating Transmitters: Hydrostatic Type (suitable), VFD for Air Blowers (suitable) VFD for Decanters (suitable), Soft Starter for Air Blowers (suitable) , Decanter Level Sensor (suitable), Decanter Position Sensor (suitable), Level Transmitters: Ultrasonic Type (suitable), Differential Level Transmitters: Ultrasonic Type (suitable), Flow Meter: Ultrasonic Type (suitable), Level Switches: Capacitance Type (suitable), PLC-Cum-Control Panel (suitable), Online 2 KVA UPS with 1/2 Hours Battery Back- up (suitable). drains etc. complete	the Air Blower, so there is no requirement of soft starter. Because VFD is the advanced drives of the soft starter and also be noted that combination of soft starter and VFD both are not used for the drives.	upon approval of competent authority, VFD Drive/ Soft starter or both shall be used.
7	Section No. 2 Page No.06 Para No/ Clause No. A3	No Escalation will be allowed. The price quoted should be firm the validity of the contract period.	Considering the volume of work and present market situation, we request you to include Price Escalation clause, so that the bidder can quote competitive rates.	Clarified as:- No change in NIT
8	Section No. III Page No. 16 Para No/ Clause No. 1.1	Performance Security, Contractor shall be required to submit the bank Guarantee from nay scheduled commercial Bank for an amount equal to 5% of the accepted contract cost towards performance security. EMD can also be adjusted and the balance amount shall be required to be submitted by the contractor. The Validity of the of Bank guarantees (s) shall cover entire duration of the contract period plus 6 months.	Bidders confirm to provide the Performance Bank Guarantee for the capital cost for the project period 3 years Plus 6 Month and separate PBG shall be given for the O&M cost up to contract closure period plus 6 Months. So Bidders requested to consider a	Clarified as:- Performance security amounting to 5% of the accepted contract cost shall covered the entire project period i.e 3 years plus 7 years O&M. On successful completion of the project for the entire period the performance security will be returned back to the concerned contractor.

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			provision to return the Performance Bank guarantee after completion of project works this proposal is to maintain the cashflow to the project and to avoid the acute shortage of the cash and sever problem. However the O&M PBG shall be available till end the of contract period.	
9	Capacity	IPS, MPS and STP	Total capacities of IPS and MPS is NOT matching with capacity of STP (16 MLD). So Bidders request to kindly confirm the no. of MPS & IPS shall be connected to STP Plant and also provide their capacity	Clarified as: Site map is enclosed as Annexure III.
10	Scope	Approach road	Bidders understand that main approach to STP site scope of PUBLIC HEALTH ENGINEERING DEPARTMENT, Please confirm.	Clarified as:- Main approach to STP site is under Bidder's scope
11	Drawing	Network Drawing and Pumping Station	We request you to kindly provide AutoCAD drawing of proposed plot for STP and MPS.	Clarified as:- Lat-long of the proposed STP and MPS is attached as Annexure-IV.

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12	DPR	Project Report	Bidders request you to kindly provide the project DPR	Clarified as:- The nature of the work includes Design, Drawing, Construction, Commissioning, Testing and Trial Run. Therefore, Bidder has to design as per the schedule of items given in Appendix-9 wherein the approximate cost involvement is also shown.
13	Section No. General Page No. Para No/ Clause No.	Land Availability for IPS/MPS	During site visit, it is understood that the availability of most the IPS/MPS land is not clear. Please confirm the availability of land for each IPS/MPS.	Clarified as:- There is no such issues related to land. The land required for the project are readily available at site.
14	Section No. General Page No. Para No/ Clause No.	Delay due to Land un-availability for IPS/MPS	1) We understand that required land for construction of STP, IPS, MPS, EPS shall be made available to Contractor within agreed timeline. Please confirm. 2) We understand that any project delay due to delay in land availability shall have provision of extension of time as well as price escalation. Please confirm.	Clarified as:- There are no such issues related to land. The land required for the project are readily available at site.
15	Section No. General Page No.	Available plot area for each IPS/MPS/STP	We request you to kindly provide plot area (in sq m) available for each	Clarified as:- Attached as Annexure IV

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	Para No/ Clause No.		IPS/MPS/STP	
16	Section No. General Page No. Para No/ Clause No.	Details required for IPS/MPS design	We request you to kindly provide following details for design of IPS/MPS 1) Invert Level of incoming sewer 2) NGL for each IPS/MPS 3) FGL for each IPS/MPS 4) Soil bearing capacity / Soil data	Clarified as:- Attached as Annexure I and Annexure VI
17	Section No. General Page No. Para No/ Clause No.	Feeder Line to IPS/MPS/STP	Price BOQ specifies the laying of feeder line to each respective IPS/MPS/STP. Bidder needs following minimum details in order to have correct estimation. 1) Voltage levels of power feeder - 11 KV / 33KV / 415 V. - Please clarify 2) Whether overhead lines or underground lines to be laid - Please clarify 3) Clear Right of way shall be provided for laying of feeder lines - Please confirm.	Clarified as:- Voltage levels of power feeder - 11 KV / 415 V. Overhead lines from the nearest substation upto the IPS/MPS/STP site entrance and beyond that underground lines till the panel to be laid. Clear Right of way is made available at the sides of the road and if in any case, utility shifting/river/ culvert crossings etc. are also in bidder's scope.
18	Section No. IFB Page No. 1 Para No/ Clause No.	Bid Security - Rs. 2.29 Cr. EMD shall be in the form of D-At-Call/ Demand Draft/Fixed Deposit Receipts / Bank Guarantees in favour of the Executive Engineer, Drainage and Sewerage Division, PHED, Manipur,	We request you to kindly accept Bid Security Declaration form instead of DD/BG/FDR etc. This is an acceptable practice	Clarified as:- No change in NIT

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		payable at Imphal, Manipur.	in all sewerage /STP projects published by National Mission for Clear Ganga (NMCG).	
19	Section No. 1 Page No. 4 Para No/ Clause No. k&l	3. Only Online Submission of the bids are acceptable. However the originals of D-At Call/ Demand Draft/Fixed Deposit Receipts/Bank Guarantees, other forms of securities and originals of financial instruments are to be submitted in seal cover before opening of Technical Bid & Last Date & Time for receipt of original copy of the Tender Fee - 28/05/2022 Opening of Technical Bid - 25/05/2022	As per IFB, Originals to be submitted before opening of technical Bid, whereas as per Bid datasheet, original copy submission is scheduled on 28/05/2022 and technical Bid opening is scheduled on 25/05/2022. Please clarify the submission date for original copies of Bid. Further we understand that the original copy of Bid is applicable for EMD Bank Guarantee and Tender Fee DD only. No other physical submission is required. Please confirm.	Clarified as:- Bidders are allowed to submit the original copies of tender fees and Bid security on or before 27/06/2022. However the scanned copies of the same are required to be uploaded in their technical bid. Further, original copy of EMD Bank Guarantee and Tender Fee DD are required to be submitted in hard copies.
20	Section No. II Page No. 3 Para No/ Clause No. A.3.1	Cost Escalation A 3.1 No escalation will be allowed. The price quoted should be firm during the validity of contract period.	Please note at present situation, material prices are very volatile and do not have long term validity. Considering total construction period is 3 years followed by 7 years of O&M, we request you	Clarified as: No change in NIT.

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			to keep provision of price escalation as per prevailing indices of WPI/CPI for both construction and O&M phase.	
21	Section No. 2 Page No. 16 Para No/ Clause No. I.1	Performance Security Contractor shall be required to submit Bank Guarantee from any Scheduled Commercial Bank for an amount equal to 5% of the accepted contract cost towards Performance Security. EMD can also be adjusted and the balance amount shall be required to be submitted by the contractor.	Please clarify whether the accepted contract value is inclusive of 7 years O&M cost.	Clarified as: The probable amount of contract is inclusive of all applicable taxes including 7 years O&M cost.
22	Section No. IFB Page No. 1 Para No/ Clause No.	Construction Period - 3 years Trial run - 3 months	Please clarify that construction period of 3 years is inclusive of 3 months of trial run.	Clarified as: Project construction period of 3 years is inclusive of 3 months of trial run.
23	Section No. - Appendix 9 Page No. - 28 Cl. No.	Major scope 1) 1 no. 16 MLD STP 2) 19 nos. Pumping Station 3) Pumping mains - DI (K9) pipes 4) O&M - 7 years	We understand, gravity sewer pipeline to covey the raw sewage from source such as nallahs or main trunk up to respective pumping station is not the part of scope of this project. Please confirm. Raw sewage will be conveyed up to respective pumping station by other agency. Please confirm.	Clarified as: Only the items listed in the BOQ are required to be executed by the bidder.
24	Section No. - Appendix 9	Pumping Main Details IPS 1 - Dia 250 mm, L- 150 m	We understand that bidders proposal shall be	Clarified as: Only the items listed in the BOQ

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	Page No. - 28 to 30 Cl. No. 1.0	IPS 2 - Dia 200 mm, L- 50 m IPS 3 - Dia 100 mm, L- 110 m IPS 4 - Dia 800 mm, L- 6000 m IPS 5 - Dia 250 mm, L- 950 m IPS 6 - Dia 250 mm, L- 600 m IPS 7 - Dia 300 mm, L- 550 m IPS 8 - Dia 300 mm, L- 100 m IPS 9 - Dia 350 mm, L- 100 m IPS 10 - Dia 400 mm, L- 150 m IPS 11 - Dia 400 mm, L- 50 m IPS 12 - Dia 600 mm, L- 1400 m IPS 13 - Dia 100 mm, L- 125 m IPS 14 - Dia 200 mm, L- 80 m IPS 15 - Dia 300 mm, L- 70 m IPS 16 - Dia 350 mm, L- 50 m IPS 17 - Dia 400 mm, L- 100 m IPS 18 - Dia 250 mm, L- 550 m MPS 19 - Dia 600 mm, L- 6000 m EPS 20 - Dia 600 mm, L- 1400 m	based on pipe diameters and pipe length specified in the referred clause of tender document. Any increase in size/quantities i.e. pipe dia or length or change in pipe material during detailed engineering phase shall be treated as extra items and Contractor shall be paid for increased pipe dia or lengths. Please confirm.	are required to be executed by the bidder.
25	Section No. - Appendix 9 Page No. - 28 to 30 Cl. No. 1.0	Design, drawing and construction of pipe crossing steel truss bridges across rivers(if any), nallah (if any), etc.	Item description also specifies the scope of pipe crossing steel truss bridges. In order to estimate for the same, please provide length/width of the nallah/river crossings.	Clarified as:- The total number of nallah/ river crossings under Zone-2&3, Zone 4 and Zone-5 is 5 with an approximate length of 250 m. But, the actual work will be as per the design and drawing submitted by the bidder depending on the site condition.
26	Section No. - Appendix 9 Page No. - 30 to 59 Cl. No. 2A to 2S	Sewage Pumping Station	Design of various IPS and MPS is in the scope of Contractor. In order to design the pumping station following details required.	Clarified as: Attached as Annexure I

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			1) Invert level of incoming sewer 2) Natural ground level 3) Finish ground level These details are required for design of receiving chamber, screen chamber and wet well Further in order to estimate static head of sewage pumps, indicative L-section of pumping main and terminal sewage pressure is required. Please provide the above details required for pre-bid design and correct estimation purpose.	
27	Section No. - Appendix 9 Page No. - 30 to 59 Cl. No. 2A to 2S	Sewage Pumping Station Design capacity	Raw sewage flowrates are mentioned for each IPS and MPS. We understand, the specified flowrate values are inclusive of peak factor. Please confirm.	Clarified as: The mentioned flow rates are inclusive of peak factor.
28	Section No. - Appendix 9 Page No. - 30 to 59 Cl. No. 2A to 2S	Sewage Pumping Station Pump Discharge Head	Please provide required pump discharge head for each pump sets	Clarified as: Please refer to Annexure I and Annexure III
29	Section No. - Appendix 9 Page No. - 61	Sewage Treatment Plant - 16 MLD Sludge Disposal	Kindly provide the location and distance of sludge disposal site from	Clarified as: The final disposal point/location of treated sewage is within the

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	Cl. No. 3		STP.	STP premises which may be approx. within 1 km radius range.
30	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Effluent Pumping Station	Please provide the location for disposal of treated effluent.	Clarified as: The treated effluent will be discharged at the nearby drains/canal for further discharging to the river within 3 km radius range from STP.
31	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Sewage Treatment Plant	Kindly provide the following details for STP plot 1) Ground water table at STP plot 2) Natural Ground Level 3) Finish ground level 4) HFL of nearby Nallah/River 5) Soil bearing capacity of STP plot	Clarified as: Attached as Annexure I, Annexure V and Annexure VI.
32	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Sewage Treatment Plant	Kindly provide the raw sewage parameters for which STP shall be designed.	Clarified as: Attached as Annexure II.
33	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Sewage Treatment Plant	We understand, Raw feed sewage to STP is municipal sewage. No ingress of industrial effluents into raw sewage is envisaged. Please confirm	Clarified as: Raw feed sewage to STP is household/municipal sewage.

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34	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Land for STP, IPS, MPS, EPS	We understand that required land for construction of STP, IPS, MPS, EPS is in possession of Client. Please confirm.	Clarified as: The land required for the project are readily available at site.
35	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	DG set for IPS, MPS, STP	Please provide the duration and frequency of power cuts in order to estimate for diesel consumption for DG sets.	Clarified as: There is no such power cuts/load shading in the project area. However during emergency, there may be 2-3 hours power cut in which the back up from the DG set will be required.
36	Section No. - Appendix 9 Page No. - 61 Cl. No. 3	Power charges during operation phase	We understand that power charges for IPS, MPS, STP, EPS during operation phase shall be paid by Client. Please confirm.	Clarified as: All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
37	Section No. - Appendix 9 Page No. - 64 Cl. No. Note	Design data & drawings (.dwg AutoCAD file) to be submitted in soft as well as hard copy(4 copies each set).	We understand that the referred clause is applicable for execution phase and not bidding stage. Please confirm.	Clarified as: Design data & drawings (.dwg AutoCAD file) in soft as well as hard copy (4 copies each set) are to be submitted in execution phase.
38	Section No. - Drawings Page No. - 106 - 110 Cl. No. Drawings	sizes and capacities	We presume that, the sizes, unit arrangements provided along with drawings are only for indication and bidder is free to change as per design.	Clarified as: The sizes, unit arrangements provided along with drawings are indicative and based on site conditions, any change in the actual sizes, unit arrangements, if necessary, approvals of the competent authority along with drawings and designs shall be

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				required.
39	Section No. - Drawings Page No. - 106 - 110 Cl. No. Drawings	DLP of 6 months	We understand that DLP of 6 months is included in O&M period. Please confirm.	Clarified as: DLP of 6 months after the construction phase is in conjunction with 7 years O&M period.
40	Section No. - Page No. - Cl. No. General	Standby philosophy	We request to please provide standby philosophy for each equipment to make all bidders at par.	Clarified as: Wherever mentioned in BOQ items, there is requirement of standby units for emergency/breakdowns.
41	Section No. - Price BOQ Page No. - Cl. No. 22	Operation & Maintenance of the above Infra Structures for a period of 7 years after commission of the project on turn-key basis.	Please clarify whether Operating Power charges to be included in O&M cost.	Clarified as: All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
42	Section No. - Price BOQ Page No. - Cl. No. 22	Operation & Maintenance of the above Infra Structures for a period of 7 years after commission of the project on turn-key basis.	In case power charges to be included in O&M, please provide the unit rate of power to be considered.	Clarified as: Manipur govt. latest tariff rate 2022-23 is enclosed as Annexure-VII for reference.
43	Section No. - Price BOQ Page No. - Cl. No. 22	Operation & Maintenance of the above Infra Structures for a period of 7 years after commission of the project on turn-key basis.	We understand O&M period of 7 years is inclusive of 6 months DLP period. Please confirm.	Clarified as: DLP of 6 months after the construction phase is in conjunction with 7 years O&M period.
44	Section No. - Price BOQ Page No. - Cl. No.	Price bid (excel sheet) and appendix 9, schedule of items	We request to kindly allow bidder to provide Oil type transformer instead of dry type transformer	Clarified as: Suitable type of transformer may be considered.

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45	Section No. - Price BOQ Page No. - Cl. No.	Price bid (excel sheet) and appendix 9, schedule of items	In the price bid, it is mentioned that, receiving chamber in STP pumping station should be 2 nos, 1 working + 1 standby. As there won't be any mechanical item in receiving chamber, we presume that, receiving chamber can be given 1 no. kindly confirm.	Clarified as: No change in NIT.
46	Section No. - Price BOQ Page No. - Cl. No.	Price bid (excel sheet) and appendix 9, schedule of items	We presume that, Dosing pump MOC shall be PP and liquid end shall be SS 304. Kindly confirm.	Clarified as: Suitable as per designed proposed by bidder may be considered.
47	Section No. - Appendix 9 Page No. - 35 Cl. No.	Appendix 9: Schedule of items: Design, Drawing and Construction of dedicated power feeder including necessary HT Panel (suitable with one standby), 1 no. Dry type Transformer (suitable), LT Panel with Capacitors and APFC Relays (suitable) , Diesel Generator set (suitable with one standby) with control panel and accessories, HT Cables including termination & termination, LT Cables including termination & jointing, Earthing Pit and earthing, Yard Lighting, Wiring and Illumination, Ventilation of Pump house superstructure, Safety Equipment, firefighting equipment, danger boards and rubber mats, Lightning arrestors etc complete (Length-3.5 km).	Please explain the term "Design, Drawing and Construction of dedicated power feeder"? Does it mean that contractor has to lay HT transmission line from a substation located at 3.5 km distance? If yes, then please let us know whether the supply is 11kV or 33kV level.	Clarified as: Contractor has to lay HT transmission line from a substation located at about 3.5 km distance. Voltage levels of power feeder - 11 KV / 415 V.
48	Section No. - Appendix 9 Page No. - 35	Appendix 9: Schedule of items:Design, Drawing and Construction of dedicated power feeder including necessary HT Panel (suitable with one	If contractor has to extend supply from nearest substation to the plant,	Clarified as: Overhead lines from the nearest substation upto the IPS/MPS/STP

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	Cl. No.	standby), 1 no. Dry type Transformer (suitable), LT Panel with Capacitors and APFC Relays (suitable) , Diesel Generator set (suitable with one standby) with control panel and accessories, HT Cables including termination & termination, LT Cables including termination & jointing, Earthing Pit and earthing, Yard Lighting, Wiring and Illumination, Ventilation of Pump house superstructure, Safety Equipment, firefighting equipment, danger boards and rubber mats, Lightning arrestors etc complete (Length-3.5 km).	then please let us know can it be done through HT overhead line or through Cable line? In both cases, Right of way clearance will be required. Please confirm that land clearance for power feeder will be provided by Employer.	site entrance and beyond that underground lines till the panel to be laid. Clear Right of way is made available at the sides of the road and if in any case, utility shifting/river/ culvert crossings etc. are also in bidder's scope.
49	Section No. - Appendix 9 Page No. - 35 Cl. No.	Appendix 9: Schedule of items: Design, Drawing and Construction of dedicated power feeder including necessary HT Panel (suitable with one standby), 1 no. Dry type Transformer (suitable), LT Panel with Capacitors and APFC Relays (suitable) , Diesel Generator set (suitable with one standby) with control panel and accessories, HT Cables including termination & termination, LT Cables including termination & jointing, Earthing Pit and earthing, Yard Lighting, Wiring and Illumination, Ventilation of Pump house superstructure, Safety Equipment, firefighting equipment, danger boards and rubber mats, Lightning arrestors etc complete (Length-3.5 km).	1 no. Dry type Transformer (suitable)- Please also allow the use of Oil type transformers as they are most robust, efficient and widely used.	Clarified as: Suitable type of transformer may be considered.
50	Section No. - Appendix 9 Page No. - 35 Cl. No.	Appendix 9: Schedule of items: Design, Drawing and Construction of dedicated power feeder including necessary HT Panel (suitable with one standby), 1 no. Dry type Transformer (suitable), LT Panel with Capacitors and APFC Relays (suitable) , Diesel Generator set (suitable with one standby) with control panel and	Diesel Generator set (suitable with one standby)- As per CPCB guidelines and standard criteria across the country, only one DG set of suitable capacity is to be	Clarified as: No change in NIT.

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		accessories, HT Cables including termination & termination, LT Cables including termination & jointing, Earthing Pit and earthing, Yard Lighting, Wiring and Illumination, Ventilation of Pump house superstructure, Safety Equipment, firefighting equipment, danger boards and rubber mats, Lightning arrestors etc complete (Length-3.5 km).	provided (1x100% or 2x50%) and no standby is required. You have also mentioned only DG set of suitable capacity in STP details. Request to allow (1x100% or 2x50%) DG set configuration.	
51	Section No. - Appendix 9 Page No. - 32 Cl. No.	Boundary wall and fencing gates	Kindly provide the height & type of boundary wall to be constructed. Also provide the scope of fencing work & its location.	Clarified as: The boundary wall must be brick walled type with a height of approx. 1.8 m.
52	Section No. - Appendix 9 Page No. - 32 Cl. No.	Approach Road	Kindly provide the Length, width & type of road to be constructed.	Clarified as: Normally the width of the approach road is 3.5 m for single lane and 7.0 m for double lane. However, the actual width will be as per site condition and nature of the structural units to be constructed.
53	Section No. - Annexure I Page No. - 109 Cl. No.	Typical drawings	Kindly provide coordinates of the STP & MPS's location.	Clarified as: Attached as Annexure-IV
54	Section No. - Annexure I Page No. - 114 Cl. No.	Sample Hydraulic Fow Diagram of STP	Kindly provide the contour plan, NGL, FGL, GWT and HFL for each MPS location. Also provide HFL at STP location.	Clarified as: Attached as Annexure I and Annexure V.
55	Section No. -	Soil Investigation Report	We kindly request you to	Clarified as:

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	General Page No. - Cl. No.		provide soil investigation report of STP & MPS locations for design purpose at tender stage.	Attached as Annexure VI
56	Section No. - General Page No. - Cl. No.	Civil Design Methodology	We understand "Limit State Method" is allowed for design of civil structures. Please confirm.	Clarified as: Any Design method can be adopted.
57	Section No. - VI General Condition of Contract Page No. - 77 Cl. No. 6.1	Payment to Contractors The Employer shall cause the payment of the Contractor promptly after receive of the bill by the Employer on the basis of the measured works actually completed and verified by the Employer and the PM&SC on quarterly basis as per availability of Check Drawal Authority/Money as per the rules and regulations under government of Manipur.	We understand that Payment shall be made on Progressive basis for Civil, Electro-Mechanical items and Other items. Please Clarify. Also we would like to know that whether Payment shall be made to Contractor for Electro-Mechanical Items on Supply at site. Please Clarify.	Clarified as: Payment to contractors will be made on the basis of billing break-up (BBU) which the department and the successful bidder will prepared jointly and be a part of contract.
58	Section No. - VI General Condition of Contract Page No. - 79 Cl. No. 10	PWD Form No 12 for Lump Sum Contract will be a part of the GC of Contract. No mobilisation advanced. Clause 10 (C), clause 10 (CA) and clause 10 (CC) of forms no. CPWD 7 & 8 also would not be entertained.	We request you to provide Mobilization Advance of 10% against submission of equivalent amount of Bank Guarantee from Scheduled Bank.	Clarified as : No change in NIT
59	Section No. Page No Para No/ Clause No		Kindly confirm gravity sewer network is in the scope of this project or not. If not then provide	Clarified as: Attached as Annexure I.

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			the invert level at each receiving chamber.	
60	Section No. Page No Para No/ Clause No		Flow given at each pumping station kindly provide head for the same and also confirm how many pumps required at each pumping station i.e. (No of working + No of standby)	Clarified as: Please refer to Annexure 1 and Annexure III
61	Section No. Sec – III, Evaluation and Qualification Criteria Page No Para No/ Clause No	The Agency shall have a tie-up with a technology provider for Designing, Providing Key Equipment and Performance Guarantee for SBR technology and submit the affidavit to the Department regarding the tie-up with the technology provider. The technology provider must have provided technology for at least one Sewage Treatment Plant of min. 15.00 MLD Capacity based on SBR technology during the last seven years in India or Abroad and are working satisfactorily for at least three years as on date of calling of tenders and achieving the outlet parameters as per the tender requirement.	We understand technology provider's certificate shall clearly mention 15 MLD STP is working and achieving the outlet parameters as per latest NGT guideline for minimum last three years before bid submission date. kindly confirm.	Clarified as:- Yes, outlet parameters achieved and mentioned in Technology Provider's experience certificate shall be as per latest NGT guideline
62	Section No. Page No - 61 Para No/ Clause No -Cl. 3 – SBR Basins	(ii) Design, drawing, construction and testing of biological treatment units such as SBR basin (suitable with one standby),	It is understood that Four numbers SBR Basins are mentioned in the Table of Layout Plan provided in Tender document for continuous operation of STP even one Basin is under maintenance. Kindly confirm.	Clarified as: Number and size of SBR basin to be provided shall be designed by the bidder as per the NITs requirements.
63	Section No.	Permanent power supply for O&M purpose	Please confirm whether	Clarified as:

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	Page No Para No/ Clause No		permanent power supply required for O&M purpose shall be provided by the client.	All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
64	Section No. Page No Para No/ Clause No	Power rate per unit in kWh	Please confirm per unit rate(Rs/kWh) for Power in rupees required to be considered for bid evaluation.	Clarified as: Manipur govt. latest tariff rate 2022-23 is enclosed as Annexure-VII for reference.
65	Section No. Page No Para No/ Clause No	Bid Due Date	We request you to kindly extend the bid date by 6 weeks from the date of pre bid replies	Clarified as: Two clear weeks will be given after uploading of pre-bid replies.
66	Section – I Bid Data Sheet	Bid Security - Rs. 2.29 Crore or equivalent amount in USD (as per prevailing exchange rate at the time of submission of bid)	On account of slow down economy due to COVID-19 Pandemic, there is acute financial crunch among many commercial entities and contractors, which in turn affect timely execution of the contracts, and also many of the agencies/ bidders not able to participate in the tenders, which in turn reduce the completion in the bidding. In view of the above, we request you to kindly keep	Clarified as: No change in NIT

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			the provisions of asking "Bid Security Declaration" from the bidders, instead asking for furnishing the Bid security, thereby many of the bidders will be able to bid for the project effectively which will in turn enhance the competition level in the bidding.	
67	Section II Instructions To Bidders (ITB) Page No. Para No/ Clause No.	A3. COST ESCALATION A 3.1 No escalation will be allowed. The price quoted should be firm during the validity of contract period.	Tender has specified that no price escalation will be allowed. Construction period as stipulated is 36 months and Price of construction material and E&M brought out items are very volatile. Even as per CVC Guideline or externally funded projects, all contracts having timeline of more than 18 months are eligible for Cost Escalation. Due to extreme volatility in market prices, we	Clarified as: No change in NIT

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			request you to consider Cost Escalation / Price Adjustment for cement, reinforcement steel, labour & other materials and also provide percentage of components based on formulae governed by relevant RBI indices. Since O&M duration is for 7 years and it is subjected to huge variation in prices for manpower, materials and fuel, therefore, request to consider the Cost Escalation / Price Adjustment during O&M period. Please consider and confirm through necessary amendments.	
68	Section II Instructions To Bidders (ITB) Page No. Para No/ Clause	A4. ELIGIBLE BIDDERS A 4.1 A Bidder may be a reputed firm / contractor, registered in Central/State Government / Semi Government works in appropriate class upto the date of issue of this	Proposed project is for development of Waste Water Infrastructure Works around Imphal, but the this condition will	Clarified as: No JV is allowed

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	No.	procurement/NIT and from any of the member countries of NDB. No Consortium / Joint bids shall be accepted.	restrict many infrastructure companies to participate in bidding in JV and will narrow the competition. Therefore, we request your good self to kindly arrange to amend Minimum Qualifying Criteria allowing JV with maximum 2 (two) members so that the maximum number of bidders can participate in the bidding and will have healthy competition	
69	Section III Evaluation And Qualification Criteria Page No. 49 Para No/ Clause No.8	A.1 TECHNICAL CRITERIA 2. The bidder should fulfil the following experience criteria:- Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:- a) Three similar completed works costing not less than the amount equal to Rs. 87.49 Crore, or b) Two similar completed works costing not less than the amount equal to Rs. 109.36 Crore, or c) One similar completed works costing not less than the amount equal to Rs. 174.98 Crore.	In almost all externally Funded Projects, Substantial completed similar works (80% or more works completed) is accepted in qualification requirements. Proposed project is for development of Waste Water Infrastructure Works around Imphal, but this condition will restrict many major infrastructure companies to participate in bidding. Therefore, we	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.

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		**Similar works- "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	request your good self to kindly accept Substantial completed similar works in Qualifying Criteria so that the maximum number of bidders can participate in the bidding and will have healthy competition.	
70	Section No. Page No. Para No/ Clause No.	Mobilization Advance	The proposed project is substantially vast in term of monetary and practical as well. Project mobilization will require a financial boost. Therefore, to assist and speed up the mobilization, we request for provision of interest free Mobilization advance to the extent of 10% of the contract price after submission of request from contractor with Bank Guarantee of 110% value at the commencement of the work to keep contractor's cash flow at par. Eventually, this provision will lower the financing	Clarified as: No change in NIT

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			charges, and ultimately lower the project cost. The recovery of advance shall commence from the sixth (6) month from the month in which the advance is paid, and full recovery of advance shall be completed by the end of eighteen (18) months from the date of issue of work order.	
71	Section III Evaluation And Qualification Criteria Page No. 50 Para No/ Clause No. 12	I.1 PERFORMANCE SECURITY Contractor shall be required to submit Bank Guarantee from any Scheduled Commercial Bank for an amount equal to 5% of the accepted contract cost towards Performance Security. EMD can also be adjusted and the balance amount shall be required to be submitted by the contractor. The validity of the Bank Guarantee(s) shall cover entire duration of contract period plus 6 months. The format of the Bank Guarantee(s) shall be got approved by the Contractor from the PHED, Manipur. If performance of the Contractor is not found satisfactory this security will be liable to be forfeited. In addition, the Contractor shall be liable for action under other clauses of the contract.	In this connection we wish to bring to your notice to the conditions stipulated in the Circular/ Office Memorandum issued by GoI, Ministry of Finance, dated 12th November 2020, wherein in clause number 3, it is stated as under: Clause 3.: In view of all above, it is decided to reduce Performance Security from existing 5 - 10 % to 3% of the value of the contract for all	Clarified as: No change in NIT.

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			existing contracts. However, the benefit of the reduced Performance Security will not be given in the contracts under dispute wherein arbitration/ court proceedings have been already started or are contemplated. Further, all tenders/ contracts issued/ concluded till 31 .03.2023 should also have the provision of reduced Performance Security. In all contracts where Performance Security has been reduced to 3% in view of above stipulations, the reduced percentage of Performance Security shall continue for the entire duration of the contract and there should be no subsequent increase	

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			of Performance Security even beyond 31.03.2023. In view of the above stipulations, we request you to kindly consider keeping the provisions of reduced performance security of 3% instead 5% as specified in the bidding documents. This will enable more bidders to participate in the bidding thereby increase the competition level.	
72	Section II F.1 Page No. Para No/ Clause No.	The PHED Manipur may conduct independent quality and general condition of the structures over and above monitoring done by the Project Management & Supervision Consultant.	We understand that PHED Manipur will bear charges of the same. Please confirm.	Clarified as: If the department feels that the quality of the structures/infrastructures are below standard, PHED Manipur may conduct independent quality testing and general condition of the structures over and above monitoring done by the Project Management & Supervision Consultant. All the cost will be borne by the contractor.
73	Section VI 9e Page No. Para No/ Clause No.	In the case of requirement of tribal community land for implementing the works (permanent/temporary), including any land for construction camps and laydown areas during implementation, the Contractor will take prior	We understand that all land for placement of STP and IPS has been identified and will be handed over to the bidder	Clarified as: The land required for the project are readily available at site and will be handed over to the bidder free of all encumbrances.

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		permission from the respective village development councils, to avoid any conflict.	free of all incumbenciesencumbrances	
74	Appendix 9 schedule of items Page No. Para No/ Clause No.	The nature of work will include Design, Drawing, Construction, Commissioning, Testing and Trial run (3 months before commission) complete for 1 no of Sewage Treatment Plant based on Sequencial Batch Reactor (SBR) Technology and its related appurtenant structures, 19 nos of Pumping Station and its related appurtenant structures, DI (K9) pipes including suitable pipe specials, Laboratory Buildings, Duty room, guard room, Quarters, dedicated power feeders, for Imphal Sewerage Zones 2 , 3, 4 and 5 (IMC ward nos. 7,8,9,10,11,12,13,16, 17, 18, 19, 20, 21, 22, 23 and added areas Porompat (CT), Porompat Plan Area (OG), Kongkham Leikai , Oinam Thingel, Naoriya Pakhanglakpa, Khongman Torban, Bijoy Govinda, Takyel) including Operation & Maintenance for a period of 7 years after commissioning the project on turn-key basis; Section II A.8: The defect liability period in respect of the entire structure as a whole or in parts of individual components included in the contract shall be 6 months after successful completion of work in all respects and its testing & commissioning.	We understand that period of completion 3 years after the date of issue of work order covers 3 months O&M. Further we understand that 6 months DLP will be concurrent with 1st year of O&M. Please confirm.	Clarified as: The project construction period of 3 years is including 3 months Trial run before commissioning of the project. Further, the O&M period of 7 years will start immediately after commissioning and 6 months DLP is also concurrent with 1st year of O&M.
75	General Page No. Para No/ Clause No.	Land for STP, IPS: 1	We understand that all land for placement of STP and IPS has been identified and will be handed over to the bidder free of all encumbrances.	Clarified as: The land required for the project are readily available at site. Clear Right of way is made available at the sides of the road and if in any case, utility shifting/river/ culvert

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			Further, department will arrange for EIA and all necessary clearances for land, environment, forest department (as applicable), Right of Way as applicable. Bidder could assist. Kindly clarify	crossings etc. are also in bidder's scope.
76	General Page No. Para No/ Clause No.	Land Area	We request to provide land area that will be allocated for placement of STP and respective IPS. Site layout of STP, IPS sites along with dimensions and co-ordinates, north direction will be useful for assessing the placement of units within allocated area.	Clarified as: Attached as Annexure-IV
77	General Page No. Para No/ Clause No.	Relief mechanism for Delay	If there is delay in achieving necessary clearances/work front, please allow relief mechanism for the bidder. Please confirm.	Clarified as: May be taken up on case-to-case basis as and when required.
78	General Page No. Para No/ Clause No.	Sludge disposal	We understand that land for sludge disposal will be provided to the bidder during O&M on non-chargeable basis. Please confirm. Also we request you to indicate the	Clarified as: The final disposal point is within the STP premises which may be approx. within 1 km radius range.

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			tentative location of sludge disposal land.	
79	General Page No. Para No/ Clause No.	Nearest storm water drain near STP/IPS sites	Please confirm the distance and invert level of the nearest storm water drain or channel of city network from STP and pumping station sites.	Clarified as: Attached as Annexure-I
80	General Page No. Para No/ Clause No.	Design, Drawing and Construction of dedicated power feeder	We understand that as principal owner of the project, PHED Imphal will bear charges of power connection at STP and IPS as applicable. Further we understand that charges for establishing power feeder into the incomer panels at respective sites will be borne by department. Please confirm.	Clarified as: All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
81	General Page No. Para No/ Clause No.	Width of the approach road, and width of the road inside STP/IPS.	Please confirm.	Clarified as: Normally the width of the approach road is 3.5 m for single lane and 7.0 m for double lane. However, the actual width will be as per site condition and nature of the structural units to be constructed.
82	General Page No. Para No/ Clause No.	Crossings	Please confirm nos of road/rail/water body crossings anticipated in the demarkated network. Request to provide kmz	Clarified as: The total number of nallah/ river crossings under Zone-2&3, Zone 4 and Zone-5 is 5 with an approximate length of 250 m. But,

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			file for the same.	the actual work will be as per the design and drawing submitted by the bidder depending on the site condition.
83	General Page No. Para No/ Clause No.	High flood level (HFL) data of the area	Request to provide the same for STP.	Clarified as: Attached as Annexure-V
84	General Page No. Para No/ Clause No.	Topographical survey map / average existing ground level of STP, pumping station sites	Please arrange to provide.	Clarified as: Attached as Annexure-I.
85	General Page No. Para No/ Clause No.	Geotechnical data of the respective sites	Please arrange to provide Geotechnical, Topographical and Investigation data And Reports used for preparation of Detailed Project Report & Estimation. This will minimize the assumptions and remove all speculation by bidders and will bring all bidders at par for preparation of techno-commercial proposal of project and Hence costing will more economical and competitive.	Clarified as: Attached as Annexure-VI.
86	General	Operation & Maintenance of the above Infra	We understand that	Clarified as:

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	Page No. Para No/ Clause No.	Structures for a period of 7 years after commission of the project on turn- key basis	department will bear charges of electricity, and bidder will bear rest all charges. Please confirm.	All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
87	Sec lll (A.1)(2) Page No. 46 Para No/ Clause No.	The bidder should fulfil the following experience criteria» Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:- (a) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or (b) Two similar completed works costing not less than the amount equal to Rs. 109.36 crore, or (c) One similar completed works costing not less than the amount equal to Rs. 174.98 crore. ••similar works- "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	Requesting to consider the experience of Sewerage Treatment Plant and Water Treatment Plant As per Tender document, authority is asking (a) 1 work each @30% of estimated value. (b) Consideration of Completion/Substantial/Performance Certificate	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.
88	Sec III (A.1)(4) Page No. 19 Para No/ Clause No. ANNEXURE-11: EVALUATION CRITERIA OF TECHNICAL PROPOSAL	Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-2 I to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works.	From the reffered Clause we understand that from Financial Year 2018-19 to FY 2022-212 is given. We therefore request from FY 22019020 to FY 2021-22 to be considered with Provisional Audited for the year FY 2021-22.	Amended as:- Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from

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				execution of Sewerage and other civil engineering works. Further, if any bidder is having Provisional Balance sheet for FY 2021-22 then the same can be submitted. In that case, the audited financial statements for the last 3 (three) financial years from FY2019-20 to FY2021-22 shall be considered while calculating Average Construction Turnover. **Separate corrigendum will also be issued.
89	SECTION III EVALUATION AND QUALIFICATI O N CRITERIA Page No. 13 Para No/ Clause No. . A1. Sl.no.02	The bidder should fulfil the following experience criteria:- Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:- (a) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or (b) Two similar completed works costing not less than the amount equal to Rs. 109.36 crore, or (c) One similar completed works costing not less than the amount equal to Rs. 174.98 crore. **Similar works- "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	We have carried out bigger Projects than the proposed work, details of which are as follows: Project 1: 23 MLD STP, 1 SPS, 96.00 kms Sewer Line Project 2: 15 MLD STP, 2 SPSs, 125.00 kms Sewer Line Project 3: 20 MLD STP 1 SPS Even though these Projects are larger in size, their	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.

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			costs are around 70 – 100 Cr, and even though the proposed Project is smaller in size, the cost is higher, as the cost of building and other raw material in Manipur is remarkably high. Thereby, in order to increase fair competition and participation of creditable bidders, we request you to kindly relax this criteria by at least half, i.e.: 1 similar work of Rs. 7.49 Cr., OR 2 similar works of Rs. 4.68 Cr. each, OR 3 similar works of Rs. 43.74 Cr. each OR Allow Joint Venture/Consortium of maximum 2 members for qualification. To compensate this relaxation, a criteria of positive networth or a networth of minimum 10% of ECV can be	

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			added to evaluate the financial capability and soundness of bidders. Kindly consider our request as we are competent to execute the Project and do qualify for all other eligibility criteria.	
90	Section No.II Page No.6 Para No./Clause No.A4	A Bidder may be a reputed firm / contractor, registered in Central/State Government / Semi Government works in appropriate class upto the date of issue of this procurement/NIT and from any of the member countries of NDB. No Consortium/Joint bids shall be accepted.	We request you to kindly accept Joint bids i.e from a Consortium/Joint Venture involving maximum of 2 parties.	Clarified as: No JV is allowed.
91	Section No. Page No. Para No/ Clause No.		The Tender Document does not mention any Average Ground Level or Finished Ground Level. We therefore request you to kindly provide details regarding the Topography of land and STP Premises.	Clarified as: Attached as Annexure-I
92	Section No. Page No. Para No/ Clause No.		We request you to kindly provide details regarding the Safe Bearing Capacity of the soil/Plot of the STP.	Clarified as: Attached as Annexure-VI
93	Section No. - 111	The bidder should fulfil the following	It is requested to consider the substantially	Amended as:

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	Page No.13 Para No/ Clause No.	experience criteria:- Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:- (a) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or (b) Two similar completed works costing not less than the amount equal to Rs. 109.36 crore, or (c) One similar completed works costing not less than the amount equal to Rs. 174.98 crore. **Similar works- "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	completed similar works.	A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.
94	Section No. 2 Page No. 6 Para No/ Clause No. A.4.1	A bidder may be a reputed firm/contractor, registered in Central/State Government/Semi Government works in appropriate class upto the date of issue of this procurement/NIT and from any of the member countries of NDB. No Consortium/Joint bids shall be accepted.	Bidder requests the authority to allow for joint venture or and from consortium	Clarified as: No JV is allowed.
95	Section No. 2 Page No. 10	No consortium/ Joint bids shall be accepted	Bid may be submitted by Joint Ventures/	Clarified as: No JV is allowed.

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	Para No/ Clause No. A4.1		Consortium. Please allow.	
96	Section No. 2 Evalaution and Qualification Criteria A-1, Technical Criteria Page No. 13 Para No/ Clause No.	The Bidder should fulfill the following experience Criteria Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following: A) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or B) Two similar completed works costing not less than the amount equal to Rs. 109.36 crore, or C) One similar completed works costing not less than the equal to Rs. 174.98 crore. **Similar works- Basic and detailed engineering including procurement and construction of Sewerage infrastructure (not below 15.00 MLD)	We are one of the leading companies in India undertaqking EPC for STPs/CETPs and Sewerage system. We have more than 15 STPs executed on EPC model having capacity more than 25 MLD. For the proposed project, the capacity of STP os 15 MLD, having an estimated cost of Rs. 36 Crore and max. value of a pumping station is approx… Rs. 10 Crore. Therefore we request you t please allow the bidders who have completed at least 3 Sewerage projects having 15 MLD STP and a pumping station of Rs. 50 Crore. We request you to kindly allow Joint Ventures, to fulfill the said criteria. Further the	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.

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			last 7 years may please be revised to 2015-16 to 2021-22	
97	Section -11, Evaluation and Qualification Criteria Page No. 14 Para No/ Clause No. 5.2	Average Construction turnover: the bidder should submit the audited financial statements for the last 3 (three) financial years from FY2918019 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works.	Audited Financial statements for the last three financial years along with turnover certificate issued by Chartered Accountant or equivalent of the respective country in the format as mentioned in Appendix – 4	Amended as:- Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works. Further, if any bidder is having Provisional Balance sheet for FY 2021-22 then the same can be submitted. In that case, the audited financial statements for the last 3 (three) financial years from FY2019-20 to FY2021-22 shall be considered while calculating Average Construction Turnover. **Separate corrigendum will also be issued.
98	Section No. III Page No. 2 Para No/ Clause No. A.1	The bidder should fulfil the following experience criteria:• Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:-	Experience for full completion / substantial completion of similar works	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one)

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		(a) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or (b] Two similar completed works costing not less than the amount equal to Rs. ios.sscrore, or (c) One similar completed works costing not less than the amount equal to Rs. 174.98 crore. **Similar works- "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	during previous 7 years (2014-15 to 2020-21) as cited below. Similar works on EPC mode 1. Sewerage Treatment Plant infrastructures not below the capacity of 15 MLD having financial value not less than 70 crore or 2. Construction experience of WTP not below 35MLD having financial value not less than 70 Crore.	Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.
99	Section No. 2 Page No. 8 Para No/ Clause No.A.8	The defect liability period in respect of the entire structure as a whole or in parts of individual components included in the contract 'shall be 6 months	From the referred clause it is understood that DLP of 6 months in concurrent	Clarified as: The project construction period of 3 years is including 3 months Trial run before commissioning of

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		after successful completion of work in all respects and its testing & commissioning.	with 7 years of O & M which shall commence after construction duration of 36 months. Please Confirm the same.	the project. Further, the O&M period of 7 years will start immediately after commissioning and 6 months DLP is also concurrent with 1st year of O&M.
100	Section No. 5 Page No. 47 Para No/ Clause No. 5.2	Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs.65.61 Crore from execution of Sewerage and other civil engineering works.	The interested Bidders should produce Audited Financial Statement for the last 3 years counting from FY 2018-19 to FY 2021-22 duly filled up in Appendix-4 The audited statement for FY 2021-22 may be permitted to produce Provisional Balance Sheet as settlement for final audited statement may take some time.	Ammended as:- Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works. Further, if any bidder is having Provisional Balance sheet for FY 2021-22 then the same can be submitted. In that case, the audited financial statements for the last 3 (three) financial years from FY2019-20 to FY2021-22 shall be considered while calculating Average Construction Turnover. **Separate corrigendum will also be issued.

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101	Page 5 of 117 NIT	Tender Fees of Rs.1,00,000/-	The tender fees required in the present NIT is very high in comparison to other bids by various government departments, wherein generally tender fees of Rs.1,000/- is accepted. Therefore, it is requested to reduce the Tender Fees to Rs.1,000/-.	Clarified as: No change in NIT
102	Pg. 10 of 117 Of DNIT A 3.1	COST ESCALATION No escalation will be allowed. The price quoted should be firm during the validity of contract period	Since the contract period is for 3 Years for construction and 7 Years for Operation and Maintenance and considering the uncertain situation of market rates of raw material and inputs, it is requested that Cost Escalation be applicable in the said contract in order to secure risk of both the contractor and employer.	Clarified as: No change in NIT

Th. Yogita

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103	Pg. 10 of 117 Of DNIT A 4.1	Eligible Bidders No Consortium / Joint bids shall be accepted.	It is requested that Joint Venture In the subject cited project be allowed in order to have healthy competition.	Clarified as: No JV is allowed.
104	Pg. 110 of 117 DNIT	Levels at MPS/STP	It is requested to provide following levels: • Invert level of incoming sewer • Natural Ground Level at MPS and STP • Required Finished Ground Level at MPS and STP • Highest Flood Level • Invert Level at Disposal Point of Treated Effluent	Clarified as: Attached as Annexure-I, Annexure-V and Annexure-VI. The final disposal point/location of treated sewage is within the STP premises which may be approx. within 1 km radius range.

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105	Pg. 110 of 117 DNIT	Soil Investigation Report	It is requested to provide Soil Investigation Report at the Location of STP and MPS.	Clarified as: Attached as Annexure-VI
106	Page 68 of 117 DNIT	Cost of Electricity during Commissioning, Trial Run and Operation and Maintenance	It is understood that Cost of Electricity during Commissioning, Trial Run and Operation and Maintenance will be borne by Department including cost of Diesel.	Clarified as: All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
107	Page 32 of 117 DNIT	Schedule of Rates : GST	It is requested that GST be payable extra at the applicable rates and should not be included in the prices quoted by the bidder.	Clarified as: Please refer to para 12 of IFB
108	Pg. 10 of 117 Of DNIT A 3.1	COST ESCALATION No escalation will be allowed. The price quoted should be firm during the validity of contract period	Since the contract period is of long duration total 10 years, we request you to add Cost Escalation clause. Kindly confirm.	Clarified as: No change in NIT
109	Pg. 10 of 117 Of DNIT A4.1	Eligible Bidders No Consortium / Joint bids shall be accepted	For better participation & competitive pricing we request to kindly allow JV for this bid.	Clarified as: No JV is allowed

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110	Pg. 110 of 117 DNIT	Soil Investigation Report	Kindly provide Soil investigation report of the proposed plants (STP & MPS) for our working purpose.	Clarified as: Attached as Annexure-VI
111	Page 68 of 117 DNIT	Cost of Electricity during Commissioning, Trial Run and Operation and Maintenance.	Bidder understanding is that the power cost during commissioning, Trial Run and Operation and Maintenance is in client scope including fuel if any consumed. Kindly Confirm.	Clarified as: All the charges including consumables, power, w/c etc. during the construction phase and 7 years O/M period are in the scope of bidder.
112		General	Kindly extend the submission date atleast by 2 – 3 weeks from the present date of submission and oblige.	Clarified as: Two clear weeks will be given after uploading of pre-bid minutes.
113	Section No. II ITB Page No.10 Clause No. A3 - Cost Escalation	No escalation will be allowed. The price quoted should be firm during the validity of contract period	Considering the highly volatile market scenario, we request the authority to allow for price escalation/variation	*Clarified as:* *No change in NIT*
114	Section No. PWD Form-12 Page No. 90 Para No. 27	When the work shall be completed, the contractor(s) is/are to be entitled to receive all moneys due payable to him/them under or by virtue of the contract, except sum of ..... Percent of the total value of the work dine which will be retrained for six months after the date of	Request the authority the specify the percentage in the clause Bidder understands that this is the Retention Money. Please clarify.	Clarified as: The retention money in the form of Performance security and security deposit will only be returned/refunded after successful completion of the project in time and as per specification.

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		completion of the work		
115	Section No. 2 Page No.6 Para No/ Clause No. A3.1	No escalation will be allowed. The price quoted should be firm during the validity of contract period.	Considering the voluminous nature of work with huge quantum of Civil Structure and also due to extreme volatility of prices of various materials, labour, machineries. We request you to consider price escalation for the contract period has being considered in contracts PAN india for projects for such durations.	Clarified as: No change in NIT
116	Section No. 3 Page No. 13 Para No/ Clause No. Sl. No.2	The bidder should fulfil the following experience criteria:- Experience of having successfully completed similar work during the last 7 years (2014-15 to 2020-21) should be either of the following:- (a) Three similar completed works costing not less than the amount equal to Rs. 87.49 crore, or (b) Two similar completed works costing not less than the amount equal to Rs. 174.98 crore. **Similar works- "detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)	Requesting for considering in experience of having successfully completed/substantial completion of similar works during the last 7 years (2014-15 to 2020-21) should be of the following:- i) Construction of Sewerage Treatment Plant (not below 15.00 MLD) amount equal to Rs 70.00 Cr & ii) Experience in Construction of Water Treatment Plant (not	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.

Th. Yogita

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			below 42.00 MLD) amount equal to Rs 80.00 Cr	
117	Section No. IV & Appendix-4 Page No.14 & 23 Para No/ Clause No. - Sl. No.- 4 & Appendix-4	Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works.	Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY 2020-21 & in APPENDIX-4 FY2019-20 to FY 2021-22 is taken. i))Requesting to consider FY2019-20 to FY202 I-22 as mentioned in Appendix-4 ii) Requesting FY 2021-22 Provisional Audited Sheet also to be considered.	Amended as:- Average Construction Turnover: The bidder should submit the audited financial statements for the last 3 (three) financial years from FY2018-19 to FY2020-21 to demonstrate the current soundness of the bidders' financial position showing a minimum average turnover of not less than Rs. 65.61 Crore from execution of Sewerage and other civil engineering works. Further, if any bidder is having Provisional Balance sheet for FY 2021-22 then the same can be submitted. In that case, the audited financial statements for the last 3 (three) financial years from FY2019-20 to FY2021-22 shall be considered while calculating Average Construction Turnover. **Separate corrigendum will also be issued.
118	Section No. VI ANNEXURE II Page No.77 Para No/ Clause	Mode of Billings and Payment as priority I Financial norms of the State Financial Department The Employer shall cause the payment of the contractor promptly after receive of the bill by the Employer of the basis of the measured works	For the Better implementation of the Project, timely payment should be assured. And also bill cycle shall be monthly Percentage of	Clarified as: No change in NIT

Th. Yogita

Th. Bebina Devi

	No.6.1	actually completed and verified by the Employer and PM&SC on quarterly basis as per availability of Check Drawal Authority/Money as per the rules and regulations under government of Manipur.	retention if any and details of other recoveries shall be provided.	
119	Section No. VI Page No.77 Para No/ Clause No. 5.2	Cost escalation, affecting the Applicable Law, with respect to taxes and duties and idle period which increases or decreases or due to delay of works in any case, the cost incurred by the Contractor in performing the works, occurred will not be accepted by the Employer, in any case.	It is understood that the contractor shall bear and pay all taxes, duties, levies and charges assessed on the contractor by all municipal, state or National govt Authorities and Employer will reimburse the same at the time of payment. Please confirm the same.	Clarified as: No cost escalation is allowed.
120	Section No. VI Page No. 79 Para No/ Clause No. 10	PWD Form No. 12 for Lump Sum Contract will be a part of the GC of Contract. No mobilization advance Clause 10 (C). clause 10 (CA) and clause 10 (CC) of forms no. CPWD 7 s 8 also would not be entertained.	We would like to bring to your kind notice that Mobilization Advance has been provided for various Sewerage infrastructure projects that where envisaged across Projects in India. Hence in order to facilitate and better cash flow of the project. We request you to provide interest free mobilization advance of 10% of the contract value.	Clarified as: No change in NIT
121		Technical Details	The technical details, i.e. invert level of incoming sewer at the location of	Clarified as: Attached as Annexure-I, Annexure-VI.

Th. Yogita

Th. Bebina Devi

			proposed pumping stations, Geo technical investigation reports at all pumping stations and STP site, level at which treated water is required at the outlet of STP, are required to be furnished.	The treated effluent will be discharged at the nearby drains/canal for further discharging to the river within 3 km radius range from STP.
122	Section No. 3 Page No. 13 Para No/ Clause No. Sl. No. - 2	The bidder should fulfil the following experience criteria:- Experience of having successfully completed similar works during the last 7 years (2014-15 to 2020-21) should be either of the following:- (a) Three similar completed works costing not less than the the amount equal to Rs. 87.49 Crore or (b) two similar completed works costing not less than the amount equal to Rs. 109.36 Crore or (c) One similar completed works costing not less than the amount equal to Rs. 174.98 Crore ** Similar works – "Basic and detailed engineering including procurement and Construction of Sewerage Infrastructure (not below 15.00 MLD)"	Request to consider in providing relaxation for the qualification in Sewerage infrastructure to similar work as *Sewerage Treatment Plant not less than 15.00 MLD with value of 50.00 Crore".*	Amended as: A.1 TECHNICAL CRITERIA 2. Basic and detailed engineering including procurement, construction of minimum 1 (one) Sewerage Treatment Plant (STP) with capacity 15 MLD or above in member countries of NDB during the last five years from 2017-18 to 2021-22. **Separate corrigendum will also be issued.
123	Section No. 1 (Bid Data sheet), Page No. 1 & 4 Para No/ Clause No.		Hard copy submission date? Two Dates are mention 1) On Pg- 1, it sasys before Technical opening. 2) On pg-4 it says	Clarified as:- Two clear weeks will be given after uploading of pre-bid minutes.Bidders are allowed to submit the original copies of tender fees and Bid security upto 3 days after opening of the bid.

Th. Yogita

Th. Bebina Devi

			28th May by 12.00 Noon	However the scanned copies of the same are required to be uploaded in their technical bid.
124	Section No. Page No. Para No/ Clause No.		EMD – in Form of BG. Tender Fee – In Form of DD. TO BE SUBMITTED AS 1) SCAN COPY on e-proc portal and, 2) In original in Hard Copy. Please confirm	Clarified as:- The scanned copies of the same are required to be uploaded in their technical bid. Further, original copy of EMD Bank Guarantee and Tender Fee DD are required to be submitted in hard copies.
125	Section No. III Page No. 14 Para No/ Clause No. A1 (5)		Access to Credit Facility- Value of availability/access to credit limit is not given?	Clarified as: The credit facility asked here is to check the accessibility of credit in banks by the bidder. There is no such limit to it.
126	Section No. III Page No. 1 & 14 Para No/ Clause No. 7	7. If a single bidder applies in all five packages viz ISP P-I(W), ISP P-II(W), ISP P-III(W), ISP P-IV(W) & ISP P-V(W), the qualification requirement will be sum total of average annual turnover required in individual tenders taken together. Similar formula will apply in case single bidder bids for multiple packages.	Is this clause have any relevance to this Tender? Please Clarify?	Clarified as: Deleted "If a single bidder applies in all five packages viz ISP P-I(W), ISP P-II(W), ISP P-III(W), ISP P-IV(W) & ISP P-V(W), the qualification requirement will be sum total of average annual turnover required in individual tenders taken together. Similar formula will apply in case single bidder bids for multiple packages."
127	Section No. III Page No. 25 Para No/ Clause	APPENDIX-6 GENERAL CONSTRUCTION EXPERIENCE –	In column no. 6, Construction Rate of Key activities is asked, do we	Clarified as: Item/work rate of previous executed works may be

Th. Yogita

Th. Bebina Devi

	No.	Construction Rate of Key activities, is asked/	have to define BOQ Rates of Item?	highlighted in the respective table. *BOQ Item rates for this contract shall only be quoted in the Financial bid not anywhere in Technical bid.
128	Section No. III Page No. 28 Para No/ Clause No.	APPENDIX – 9 SCHEDULE OF ITEMS	As this is LUMP-SUM Tender to arrive on realistic costing bidder need the following: FOR PUMPING MAIN 1.Pumping main Route Map- To identify road surface, for any NH/River/Nallaha crossing. 2. Trench Section defining Excavation & Bedding. 3. Disposal/Termination point with its GL/IL for head calculation of pumps. 4. Flow mentioned is Aug. or Peak. FOR PUMPING STATION 1) Land Possession Status 2) Land size available for each. 3) Locations with Incoming sewer	Clarified as: Attached as Annexure-I, II, III and IV Flow mentioned is peak flow. The land required for the project are readily available at site. The final disposal point is within the STP premises which may be approx. within 1 km radius range.

Th. Yogita

Th. Bebina Devi

			pipe IL. 4) Configuration of Pumps, i.e. working & standby pumps. 5) Necessity of DIRECT FEEDER LINE, if Yes then shall it be compulsorily be HT or depends on the Load calculation of Pumping Station. FOR STP 1) Please provide Influent Sewage Parameter. 2) Sludge disposal will be in whose scope?	
129	Section No. Page No. - 77 Para No/ Clause No- 6.PAYMENTS TO THE CONTRACTOR	The Employer shall cause the payment of the Contractor promptly after receive of the bill by the Employer on the basis of the measured works actually completed and verified by the employer and the PM&SC on quarterly basis.	1) Will RA Bills will be paid monthly based on work executed and measured. 2) Is there any payment Break-up is envisaged or it will be approved with Design & Drawing	Clarified as: No change in NIT

Th. Yogita

Th. Bebina Devi

			submission in Design-Build Duration.	
130	Section No. II Page No. -6 Para No/ Clause No- A3- COST ESCALATION	A 3.1 No escalation will be allowed. The price q2uoted should be firm during the validity of contract period.	We request you to please re-consider and provide us with Cost Escalation as per National Standard for project duration more than 1 year.	Clarified as: No change in NIT
131	Section No. Page No. Para No/ Clause No-		GENERAL 1) Please provide us with SOIL TESTING REPORTS for SPS & STP location. 2) One SPS is on bank of river, so please provide us with HFL of river. 3) We are considering Applicable GST Rate is 18%, please confirm.	Clarified as: Attached as Annexure-V and Annexure-VI
132	Section No. VI Page No.77 Para No/ Clause No. 6.1	Mode of Billings and payments as per the priority/Financial norms of the State Financial Department "The employer shall cause the payment of the Contractor promptly after receive of the bill by the Employer on the basis of the measured works actually completed and verified by the Employer and the PM & SC on quarterly basis	We want to request you to change bill raising and payment time from quarterly basis to work completion as per mile stone basis and provide Price breakup schedule for all the BOQ Items	Clarified as: No change in NIT.

Th. Yogita

Th. Babina Devi

		as per availability of Check Drawl Authority/Money as per the rules and regulations under government of Manipur. The final payment under this clause shall be made only after the final report and a final statement, identified as such, shall have been submitted by the Contractor and approved as satisfactory by the Employer. The contract shall be deemed completed and finally accepted by the employer and the final statement shall be deemed approved by the Employer as satisfactory sixty (60) days after the final and final statement by the Employer unless the Employer, within such sixty (60) days period, gives written notice to the Contractor specifying in detail deficiencies in the contract works, the final report or final statement. The contractor shall thereupon make any necessary corrections, and upon completion of such corrections, the foregoing process shall be repeated. Payments shall be adjusted for deductions for advance payments (if any), retention, other recoveries in terms of contract & taxes to be deducted at source [TDS} as per applicable law".	respectively. We kindly request you to clarify or provide relevant details for above mentioned points of Pre-Bid queries from our side.	

Th. Yogita
Superintending Engineer
Planning & Monitoring Circle
PHED, Govt. of Manipur

Th. Bebina Devi
Superintending Engineer
Urban Circle, PHED
Manipur

Chief Engineer (PHED)
Government of Manipur

ANNEXURE-I

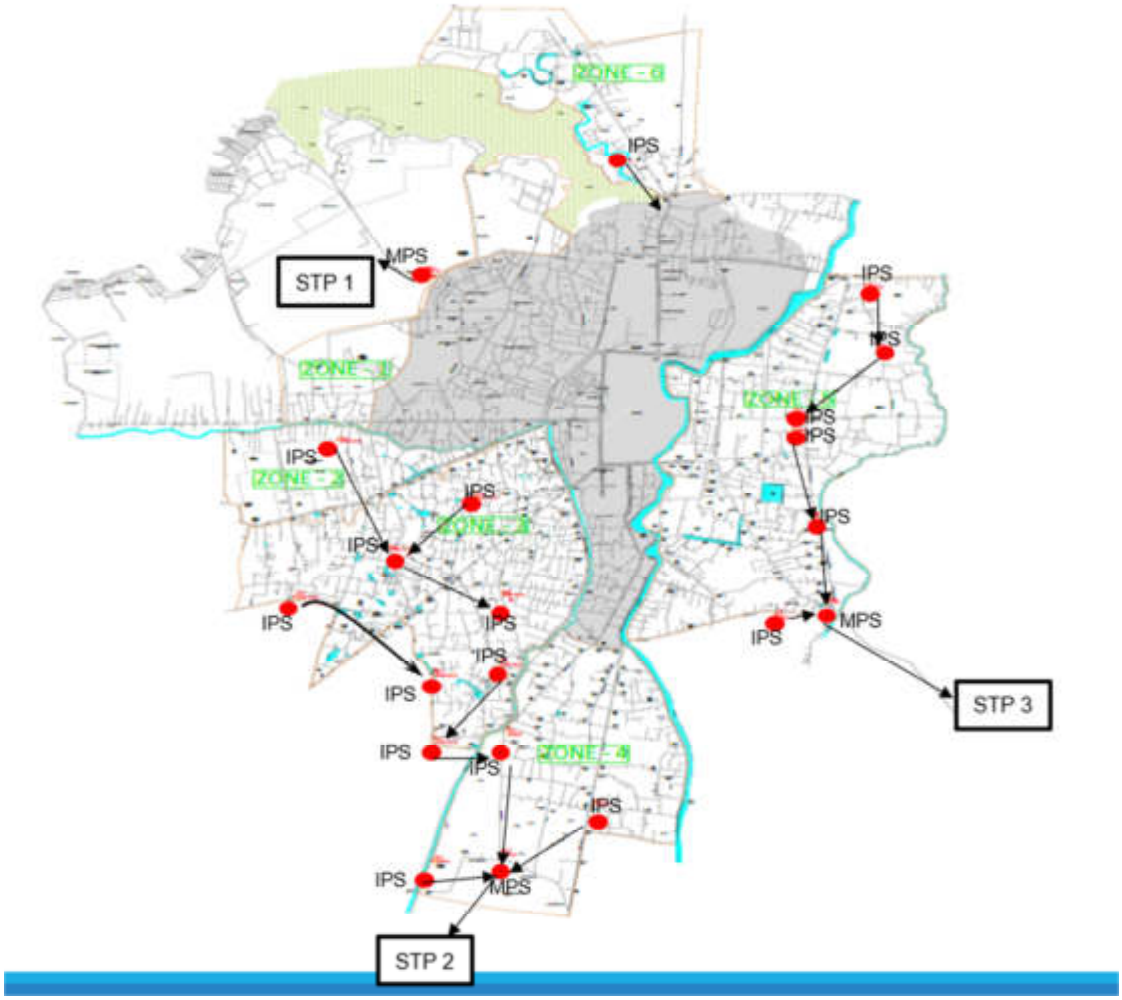
ZONE	PS	Invert level of sewer, m	Invert level of screen chamber, m	HWL , m	LWL, m	Invert level of well, m	Discharge ground level, m	Discharge Level, m
ZONE II & III	IPS 1	776.85	776.75	776.45	773.45	772.55	783.91	782.79
	IPS 2	776.60	776.50	776.20	773.20	772.20	782.68	781.56
	IPS 3	776.19	776.09	775.79	772.79	771.79	783.17	782.02
	IPS 4	778.10	778.00	777.70	774.70	773.70	783.16	782.01
	IPS 5	776.09	775.99	775.69	772.69	771.29	781.70	780.53
	IPS 6	775.95	775.85	775.55	772.55	771.15	782.07	780.87
	IPS 7	776.17	776.07	775.77	772.77	771.37	781.86	780.66
	IPS 8	774.73	774.63	774.33	771.33	769.53	782.20	780.90
ZONE IV	IPS 1	775.98	775.88	775.58	772.58	771.58	781.94	780.82
	IPS 2	776.40	776.30	776.00	773.00	772.10	782.54	781.44
	IPS 3	776.36	776.26	775.96	774.96	774.26	781.98	780.93
	MPS 2	774.87	774.77	774.47	771.47	769.67	777.66	786.26
ZONE V	IPS 1	779.54	779.44	779.14	778.14	777.44	785.16	784.11
	IPS 2	778.86	778.76	778.46	775.46	774.56	784.59	783.49
	IPS 3	778.65	778.55	778.25	775.25	774.55	784.88	783.73
	IPS 4	778.80	778.70	778.40	775.40	774.00	784.96	783.79
	IPS 5	778.63	778.53	778.23	775.23	773.83	784.60	783.40
	IPS 6	777.75	777.65	777.35	774.35	773.35	783.76	782.64
	MPS 3	778.60	778.50	778.20	775.20	773.80	792.60	801.30

ANNEXURE-II

INFLUENT CHARACTERISTICS

S No	Parameters	Units	
1	pH	-	5.5 to 9.0
2	Biochemical OxygenDemand (BOD5)	mg/l	250
3	Chemical Oxygen Demand(COD)	mg/l	425
4	Total Suspended Solids(TSS)	mg/l	375
5	Total Kjeldahl Nitrogen(TKN)	mg/l	45
6	Total Phosphorous (TP)	mg/l	7
7	Feacal Coliform	MPN/100 ml	1×10^6
8	Total Coliform	MPN/100 ml	1×10^7

ANNEXURE-III



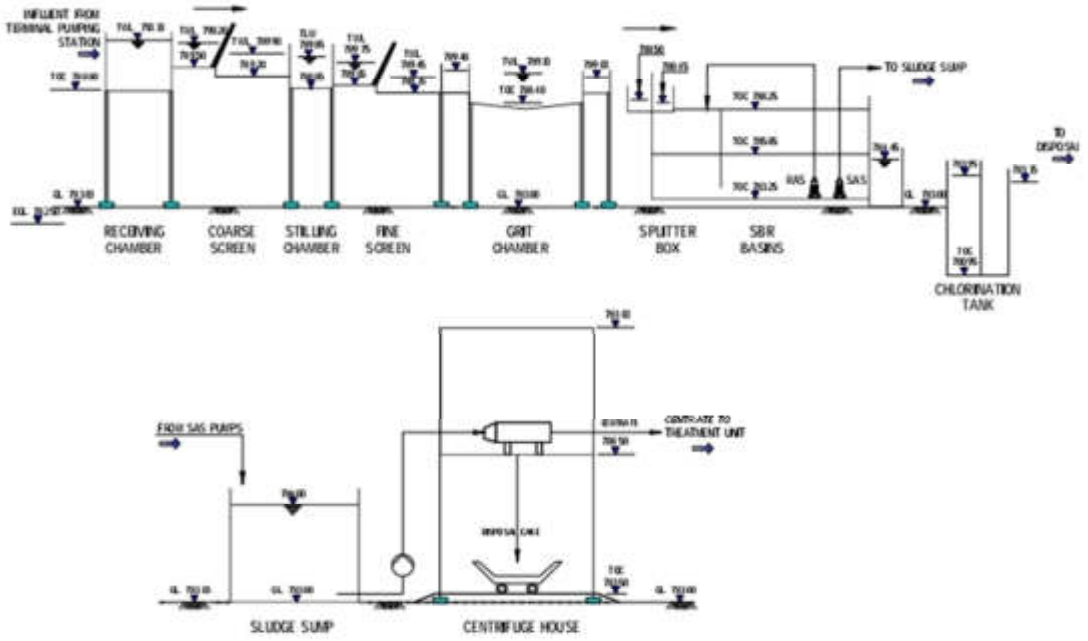
Layout showing the location of MPS, IPS and STP

ANNEXURE-IV

PLOT AREA

Zone	PS/STP	Plot area	Location
Zone 2 &3	IPS 1	121 sqm	Lat- 24.805945 Long- 93.914299
	IPS 2	121 sqm	Lat- 24.798680 Long- 93.925991
	IPS 3	209 sqm	Lat- 24.787617 Long- 93.909027
	IPS 4	121 sqm	Lat- 24.791599 Long- 93.918912
	IPS 5	209 sqm	Lat- 24.788373 Long- 93.928553
	IPS 6	209 sqm	Lat- 24.780888 Long- 93.927846
	IPS 7	209 sqm	Lat- 24.776313 Long- 93.921736
	IPS 8	231 sqm	Lat- 24.772948 Long- 93.92173
Zone 4	IPS 1	121 sqm	Lat- 24.763532 Long- 93.936864
	IPS 2	121 sqm	Lat- 24.769427 Long- 93.928180
	IPS 3	121 sqm	Lat- 24.756268 Long- 93.92033
	MPS 2	286 sqm	Lat- 24.758429 Long- 93.924004
Zone 5	IPS 1	121 sqm	Lat- 24.821785 Long- 93.960093
	IPS 2	121 sqm	Lat- 24.815814 Long- 93.965070
	IPS3	209 sqm	Lat- 24.807312 Long- 93.960829
	IPS 4	209 sqm	Lat- 24. 805285 Long- 93.958053
	IPS 5	209 sqm	Lat- 24.796723 Long- 93.958563
	IPS 6	209 sqm	Lat- 24.792037 Long- 93.959516
	MPS 3	220 sqm	Lat- 24. 785529 Long- 93.960456
STP		2 Ha	24°46'19.9"N 93°58'08.1" E

ANNEXURE-V



HFL of STP

ANNEXURE-VI

YEAR-2017

PROJECT: A REPORT ON SOIL INVESTIGATION WORK FOR PREPARATION OF DETAILED PROJECT REPORT FOR INTEGRATED SEWERAGE SYSTEM FOR IMPHAL CITY, MANIPUR.

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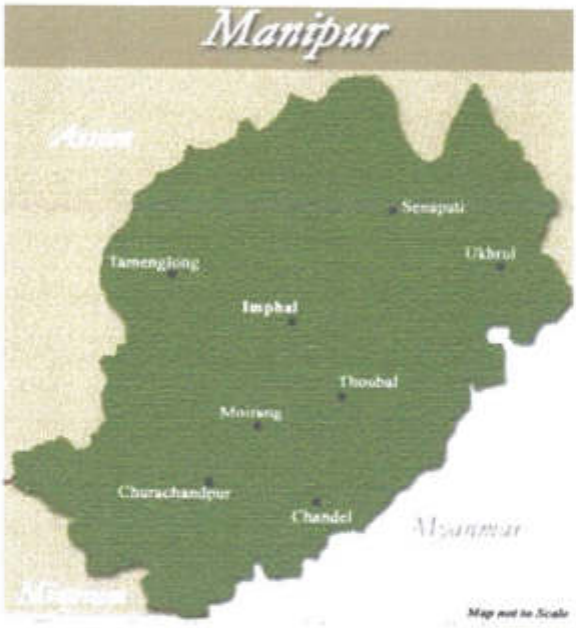


SOIL INVESTIGATION WORK EXECUTED AND REPORT PREPARED BY :

RIGHT SITE SURVEY

NEW TOWN
RAJARHAT
KOLKATA

GKW Consult GmbH Received 29/01/18

Right Site Survey Kolkata Rajarhat

EXISTING STP SITE PHOTO

IPS-I ZONE-IV

IPS-I ZONE-V

IPS-I ZONE-VI

IPS-II ZONE-II&III

IPS-III ZONE-IV

IPS-III ZONE-V

IPS-II ZONE-V

IPS-VI ZONE-V

MPS-I ZONE-I

MPS-II ZONE-IV

MPS-III ZONE-V

PROP.STP-II

PROP.STP-II

PROP.STP-III

Project: Soil Investigation work for Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

CONTENTS

CHAPTER – I

1.0 PREFACE

1.1 It is decided by the Authority to develop Sewerage System for Imphal City. A detailed Geo-technical Investigation work and Preparation of Report for designing of Foundation system assigned to us. We have conducted the Geotechnical Investigation work at proposed sites and Prepared this soil investigation report for designing the foundation system for Integrated Sewerage System for Imphal City at Manipur.

1.2 Scope of Investigation

The scope of work as per the assignment consists of sinking vertical bore hole of maximum 20.0m depth below ground level at exploratory site for construction of proposed various MPS,IPS and STP..

The present sub-soil investigation work can be broadly divided into the following activities.

a) Sinking of bore holes.

b) Carrying out Standard penetration tests.

c) Collection of disturbed and undisturbed soil samples.

d) Carrying out laboratory tests.

e) Preparation and Submission of report

The objects of the present sub-soil investigation are:

i) Identification of the sub-soil profile.

ii) Determination of the soil design parameters.

iii) Recommendation for bearing capacity of foundations.

1.3 The Project Site

The proposed sites were within the territory of Imphal city in the State of Manipur. The topography of the sites were regular in terrain.

CHAPTER - II

2.0 METHOD OF INVESTIGATION

2.1 General:

To achieve most economic and safe design of foundation for the proposed Sewerage System at this site, Geotechnical Investigation was envisaged. The Entire Investigation programme had been divided mainly into two parts, i)Field works & ii) Laboratory tests .

i) Detailed Field works unfold the sub-surface condition of soil strata and deposit types and their characteristics and

ii) Laboratory tests part would help determining the relevant physical and geotechnical properties of the sub-surface deposits leading to finalization of the foundation depths of the structures and bearing capacity with particular reference to the sub-structure types and their strength parameters and settlement potentials at the site.

2.2 The exploratory site, bore hole No., depths of bore hole, static water level are mentioned below.

Sl.No	Exploratory site	Borehole No	Termination depth (m)	Bore Hole Level,EGL (m)	Static Ground Water table below EGL (m)
1	MPS-1(Zone-1)	1	20.0	100.0 (assumed)	0.50
2	do	2	20.0		0.50
3	Existing STP-1 (zone-1)	1	20.0		At EGL
4	do	2	20.0		At EGL

Sl.No	Exploratory site	Borehole No	Termination depth (m)	Bore Hole Level,EGL (m)	Static Ground Water table below EGL (m)
5	do	3	20.0	100.0 (assumed)	At EGL
6	IPS-2(Zone 2&3)	1	20.0		1.0
7	do	2	20.0		1.0
8	IPS-1(zone 2&3)	1	20.0		0.50
9	Do	2	20.0		0.30
10	IPS-4(Zone-2&3)	1	20.0		1.00
11	do	2	20.0		1.00
12	IPS-5 (Zone -2&3)	1	20.0		1.50
13	do	2	20.0		1.50
14	IPS-3(Zone 2&3)	1	20.0		0.50
15	do	2	20.0		0.50
16	IPS-6(Zone 2 &3)	1	20.0		1.00
17	do	2	20.0		1.00
18	IPS—7(Zone 2 & 3)	1	20.0		1.50
19	do	2	20.0		1.50
20	IPS-8 (Zone 2 & 3)	1	20.0		2.50
21	do	2	20.0		2.50
22	IPS-3 (Zone-4)	1	20.0		1.50
23	do	2	20.0		1.50
24	MPS-2(Zone-4)	1	20.0		1.20
25	do	2	20.0		1.20
26	IPS-2 (zone-4)	1	20.0		1.00
27	do	2	20.0		1.00
28	IPS-1 (Zone-4)	1	20.0		2.00
29	do	2	20.0		2.00

Sl.No	Exploratory site	Borehole No	Termination depth (m)	Bore Hole Level,EGL (m)	Static Ground Water table below EGL (m)
30	IPS-6 (Zone 5)	1	20.0	100.0 (assumed)	At EGL
31	do	2	20.0		At EGL
32	MPS-3 (Zone-5)	1	20.0		1.0
33	do	2	20.0		1.0
34	IPS -5(Zone-5)	1	20.0		1.0
35	do	2	20.0		1.0
36	IPS-4(Zone-5)	1	20.0		0.30
37	do	2	20.0		0.30
38	IPS-3 (Zone-5)	1	20.0		2.0
39	do	2	20.0		2.0
40	IPS-2(Zone-5)	1	20.0		1.0
41	do	2	20.0		1.0
42	IPS-1(Zone -5)	1	20.0		0.50
43	do	2	20.0		At EGL
44	IPS-1 (Zone-6)	1	20.0		0.50
45	do	2	20.0		0.50
46	Prop STP-2	1	20.0		3.00
47	do	2	20.0		0.50
48	do	3	20.0		0.50
49	Prop STP-3	1	20.0		1.00
50	do	2	20.0		3.00
51	do	3	20.0		2.50

2.3 The borehole is sunk in accordance with the provisions of BIS 1892-1979. Bore hole is advanced using Auger, Shell and standard powered winch with tripod rig & tools held by wire rope. Rotary mud drilling has also been adopted to advance the bore hole further beyond shell boring. The diameter of the boreholes is 150mm. The sides of the bore hole are supported using temporary casings in stages of advancement. The shell is used to bore and remove soil cuttings. Care is taken to minimize disturbance to the soil at the base of the bore hole. Adequate cleaning of bases is done before SPT or UDS collection. Ground water level when struck with is recorded. It was also measured and recorded after 24 hours of removal of casings and is designated as static water level.

2.4 During the execution of the field works, the disturbed soil samples were collected at regular intervals from the split spoon sampler after conducting the standard penetration tests. These samples were used in the preparation of bore hole logs, for identification & classification purpose and conducting some specific tests as per the provisions laid down in IS: 1498-1970.

2.5 Nominal 100mm diameter undisturbed samples were recovered from borehole. The sampling equipment used consists of a seamless steel sample tube of 450mm in length fitted at its lower end with cutting shoe. The sampling assembly was driven by means of jarring link to its full length or as far downs as was found practicable. After withdrawal, the ends of the tubes were sealed with wax and capped before onward transmission to the laboratory.

2.6 The standard penetration tests (SPT) were conducted at regular intervals as per provisions laid down in IS: 2131-1981. The standard Split spoon sampler was used for conducting the above test by dropping a hammer of 63.5 kg. falling freely from a height of 75 cm. 'A' type drill rod was used for carrying out the SPT test. G.I pipes were fully withdrawn before lowering the SPT assembly in to the bore hole. The penetration resistances commonly known as `N' value were recorded by counting the number of blows for middle 30 cm penetration of a total penetration

of 45 cm. 'N' values thus obtained are shown in bore log data sheet. The water table in the bore hole was recorded during the field work.

2.7 Laboratory Investigation

For proper identification and classification of the sub-soil deposits and for deriving adequate information regarding its relevant physical and geotechnical properties at the site under investigation, the following laboratory tests are conducted on the soil samples collected from the exploratory bore holes:

a) Natural moisture content
b) Bulk and Dry Density
c) Specific Gravity
d) Atterberg Limits
e) Grain Size Analysis (Sieve and Hydrometer)
f) Triaxial Test/Direct Shear Test
g) Consolidation Test
h) UCC test
i) Swelling Index

2.8 Brief Description of various laboratory Test:-

i) NATURAL MOISTURE CONTENT (as per IS 2720-Part 18):-

It is the ratio of the weight of water to the dry weight of soil determined by oven drying.

ii) BULK DENSITY:-

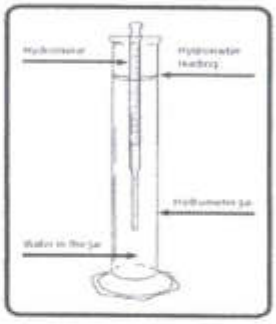
The bulk density γ is defined as the total weight W of a soil mass per unit of its total volume V.

iii) GARIN SIZE ANALYSIS (as per IS 2720-Part-4) :-

a) Sieve Analysis-

The complete sieve analysis can be divided into two parts, i.e, the coarse analysis and fine analysis. An oven dried samples of soil is separated into two fractions by sieving it through a 4.75 mm IS sieve. The portion retained of it (+4.75mm size) is termed as the gravel fraction and is kept for the coarse analysis, while the portion passing through it (-4.75mm size) is subjected to fine sieve analysis.

b) HYDROMETER ANALYSIS:-



In the wet method of mechanical analysis or sedimentation analysis, the soil fraction, finer than 75 micron size is kept in suspension in a liquid (usually water) medium. The analysis is based on stoke's law, according to which the velocity at which grains settle out of suspension, all other factor being equal, is depended upon the shape, weight and size of the particles/grains.

The procedure depends of stoke's equation for the terminal velocity of falling sphere. The effective diameter , D, can be computed from the equation.

$$D = \sqrt{18\mu/(\gamma s - \gamma w)} \times \sqrt{Zr/t}$$

Where μ = Viscosity of water at the test temperature.

γw = Unit wt. of water at test temperature.

γs = Unit wt. of soil solids.

Zr = Distance from the surface of suspension to the centre of volume of the hydrometer

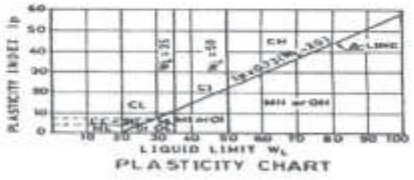
t = Total elapsed time.

iv) ATTERBERG LIMITS (as per IS 2720, Part-5):-

These are arbitrary moisture contents to determine the instant at which the soil is on the verge of being viscous liquid (Liquid limit) or non–plastic /Plastic limit. Liquid limits determined with the help of a liquid limit apparatus. Plastic limit is the water content at which the soil begins to crumble when rolled out into a thin thread of 3mm.

Diagram illustrating Liquid limit test

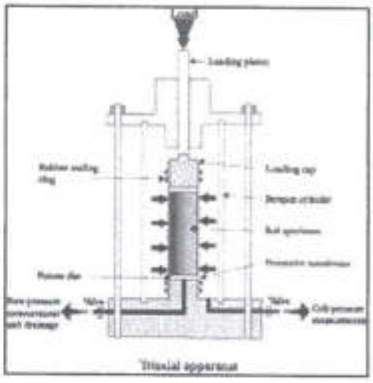
This test is of considerable interest to foundation engineers because the liquid limit and plastic limit of soils are correlated to their engineering properties. It has been observed from experiences that the OMC (Optimum Moisture Content) is found to be close to the plastic limit of cohesive soil. This may be very useful information required while compacting such soil. Soil Classification for fine grained soil has been done on the basis of atterberg Limits.



v) SPECIFIC GRAVITY:-

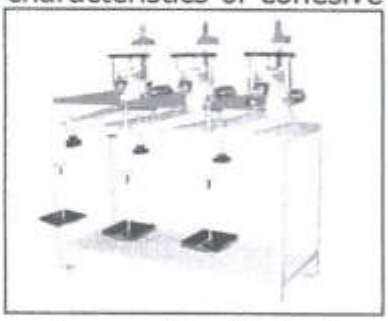
It is the ratio of unit weight of soil solids to that of water.

vi) TRI-AXIAL SHEAR TEST (as per IS 2720 part 11):-



Tri-axial test is conducted on mixed type of soils (C-Ø soil) like sandy clayey silt/silty clay and other cohesive soil. The sample, in this test, are subjected to different lateral stress, (e.g. 0.50,1.0,1.50 kg/sq cm etc.) i.e, cell/confining pressure as well as vertical stress and tested up to a maximum axial strain of 20% under a quick condition at a rate of 1.25 mm/min. The lateral stress on the sample is kept constant when the test continuous.

vii) CONSOLIDATION TEST (as per IS 2720 part-15):-



This test is necessary to estimate the settlement characteristics of cohesive soils. In the consolidometer ring of 6.25 cm dia and 2 cm high. A sample is taken with porous stones on top and bottom. After saturation a compressive load is applied and maintained for 24 hours. The compression of the sample is measured at regular intervals by a dial gauge. From the results obtained, e-log P curve drawn to estimate the compression index (Cc) from the straight portion of the curve.

viii) UNCONFINED COMPRESSION TEST (as per IS 2720-Part 10):-

Unconfined compression tests are conducted on cohesive soil like clay/clayey silt samples to determine their shear strengths. The samples are tested under quick condition at a rate of 1.25mm/min and are loaded upto a maximum of axial strain. This is a special type of tri-axial test where no

cell/confining pressure is applied laterally. The cylindrical specimen of soil is subject to major principal stress till the specimen fails due to shearing along a critical plane of failure.

All the tests, wherever possible, were conducted as per relevant Indian Standard Specifications. The result of all the laboratory tests have been reflected in a borehole log and test result data sheet enclosed at the annex. Graphical and pictorial presentations of test observations wherever relevant were also reflected and enclosed at the annex for better appreciation.

CHAPTER – III

3.0 SUB-SOIL CONDITIONS & PROPERTIES

3.1 The site has been investigated by sinking of bore hole of maximum 20.0m depth below existing ground level. The bore log, laboratory test results, sub-soil profile and sample calculation are presented in this report. The figures, graphs related to laboratory and field tests are also presented in Annexure of this report. Reader may go through the individual bore log and laboratory test results for detailed description, thickness, 'N' values and other physical properties. Incidentally, it has been observed that bore log indicated almost similar and identical soil stratification in the respective exploratory site with minor variation in the thickness of the individual strata as well as in respect of the presence of some intermediate pocket layer of dissimilar soils.

Based on the field test and laboratory test results of the soil investigation work, the condition of the sub-soil under the sites classified in merely 3 nos different stratum. The sub-soil deposit upto about 1.50m depth below E.G.L. at the exploratory site is found to be consisted of heterogeneous filled up material consisted moorum, brick bats etc. From 1.50 m depth to 13.0m depth very soft dark grey clayey silt / silty clay of medium to high plasticity with varying percentage of decomposed wood and peat/muck observed .Cohesion of soil found to be 0.10-0.15 kg/cm^2. From 13.0 m to termination depth of boreholes medium to stiff silty clay layer encountered with decomposed wood and peat/muck observed. Cohesion of soil found to be 0.30-0.50 kg/cm^2.

It is understood that the subsoil characteristics throughout the depth of investigation is very poor with respect to swell, shrinkage, shear strength and consolidation parameters. The SPT "N" values are very poor and it is varies between 0 to 4 in upper reaches. Whereas N value 5 to 9 has been observed in lower reaches of the boreholes.

CHAPTER – IV

4.0 RECOMMENDATIONS

4.1 The characteristics of sub-soil deposit at up to termination depth of boreholes as revealed from the detail investigation work is very poor with respect to shear, settlement and swelling parameters.

It is also understood that the superstructures proposed to be constructed at this site would be mostly medium to high loading.

Differential free swell test conducted from the soil samples indicated that clay deposit exhibits the expansive characteristics, the degree of expansiveness being mostly moderate to high in nature. More over presence of peat, decomposed vegetation and muck should be intricated the situation.

Considering such subsoil condition and proposed medium to highly loaded super structure to be constructed at this site, we are of the considered opinion that the structures may be supported with provision of **small under-reamed pile foundation system which becomes effective for such very soft, crack prone organic soil properties and hence considered to be a prudent proposition.** The structure may be supported on group of piles embedded in pile caps depending on the total super imposed loads. Pile load capacity should be confirmed by pile load test.

We do not envisage any shallow foundation system for these exploratory sites.

METHOD OF PILE LOAD CAPACITY CALCULATION:

1. Safe load carrying capacity of RCC cast-in-place Under -Reamed pile has been ascertained by static formula as per IS :2911 (Part III) as a ready reference to the Design Engineer

   Following formula has been adopted for the calculation of Load carrying Capacity of Under Reamed Pile (Ref IS 2911 (Part III-1979):-

   $$Qu = Ap.Nc.Cp + Aa.Nc.C'a + C'a.A's + \alpha . Ca.As$$

Factor of safety has been considered 2.50 for all practical purposes

Load Carrying Capacity for Deep Foundation (Under ream pile)

Location : MPS-1 (Zone-1)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.00	5.00
0.30	0.75	13.00	11.50	1.50	7.50	5.40
0.40	1.00	12.00	10.50	1.50	10.20	6.90
0.40	1.00	13.00	11.50	1.50	10.90	7.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.10	5.0
0.30	0.75	13.00	11.50	1.50	7.60	5.40
0.40	0.75	12.00	10.50	1.50	10.30	7.00
0.40	1.00	13.00	11.50	1.50	11.00	7.60

Location : STP-1-Existing Site

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	10.60	7.80
0.30	0.75	13.00	11.50	1.50	11.20	8.30
0.40	1.00	12.00	10.50	1.50	16.20	11.60
0.40	1.00	13.00	11.50	1.50	17.00	12.30
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	10.80	8.00
0.30	0.75	13.00	11.50	1.50	11.40	8.40
0.40	0.75	12.00	10.50	1.50	16.60	12.0
0.40	1.00	13.00	11.50	1.50	17.40	12.60

Location : IPS-2(ZONE-2&3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.20	4.90
0.30	0.75	13.00	11.50	1.50	7.50	5.20
0.40	1.00	12.00	10.50	1.50	11.10	7.40
0.40	1.00	13.00	11.50	1.50	11.60	7.80
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.30	5.00
0.30	0.75	13.00	11.50	1.50	7.70	5.30
0.40	0.75	12.00	10.50	1.50	11.40	7.60
0.40	1.00	13.00	11.50	1.50	11.80	8.00

Location :IPS-1 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	9.40	7.00
0.30	0.75	13.00	11.50	1.50	9.90	7.40
0.40	1.00	12.00	10.50	1.50	14.40	10.50
0.40	1.00	13.00	11.50	1.50	15.10	11.00
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	9.60	7.20
0.30	0.75	13.00	11.50	1.50	10.10	7.60
0.40	0.75	12.00	10.50	1.50	14.70	10.80
0.40	1.00	13.00	11.50	1.50	15.40	11.30.

Location :IPS-4 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.20	5.10
0.30	0.75	13.00	11.50	1.50	7.40	5.30
0.40	1.00	12.00	10.50	1.50	11.50	8.00
0.40	1.00	13.00	11.50	1.50	11.90	8.30
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.40	5.20
0.30	0.75	13.00	11.50	1.50	7.60	5.50
0.40	0.75	12.00	10.50	1.50	11.80	8.30
0.40	1.00	13.00	11.50	1.50	12.20	8.60

Location :IPS-5 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	6.50	4.80
0.30	0.75	13.00	11.50	1.50	7.00	5.20
0.40	1.00	12.00	10.50	1.50	9.70	7.00
0.40	1.00	13.00	11.50	1.50	10.30	7.40
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.60	4.90
0.30	0.75	13.00	11.50	1.50	7.10	5.20
0.40	0.75	12.00	10.50	1.50	9.90	7.10
0.40	1.00	13.00	11.50	1.50	10.40	7.60

Location :IPS-3 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	5.70	4.20
0.30	0.75	13.00	11.50	1.50	6.00	4.40
0.40	1.00	12.00	10.50	1.50	8.70	6.20
0.40	1.00	13.00	11.50	1.50	9.10	6.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	5.80	4.20
0.30	0.75	13.00	11.50	1.50	6.10	4.50
0.40	0.75	12.00	10.50	1.50	8.90	6.40
0.40	1.00	13.00	11.50	1.50	9.30	6.70

Location :IPS-6 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.40	5.20
0.30	0.75	13.00	11.50	1.50	7.80	5.50
0.40	1.00	12.00	10.50	1.50	11.40	7.80
0.40	1.00	13.00	11.50	1.50	11.90	8.20
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.60	5.30
0.30	0.75	13.00	11.50	1.50	7.90	5.60
0.40	0.75	12.00	10.50	1.50	11.70	8.00
0.40	1.00	13.00	11.50	1.50	12.20	8.40

Location :IPS-7 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.60	5.50
0.30	0.75	13.00	11.50	1.50	8.10	5.90
0.40	1.00	12.00	10.50	1.50	11.30	7.90
0.40	1.00	13.00	11.50	1.50	12.00	8.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.80	5.60
0.30	0.75	13.00	11.50	1.50	8.20	6.00
0.40	0.75	12.00	10.50	1.50	11.50	8.10
0.40	1.00	13.00	11.50	1.50	12.20	8.60

Location :IPS-8 (ZONE 2 & 3)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	6.30	4.20
0.30	0.75	13.00	11.50	1.50	6.60	4.40
0.40	1.00	12.00	10.50	1.50	9.80	6.20
0.40	1.00	13.00	11.50	1.50	10.20	6.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.40	4.20
0.30	0.75	13.00	11.50	1.50	6.70	4.50
0.40	0.75	12.00	10.50	1.50	10.0	6.40
0.40	1.00	13.00	11.50	1.50	10.40	6.70

Location :IPS-3 (ZONE 4)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	10.90	8.00
0.30	0.75	13.00	11.50	1.50	11.50	8.50
0.40	1.00	12.00	10.50	1.50	16.70	12.00
0.40	1.00	13.00	11.50	1.50	17.50	12.70
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	11.10	8.20
0.30	0.75	13.00	11.50	1.50	11.70	8.70
0.40	0.75	12.00	10.50	1.50	17.10	12.40
0.40	1.00	13.00	11.50	1.50	17.90	13.00

Location :MPS 2 (ZONE 4)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.40	5.50
0.30	0.75	13.00	11.50	1.50	7.80	5.90
0.40	1.00	12.00	10.50	1.50	10.90	7.90
0.40	1.00	13.00	11.50	1.50	11.50	8.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.50	5.60
0.30	0.75	13.00	11.50	1.50	7.90	6.00
0.40	0.75	12.00	10.50	1.50	11.10	8.10
0.40	1.00	13.00	11.50	1.50	11.70	8.60

Location :IPS 2 (ZONE 4)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.30	5.20
0.30	0.75	13.00	11.50	1.50	7.70	5.50
0.40	1.00	12.00	10.50	1.50	11.20	7.80
0.40	1.00	13.00	11.50	1.50	11.70	8.20
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.40	5.30
0.30	0.75	13.00	11.50	1.50	7.80	5.60
0.40	0.75	12.00	10.50	1.50	11.50	8.00
0.40	1.00	13.00	11.50	1.50	12.00	8.40

Location :IPS 1 (ZONE 4)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	8.30	6.30
0.30	0.75	13.00	11.50	1.50	8.70	6.60
0.40	1.00	12.00	10.50	1.50	12.80	9.50
0.40	1.00	13.00	11.50	1.50	13.30	10.00
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	8.50	6.40
0.30	0.75	13.00	11.50	1.50	8.90	6.80
0.40	0.75	12.00	10.50	1.50	13.10	9.80
0.40	1.00	13.00	11.50	1.50	13.70	10.30

Location :IPS 6 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.50	5.50
0.30	0.75	13.00	11.50	1.50	7.90	5.80
0.40	1.00	12.00	10.50	1.50	11.40	8.20
0.40	1.00	13.00	11.50	1.50	11.90	8.60
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.60	5.60
0.30	0.75	13.00	11.50	1.50	8.00	5.90
0.40	0.75	12.00	10.50	1.50	11.70	8.40
0.40	1.00	13.00	11.50	1.50	12.20	8.80

Location :MPS 3 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	10.20	7.80
0.30	0.75	13.00	11.50	1.50	10.70	8.30
0.40	1.00	12.00	10.50	1.50	15.40	11.60
0.40	1.00	13.00	11.50	1.50	16.20	12.30
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	10.40	8.00
0.30	0.75	13.00	11.50	1.50	10.90	8.40
0.40	0.75	12.00	10.50	1.50	15.80	12.00
0.40	1.00	13.00	11.50	1.50	16.60	12.60

Location :IPS 5 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	6.70	5.20
0.30	0.75	13.00	11.50	1.50	7.10	5.50
0.40	1.00	12.00	10.50	1.50	10.20	7.80
0.40	1.00	13.00	11.50	1.50	10.70	8.20
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.90	5.30
0.30	0.75	13.00	11.50	1.50	7.30	5.60
0.40	0.75	12.00	10.50	1.50	10.50	8.00
0.40	1.00	13.00	11.50	1.50	11.00	8.40

Location :IPS 4 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	6.50	4.60
0.30	0.75	13.00	11.50	1.50	6.90	5.00
0.40	1.00	12.00	10.50	1.50	9.80	6.80
0.40	1.00	13.00	11.50	1.50	10.30	7.20
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.60	4.70
0.30	0.75	13.00	11.50	1.50	7.00	5.00
0.40	0.75	12.00	10.50	1.50	9.90	6.90
0.40	1.00	13.00	11.50	1.50	10.50	7.40

Location :IPS 3 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	5.90	4.20
0.30	0.75	13.00	11.50	1.50	6.20	4.40
0.40	1.00	12.00	10.50	1.50	9.00	6.20
0.40	1.00	13.00	11.50	1.50	9.40	6.50
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.00	4.20
0.30	0.75	13.00	11.50	1.50	6.30	4.50
0.40	0.75	12.00	10.50	1.50	9.20	6.40
0.40	1.00	13.00	11.50	1.50	9.60	6.70

Location :IPS 2 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	7.60	5.70
0.30	0.75	13.00	11.50	1.50	8.00	6.10
0.40	1.00	12.00	10.50	1.50	11.50	8.10
0.40	1.00	13.00	11.50	1.50	12.10	9.00
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	7.70	5.80
0.30	0.75	13.00	11.50	1.50	8.10	6.20
0.40	0.75	12.00	10.50	1.50	11.80	8.80
0.40	1.00	13.00	11.50	1.50	12.30	9.20

Location :IPS 1 (ZONE 5)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	10.10	7.50
0.30	0.75	13.00	11.50	1.50	10.60	8.00
0.40	1.00	12.00	10.50	1.50	15.30	11.30
0.40	1.00	13.00	11.50	1.50	16.10	11.90
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	10.30	7.70
0.30	0.75	13.00	11.50	1.50	10.80	8.20
0.40	0.75	12.00	10.50	1.50	15.70	11.60
0.40	1.00	13.00	11.50	1.50	16.40	12.20

Location :IPS 1 (ZONE 6)

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	6.10	4.70
0.30	0.75	13.00	11.50	1.50	6.40	5.00
0.40	1.00	12.00	10.50	1.50	9.20	7.0
0.40	1.00	13.00	11.50	1.50	9.70	7.40
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	6.20	4.80
0.30	0.75	13.00	11.50	1.50	6.60	5.10
0.40	0.75	12.00	10.50	1.50	9.50	7.20
0.40	1.00	13.00	11.50	1.50	9.90	7.60

Location :Proposed STP -2

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	5.60	4.00
0.30	0.75	13.00	11.50	1.50	5.90	4.30
0.40	1.00	12.00	10.50	1.50	8.60	6.00
0.40	1.00	13.00	11.50	1.50	9.00	6.40
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	5.70	4.10
0.30	0.75	13.00	11.50	1.50	6.00	4.40
0.40	0.75	12.00	10.50	1.50	8.80	6.20
0.40	1.00	13.00	11.50	1.50	9.20	6.50

Location :Proposed STP -3

Under – Reamed (Single)Pile Foundation						
Diameter of pile stem (m)	Under Reamed Diameter (m)	Shaft Length (m)	Effective Length of pile shaft (m)	Cut off depth (m)	Safe Load Carrying Capacity of individual pile (ton)	Safe Uplift capacity (ton)
0.30	0.75	12.00	10.50	1.50	10.00	6.90
0.30	0.75	13.00	11.50	1.50	10.60	7.50
0.40	1.00	12.00	10.50	1.50	14.70	9.80
0.40	1.00	13.00	11.50	1.50	15.60	10.60
Under – Reamed (Double)Pile Foundation						
0.30	0.75	12.00	10.50	1.50	10.10	7.00
0.30	0.75	13.00	11.50	1.50	10.70	7.60
0.40	0.75	12.00	10.50	1.50	15.00	10.00
0.40	1.00	13.00	11.50	1.50	15.80	10.70

However, the aforesaid load carrying capacity involves various limitation and many simplifying assumption. And also, the performance of pile foundation is very much sensitive to the method of installation, equipment used, level of supervision adopted during execution of work. Therefore, the load carrying capacity of pile as obtained should preferably be cross-checked and established by conduction of load test of pile as specified in IS 2911 part IV.

4.2 Notes & Suggestion:-

- Based on the actual loading from superstructure if necessary the design engineer may provide appropriate pile foundation based on this soil report. **The actual load carrying capacity may be ascertained based on pile load test as per relevant IS code.**
- While piles are in group the piles may be installed at a center to center spacing of 2.50 times the diameter of the pile.
- Every precautionary measures as laid down in the relevant IS codes and as applicable for the particular type of foundation is to be adopted here must be taken during execution of foundation work. Due consideration should particularly be given towards the safety of nearby existing structure, if any.

4.3 LIMITATION

While interpreting and subsequently ascertaining the test results, observation and safe allowable bearing capacity or load carrying capacity obtained thereof, due consideration should be attributed towards capriciousness of the soil properties, restricted no. of boreholes and their locations, various limitations and constraints usually associated with such sub-soil exploration work and many simplifying assumptions made during subsequent analysis. **If during execution of foundation, local sub-soil variations with respect to the condition revealed at the present boring location were noticed, then the load capacity values must be modified accordingly and the recommendations to be reviewed in the right perspective.**

Thus, it is expected that this report should be used as a guideline in the process of further design. The particular type and nature of foundation to be adopted will, however, depend on the Design Engineers with due consideration to the nature and complexity of the structure.

It is also relevant to mention here that this report should be read in totality and not in isolation or just any selected portion of it in order to avoid any mis-interpretation.

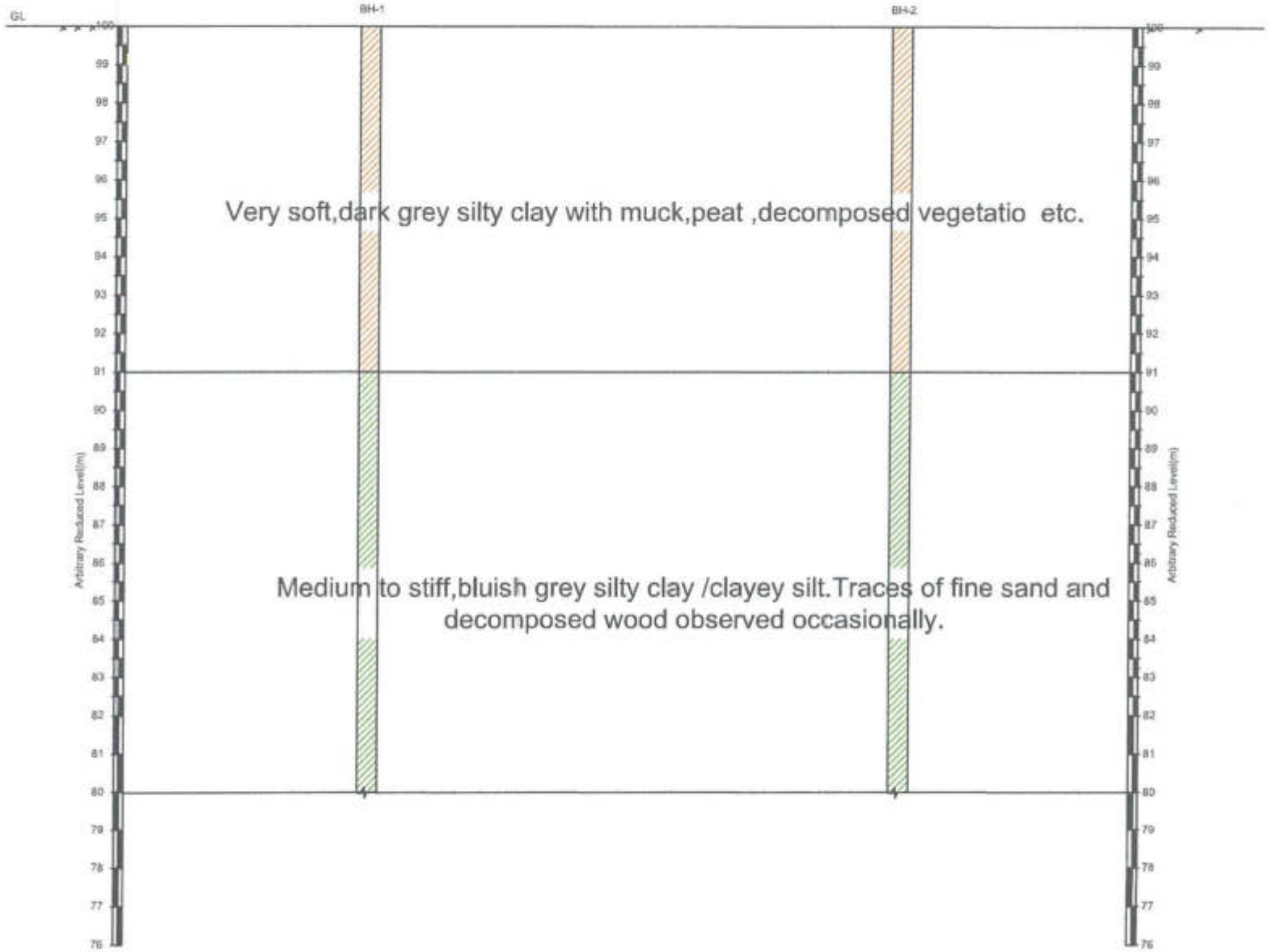
We appreciate the opportunity to perform this investigation for you and have pleasure in submitting this report. Please contact us when we can be of further service to you.

Right Site Survey Kolkata Rajarhat

(A .MONDAL)
M.TECH IN GEOTECHNICAL ENGINEERING
CHARTERED ENGINEER.

ANNEXURE-1

⇒ GENERALISED SOIL PROFILE


GL
BH-1
BH-2
Very soft,dark grey silty clay with muck,peat ,decomposed vegetatio etc.
Medium to stiff,bluish grey silty clay /clayey silt.Traces of fine sand and decomposed wood observed occasionally.
Arbitrary Reduced Level(m)
100
99
98
97
96
95
94
93
92
91
90
89
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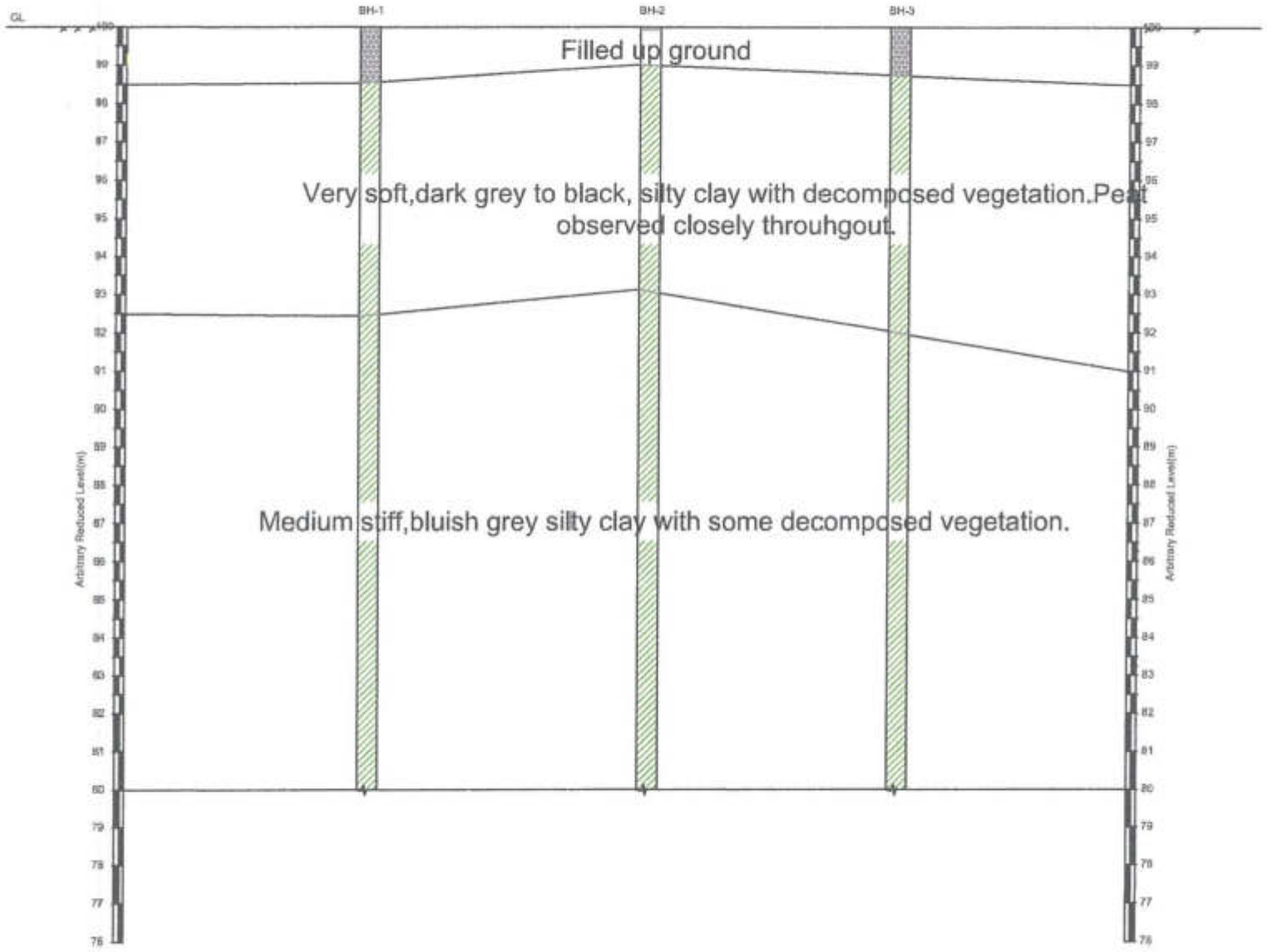

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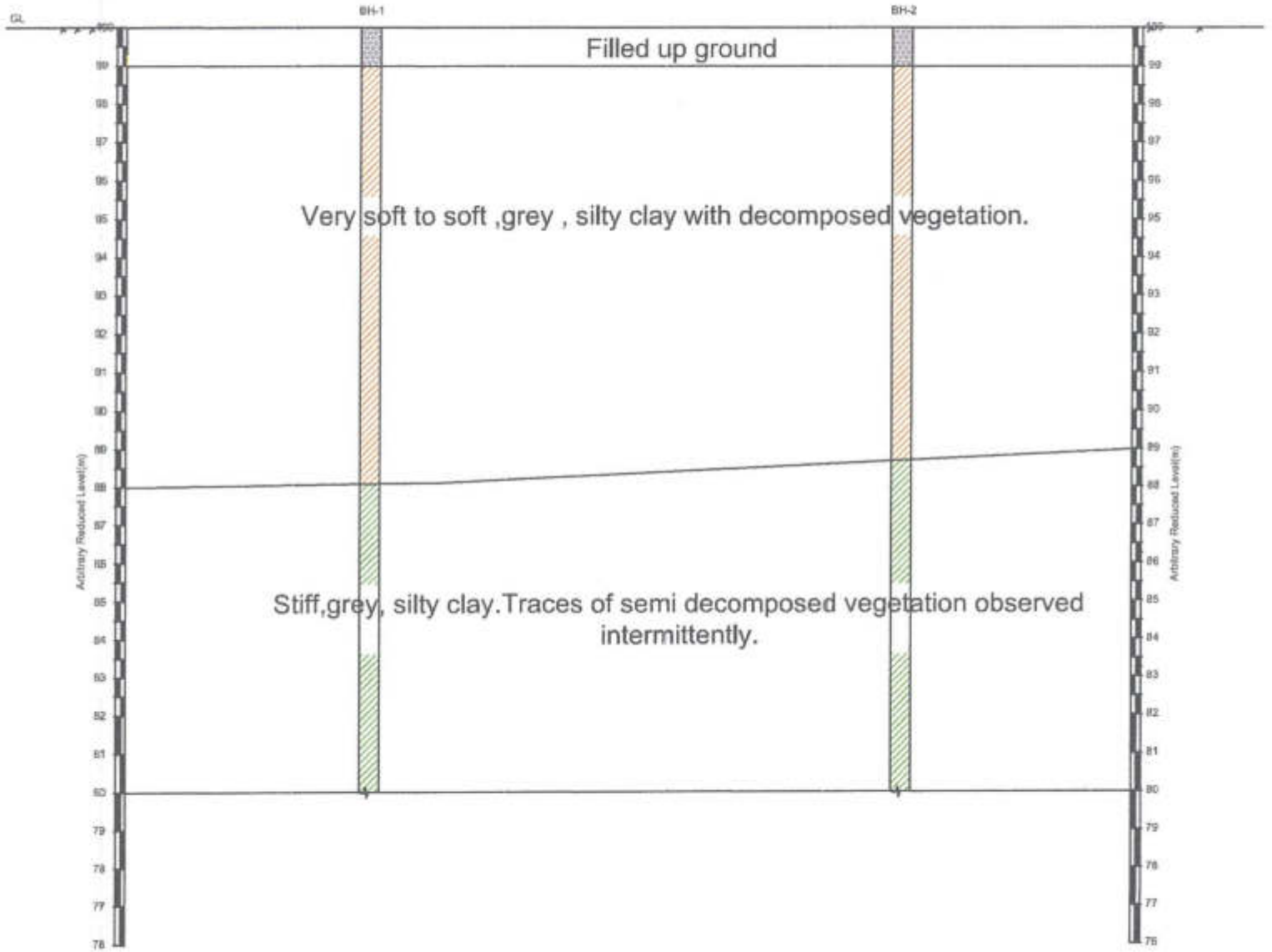

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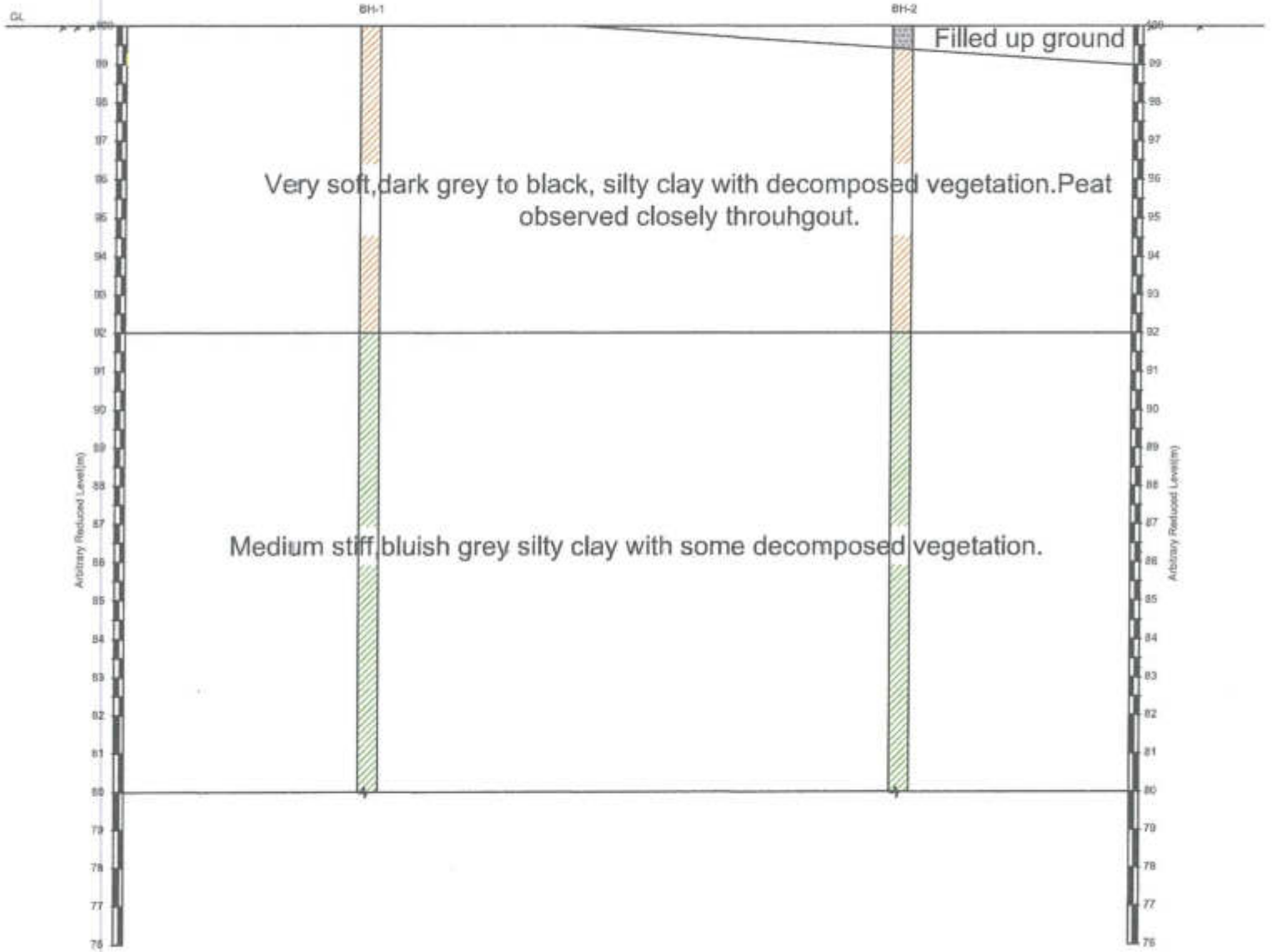

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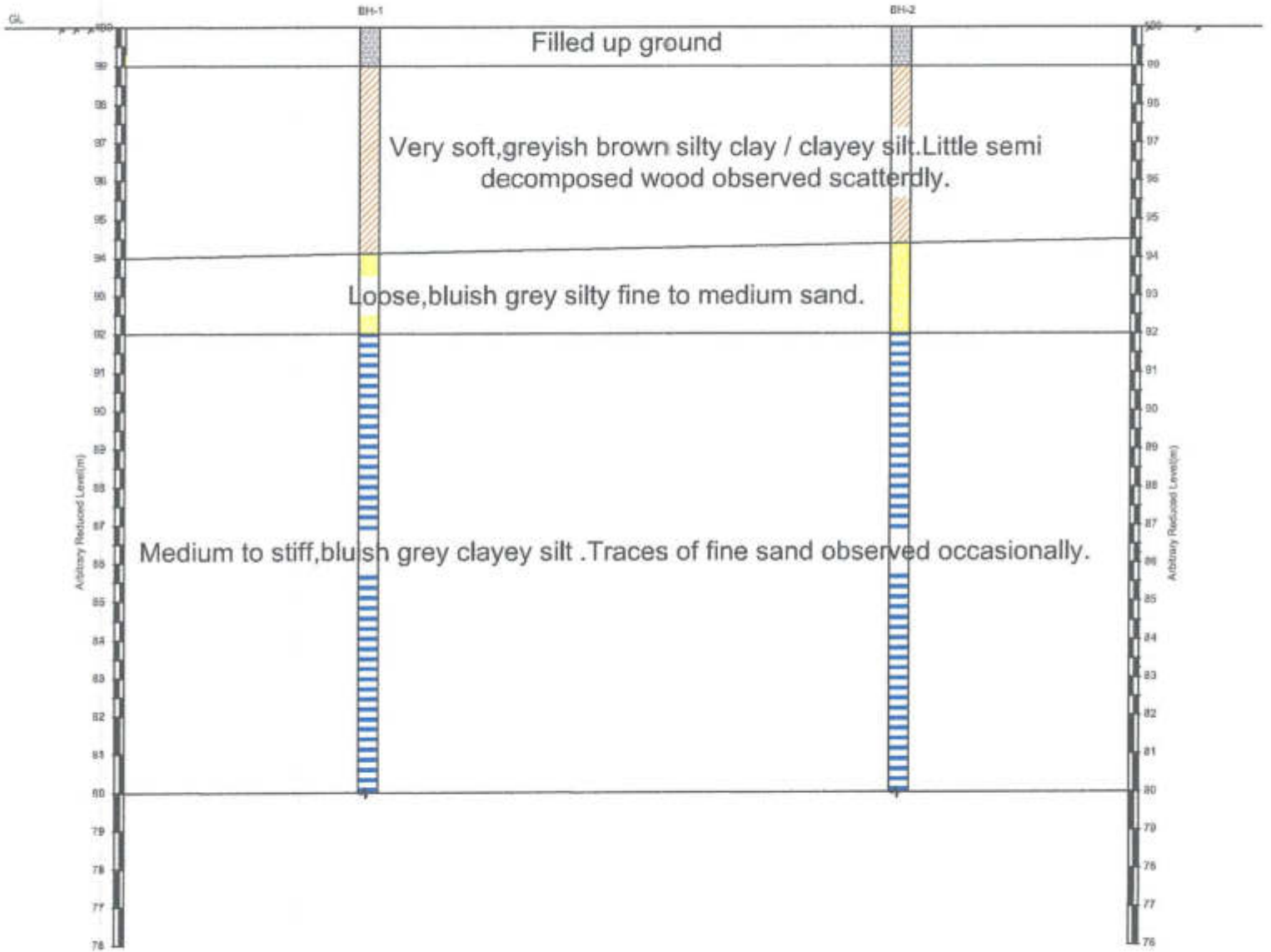

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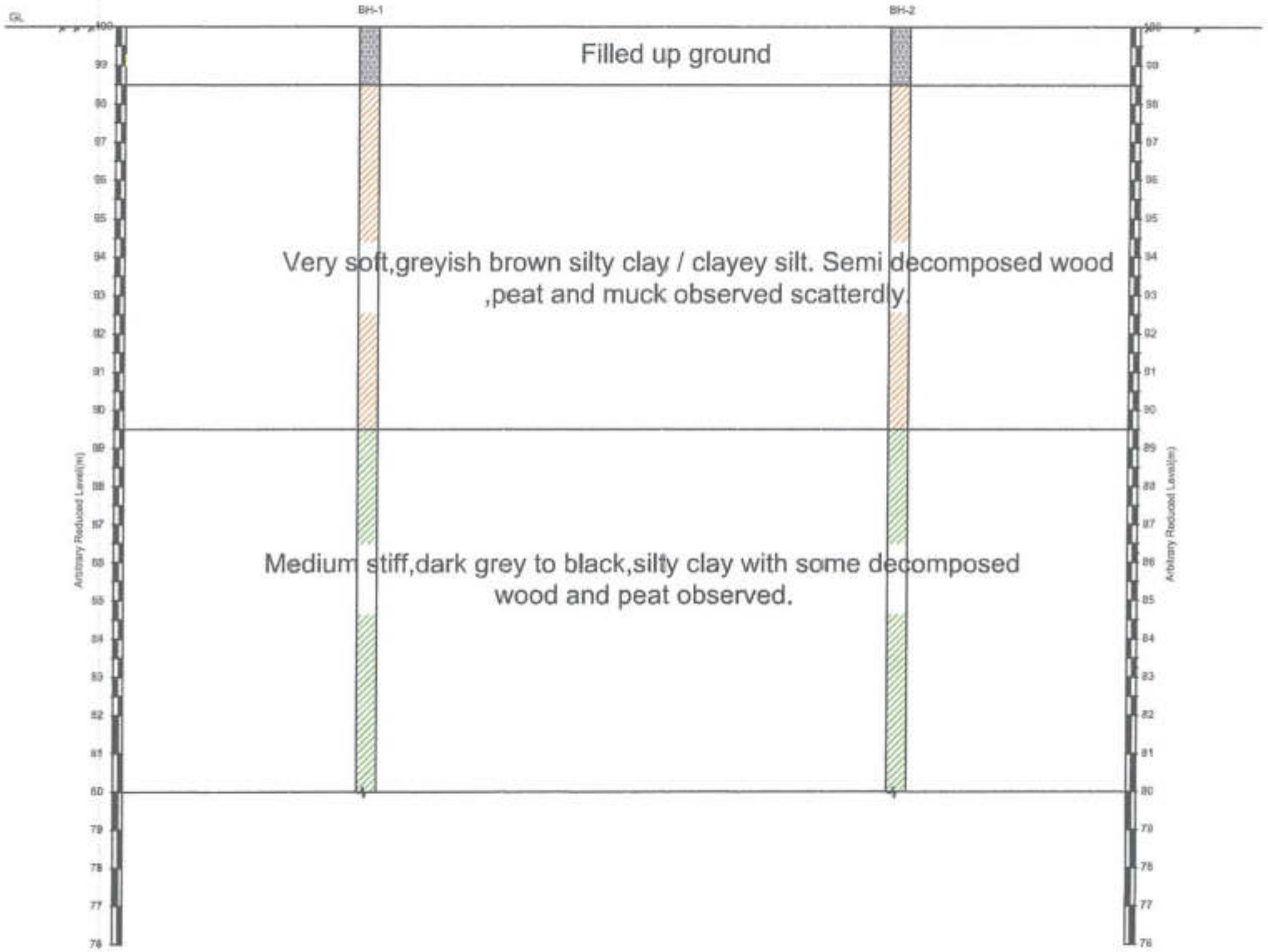

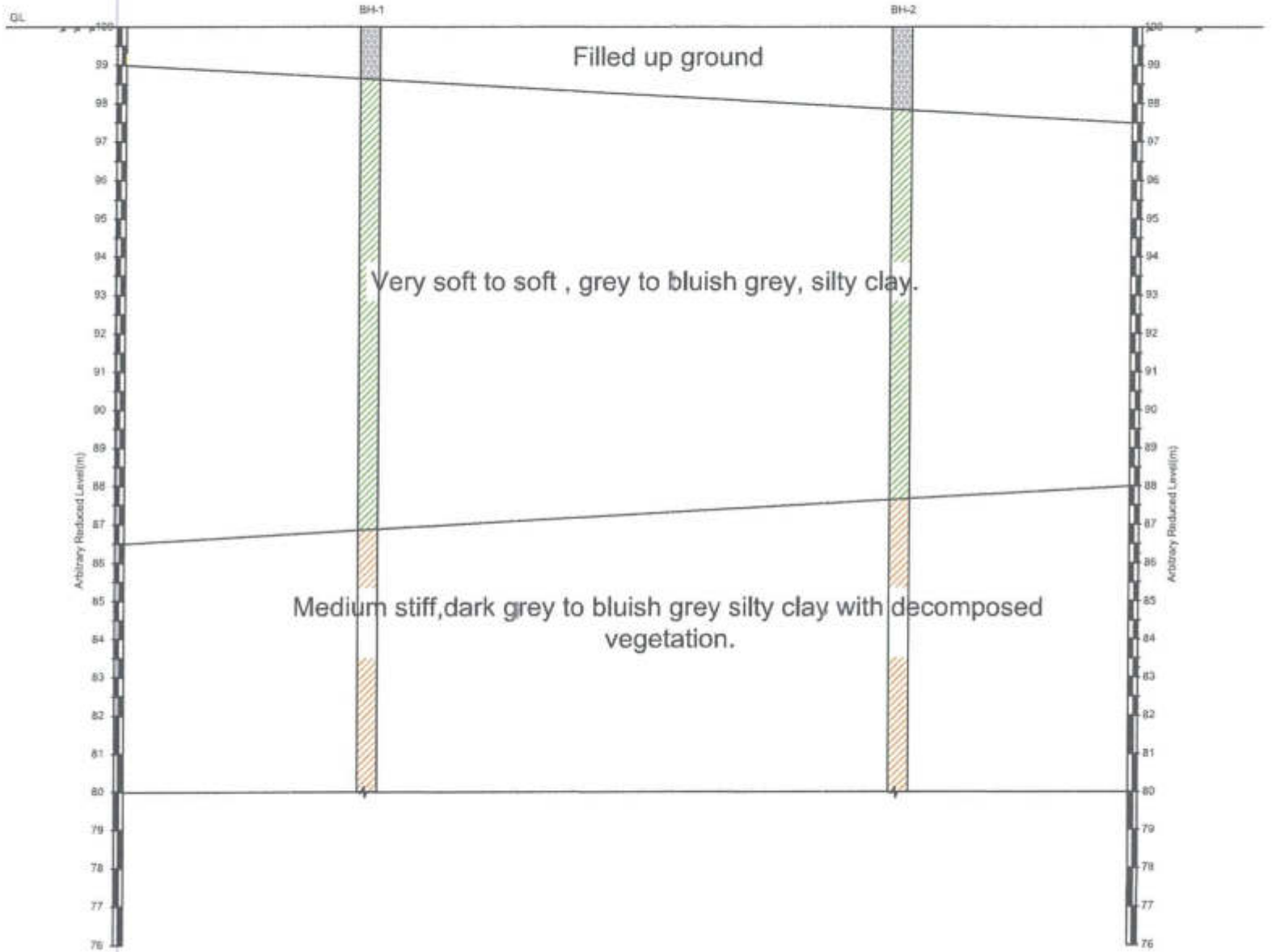
GL
BH-1
BH-2
Filled up ground
Very soft to soft , grey to bluish grey, silty clay.
Medium stiff,dark grey to bluish grey silty clay with decomposed vegetation.
Arbitrary Reduced Level(m)
Arbitrary Reduced Level(m)

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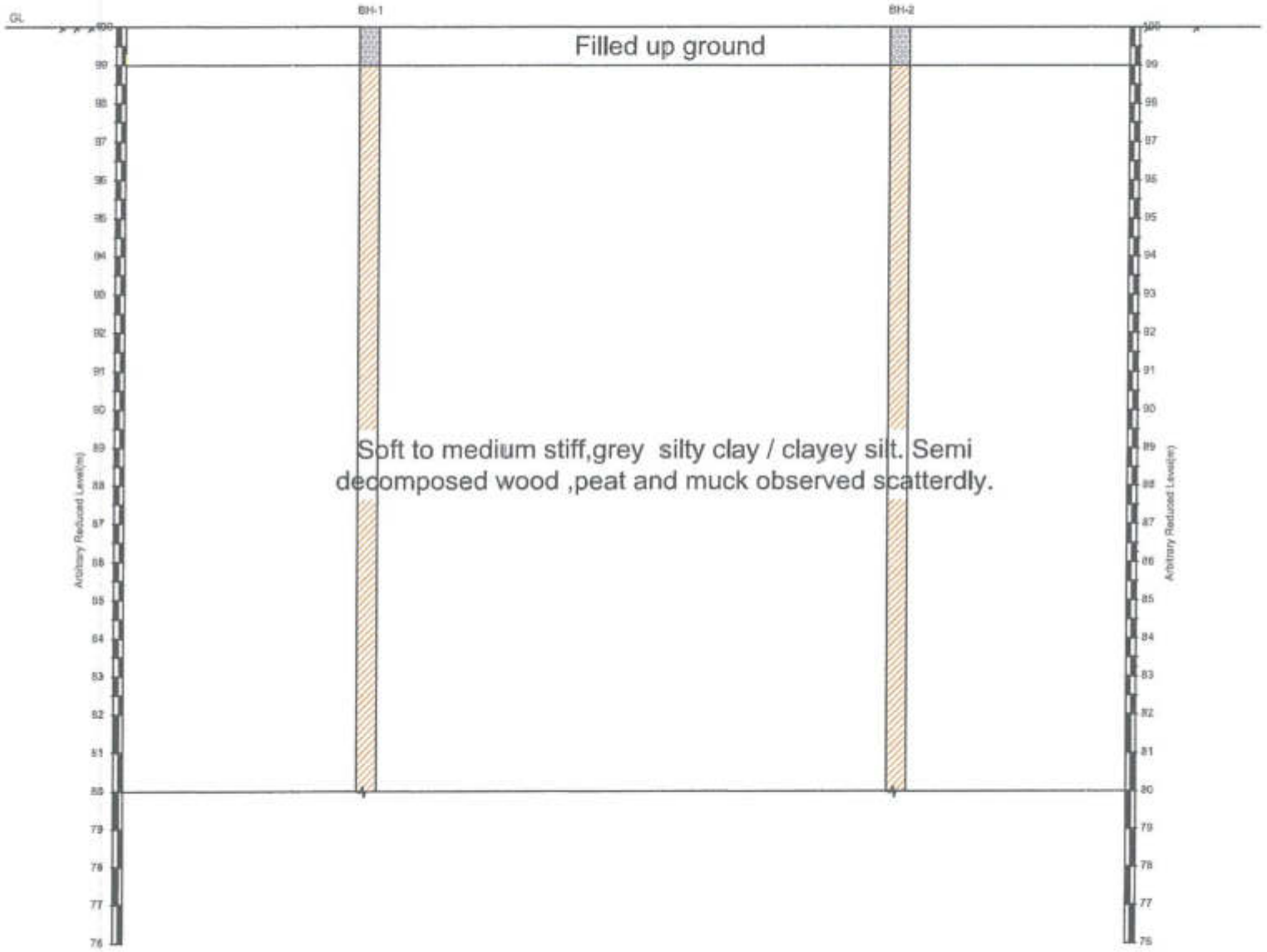

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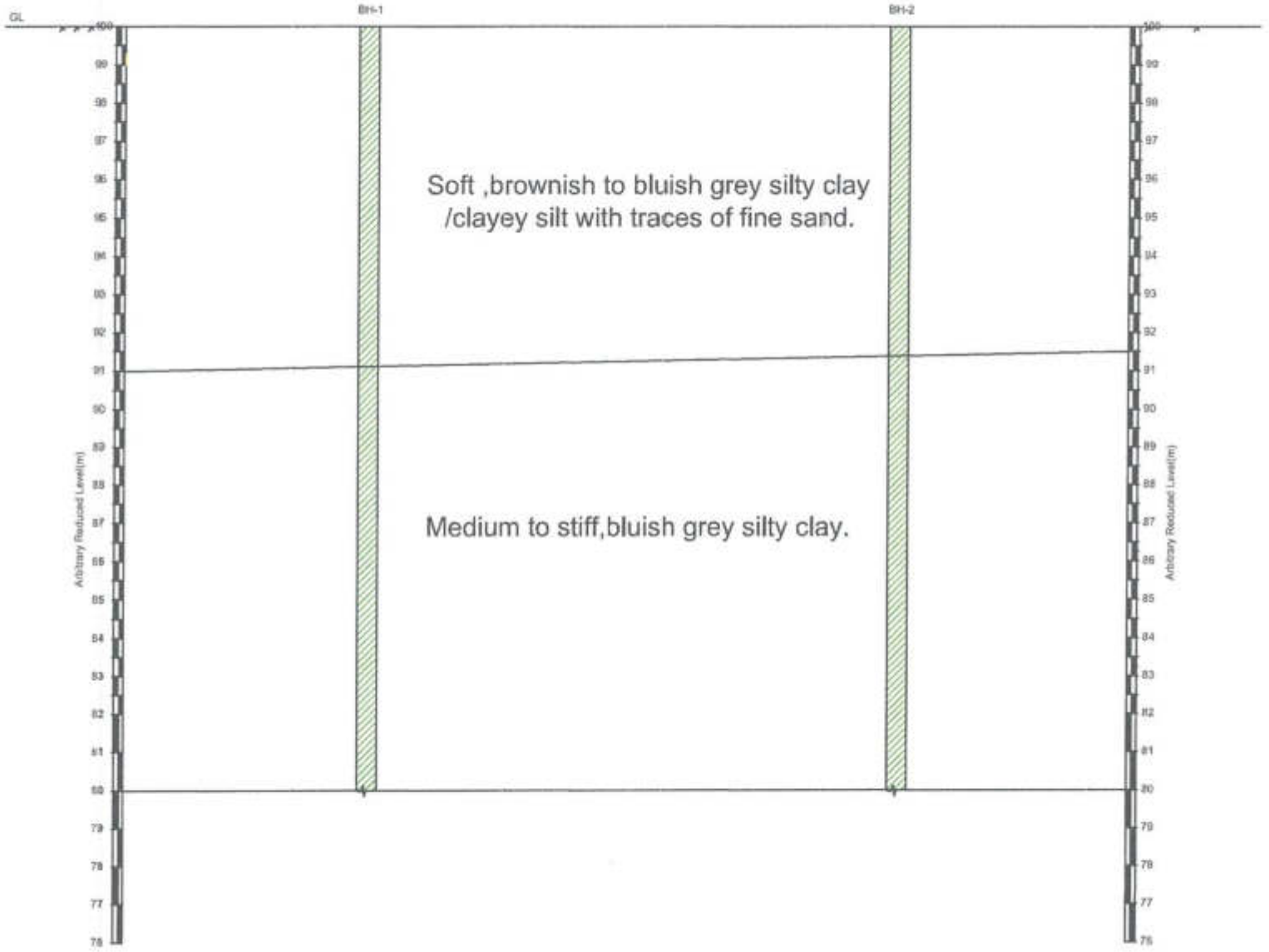

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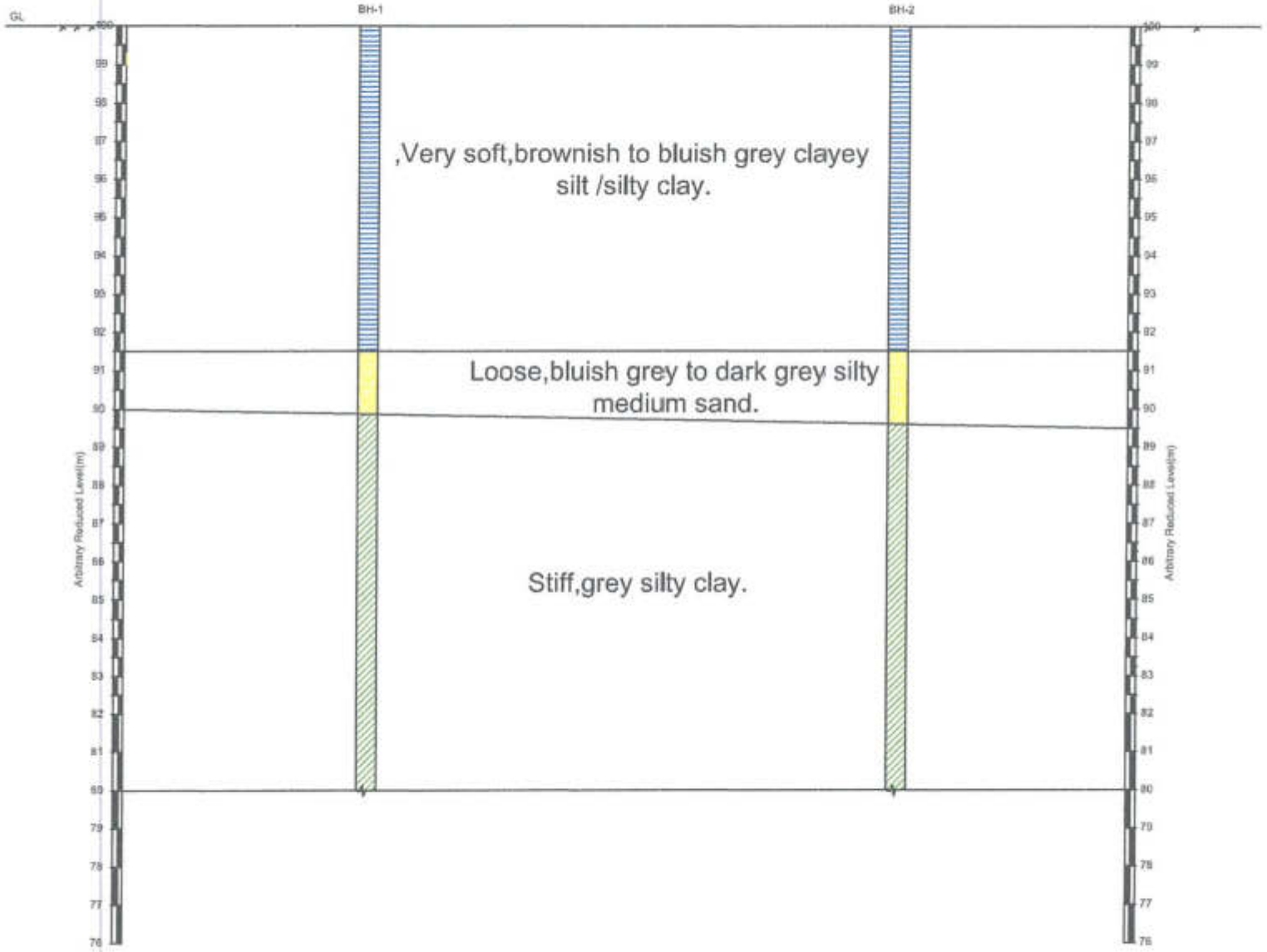

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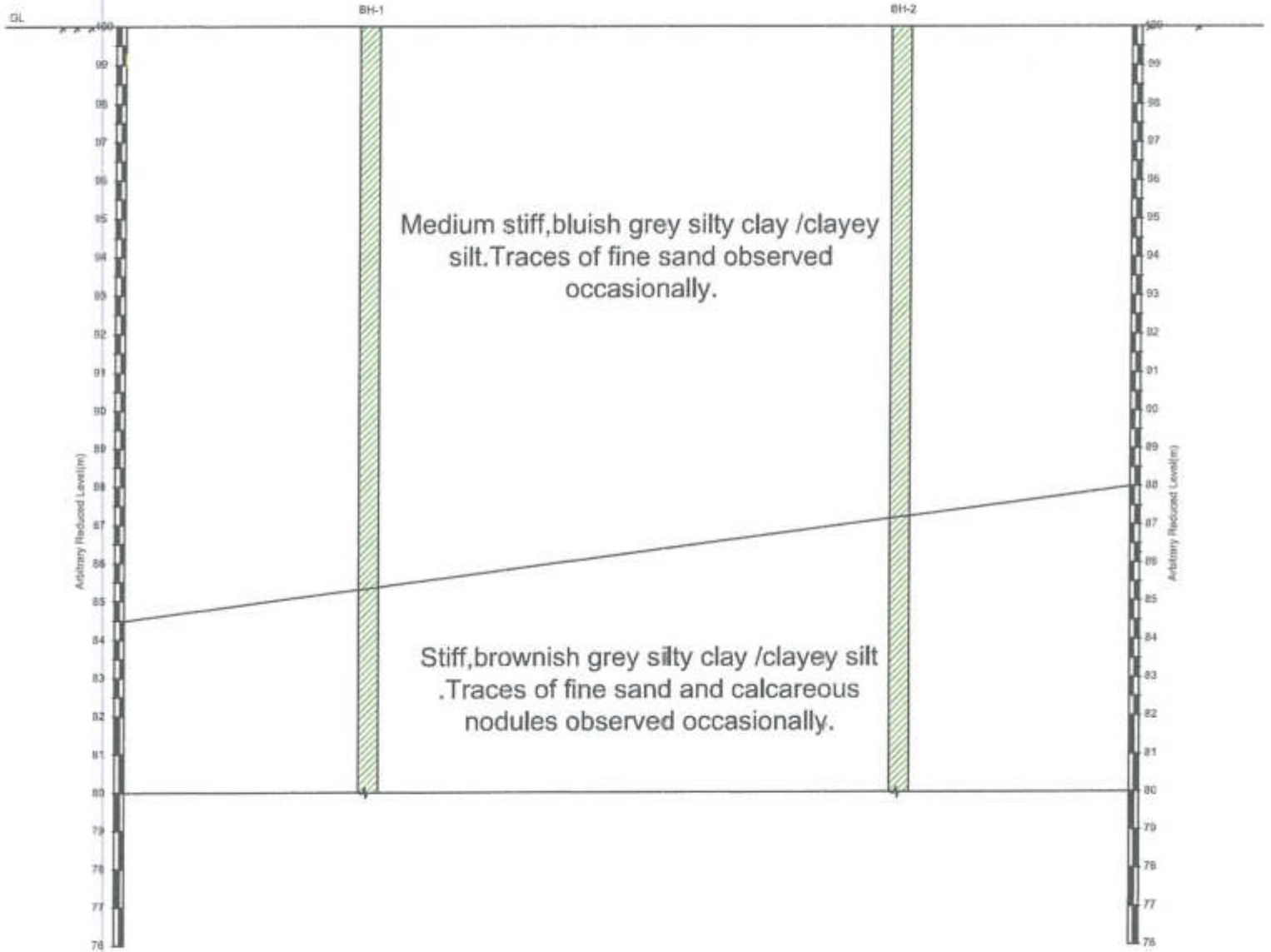

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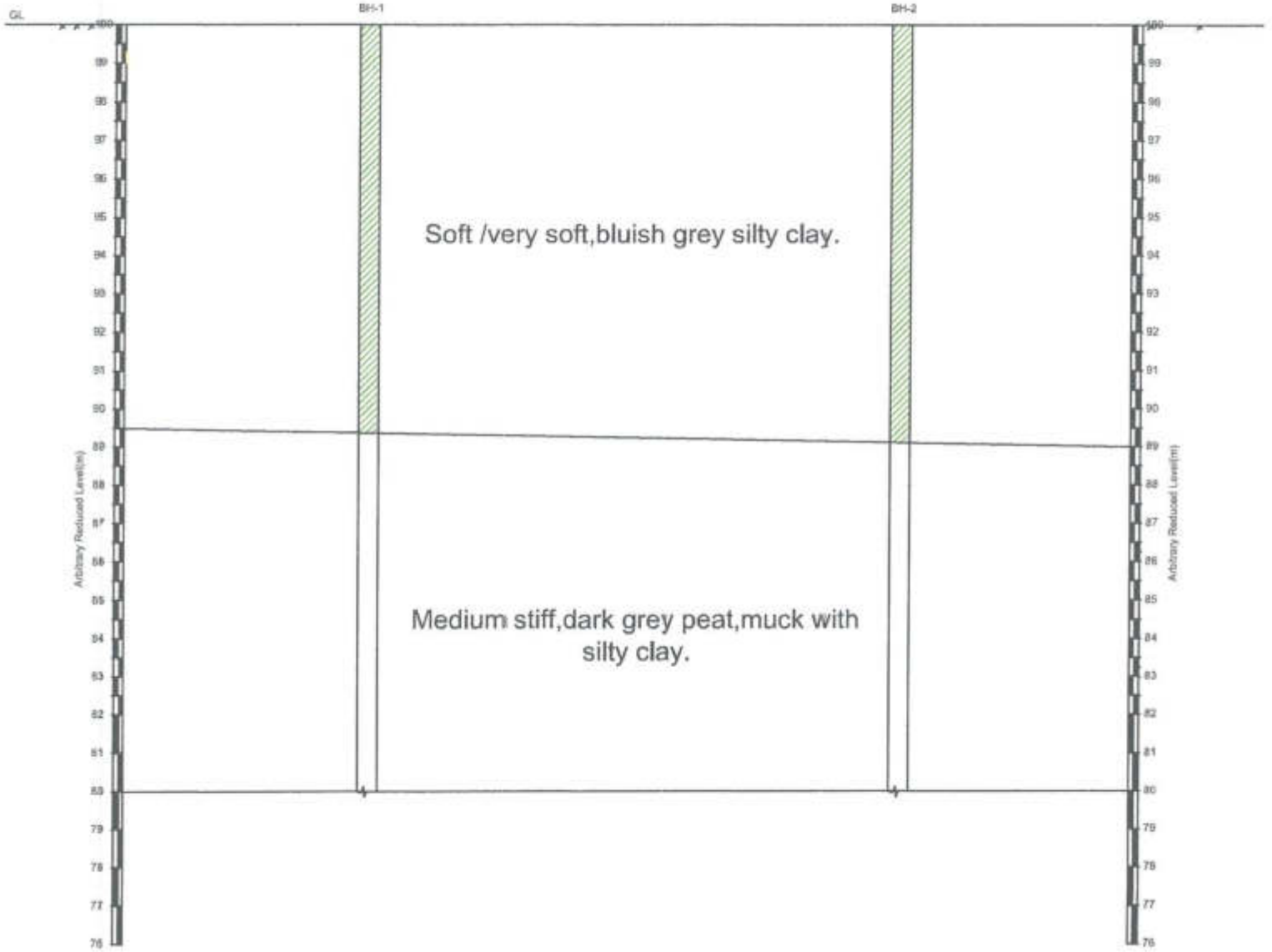

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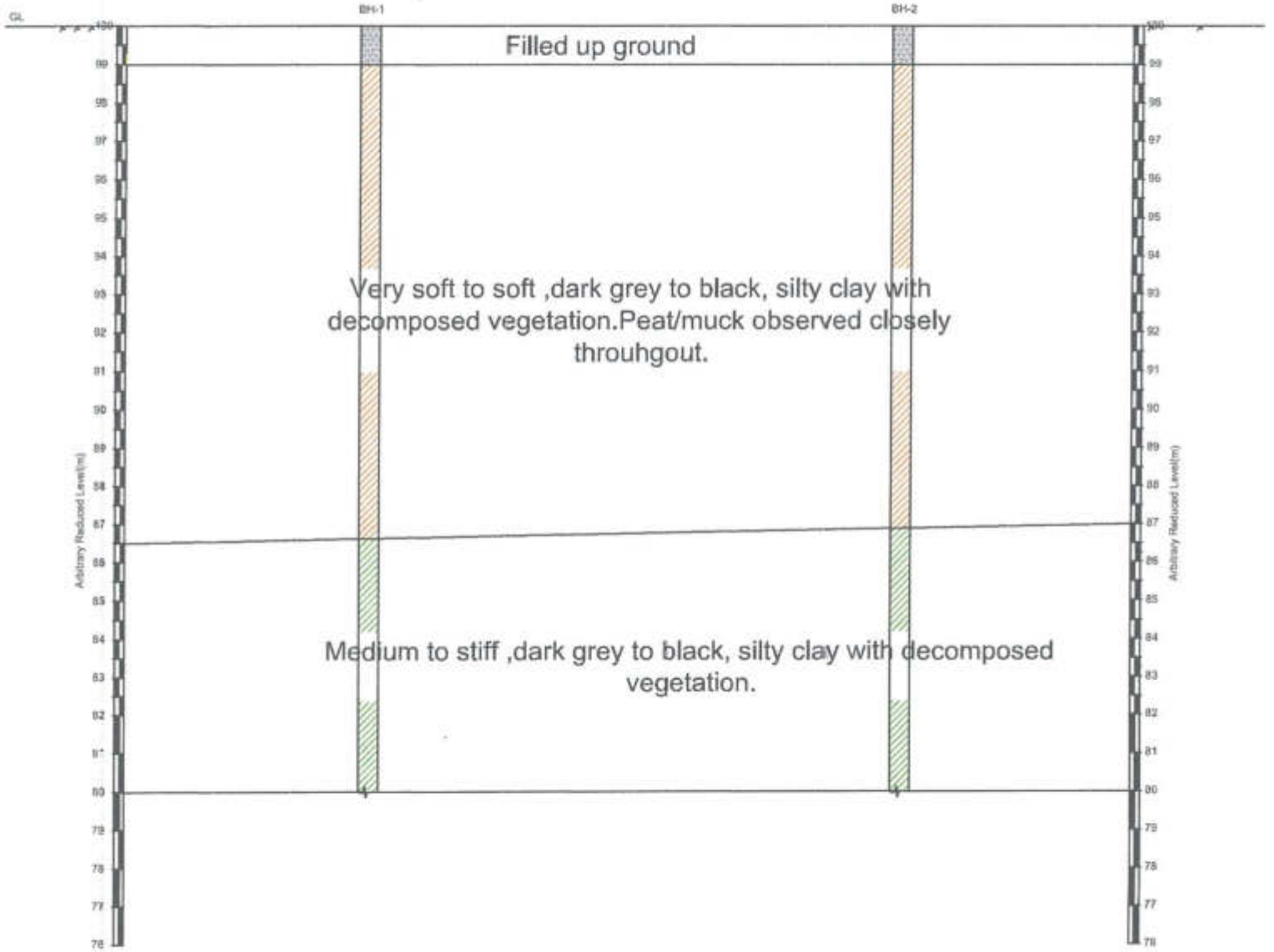

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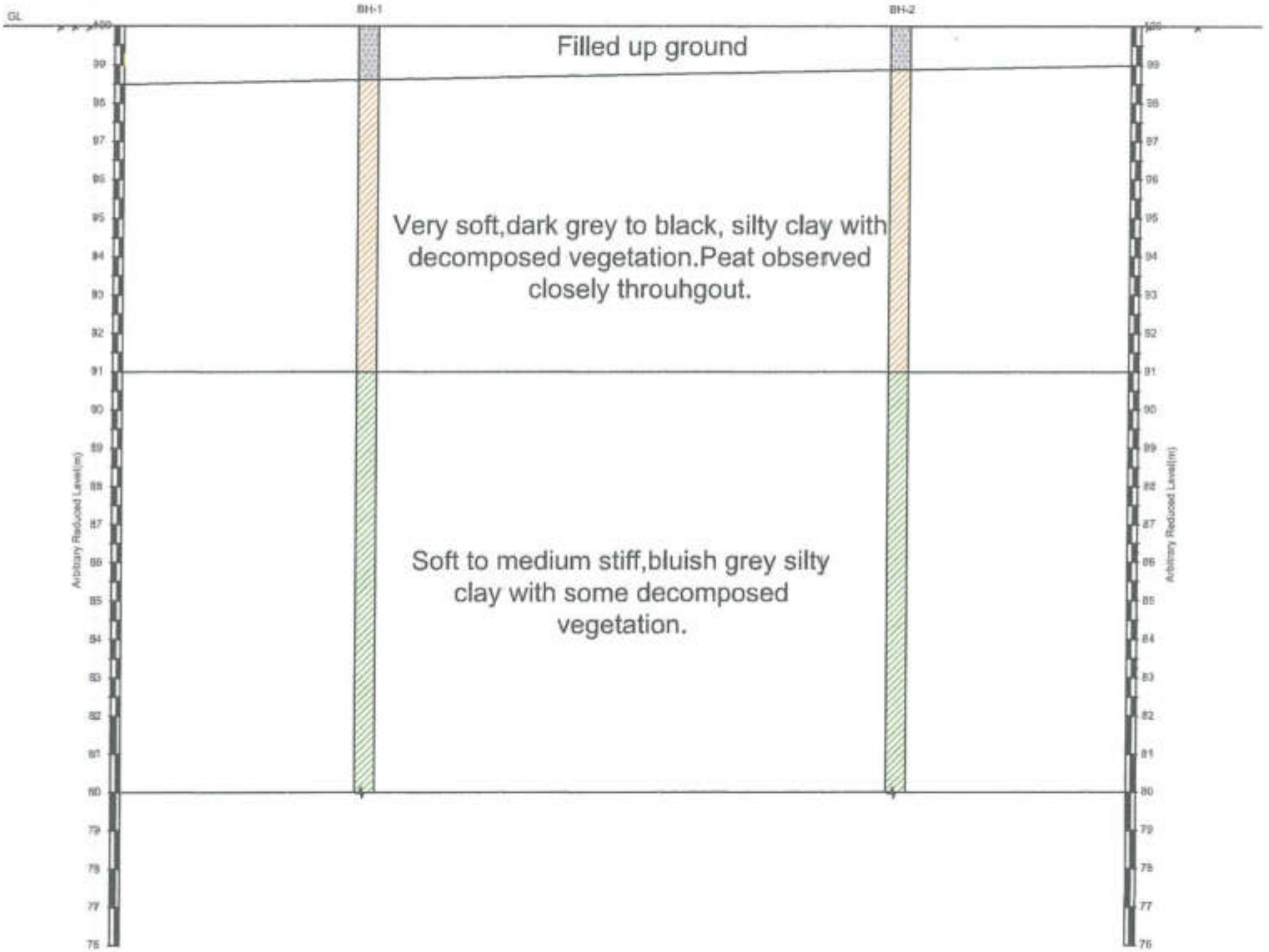

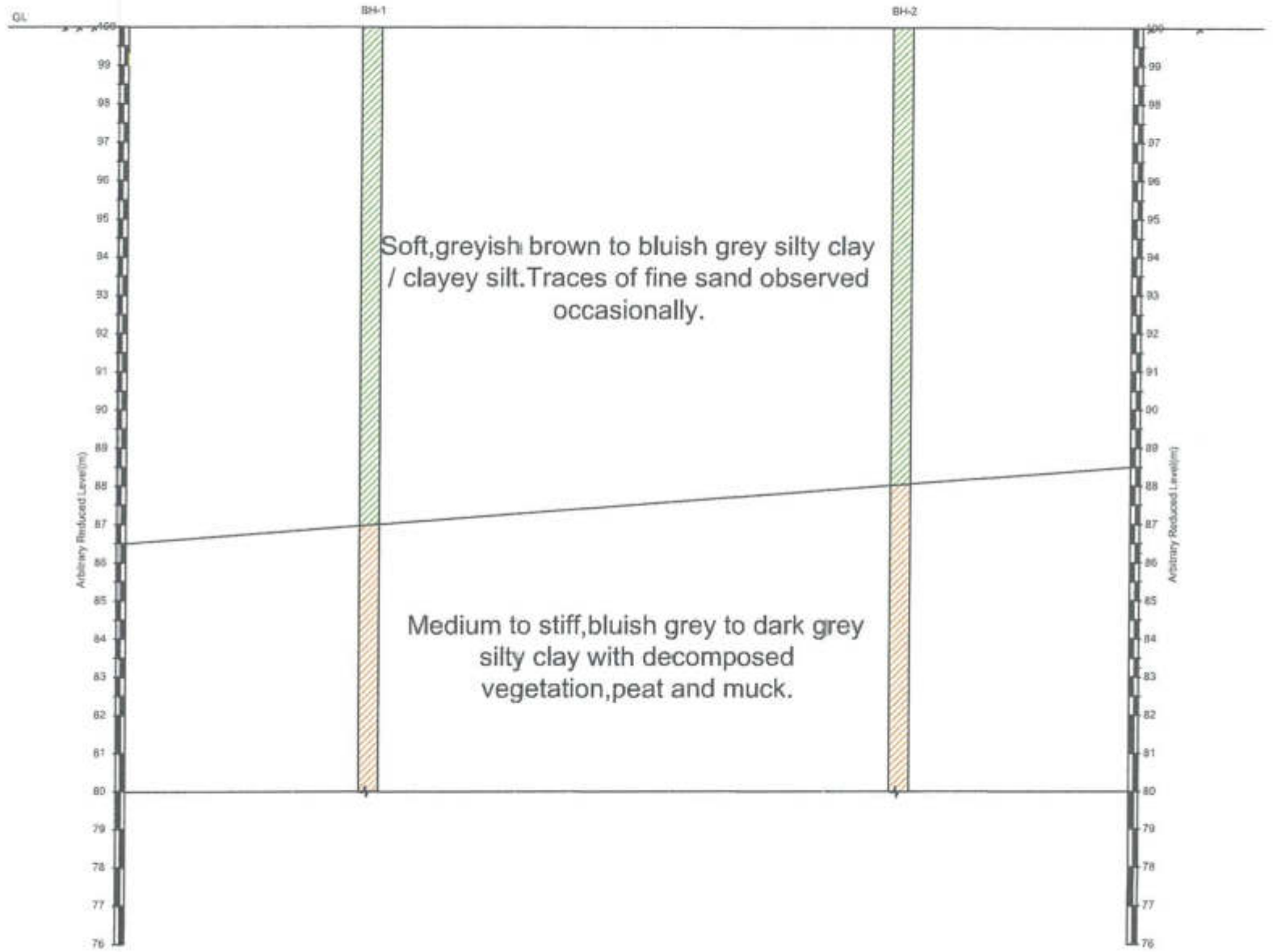
GL
BH-1
BH-2
Soft,greyish brown to bluish grey silty clay / clayey silt.Traces of fine sand observed occasionally.
Medium to stiff,bluish grey to dark grey silty clay with decomposed vegetation,peat and muck.
Arbitrary Reduced Level(m)
100
99
98
97
96
95
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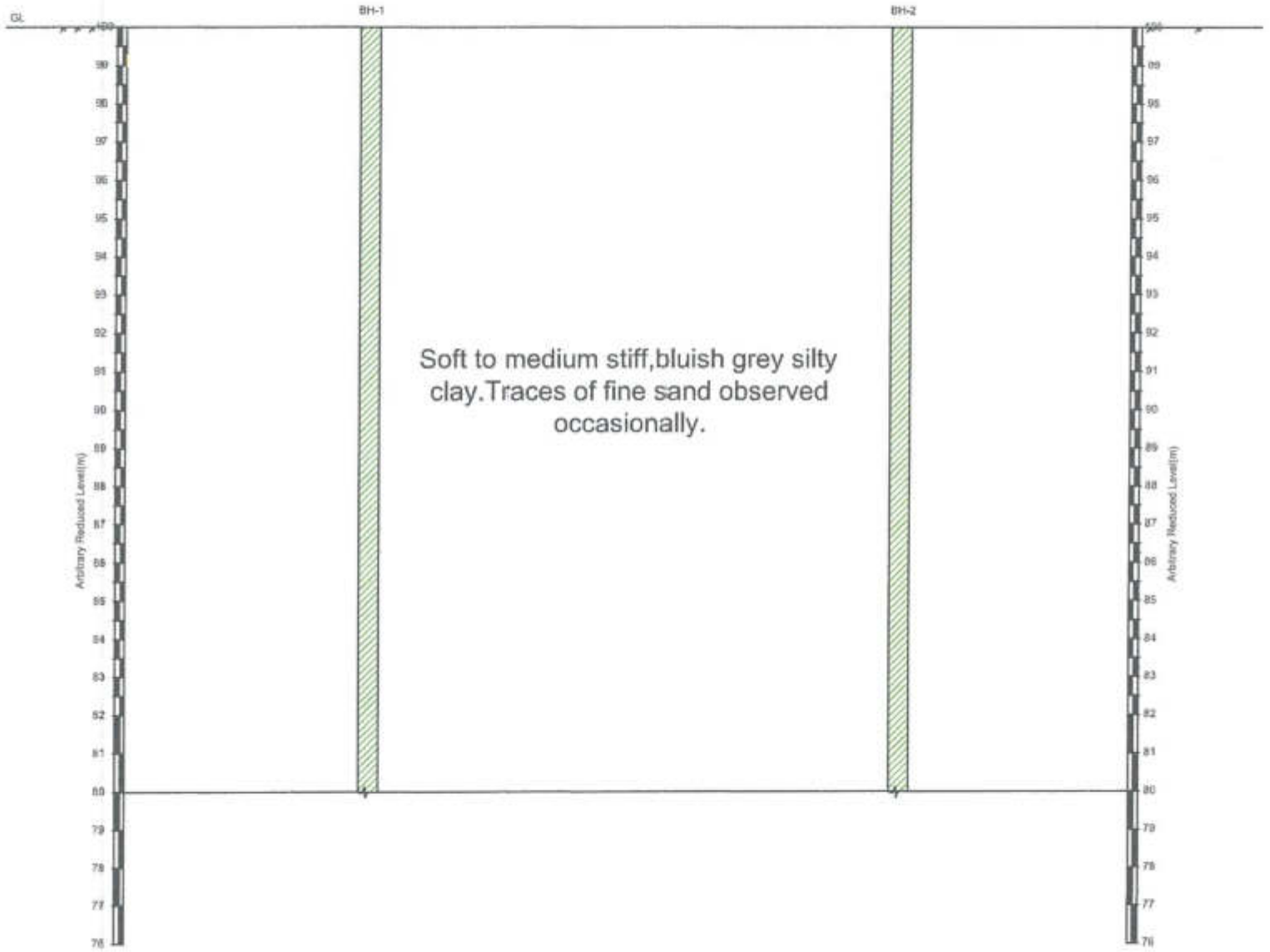

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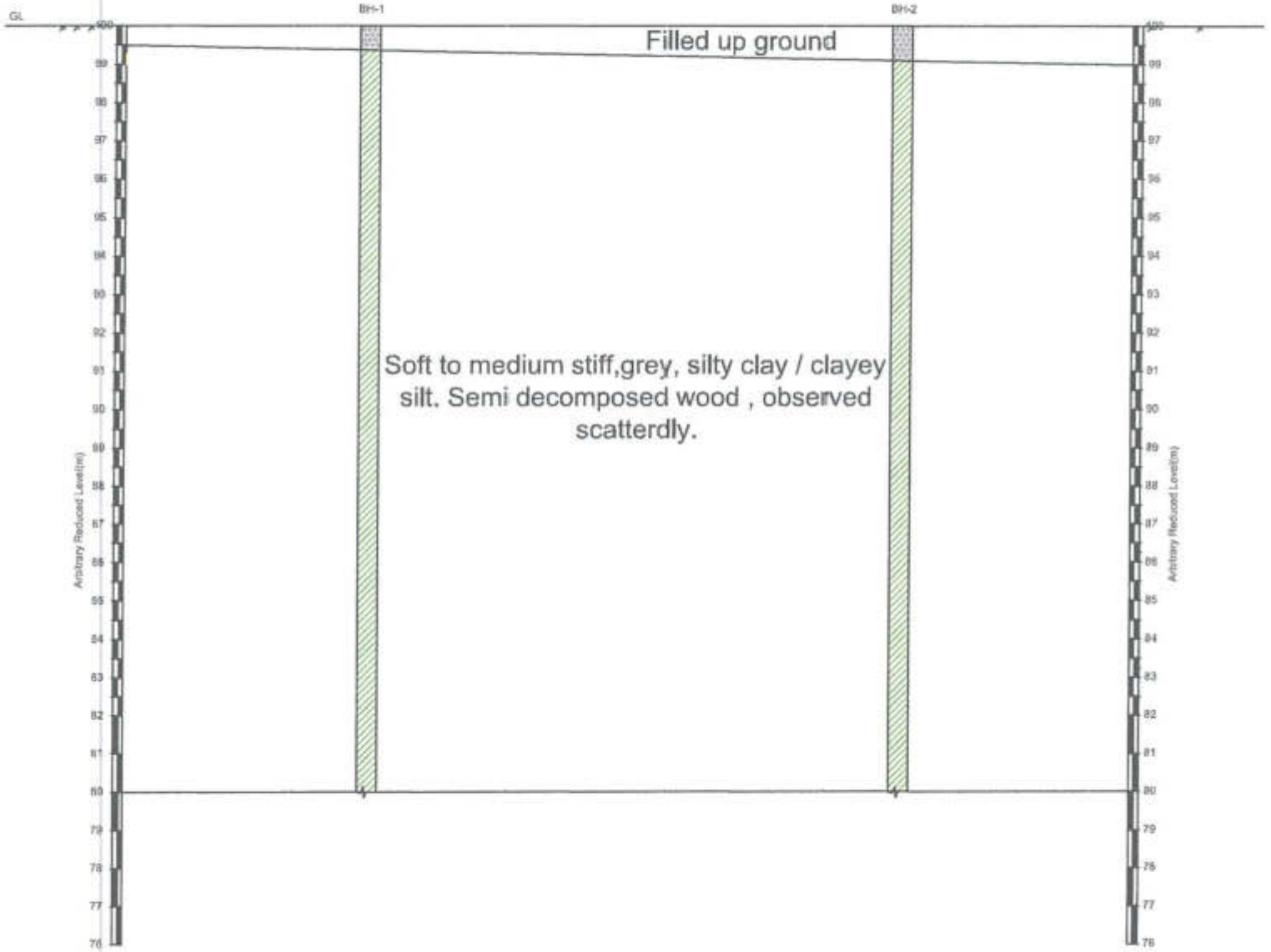

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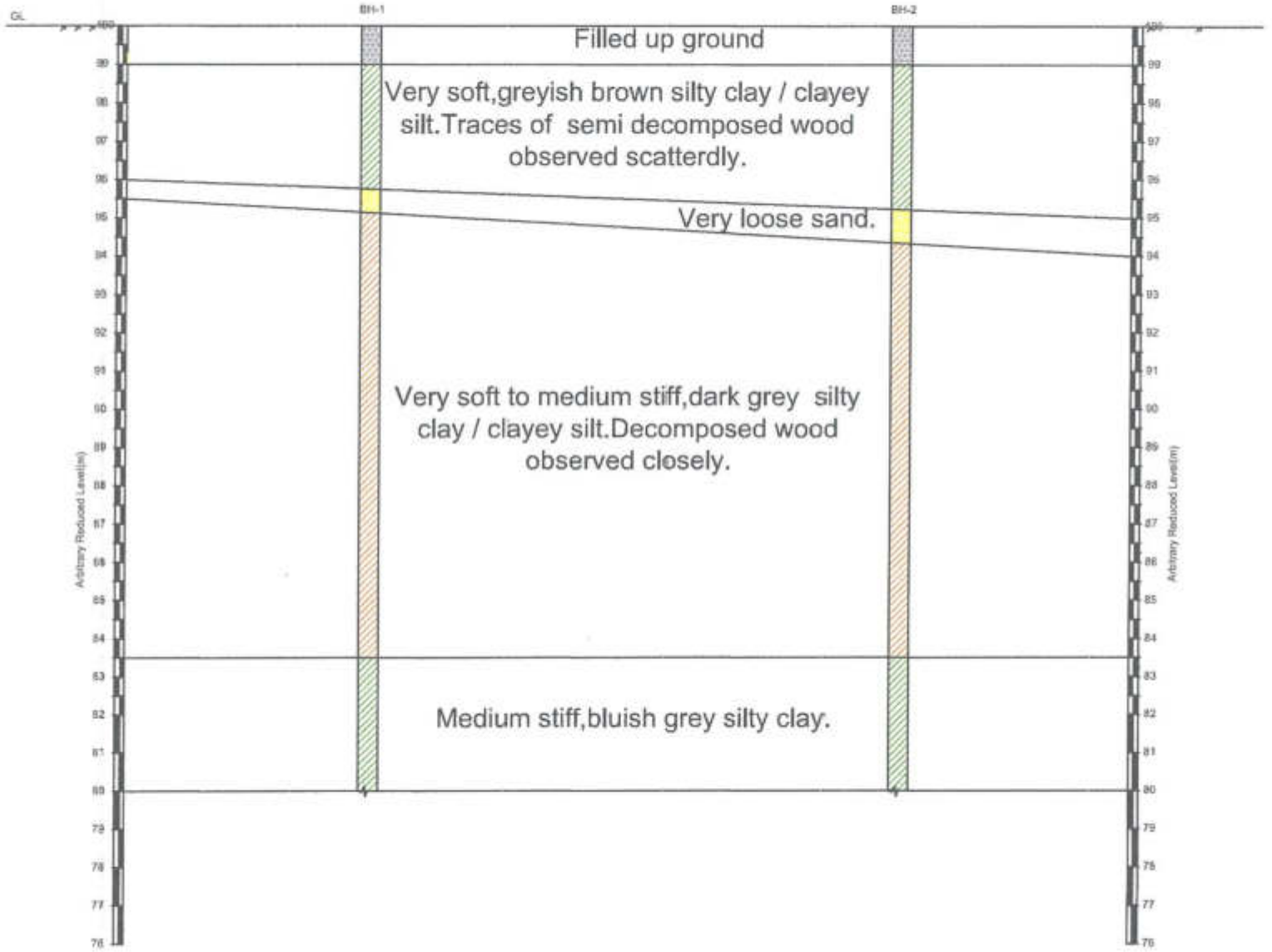
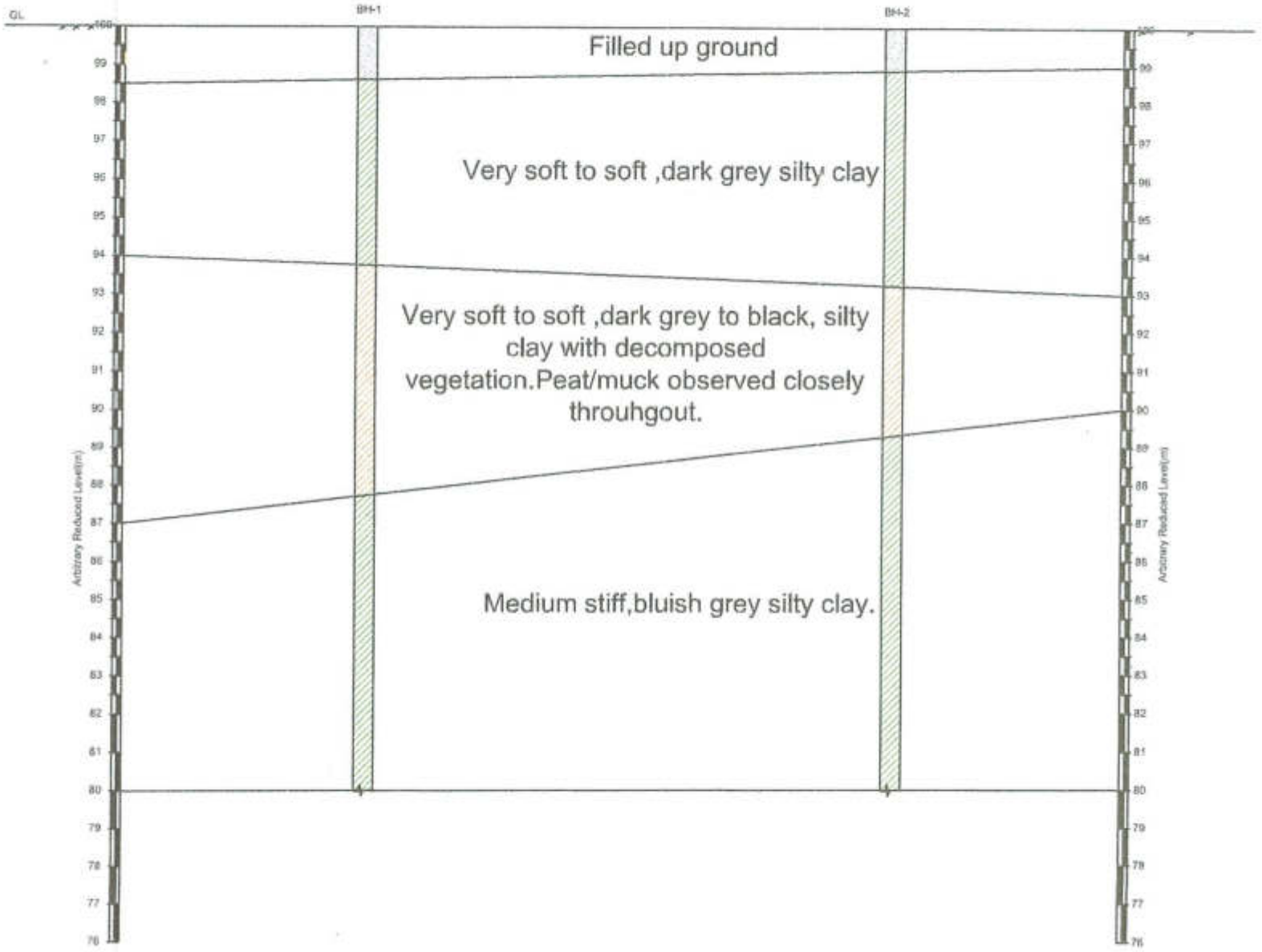
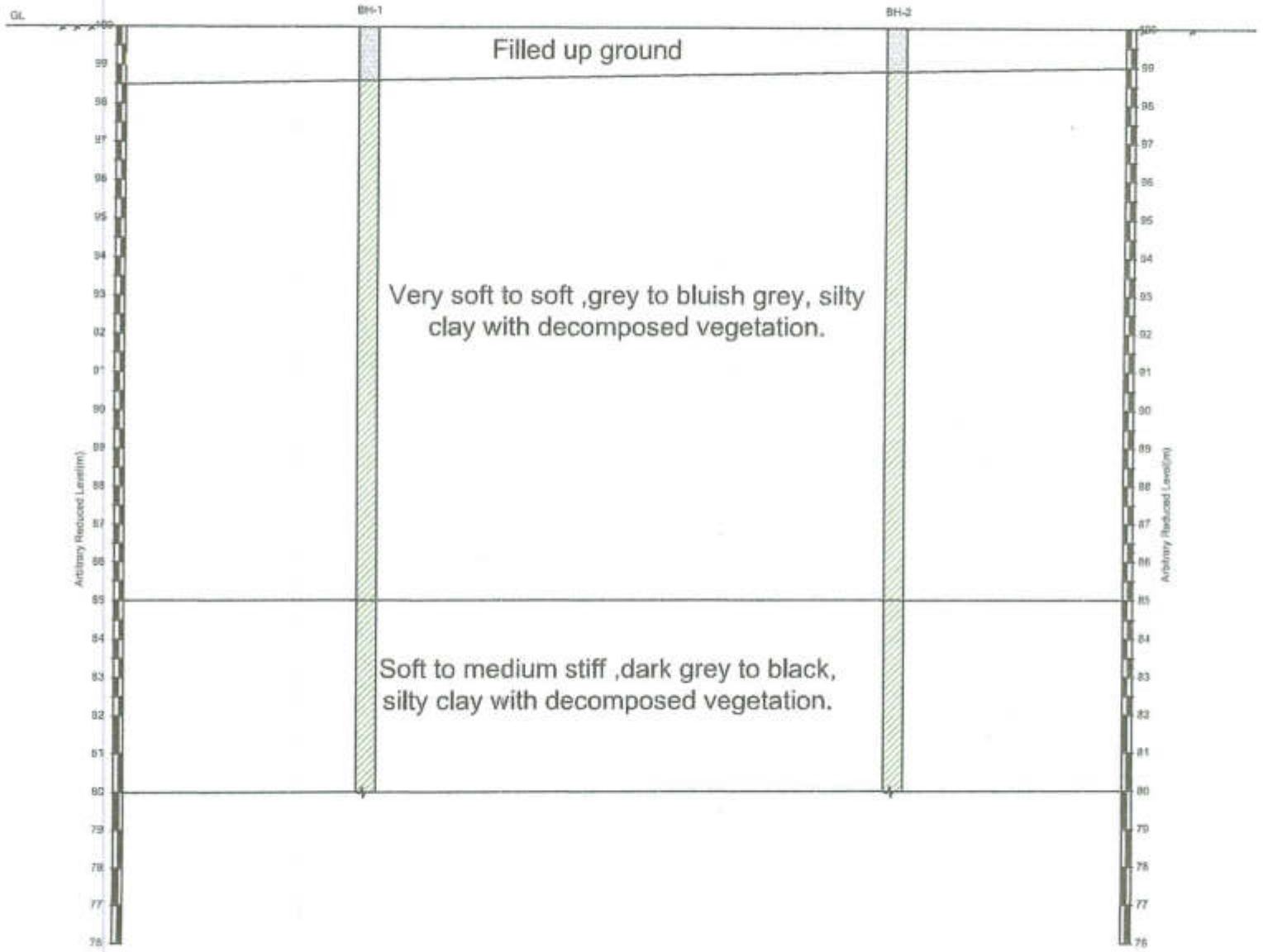



GL
BH-1
BH-2
Filled up ground
Very soft to soft ,dark grey silty clay
Very soft to soft ,dark grey to black, silty clay with decomposed vegetation.Peat/muck observed closely throuhgout.
Medium stiff,bluish grey silty clay.
Arbitrary Reduced Level(m)
Arbitrary Reduced Level(m)


GL
BH-1
BH-2
Filled up ground
Very soft to soft ,grey to bluish grey, silty clay with decomposed vegetation.
Soft to medium stiff ,dark grey to black, silty clay with decomposed vegetation.
Arbitrary Reduced Level(m)

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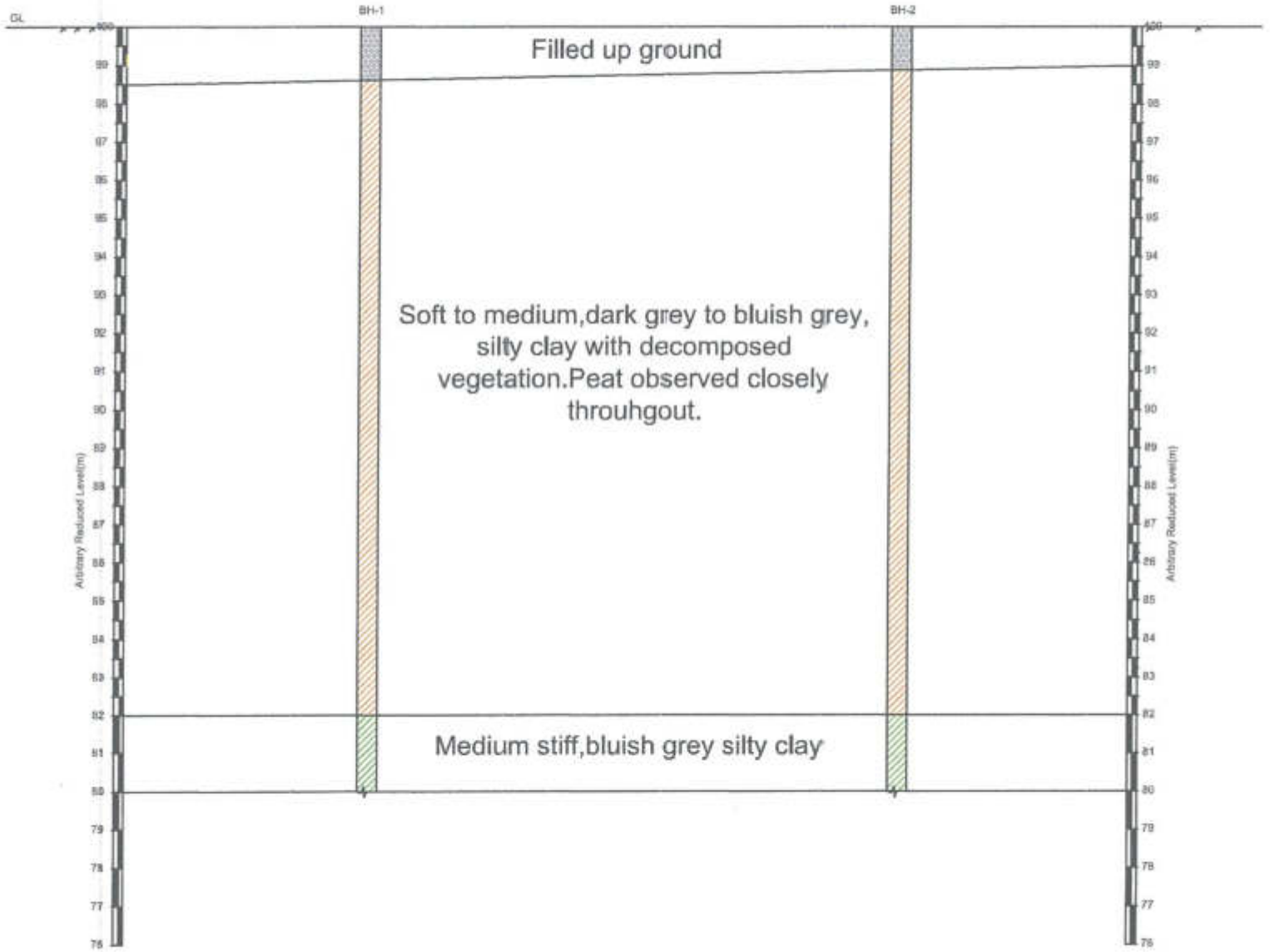
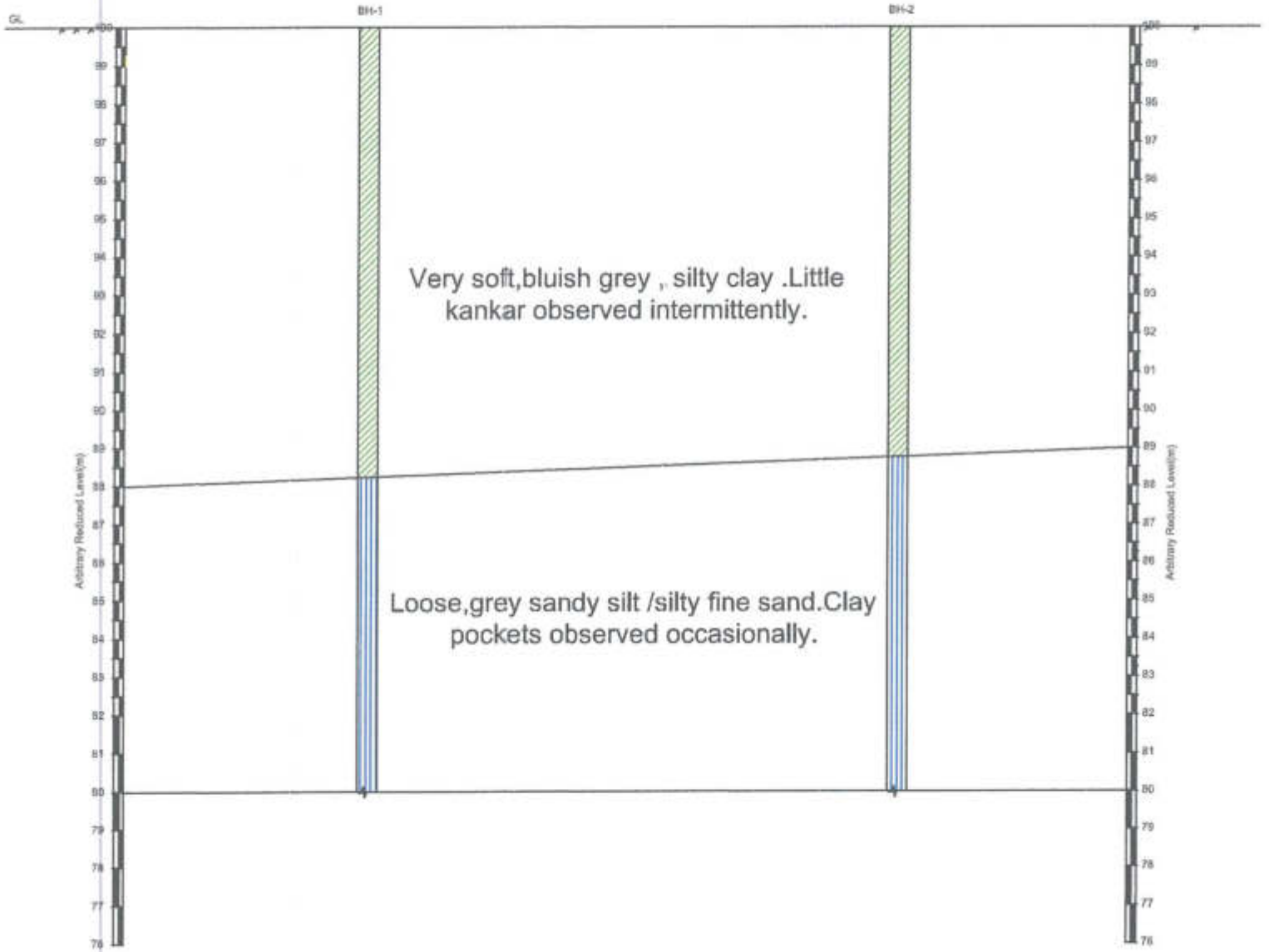
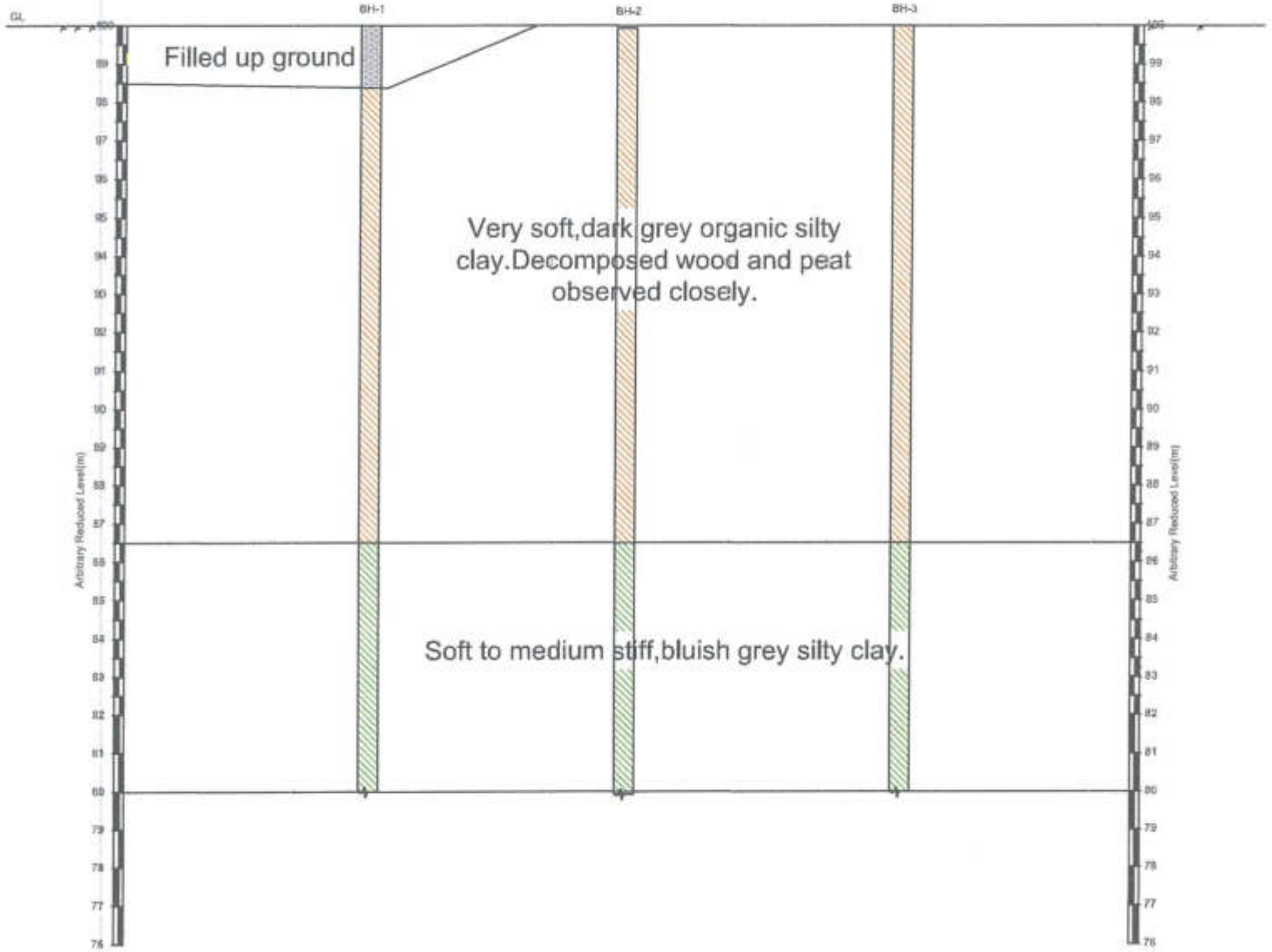
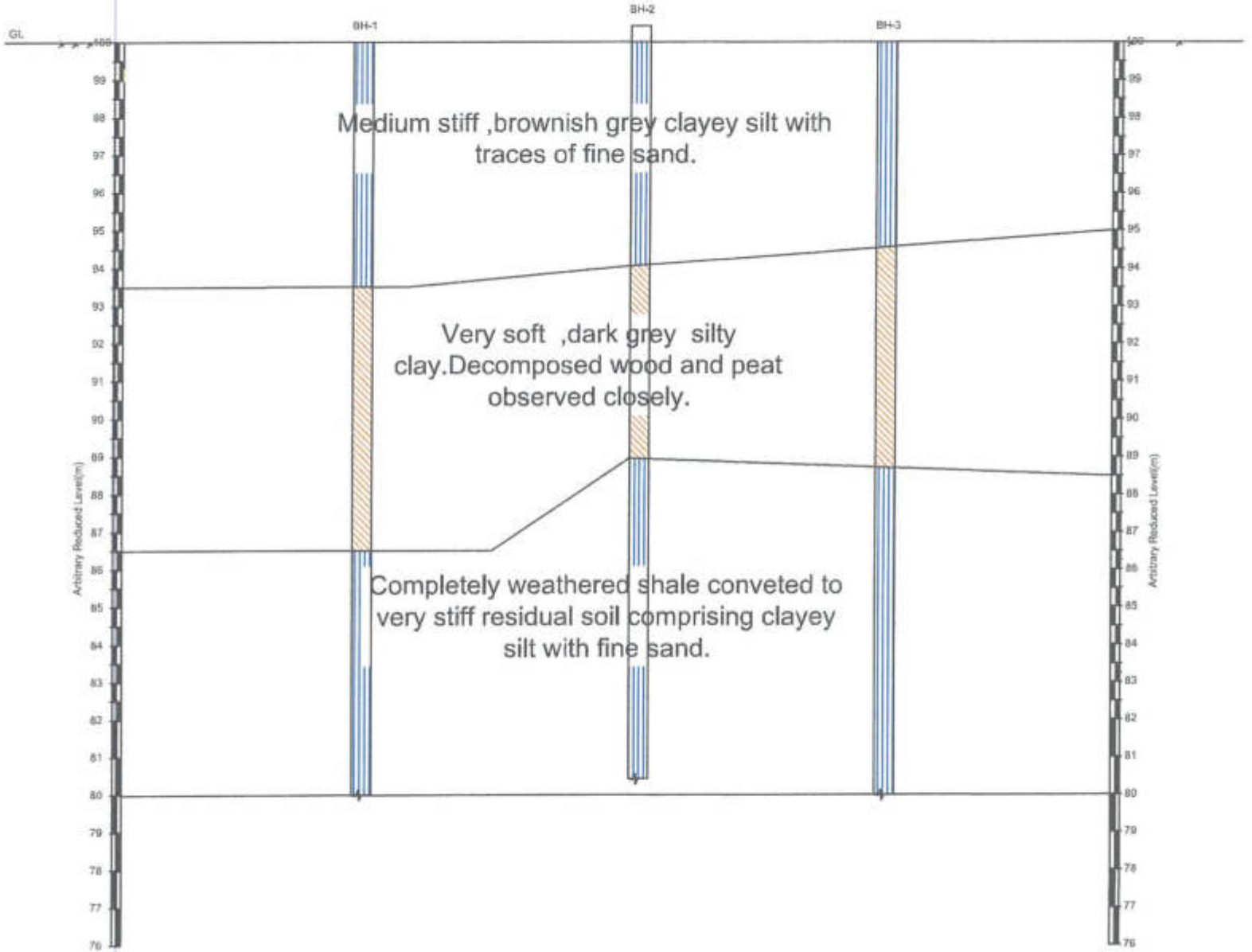


Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.



Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.




GL
BH-1
BH-2
BH-3
Medium stiff ,brownish grey clayey silt with traces of fine sand.
Very soft ,dark grey silty clay.Decomposed wood and peat observed closely.
Completely weathered shale conveted to very stiff residual soil comprising clayey silt with fine sand.
Arbitrary Reduced Level(m)
100
99
98
97
96
95
94
93
92
91
90
89
88
87
86
85
84
83
82
81
80
79
78
77
76

ANNEXURE-2

⇒ BOREHOLE LOG & TEST RESULTS

⇒ CURVES

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Block core sample	
UDS	:Undisturbed sample	RQD: Rock Quality Designation	
Si.	:Slipped	CR:Core Recovery	
TS	:Triaxial test/UCS	DT: Direct Shear test	
K	:Co-efficient of Permeability		

Site : MPS-1 (ZONE-1)
Bore Hole No: 1(one)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 23.07.17.
Date of completion: 23.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			HCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C.R.(%)	R.Q.D.(%)					% Gravel	% Sand	% Silt	% clay						L.L.(%)	PL.(%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	P_0
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	4																								
2.00																												
2.50	UDS	2.50-2.954								OH	0	0	52	48	41	55.0	1.550	1.00	2.51	75	48	27	TS	0.11	0.00	0.15	0.45	1.51
3.00	DS	3.00-3.45	3.00	0																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	0				Top surface soil followed by very soft,dark grey silty clay with rauck,peas ,decomposed vegetalio etc.	to						Past														
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	1																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	1						OH	0	0	50	50	38					78	52	26						
8.00																												
8.50									9.00																			
9.00	DS	9.00-9.45	9.00	5					9.00																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	7																								
11.00	UDS	11.0-11.45						Med ium to stiff,bluish grey silty clay /clayey silt.Traces of fine sand and decomposed wood observed occasionally		CH	0	0	60	40	33	34.0	1.850	1.38	2.69	56	25	31	TS	0.40	0.00	0.85	0.20	0.95
11.50																												
12.00	DS	12.00-12.45	12.00	7					to																			
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	6																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed Sample	RQD	:Rock Quality Designation
SL	:Slippo	CR	:Core Recovery
TS	:Triaxial test (UU	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : MPS-1 (ZONE-1)

Bore Hole No: 1(one)

R.L. of BH (m): 100.00 (Nearest Road Level : 00m assumed)

Date of starting: 23.07.17.

Date of completion: 23.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	C_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00	UDS	17.0-17.45								CH	0	0	65	35		29.0	1.850	1.43	2.68	65	25	40	TS	0.46	0.00	-	0.20	0.87
17.50																												
18.00	DS	18.00-18.45	18.00	8				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	11																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
St	Slipped	PR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : MPS-1 (ZONE-1)
Bore Hole No: 2(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m received)

Date of starting: 23.07.17.
Date of completion: 23.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Run)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	ε
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	2																								
2.00	UDS	2.0-2.45								OH	0	0	56	44	38	56.0	1.600	1.03	2.56	66	46	20	TS	0.10	0.00	0.13	0.37	1.50
2.50																												
3.00	DS	3.00-3.45	3.00	0											Peat													
3.50																												
4.00								Top surface soil followed by very soft,dark grey silty clay with muck,peat ,decomposed vegetatio etc.	to																			
4.50	DS	4.50-4.95	4.50	1											Peat													
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	0																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2						CH	0	0	64	36	40					65	25	40						
8.00																												
8.50									9.00																			
9.00	DS	9.00-9.45	9.00	6					9.00																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	6																								
11.00																												
11.50	UDS	11.50-11.95						Medium to stiff,bluish grey silty clay /clayey silt.Traces of fine sand and decomposed wood observed occasionally																				
12.00	DS	12.00-12.45	12.00	8					to	CH	0	0	54	46	35	35.0	1.840	1.40	2.71	60	25	35	TS	0.44	0.00	0.85	0.22	0.93
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	7																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sliped	CR	Core Recovery
TS	Thin tube sampler	DS	Direct Shear test
K	Co-efficient of Permeability		

Site : MPS-1 (ZONE-1)
Bore Hole No: 2(Two)
R.L. of SH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 23.07.17.
Date of completion: 23.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	ϕ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	9				-do-		CH	0	0	60	40						64	26	38						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : STP-1-Existing Site
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 24.07.17.
Date of completion: 24.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Cast core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test,UCC	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'n'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	mv
0.00									0.00																			
0.50	DS	0.50						Filled up ground	to	Fill																		
1.00	DS	1.00							1.50																			
1.50	DS	1.50-1.95	1.50	3					1.50																			
2.00	UDS	2.0-2.45								CI	0	0	59	41	31	36.0	1.700	1.25	2.60	49	24	25	TS	0.20	0.00	0.40	0.24	1.08
2.50																												
3.00	DS	3.00-3.45	3.00	1						Pt																		
3.50								Very soft,dark grey to black, silty clay with decomposed vegetation.Peat observed clusely throughout.																				
4.00																												
4.50	DS	4.50-4.95	4.50	0					to	Pt																		
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	1						OH	0	0	48	52	46	-	-	-	-	66	40	26	-	-	-	-	-	-
6.50																												
7.00									7.50																			
7.50	DS	7.50-7.95	7.50	4					7.50																			
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	8																								
9.50	UDS	9.50-9.95								CH	0	0	54	46	33	31.0	1.380	1.44	2.68	56	25	31	TS	0.50	0.00	1.10	0.18	0.87
10.00																												
10.50	DS	10.50-10.95	10.50	7																								
11.00								Medium stiff,bluish grey silty clay with some decomposed vegetation.																				
11.50									to																			
12.00	DS	12.00-12.45	12.00	6						CH	0	0	61	39	33	--	-	-	-	55	24	31	-	-	--	-	-	-
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	8																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	8					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : STP-1-Existing Site
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 24.07.17.
Date of completion: 24.7.17
Method of boring : Shell & Augur, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m): 20.0m

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Signal	CR	Core Recovery
TS	Terzaghi Tube	FT	Field Vane Test
K	Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample (m)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00	UDS	17.0-17.45								CH	0	0	55	45		33.0	1.880	1.41	2.69	60	25	35	TS	0.50	0.00	1.00	0.22	0.90
17.50																												
18.00	DS	18.00-18.45	18.00	9				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8						CH	0	1	51	48		--	-	-	-	62	25	37	-	-	-	-	-	-
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed Sample	RQD	:Rock Quality Designation
SL	:Slippal	CR	:Core Recovery
TS	:Triaxial test(UU)	DST	: Direct Shear test
K	:Co-efficient of Permeability		

Site : STP-1-Existing Site
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Reduced Level 100 m assumed)

Date of starting: 24.07.17.
Date of completion: 24.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00																												
0.50	DS	0.50						Filled up ground	0.00 to 1.0	Fill																		
1.00	DS	1.00-1.45	1.00	3					1.00																			
1.50																												
2.00	UDS	2.0-2.45								OH	0	0	52	48	41	52.0	1.620	1.07	2.59	75	39	36	TS	0.14	0.00	0.20	0.35	1.43
2.50	DS	2.50-2.95	2.50	1																								
3.00								Very soft,dark grey to black, silty clay with decomposed vegetation.Peat observed closely throughout.																				
3.50									to																			
4.00	DS	4.00-4.45	4.00	1																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	0						Pt																		
6.00																												
6.50									7.00																			
7.00	DS	7.00-7.45	7.00	3					7.00																			
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	5						CH	0	0	55	45	40	-	-	-	-	61	25	36	-	-	-	-	-	-
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	6																								
10.50	UDS	10.50-10.95								CH	0	0	48	52	29	34.0	1.860	1.39	2.64	65	24	41	TS	0.45	0.00	0.95	0.22	0.90
11.00								Medium stiff,bluish grey silty clay with some decomposed vegetation.																				
11.50	DS	11.50-11.95	11.50	7					to																			
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	9																								
13.50	UDS	13.50-13.95								CH	0	1	54	45		31.0	1.880	1.44	2.65	61	25	36	TS	0.52	0.00	1.00	0.20	0.85
14.00																												
14.50	DS	14.50-14.95	14.50	7					20.45																			
15.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	C	:Core Recovery
FS	:Free at Test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : **STP-1-Existing Site**

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 24.07.17.

Date of completion: 24.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
15.50																												
16.00	DS	16.00-16.45	16.00	7																								
16.50																												
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	10				-do-		CH	0	0	59	41		-	-	-	-	61	25	36	-	-	-	-	-	-
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : STP-1-Existing Site
Bore Hole No: 03(Three)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 25.07.17.
Date of completi 25.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
0.00																												
0.50	DS	0.50						Filled up ground	0.00 to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	2					1.50																			
2.00																												
2.50	UDS	2.50-2.95								CH	0	0	54	46	31	35.0	1.710	1.27	2.64	61	24	37	TS	0.15	0.00	0.16	0.24	1.08
3.00	DS	3.00-3.45	3.00	1																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	1				Very soft,dark grey to black, silty clay with decomposed vegetation.Peat observed closely throughout.		Pt																		
5.00									to																			
5.50																												
6.00	DS	6.00-6.45	6.00	2																								
6.50																												
7.00																												
7.50	UDS	7.50-7.95								OH	0	0	59	41	36	49.0	1.610	1.08	2.65	71	48	23	TS	0.19	0.00	0.16	0.35	1.45
8.00																												
8.50									9.00																			
9.00	DS	9.00-9.45	9.00	6					9.00																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	7						CH	0	0	64	36	33					61	24	37						
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	8				Medium stiff,bluish grey silty clay with some decomposed vegetation.	to																			
12.50	UDS	12.50-12.95								CH	0	1	59	40		31.5	1.870	1.42	2.66	60	24	36	TS	0.48	0.00	0.90	0.18	0.87
13.00																												
13.50	DS	13.50-13.95	13.50	8																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	8					20.00																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Sieved	CR:Core Recovery	
TS	:Triaxial test(UU)	DT : Direct Shear test	
K	:Co-efficient of Permeability		

Site : STP-1-Existing Site

Bore Hole No: 03(Three)

R.L. of BH (m): 100.00 (Near of Road Level 100m assumed)

Date of starting: 25.07.17.

Date of complet 25.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	ϕ (degree)		Cc	e_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-																				
18.50	UDS	18.50-18.95								CH	0	0	55	45		32.2	1.850	1.40	2.66	61	25	36	TS	0.45	0.00	0.92	0.22	0.90
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Shelby core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slitted	CR	:Core Recovery
TS	:Thin tube sample(UD)	VT	:Vane Shear test
K	:Co-efficient of Permeability		

Site : IPS-2(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 26.04.17.
Date of completion: 26.4.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			LCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	ε_0
0.00																												
0.50	DS	0.50						Filled up ground with sand	0.00 to 1.0	Fill																		
1.00	DS	1.00							1.00																			
1.50	DS	1.50-1.95	1.50	4																								
2.00	UDS	2.00-2.45								CI	0	0	64	36	30	32.0	1.770	1.34	2.71	50	23	27	TS	0.20	0.00	0.44	0.23	1.02
2.50																												
3.00	DS	3.00-3.45	3.00	0																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	0																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	4																								
6.50	UDS	6.50-6.95						Very soft grey , silty clay with decomposed vegetation.	to	CH	0	0	52	48	39	31.0	1.800	1.37	2.70	61	25	36	TS	0.20	0.00	0.45	0.21	0.97
7.00																												
7.50	DS	7.50-7.95	7.50	3																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	4																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	5																								
11.00																												
11.50									12.00																			
12.00	DS	12.00-12.45	12.00	12					12.00																			
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	9				Stiff grey, silty clay.	to																			
14.00	UDS	14.0-14.45								CH	0	0	48	52	31	33.0	1.880	1.41	2.69	65	25	40	TS	0.50	0.00	1.10	0.19	0.90
14.50																												
15.00	DS	15.00-15.45	15.00	9					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SI.	:Silt/soil	CR:Core Recovery	
TS	:Triaxial test(UU)	DT :Direct Shear test	
K	:Co-efficient of Permeability		

Site : **IPS-2(ZONE-2&3)**
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 26.04.17.
Date of completion: 26.4.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion kg/cm²	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	10				-do-		CI	0	0	67	33						48	23	25						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	12																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-2(ZONE-2&3)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 26.04.17.
Date of completion: 27.4.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 4.00m BGL
Termination Depth (m):20.0m

Notation

DS	:Disturbed Sample	CS	:Rock Core Strength
UDS	:Undisturbed Sample	RQD	:Rock Quality Designation
SS	:Slipped	CR	:Core Recovery
TS	:Thinwall Tube (UD)	DT	:Direct Shear Test
k	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "n"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		C_c	c_v
0.00																												
0.50	DS	0.50						Filled up ground with earth.	0.00 to 1.0	Fill																		
1.00	DS	1.00-1.45	1.00	3					1.00	OH	0	0	48	52						75	46	29						
1.50																												
2.00	UDS	2.0-2.45								CI	0	0	65	35		35.0	1.760	1.30	2.72	50	24	26	TS	0.16	0.00	0.30	0.24	1.09
2.50	DS	2.50-2.95	2.50	2																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	1						CH	0	0	53	47	36					60	25	35						
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	3				Very soft to soft ,grey , silty clay with decomposed vegetation.	to																			
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2																								
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	4																								
9.00	UDS	9.0-9.45								CH	0	0	40	60	35	39.0	1.820	1.31	2.75	70	26	44	TS	0.20	0.00	0.44	0.25	1.10
9.50																												
10.00	DS	10.00-10.45	10.00	4					11.00																			
10.50																												
11.00									11.00																			
11.50	DS	11.50-11.95	11.50	10																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	7				Stiff,grey, silty clay.Traces of semi decomposed vegetation observed intermittently.	to	CH	0	0	54	46						68	25	43						
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	11					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock's core sample	
UDS	:Undisturbed sample	RQD Rock Quality Designation	
SL	:Slipped	CR:Core Recovery	
TS	:Triaxial test (UU)	DST : Direct Shear Test	
IL	:Liquefaction of Permeability		

Site : IPS-2(ZONE-2&3)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m measured)

Date of starting: 26.04.17.

Date of completion: 27.4.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL

Termination Depth (m):20.0m

Depth below NGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	10				-do-		CI	0	0	69	31						47	23	24						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
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26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 24.07.17.
Date of completio 24.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SI. :Slipped
PS :Penetration(UU)
K :Co-efficient of Permeability
CS:Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT : Direct Shear test

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	σ_0
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00								OH	0	0	48	52		-	-	-	-	75	45	30	-	-	-	-	-	-
1.50	DS	1.50-1.95	1.50	4																								
2.00	UDS	2.0-2.45								CI	0	0	67	33	28	34.5	1.770	1.32	2.65	49	23	26	TS	0.20	0.00	0.33	0.22	1.01
2.50																												
3.00	DS	3.00-3.45	3.00	1				Very soft,dark grey to black, silty clay with decomposed vegetation.Peat observed closely throughout.																				
3.50									to																			
4.00																												
4.50	DS	4.50-4.95	4.50	1																								
5.00	UDS	4.50-4.95								CH	0	0	54	46	44	35.0	1.750	1.30	2.66	59	24	35	TS	0.14	0.00	0.25	0.23	1.05
5.50																												
6.00	DS	6.00-6.45	6.00	3																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	3					8.00																			
8.00									8.00																			
8.50																												
9.00	DS	9.00-9.45	9.00	11																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	6																								
11.00	UDS	11.0-11.45						Medium stiff,bluish grey silty clay with some decomposed vegetation.		CH	0	0	48	52	38	32.0	1.840	1.39	2.65	60	25	35	TS	0.44	0.00	0.90	0.21	0.90
11.50									to																			
12.00	DS	12.00-12.45	12.00	5																								
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	7																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	10					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test (UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-1(ZONE-2&3)

Bore Hole No: 01(One)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 24.07.17.

Date of completion 24.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	ε_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00	UDS	17.0-17.45								CI	0	0	69	31		27.0	1.900	1.50	2.68	48	23	25	TS	0.51	2.00	0.95	0.16	0.79
17.50																												
18.00	DS	18.00-18.45	18.00	10				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notetion

DS	:Disturbed Sample	CS	:Undisturbed sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
Sr.	:Sieve	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Coefficient of Permeability		

Site : IPS-1(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 27.07.17
Date of completion 27.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.30m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	ϕ (degree)		Cc	φ_0
0.00								Filled up ground with reddish mourum	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4					1.00																			
1.50																												
2.00	UDS	2.0-2.45								OH	0	0	45	55	45	46.0	1.520	1.04	2.52	75	48	27	TS	0.16	0.00	0.25	0.35	1.42
2.50	DS	2.50-2.95	2.50	2						Pt																		
3.00																												
3.50								Very soft,dark grey to black, silty clay with decomposed vegetation,Peat observed closely throughout.																				
4.00	DS	4.00-4.45	4.00	1					to	Pt																		
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	4						CH	0	0	52	48		-	-	-	-	65	25	40	-	-	-	-	-	-
7.50									8.00																			
8.00									8.00																			
8.50	DS	8.50-8.95	8.50	11																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	7																								
10.50	UDS	10.50-10.45								OH	0	0	44	56		40.0	1.550	1.11	2.56	75	49	26	TS	0.40	0.00	0.78	0.31	1.31
11.00								Medium stiff,bluish grey silty clay with some decomposed vegetation.																				
11.50	DS	11.50-11.95	11.50	7					to																			
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	7						CH	0	0	56	44		-	-	-	-	61	26	35	-	-	-	-	-	-
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	10					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : IPS-1(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 27.07.17
Date of completion 27.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.30m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	9				-do-		CI	0	0	69	31						48	23	25						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
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24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-4(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 28.07.17.
Date of completion:28.7.17
Method of boring : Shell & Auger , Rotary mud circulation

Static Ground Water Table: 1.10m BGL.
Termination Depth (m): 20.0m

Notation
DS :Disturbed Sample — CS Reel: core sample
UDS :Undisturbed sample — RQD,Rock Quality Designation
SI. :Slipped — Cl:Core Recovery
TS :Tri-axial test(UU) — DT : Direct Shear test
K :Co-efficient of Permeability

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Reel: Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/W.C (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
0.00								Filled up ground with soil,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00							1.00																			
1.50	DS	1.50-1.95	1.50	2																								
2.00	UDS	2.0-2.45						Very soft,greyish brown silty clay / clayey silt.Little semi decomposed wood observed scatterdly.		CI	0	1	69	30	28	33.2	1.750	1.31	2.70	48	23	25	TS	0.13	10.00	0.32	0.24	1.06
2.50																												
3.00	DS	3.00-3.45	3.00	1					to																			
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2						CI	0	0	64	36	29					50	23	27						
5.00																												
5.50									6.00																			
6.00	DS	6.00-6.45	6.00	6				Loose,bluish grey silty fine to medium sand.	6.00	SM	0	71	←——29——→			-	-	-	-	Non Plastic			-	-	-	-	-	-
6.50									to																			
7.00																												
7.50	DS	7.50-7.95	7.50	8					8.00																			
8.00									8.00																			
8.50																												
9.00	DS	9.00-9.45	9.00	7																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	9																								
11.00																												
11.50								Medium to stiff,bluish grey clayey silt .Traces of fine sand observed occasionally.	to																				
12.00	DS	12.00-12.45	12.00	7																								
12.50	UDS	12.50-12.95								MI	0	7	73	20		29.0	1.850	1.43	2.65	41	29	12	TS	0.34	4.00		0.17	0.85
13.00																												
13.50	DS	13.50-13.95	13.50	7																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	11					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Core cutter sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Thinwall sampler(U.D.)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-4(ZONE-2&3)

Bore Hole No: 01(One)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 28.07.17.

Date of completion:28.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of Test	Cohesion (kg/cm²)	Φ (degree)		C_c	C_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00																												
17.50	UDS	17.50-17.95																										
18.00	DS	18.00-18.45	18.00	10				-do-		MI	0	6	73	21		27.0	1.890	1.49	2.69	43	29	12	TS	0.55	3.00		0.16	0.81
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
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27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Thin tube(UDS)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-4(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00 (Nearest Road Level 1.00m assumed)

Date of starting: 28.07.17.
Date of completion:28.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	TS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						L.L (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	Si
0.00								Filled up ground with brownish mourum,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	2					1.00																			
1.50																												
2.00	UDS	2.0-2.45																										
2.50	DS	2.50-2.95	2.50	0				Very soft greyish brown silty clay / clayey silt,Little semi decomposed wood observed scatterdly.	to	CI	0	0	73	27	26	35.5	1.700	1.25	2.68	47	23	24	TS	0.14	0.00	0.24	0.26	1.14
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	1						CI	0	3	68	29	25	-	-	-	-	46	23	23	-	-	-	-	-	-
4.50																												
5.00									5.50																			
5.50	DS	5.50-5.95	5.50	5					5.50																			
6.00									to																			
6.50																												
7.00	DS	7.00-7.45	7.00	6				Loose,bluish grey silty fine to medium sand.		SM	0	55	45			-	1.75	-	-	Non Plastic			DT	0.00	28.0	-	-	-
7.50									8.00																			
8.00									8.00																			
8.50	DS	8.50-8.95	8.50	6																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	7						MI	0	1	78	21		-	-	-	-	42	29	13	-	-	-	-	-	-
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	9				Medium to stiff,bluish grey clayey silt .Traces of fine sand observed occasionally.	to																			
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	10																								
13.50	UDS	13.50-13.95								MI	0	2	78	20		26.0	1.890	1.50	2.70	42	29	13	TS	0.50	4.00	0.90	0.16	0.80
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	10					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Core cutter sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slight	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	:Direct Shear test
K	:Coefficient of Permeability		

Site : IPS-4(ZONE-2&3)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 28.07.17.

Date of completion:28.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL

Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Rem	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	TS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content(WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	av
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	10				-do-		MI			79	21		-	-	-	-	40	29	11	-	-	-	-	-	-
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core Sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Sliped	CR:Core Recovery	
TS	:Triaxial test(UU)	DT : Direct Shear test	
K	:Coefficient of Permeability		

Site : IPS-5(ZONE-2&3)
Bore Hole No: 01(One)
R.L. o BH (m): 100.00
(Nearest Reco Level 100m assumed)

Date of starting: 29.07.17.
Date of completion: 29.7 17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of Sampling	Depth of sample /Rock	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	Cv
0.00																												
0.50	DS	0.50						Filled up ground with brownish mooram,brick bats etc.	0.00 to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	2					1.50																			
2.00	UDS	2.0-2.45								CH	0	0	54	46	43	39.0	1.660	1.19	2.61	68	25	43	TS	0.14	0.00	0.16	0.27	1.19
2.50																												
3.00	DS	3.00-3.45	3.00	0																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	3				Very soft,greyish brown silty clay / clayey silt. Semi decomposed wood ,peat and muck observed scatterdly.	to																			
6.50										OH	0	0	44	56	44	--	-	-	-	65	48	17	-	-	-	-	-	-
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	2																								
9.50																												
10.00									10.50																			
10.50	DS	10.50-10.95	10.50	5					10.50																			
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	4				Medium stiff,dark grey to black,silty clay with some decomposed wood and peat observed.	to																			
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	5																								
14.00	UDS	14.0-14.45								CH	0	0	54	46	43	38.0	1.840	1.42	2.68	62	25	37	TS	0.30	0.00	0.55	0.19	0.89
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slotted	CR	:Core Recovery
TS	:Triaxial test (UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-5(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 29.07.17.
Date of completion: 29.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		C_c	a_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	9																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	8				-do-																				
18.50	UDS	18.50-18.95								CH	0	0	55	45		32.0	1.860	1.41	2.69	62	25	37	TS	0.48	0.00	0.85	0.19	0.91
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
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29.00																												
29.50																												
30.00																												

EIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-5(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 29.07.17.
Date of completion: 29.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m):20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slipped
TS :Triaxial test(UU)
K :Coefficient of Permeability
CS:Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT : Direct Shear test

Depth below EGL (m)	Type of sampling	Depth of sample (R.m)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free swell Index(%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	P_0
0.00																												
0.50	DS	0.50						Filled up ground with brownish	0.00	Fill																		
1.00	DS	1.00-1.45	1.00	2				topsoil,brick bats etc.	to																			
1.50									1.50																			
2.00																												
2.50	DS	2.50-2.95	2.50	1						CH	0	0	55	45	46	-	-	-	-	60	25	35	-	-	-	-	-	-
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	1																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2				Very soft,greyish brown silty																				
6.00								clay / clayey silt, Semi																				
6.50								decomposed wood ,peat and	to																			
7.00	DS	7.00-7.45	7.00	2				muck observed scatterdly.		OH	0	0	45	55	37	-	-	-	-	75	48	27	-	-	-	-	-	-
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	2																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4					10.50																			
10.50									10.50																			
11.00																												
11.50	DS	11.50-11.95	11.50	5						CH	0	0	58	42		-	-	-	-	65	26	39	-	-	-	-	-	-
12.00								Medium stiff,dark grey to																				
12.50								black,silty clay with some																				
13.00	DS	13.00-13.45	13.00	4				decomposed wood and peat	to	CH	0	0	55	45	30	-	-	-	-	61	25	36	-	-	-	-	-	-
13.50								observed.																				
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sliped	CR	Core Recovery
TS	Tractel tes(UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-5(ZONE-2&3)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 29.07.17.

Date of completion: 29.7.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL

Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Run)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free swell Index(%)	Natural Moisture Content(WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	8				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7						CH	0	0	60	40						65	26	39						
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CR:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SI.	:Slipped	CR:Core Recovery	
IS	:Tropical test(SI)	DT : Direct Shear test	
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00 (Nearest Road Level 00m assumed)

Date of starting: 30.07.17.
Date of completion: 30.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00								Filled up ground with medium type soil.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00							1.00																			
1.50	DS	1.50-1.95	1.50	3																								
2.00	UDS	2.0-2.45								CH	0	0	52	48	33	35.0	1.820	1.35	2.72	62	25	37	TS	0.16	0.00	0.30	0.25	1.02
2.50																												
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	3																								
6.50																												
7.00								Very soft to soft , grey to bluish grey, silty clay.	to																			
7.50	DS	7.50-7.95	7.50	2																								
8.00	UDS	8.0-8.45								CI	0	0	67	33	24	34.0	1.790	1.34	2.68	50	24	26	TS	0.15	0.00	0.30	0.22	1.01
8.50																												
9.00	DS	9.00-9.45	9.00	3																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	2																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	4						CI	0	1	64	35	24					49	24	25						
12.50																												
13.00									13.50																			
13.50	DS	13.50-13.95	13.50	5				Medium stiff,dark grey to bluish grey silty clay with decomposed vegetation.	13.50 to																			
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	4					20.45																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	Cb	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slip test	CR	Core Recovery
TS	Triaxial test (UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-3(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 30.07.17.
Date of completion: 30.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.60m BGL
Termination Depth (m): 20.0m

Depth below BGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	3																								
17.00	UDS	17.0-17.45								OH	0	0	40	60		52.0	1.620	1.07	2.56	68	48	20	TS	0.25	0.00	0.35	0.34	1.40
17.50																												
18.00	DS	18.00-18.45	18.00	4				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-3(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m reserved)

Date of starting 30.07.17.
Date of completion: 30.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m):20.0m

Notation
DS Disturbed Sample
UDS Undisturbed Sample
SPT Standard Penetration Test
CR Core Recovery
RQD Rock Quality Designation
K Coefficient of Permeability

Depth below EGL (m)	Type of Sampling	Depth of Sample Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/W.A (%)	Bulk Density (gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristics			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	CR (%)	RQD (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
0.00									0.00																			
0.50	DS	0.50						Filled up ground with earth,rubbish,sand etc.	to	Fill																		
1.00	DS	1.50																										
1.50																												
2.00									2.50																			
2.50	DS	2.50-2.95	2.50	2					2.50																			
3.00	UDS	3.0-3.45								CI	0	0	70	30	39	35.0	1.820	1.35	2.69	48	23	25	TS	0.15	0.00	0.22	0.25	1.00
3.50																												
4.00	DS	4.00-4.45	4.00	1																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2				Very soft to soft , grey to bluish grey, silty clay.	to																			
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	3																								
9.00	UDS	9.0-9.45								CI	0	0	58	42	31	35.0	1.800	1.33	2.72	56	25	35	TS	0.17	0.00	0.35	0.26	1.04
9.50																												
10.00	DS	10.00-10.45	10.00	3																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	4					12.00																			
12.00									12.00																			
12.50																												
13.00	DS	13.00-13.45	13.00	6				Medium stiff,dark grey to bluish grey silty clay with decomposed vegetation.	to	OH	0	0	45	55	36	46.0	1.520	1.04	2.59	69	49	20	TS	0.30	0.00	0.39	0.40	1.49
13.50	UDS	13.50-13.95																										
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-3(ZONE-733)
Bore Hole No : 02(Two)
R.L. of BH (m): 100.00 (Assumed)

Date of starting 30.07.17.
Date of completion: 30.7.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m):20.0m

Notation

DS	Disturbed Sample	UDS	Undisturbed Sample
LDS	Disturbed Sample	RQD	Rock Quality Designation
SPT	Standard Penetration Test	CBR	California Bearing Ratio
TP	Trial Pit	DT	Dumpy Test
K	Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample (from - to)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kpa/cm²)	Consolidation Characteristic	
			Depth in meter	Observed N-value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of Test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	3															-	-	-	-	-	-	-	-	-	-
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	5				clay		CH	0	0	40	60						68	48	20						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	5																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-6(ZONE-2&3)

Bore Hole No: 01(One)

R.L. of BH (m): 100.00
(Nearest Road Level 0.0m assumed)

Date of starting: 31.07.17.
Date of completion: 31.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed N*Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
0.00								Filled up ground with soil,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50							1.00																			
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	4																								
2.00	UDS	2.0-2.45								Cl	0	0	69	31	29	30.5	1.810	1.39	2.69	48	22	26	TS	0.26	0.00	0.55	0.20	0.94
2.50																												
3.00	DS	3.00-3.45	3.00	3																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	3																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	2																								
6.50																												
7.00	UDS	7.0-7.45						Soft to medium stiff,grey silty clay / clayey silt. Semi decomposed wood ,peat and mark observed scatterdly.	to	OH	0	0	51	49	43	56.0	1.590	1.02	2.56	77	52	25	TS	0.13	0.00		0.37	1.51
7.50	DS	7.50-7.95	7.50	2																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	4																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	9																								
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	8																								
14.00	UDS	14.0-14.45								CH	0	0	54	46	36	30.0	1.870	1.44	2.71	60	25	35	TS	0.47	0.00	0.90	0.18	0.88
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

Mainly decomposed wood

RIGHT SITE SURVEY
New Town,Kajarhar,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation
DS :Disturbed Sample — CS:Block core sample
UDS :Undisturbed sample — RQD:Rock Quality Designation
SL :Slotted — CR:Core Recovery
IS :Material testing — DT - Direct Shear test
K :Co-efficient of Permeability

Site : IPS-6(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level Contassumed)

Date of starting: 31.07.17.
Date of completion: 31.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic				LCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)			Cc	φ
15.50																													
16.00																													
16.50	DS	16.50-16.95	16.50	7																									
17.00																													
17.50																													
18.00	DS	18.00-18.45	18.00	8				-do-		CH	0	0	60	40						61	25	36							
18.50																													
19.00																													
19.50																													
20.00	DS	20.00-20.45	20.00	10																									
20.50																													
21.00																													
21.50																													
22.00																													
22.50																													
23.00																													
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28.00																													
28.50																													
29.00																													
29.50																													
30.00																													

EIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation
DS :Disturbed Sample — CS:Rock core sample
UDS :Undisturbed Sample — RQD:Rock Quality Designation
SL :Slipper — CR:Core Recovery
TS :Tri-axial test(UU) — DT :Direct Shear test
K :Coefficient of Permeability

Site : IPS-6(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of SH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 31.07.17.
Date of completion: 31.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.00m

Depth below EGL (m)	Type of sampling	Depth of sample/Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						L.L.(%)	P.L.(%)	P.I(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	ε_0
0.00								Filled up ground with soil,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	2					1.00																			
1.50																												
2.00	UDS	2.0-2.45								CH	0	0	56	44	40	35.0	1.830	1.36	2.68	60	26	34	TS	0.15	0.00	0.17	0.21	0.98
2.50	DS	2.50-2.95	2.50	3																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	3																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	3																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2				Soft to medium stiff,grey silty clay / clayey silt. Semi decomposed wood ,peat and muck observed scatterdly.																				
7.50																												
8.00									In																			
8.50	DS	8.50-8.95	8.50	4																								
9.00	UDS	9.0-9.45								OH	0	0	48	52	42	49.0	1.560	1.05	2.60	60	41	19	TS	0.20	0.00		0.36	1.48
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	7																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	8						CH	0	0	55	45						60	25	35						
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

FIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core Sample	
UDS	:Undisturbed sample	RQD: Rock Quality Designation	
SS	:Split	C.R:Core Recovery	
VS	:Vane shear test	DST - Direct Shear test	
K	:Co-efficient of Permeability		

Site : **IPS-6(ZONE-2&3)**
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 31.07.17.
Date of completion: 31.07.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.00m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						L.L (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	6																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-		OH	0	0	48	52						71	50	21						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town, Rajarhat, Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slotted	CR	:Core Recovery
TV	:Vane shear test	DP	:Dutch Sounding
K	:Co-efficient of Permeability		

Site : IPS-7(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 01.08.17.
Date of completion: 01.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Depth below RGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3																								
2.00	UDS	2.0-2.45								CI	0	0	69	31	24	33.2	1.790	1.34	2.68	48	23	25	TS	0.15	0.00	0.26	0.24	0.99
2.50																												
3.00	DS	3.00-3.45	3.00	3																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2				Top surface soil followed by soft ,brownish to bluish grey silty clay /clayey silt with traces of fine sand.																				
5.00									tn																			
5.50																												
6.00	DS	6.00-6.45	6.00	3																								
6.50	UDS	6.50-6.95								MI	0	3	77	20	20	28.0	1.770	1.38	2.65	42	28	14	TS	0.14	3.00		0.19	0.92
7.00																												
7.50	DS	7.50-7.95	7.50	4																								
8.00																												
8.50									9.00																			
9.00	DS	9.00-9.45	9.00	5					9.00																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	7																								
11.00	UDS	11.0-11.45								CI	0	1	73	26	27	28.0	1.840	1.44	2.68	45	23	22	TS	0.40	0.00	0.82	0.18	0.66
11.50																												
12.00	DS	12.00-12.45	12.00	6				Medium to stiff,bluish grey silty clay.	to																			
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	7																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-7(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 01.08.17.
Date of completion: 01.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SI	:Slitpet	CC: Core Recovery	
TV	:Triaxial test(UU)	DT : Direct Shear test	
K	:Coefficient of Permeability		

Depth below BGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00	UDS	17.0-17.45								CH	0	0	60	40		31.0	1.860	1.42	2.66	59	25	34	TS	0.42	0.00		0.49	0.87
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SJ.	:Slipral	CR:Core Recovery	
TS	:Tri-axial test(UC)	VT :Vane Shear test	
K	:Co-efficient of Permeability		

Site : IPS-7(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 01.08.17.
Date of completion: 01.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	ε_0
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4						Cl	0	0	71	29		-	-	-	-	47	23	24	-	-	-	-	-	-
1.50																												
2.00																												
2.50	DS	2.50-2.95	2.50	3																								
3.00	UDS	3.0-3.45								MI	0	4	78	18	23	30.6	1.790	1.37	2.70	44	29	15	TS	0.16	3.00	0.29	0.21	0.97
3.50								Top surface soil followed by soft ,brownish to bluish grey silty clay /clayey silt with traces of fine sand.																				
4.00	DS	4.00-4.45	4.00	3					to																			
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	3																								
7.50																												
8.00									8.50																			
8.50	DS	8.50-8.95	8.50	7					8.50	CI	0	2	68	30	20	-	-	-	-	46	22	24	-	-	-	-	-	-
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	8																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	7				Medium to stiff,bluish grey silty clay.	to																			
12.00	UDS	12.0-12.45								CI	0	1	67	32		29.0	1.850	1.43	2.69	47	23	24	TS	0.40	0.00		0.18	0.88
12.50																												
13.00	DS	13.00-13.45	13.00	7																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	9					20.45																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-7(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 01.08.17.
Date of completion: 01.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m):20.0m

Depth below RGL (m)	Type of sampling	Depth of Sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/ WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of Test	Cohesion (kg/cm²)	ϕ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00	UDS	17.0-17.45								CH	0	0	62	38		32.0	1.880	1.42	2.68	61	26	35	TS	0.40	0.00		0.19	0.88
17.50																												
18.00	DS	18.00-18.45	18.00	9				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation
DS :Disturbed Sample CS Rock core sample
UDS :Undisturbed sample RQD:Rock Quality Designation
SL :Sliped CR:Core Recovery
TS :Triaxial test(UU) DT : Direct Shear test
K :Coefficient of Permeability

Site : IPS-8(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)
Date of starting: 02.08.17.
Date of completion: 02.08.17
Method of boring : Shell & Auger, Rotary mud circulation
Static Ground Water Table:2.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	1						MI	0	1	78	21						40	28	12						
2.00																												
2.50	UDS	2.50-2.95								MI	0	0	80	20	20	28.0	1.770	1.38	2.68	41	28	13	TS	0.18	4.00	0.22	0.17	0.94
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00								Top surface soil followed by very soft,brownish to bluish																					
4.50	DS	4.50-4.95	4.50	1				grey clayey silt /silty clay.	to																			
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	2						MI	0	0	79	21	16					41	29	12						
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00									8.50																			
8.50																												
9.00	DS	9.00-9.45	9.00	10				Loose,bluish grey to dark grey silty medium sand.	8.50 to 10.00	SM	0	56	←44→			-	-	-	-	Non Plastic			-	-	-	-	-	-
9.50																												
10.00									10.00																			
10.50	DS	10.50-10.95	10.50	9																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	11						CI	0	0	70	30						48	23	25						
12.50								Stiff grey silty clay.	to																			
13.00	UDS	12.50-12.95								CI	0	0	68	32		28.0	1.850	1.45	2.68	49	23	26	TS	0.55	2.00	1.20	0.15	0.85
13.50	DS	13.50-13.95	13.50	11																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	11					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Block core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SI.	:Sieved	CR:Core Recovery	
TS	:Triaxial test(CU)	DT : Direct Shear test	
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-2&3)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00 (Nearest Road Level = 00m assumed)

Date of starting: 02.08.17.
Date of completion: 02.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:2.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	10																								
17.00																												
17.50	UDS	17.50-17.95																										
18.00	DS	18.00-18.45	18.00	9				-do-		CI	0	0	66	34		32.2	1.830	1.38	2.68	50	24	26	TS	0.55	0.00	1.20	0.20	0.94
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-8(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Rose Level 100m assumed)

Date of starting: 02.08.17.
Date of completion: 02.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:2.50m BGL
Termination Depth (m):20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slump
TS :Triaxial test(UC)
K :Co-efficient of Permeability
CS:Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT : Direct Shear test

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	ε_0
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	2																								
1.50																												
2.00	UDS	2.0-2.45								MI	0	1	78	21	18	30.2	1.780	1.37	2.66	43	28	15	TS	0.14	4.00	0.19	0.17	0.95
2.50	DS	2.50-2.95	2.50	1																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	1				Top surface soil followed by,very soft,brownish to bluish grey clayey silt /silty clay.	to																			
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2						MI	0	0	76	24	10	-	-	-	-	44	28	16	-	-	-	-	-	-
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2																								
7.50																												
8.00									8.50																			
8.50	DS	8.50-8.95	8.50	8				Loose ,bluish grey to dark grey silty medium sand.	8.50 to 10.50	SM	0	68	←--32--→			-	-	-	-	Non Plastic			-	-	-	-	-	-
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	10																								
10.50									10.50																			
11.00																												
11.50	DS	11.50-11.95	11.50	9																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	11				Stiff,grey silty clay.	to																			
13.50	UDS	13.50-13.95																										
14.00										CI	0	0	70	30		29.0	1.880	1.46	2.68	48	22	26	TS	0.50	2.00	1.10	0.15	0.84
14.50																												
15.00	DS	15.00-15.45	15.00	10					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation			
DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SI	Slipped	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-8(ZONE-2&3)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 02.08.17.
Date of completion: 02.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:2.50m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Allerberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	ϕ (degree)		Cc	σ_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50	UDS	17.50-17.95																										
18.00	DS	18.00-18.45	18.00	7				-do-		CI	0	0	70	30		29.0	1.820	1.41	2.67	47	23	24	TS	0.50	0.00	1.00	0.19	0.89
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-3(ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 03.08.17.
Date of completion: 3.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Notation

DS	Disturbed Sample	CS	Core cutter sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
Sr.	Sieved	CR	Core Recovery
TS	Triaxial test(UU)	DJ	Dead Shearwell
K	Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	ε
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	5																								
2.00	UDS	2.0-2.45								CI	0	0	65	35	24	29.0	1.840	1.43	2.69	49	24	25	TS	0.35	0.00	0.75	0.18	0.80
2.50																												
3.00	DS	3.00-3.45	3.00	5																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	3						CI	0	0	67	33	26					48	25	23						
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	3																								
6.50																												
7.00								Top surface soil followed by medium stiff blush grey silty clay /clayey silt.Traces of fine sand observed occasionally.																			
7.50	DS	7.50-7.95	7.50	4					to																			
8.00	UDS	8.0-8.45								CI	0	1	69	30	31	29.0	1.850	1.43	2.69	50	25	25	TS	0.30	0.00	0.65	0.18	0.88
8.50																												
9.00	DS	9.00-9.45	9.00	5																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	7						MI	0	5	75	20						41	28	13						
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	8																								
14.00	UDS	14.0-14.45								CI	0	2	68	30		27.0	1.850	1.46	2.70	47	23	24	TS	0.50	2.00	0.95	0.17	0.85
14.50																												
15.00	DS	15.00-15.45	15.00	9					15.50																			

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SI.	Slipped	CR	Core Recovery
TS	Tube sample(Thin)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : IPS-3(ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level '00' is assumed)

Date of starting: 03.08.17.
Date of completion: 3.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Allerberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50									15.50																			
16.00																												
16.50	DS	16.50-16.95	16.50	13																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	14				Stiff,brownish grey silty clay /clayey silt .Traces of fine sand and calcareous nodules observed occasionally.	to																			
18.50	UDS	18.50-18.95								CH	0	0	56	44		26.0	1.900	1.51	2.68	60	24	36	TS	0.77	2.00	1.50	0.15	0.78
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	16																								
20.50									20.45																			
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Samp e	CB:Bed. rock sample	
UDS	:Undisturbed samp'e	RQD-Rock Quality Designation	
SS.	:Slipped	CR Core Recovery	
TS	:Tri-axial test(UU)	DT: Direct Shear test	
K	:Coefficient of Permeability		

Site : IPS-3(ZONE-4)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100 m assumed)

Date of starting: 03.08.17.
Date of completion: 3.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	p_0
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4																								
1.50																												
2.00	UDS	2.0-2.45																										
2.50	DS	2.50-2.95	2.50	5						CI	0	1	70	29	32	30.0	1.840	1.42	2.69	45	22	23	TS	0.30	0.00	0.70	0.19	0.90
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	5																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	3				Top surface soil followed by medium stiff,bluish grey silty clay /clayey silt.Traces of fine sand observed occasionally.	to	CI	0	1	69	30	27					45	23	22							
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	3																								
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	3																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4						CI	0	0	66	34						50	23	27						
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	5					12.00																			
12.00									12.00																			
12.50																												
13.00	DS	13.00-13.45	13.00	9				Stiff,brownish grey silty clay /clayey silt .Traces of fine sand and calcareous nodule observed occasionally.	to	CH	2	3	49	46		29.0	1.880	1.46	2.72	58	23	35	TS	0.55	0.00	1.00	0.18	0.87
13.50	UDS	13.50-13.95																										
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	10					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **iPS-8(ZONE-4)**
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 03.08.17.
Date of completion: 3.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.50m BGL
Termination Depth (m):20.0m

Notation
DS :Disturbed Sample — CS:Rock core sample
UDS :Undisturbed sample — RQD:Rock Quality Designation
SL :Slurry — CR:Core Recovery
TS :Triaxial test(UU) — DT : Direct Shear test
K :Co-efficient of Permeability

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	Cv
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	13																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	11																								
18.50										CH	0	0	60	40		-	-	-	-	60	23	37	-	-	-	-	-	-
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	10																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

EIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	DS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Sloped	CR:Core Recovery	
TS	:Thinwall Sampler	DT : Direct Shear test	
K	:Coefficient of Permeability		

Site : MPS-2 (ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 04.08.17.
Date of completion: 04.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:1.20m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			LCCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	4																								
2.00	UDS	2.0-2.45								CH	0	0	50	50	38	34.0	1.810	1.35	2.72	65	25	40	TS	0.28	0.00	0.50	0.23	1.01
2.50																												
3.00	DS	3.00-3.45	3.00	4																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2				Top surface soil followed by soft /very soft,bluish grey silty clay.	to																			
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	2						CH	0	0	45	55	43					70	25	45						
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	3																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	3																								
9.50																												
10.00									10.50																			
10.50	DS	10.50-10.95	10.50	4					10.50	Pt	Peat																	
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	5				Medium stiff,dark grey peat,mixed with silty clay.	to																			
12.50																												
13.00																												
13.50	UDS	13.50-13.95								CH	0	0	60	40	41	38.0	1.860	1.35	2.65	65	25	40	TS	0.30	0.00	0.70	0.22	0.99
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : MPS-2 (ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 04.08.17.
Date of completion: 04.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:1.20m BGL
Termination Depth (m): 20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slipped
TS :Triaxial test(UU)
K :Co-efficient of Permeability
CS:Crack sand sample
RQD:Rock Quality Designation
CR:Core Recovery
DT : Direct Shear test

Depth below BGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						L.L (%)	P.L (%)	P.I(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50	UDS	17.50-17.95								CH	0	0	55	45		35.0	1.840	1.36	2.68	66	26	40	TS	0.40	0.00	0.85	0.21	0.97
18.00	DS	18.00-18.45	18.00	6				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Township Project, Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
St.	:Slotted	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Coefficient of Permeability		

Site : MPS-2 (ZONE-4)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 04.08.17.
Date of completion: 04.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.20m BGL
Termination Depth (m): 20.0m

Depth below RGL (m)	Type of sampling	Depth of sample/Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4						CH	0	0	65	35						52	22	30						
1.50																												
2.00																												
2.50	DS	2.50-2.95	2.50	2																								
3.00	UDS	3.0-3.45								CH	0	0	59	41	40	35.2	1.800	1.33	2.69	59	24	35	TS	0.14	0.00	0.25	0.24	1.02
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2				Top surface soil followed by soft /very soft,bluish grey silty clay.	to																			
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	3																								
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	3						CH	0	0	45	55	46					70	25	45						
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50									11.00																			
11.00									11.00																			
11.50	DS	11.50-11.95	11.50	3						Pt																		
12.00																												
12.50																												
13.00	UDS	13.00-13.45						Medium stiff,dark grey peat,muck with silty clay.	to	CH	0	0	51	49		35.0	1.820	1.35	2.71	65	26	39	TS	0.26	0.00		0.22	1.01
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

Peat

RIGHT SITE SURVEY New Town,Rajarhat, Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock Core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slipped	CR	:Core Recovery
TS	:Triaxial test (CU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : **MPS-2 (ZONE-4)**

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 04.08.17.

Date of completion: 04.08.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.20m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell index (%)	Natural Moisture Content/WA (%)	Bulk Density (gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	σ_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50	UDS	17.50-17.95								CH	0	0	54	46		30.0	1.840	1.42	2.71	60	25	35	TS	0.42	0.00		0.19	0.91
18.00	DS	18.00-18.45	18.00	7				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sloped	CR	Core Recovery
TS	Thin tube sample	D.S.	Direct Shear test
K	Co-efficient of Permeability		

Site : IPS-2(ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m considered)

Date of starting: 05.08.17.
Date of completion: 5.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
0.00								Filled up ground with earth	0.00 to1.0	Fill																		
0.50	DS	0.50							1.00																			
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3																								
2.00																												
2.50	UDS	2.50-2.95								OH	0	0	40	60	44	52.0	1.560	1.03	2.55	78	51	27	TS	0.20	0.00	0.42	0.36	1.48
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	1				DECOMPOSED WOOD																				
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	1				DECOMPOSED WOOD																				
6.50																												
7.00								Very soft to soft ,dark grey to black, silty clay with decomposed vegetation.Peat/muck observed closely throughout.	to																		
7.50	DS	7.50-7.95	7.50	1																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	4																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00	UDS	11.0-11.45								OH	0	0	55	45	42	56.0	1.550	0.99	2.52	66	46	20	TS	0.19	0.00	0.35	0.45	1.54
11.50																												
12.00	DS	12.00-12.45	12.00	4																								
12.50																												
13.00									13.50																			
13.50	DS	13.50-13.95	13.50	5				Medium to stiff ,dark grey to black, silty clay with decomposed vegetation.	13.50 to 20.45																			
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5																								

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SPT	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UC)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-2(ZONE-4)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 05.08.17.
Date of completion: 5.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below BGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	6																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	9				-do-																				
18.50	UDS	18.50-18.45								CH	0	0	42	58		33.0	1.880	1.41	2.74	60	25	35	TS	0.50	0.00	1.00	0.20	0.04
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town, Rajarhat, Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation
DS Disturbed Sample — CS Rock core sample
UDS Undisturbed sample — RQD Rock Quality Designation
SL Slipped — CR Core Recovery
TS Triaxial test — DT Direct Shear test
K Coefficient of Permeability

Site : IPS-2(ZONE-4)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 06.08.17.
Date of completion: 5.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT Depth in meter	SPT Observed "N" Value	Rock Sample C.R (%)	Rock Sample R.Q.D (%)	Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution % Gravel	% Sand	% Silt	% clay	Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits LL (%)	PL (%)	PI(%)	Shearing Strength characteristic Type of test	Cohesion (kg/cm²)	Φ (degree)	UCC (kg/cm²)	Consolidation Characteristic Cc	e₀
0.00								Filled up ground with earth	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4					1.00																			
1.50																												
2.00	UDS	2.0-2.45								CI	0	0	65	35	26	34.0	1.800	1.34	2.69	49	23	26	TS	0.22	0.00	0.50	0.22	1.00
2.50	DS	2.50-2.95	2.50	2																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2						OH	0	0	38	62	46					82	52	30						
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2				Very soft to soft ,dark grey to black, silty clay with decomposed vegetation.Peat/muck observed closely throughout.	to																			
7.50	UDS	7.50-7.95								CI	0	0	65	35	25	33.0	1.770	1.33	2.70	50	25	25	TS	0.20	0.00	0.45	0.23	1.03
8.00																												
8.50	DS	8.50-8.95	8.50	3																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	2																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	4																								
12.00																												
12.50									13.00																			
13.00	DS	13.00-13.45	13.00	5					13.00																			
13.50	UDS	13.50-13.95						Medium stiff , grey , silty clay with decomposed vegetation.		CI	0	0	69	31	30	31.0	1.840	1.40	2.70	50	23	27	TS	0.35	0.00	0.80	0.20	0.92
14.00									to																			
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-2(ZONE-4)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 05.08.17.
Date of completion: 5.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SI. :Slope
IS :Immediate(UU)
K :Co-efficient of Permeability
CS:Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT :Direct Shear Test

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	6																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-																				
18.50	UDS	18.50-18.45								CH	0	0	59	41		33.0	-	-	-	60	25	35	-	-	-	-	-	-
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI	:Slitpit	CR	:Core Recovery
UC	:Unconfined test(UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-1(ZONE-4)

Bore Hole No: 01(One)

R.L. of BH (m): 100.00

(Nearest Road Level 100 is assumed)

Date of starting: 06.08.17.

Date of completion: 6.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (Kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (Kg/cm^2)	Φ (degree)		Cc	e_0
0.00																												
0.50	DS	0.50						Filled up ground with brown murram	0.00 to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3					1.50	CI	0	0	62	38		-	-	-	-	49	24	25	-	-	-	-	-	-
2.00																												
2.50	UDS	2.50-2.95								CH	0	0	52	48	44	33.5	1.750	1.31	2.68	60	25	35	TS	0.23	0.00	0.50	0.23	1.04
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2				Very soft,dark grey to black, silty clay with decomposed vegetation.Peat observed closely throughout.																				
5.00																												
5.50									to																			
6.00	DS	6.00-6.45	6.00	1						Pt																		
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	0						Pt																		
8.00																												
8.50									9.00																			
9.00	DS	9.00-9.45	9.00	2					9.00																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	3																								
11.00	UDS	11.0-11.45								CH	0	0	50	50	42	31.5	1.800	1.37	2.65	65	25	40	TS	0.20	0.00	0.42	0.25	0.94
11.50								Soft to medium stiff,bluish grey silty clay with some decomposed vegetation.																				
12.00	DS	12.00-12.45	12.00	4					to																			
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	7						CH	0	0	54	46	36					64	25	39						
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	4					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **IPS-1(ZONE-4)**
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 06.08.17.
Date of completion: 6.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL
Termination Depth (m): 20.0m

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sloped	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample (Run)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "n"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	ϕ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	4																								
17.00																												
17.50	UDS	17.50-1.95																										
18.00	DS	18.00-18.45	18.00	6				-do-		CH	0	0	48	52		32.0	1.820	1.38	2.66	65	26	39	TS	0.30	0.00	0.55	0.20	0.93
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-4)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 06.08.17.
Date of completion: 6.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL
Termination Depth (m):20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slipped
TS :Triaxial test(UU)
K :Co-efficient of Permeability
CS:Rock core sample
RQD: Rock Quality Designation
CR:Core Recovery
DT :Direct Shear test

Depth below EGL (m)	Type of sampling	Depth of sample (Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed N-Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	εo
0.00								Filled up ground with brown	0.00	Fill																		
0.50	DS	0.50						rogorum	to 3.0																			
1.00	DS	1.00-1.45	1.00	3					1.00																			
1.50																												
2.00	UDS	2.0-2.45								OH	0	0	48	52	49	51.0	1.560	1.03	2.55	75	46	29	TS	0.19	0.00	0.35	0.36	1.47
2.50	DS	2.50-2.95	2.50	2																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2				Very soft,dark grey to black,		OH	0	0	44	56	42	-	-	-	-	78	45	33	-	-	-	-	-	-
4.50								silty clay with decomposed																				
5.00								vegetation.Peat observed closely	to																			
5.50	DS	5.50-5.95	5.50	1				throughout.		Pt																		
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2						Pt																		
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	2					9.00																			
9.00									9.00																			
9.50																												
10.00	DS	10.00-10.45	10.00	2						CH	0	0	44	56	39	-	-	-	-	66	26	40	-	-	-	-	-	-
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	4				Very soft to medium stiff,bluish																				
12.00	UDS	12.0-12.45						grey silty clay with some	to	CH	0	0	48	52	42	36.0	1.810	1.33	2.64	62	25	37	TS	0.25	0.00	0.55	0.21	0.98
12.50								decomposed vegetation.																				
13.00	DS	13.00-13.45	13.00	5																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial Test(UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : **IPS-1(ZONE-4)**
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 06.08.17.
Date of completion: 6.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50										CH	0	0	50	50		-	-	-	-	61	25	36	-	-	-	-	-	-
18.00	DS	18.00-18.45	18.00	5				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City Manipur.

Site : IPS-6(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 07.08.17.
Date of completion: 07.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m): 20.0m

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipout	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristics			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	6																								
17.00	UDS	17.0-17.45								OH	0	0	53	47		55.0	1.610	1.04	2.61	74	45	29	TS	0.29	0.00	-	0.34	.42
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	9						CH	0	0	45	55		-	-	-	-	70	28	42	-	-	-	-	-	-
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City Manipur.

Site : IPS-6(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 07.08.17.
Date of completion: 07.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At SGL
Termination Depth (m):20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI	:Slight	CR	:Core Recovery
IN	:Initial test(UU)	DT	: Direct Shear test
K	:Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(g/cc)	Dry Density (g/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristics			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	5						CI	0	0	72	28						45	23	22						
1.50																												
2.00																												
2.50	DS	2.50-2.95	2.50	5																								
3.00	UDS	3.0-3.45								CI	0	0	69	31	25	30.0	1.830	1.41	2.68	48	23	25	TS	0.28	0.00	0.50	0.20	0.90
3.50																												
4.00	DS	4.00-4.45	4.00	4																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2																								
7.50	UDS	7.50-7.95								CH	0	0	56	44	40	34.5	1.770	1.32	2.71	60	25	35	TS	0.12	0.00		0.24	1.06
8.00																												
8.50	DS	8.50-8.95	8.50	1																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50																												
11.00									11.50																			
11.50	DS	11.50-11.95	11.50	5					11.50																			
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	6																								
13.50	UDS	13.50-13.95								CH	0	0	64	36	40	36.0	1.850	1.34	2.71	60	26	34	TS	0.36	0.00		0.23	1.02
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

Top surface soil followed by soft,greyish brown to bluish grey silty clay / clayey silt.Traces of fine sand observed occasionally.

Medium to stiff,bluish grey to dark grey silty clay with decomposed vegetation,peat and muck.

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SI	Slitysil	CR	Core Recovery
TV	Triaxial test(UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-6(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 07.08.17.
Date of completion: 07.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: At EGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Ram	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/W.A (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00	UDS	17.0-17.45								OH	0	0	44	56		61.0	1.590	0.99	2.51	74	51	23	TS	0.18	0.00	-	0.38	1.54
17.50																												
18.00	DS	18.00-18.45	18.00	8				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7						CH	0	0	45	55		-	-	-	-	70	28	42	-	-	-	-	-	-
20.50																												
21.00																												
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RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **MPS-3 (ZONE-5)**
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 08.06.17.
Date of completion: 08.06.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:1.00m BGL
Termination Depth (m): 20.0m

Notation
DS :Disturbed Sample — CS:Rock core sample
UDS :Undisturbed sample — RQD:Rock Quality Designation
SL :Slipped — CR:Core Recovery
TS :Undisturbed(UC) — DT : Direct Shear Test
K :Co-efficient of Permeability

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			IICC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	av
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3						CI	0	0	65	35						49	24	25						
2.00																												
2.50	UDS	2.50-295								CI	0	0	69	31	24	34.2	1.810	1.35	2.68	50	24	26	TS	0.15	0.00	0.25	0.24	0.99
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	4																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	5																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	7				Top surface soil followed by soft to medium stiff,bluish grey silty clay. Traces of fine sand observed occasionally.	to																				
8.00	UDS	8.0-8.45								CI	0	1	66	33	24	31.1	1.850	1.41	2.70	50	25	25	TS	0.40	0.00		0.19	0.91
8.50																												
9.00	DS	9.00-9.45	9.00	5																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00																												
11.50																												
12.00	UDS	12.00-12.45								CI	0	0	72	28		30.2	1.850	1.42	2.68	43	23	20	TS	0.30	0.00	0.85	0.18	0.89
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	9						CH	0	0	60	40	31					59	25	34						
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core Sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slipped	CR	:Core Recovery
TS	:Tripod set (SPT)	DT	: Dead Stretched
K	:Co-efficient of Permeability		

Site : MPS-3 (ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 08.08.17.
Date of completion: 08.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table:1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			LoC.C (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	ε
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-																				
18.50	UDS	18.50-18.95								CI	0	0	68	32		29.0	1.840	1.43	2.68	48	23	25	TS	0.40	0.00	0.85	0.18	0.88
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	8																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : MPS-3 (ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Rued Level 100m assumed)

Date of starting: 08.08.17.
Date of completion: 08.8.17
Method of boring : Shell & Auger. Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	SQD:Rock Quality Designation	
SI.	:Slight	CR:Core Recovery	
TS	:Triaxial test(UU)	DT : Direct Shear test	
K	:Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	φ
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4																								
1.50																												
2.00	UDS	2.0-2.45								CI	0	0	69	31	25	30.0	1.840	1.42	2.69	49	23	26	TS	0.30	0.00	0.62	0.19	0.90
2.50	DS	2.50-2.95	2.50	4																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	3																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	6																								
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	6				Top surface soil followed by soft to medium stiff,bluish grey silty clay.Traces of fine sand observed occasionally.																					
7.50	UDS	7.50-7.95							to	CI	0	0	67	33	29	32.5	1.850	1.40	2.70	50	23	27	TS	0.34	0.00	0.75	0.20	0.93
8.00																												
8.50	DS	8.50-8.95	8.50	4																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	6																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	7						CH	0	1	58	41	34					60	25	35						
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	7					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SS	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UC)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : MPS-3 (ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 08.08.17.
Date of completion: 08.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	ϕ (degree)		Cc	e_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	8																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	8				-do-																				
18.50	UDS	18.50-18.95								CI	0	0	65	35		30.0	1.8-40	1.42	2.68	48	23	25	TS	0.46	10.00	0.90	0.19	0.89
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
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29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sliced	CR	Core Recovery
TS	Triaxial test (UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-5(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 09.08.17.
Date of completion: 9.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	c_v
0.00								Filled up ground with moorum.	0.00 to 0.5	Fill																		
0.50	DS	0.50							0.50																			
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	2																								
2.00																												
2.50	UDS	2.50-2.95								CH	0	1	57	42	46	35.0	1.820	1.35	2.65	60	25	35	TS	0.20	0.00	0.42	0.21	0.97
3.00	DS	3.00-3.45	3.00	5																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	4																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	4																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	4				Soft to medium stiff,grey, silty clay / clayey silt. Semi decomposed wood , observed scattordly.	to	CI	0	0	69	31	29					50	23	27						
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	5																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	2																								
12.50	UDS	12.50-12.95								CI	0	0	68	32	25	34.0	1.790	1.34	2.68	50	23	27	TS	0.14	0.00	0.19	0.22	1.01
13.00																												
13.50	DS	13.50-13.95	13.50	2																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	4					20.45																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-5(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Data of starting: 09.08.17.
Date of completion: 9.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Notation
DS Disturbed Sample — CS Rock core Sample
UDS Undisturbed sample — RQD:Rock Quality Designation
SL Slitgrd — Cir:Core Recovery
UCS Uniaxial test(UC) — DT : Direct Shear Test
K Co-efficient of Permeability

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	4																								
17.00																												
17.50	UDS	17.50-17.95																										
18.00	DS	18.00-18.45	18.00	5				-do-		CI	0	0	69	31		30.0	1.820	1.41	2.69	50	22	28	TS	0.30	0.00		0.19	0.91
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-5(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 09.08.17.
Date of completion: 09.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Run)	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	σ_0
0.00																												
0.50	DS	0.50						Filled up ground with macrum.	0.0to 1.0	Fill																		
1.00	DS	1.00-1.45	1.00	3					1.00																			
1.50																												
2.00	UDS	2.0-2.45								Cl	0	0	71	29	29	34.0	1.800	1.34	2.66	49	24	25	TS	0.24	0.00	0.25	0.21	0.98
2.50	DS	2.50-2.95	2.50	4																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	4																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	4						CH	0	0	54	46	42					62	25	37						
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	5																								
7.50																												
8.00								Soft to medium ,grey, silty clay / clayey silt. Semi decomposed wood , observed scatterdly.	7m																		
8.50	DS	8.50-8.95	8.50	4																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50	UDS	10.50-10.95								Cl	0	0	67	33	26	30.0	1.800	1.38	2.68	50	24	26	TS	0.25	0.00	0.55	0.20	0.94
11.00																												
11.50	DS	11.50-11.95	11.50	2																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	3																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	4					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat, Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Undisturbed core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-5(ZONE-5)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 09.08.17.

Date of completion: 09.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL

Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	σ_0
15.50																												
16.00																												
16.50	DS	(16.50-16.95	16.50	4																								
17.00																												
17.50										CI	0	0	72	28		-	-	-	-	46	23	23	-	-	-	-	-	-
18.00	DS	18.00-18.45	18.00	5				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Core cutter sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
VS	:Pravitorse/UCC	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-4(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 10.08.17.
Date of completion:10.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 3.30m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of Test	Cohesion (kg/cm²)	φ (degree)		Cc	φ
0.00								Filled up ground with brownish moorum,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00						Very soft,greyish brown silty clay / clayey silt.Traces of semi decomposed wood observed scatterdly.	1.00 to 4.00	CI	0	0	70	30	25	35.0	1.800	1.33	2.68	48	23	25	TS	0.15	0.00	0.28	0.22	1.01
1.50	DS	1.50-1.95	1.50	3																								
2.00	UDS	2.0-2.45																										
2.50																												
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00								Very loose,bluish grey silty fine to medium sand.	4.00 to 5.50	SM	0	61	← 39 →			-	-	-	-	Non Plastic			-	-	-	-	-
4.50	DS	4.50-4.95	4.50	4																								
5.00																												
5.50									5.50																			
6.00	DS	6.00-6.45	6.00	2																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	3																								
9.50	UDS	9.50-9.95						Very soft to medium stiff,dark grey silty clay / clayey silt.Decomposed wood observed closely.	to	OH	0	0	40	60	39	61.0	1.620	1.01	2.55	78	48	30	TS	0.10	0.00	0.14	0.40	1.53
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	5																								
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	7																								
14.00	UDS	14.0-14.45								OH	0	0	55	45	41	49.0	1.580	1.06	2.58	65	45	20	TS	0.28	0.00		0.35	1.43
14.50																												
15.00	DS	15.00-15.45	15.00	7					16.50																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TX	:Triaxial test(UU,	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-4(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Reduced Level 100m assumed)

Date of starting: 10.08.17.
Date of completion:10.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.30m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample/Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
15.50								-do-																				
16.00																												
16.50	DS	16.50-16.95	16.50	9					16.50																			
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	8																								
18.50	UDS	18.50-18.95						Medium stiff,bluish grey silty clay.	tn	CH	0	0	51	49		31.0	1.880	1.44	2.68	59	24	35	TS	0.45	0.00		0.18	0.87
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50									20.45																			
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slipped
TS :Tube sample,UCC
K :Co-efficient of Permeability
CS Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT :Direct Shear test

Site : IPS-4(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Read Level 100m assumed)

Date of starting: 10.08.17.
Date of completion:10.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.30m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion kg/cm²	Φ (degree)		Cc	c_v
0.00								Filled up ground with brownish moorum,brick bats etc.	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4					1.00																			
1.50																												
2.00	UDS	2.0-2.45																										
2.50	DS	2.50-2.95	2.50	4				Very soft,greyish brown silty clay / clayey silt.Traces of fine sand observed occasionally.	to	CI	0	1	71	28	26	31.0	1.800	.37	2.68	49	25	24	TS	0.28	0.00	0.50	0.20	0.95
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50									5.00																			
5.00								Very loose,bluish grey silty fine to medium sand.	5.00 to 6.0	SM	0	72	◄	28	►	-	-	-	-	Non Plastic			-	-	-	-	-
5.50	DS	5.50-5.95	5.50	4																								
6.00									6.00																			
6.50																												
7.00	DS	7.00-7.45	7.00	2																								
7.50																												
8.00	UDS	8.0-8.45								OH	0	0	64	36	40	55.0	1.590	.03	2.54	79	50	29	TS	0.31	0.00	0.15	0.36	1.48
8.50	DS	8.50-8.95	8.50	2																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	6				Very soft to medium stiff dark grey silty clay / clayey silt.Decomposed wood observed closely.	to																			
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	7																								
12.00	UDS	12.0-12.45								CH	0	0	56	44	36	33.0	1.850	.39	2.68	62	26	36	TS	0.44	0.00		0.20	0.93
12.50																												
13.00	DS	13.00-13.45	13.00	4																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					16.50																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CR	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI	:Sieved	CR	:Core Recovery
TS	:Triaxial test(UU)	DS	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-4(ZONE-S)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 50m eastward)

Date of starting: 10.08.17.
Date of completion:10.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.30m BGL
Termination Depth (m):20.0m

Depth below RGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay Differential Free Swell Index (%)					LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	σc
15.50								-do-																			
16.00																											
16.50	DS	16.50-16.95	16.50	7					16.50																		
17.00																											
17.50																											
18.00	DS	18.00-18.45	18.00	6				Medium stiff,bluish grey silty clay.		CH	0	0	58	42					60	26	34						
18.50									tn																		
19.00																											
19.50																											
20.00	DS	20.00-20.45	20.00	6																							
20.50									20.45																		
21.00																											
21.50																											
22.00																											
22.50																											
23.00																											
23.50																											
24.00																											
24.50																											
25.00																											
25.50																											
26.00																											
26.50																											
27.00																											
27.50																											
28.00																											
28.50																											
29.00																											
29.50																											
30.00																											

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SV	:Shipgel	CR	:Core Recovery
TS	:Triaxial test(UC)	D/T	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 11.08.17.
Date of completion: 11.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	e_0
0.00																												
0.50	DS	0.50						Filled up ground with soil,brick bats etc.	0.00 to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3					1.50																			
2.00	UDS	2.0-2.45								CI	0	1	63	36	24	29.0	1.800	1.40	2.69	50	23	27	TS	0.16	0.00	0.30	0.20	0.93
2.50																												
3.00	DS	3.00-3.45	3.00	2				Very soft to soft ,dark grey silty clay	to																			
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2					6.00																			
5.00																												
5.50									6.00																			
6.00	DS	6.00-6.45	6.00	2																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00	UDS	8.0-8.45						Very soft to soft ,dark grey to black, silty clay with decomposed vegetation.Peat/mack observed closely throughout.		OH	0	0	45	55	47	52.0	1.560	1.03	2.56	78	49	29	TS	0.18	0.00	0.30	0.37	1.49
8.50																												
9.00	DS	9.00-9.45	9.00	7					to																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	9																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	4						CH	0	0	55	45	32					62	25	37						
12.50									13.00																			
13.00									13.00																			
13.50	DS	13.50-13.95	13.50	5				Medium still,bluish grey silty clay.	to	CI	0	0	69	31						48	24	24						
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Sieve	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-5)

Bore Hole No: 01(One)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 11.08.17.

Date of completion: 11.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	σ0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	4																								
17.00	UDS	17.0-17.45								CI	0	0	67	33		30.0	1.820	1.40	2.70	48	24	24	TS	0.35	0.00	0.78	0.20	0.93
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slipped	CR	:Core Recovery
TS	:Tri-axial test (UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 11.08.17.
Date of completion: 11.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00																												
0.50	DS	0.50						Filled up ground with soil,brick bats etc.	0.00 to 1.0	Fill																		
1.00	DS	1.00-1.45	1.00	2					1.00																			
1.50																												
2.00	UDS	2.0-2.45								CH	0	0	55	45	40	38.0	1.830	1.33	2.71	60	25	35	TS	0.15	0.00	0.28	0.23	1.04
2.50	DS	2.50-2.95	2.50	3																								
3.00																												
3.50								Very soft to soft ,dark grey silty clay	to																				
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2						Cl	0	0	71	29	29					45	22	23						
6.00																												
6.50									7.00																			
7.00	DS	7.00-7.45	7.00	2					7.00																			
7.50																												
8.00								Very soft ,dark grey to black, silty clay with decomposed vegetation.Peat/muck observed closely throughout.	to																			
8.50	DS	8.50-8.95	8.50	2						OH	0	0	44	56	45					75	52	23						
9.00																												
9.50									10.00																			
10.00	DS	10.00-10.45	10.00	7					10.00																			
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	6																								
12.00	UDS	12.0-12.45						Medium stiff,bluish grey silty clay.	to	Cl	0	0	66	34	28	30.0	1.850	1.42	2.69	48	23	25	TS	0.35	0.00	0.72	0.39	0.89
12.50																												
13.00	DS	13.00-13.45	13.00	4																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CR	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Silpaul	CR	:Core Recovery
TS	:Triaxial test (UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Site : IPS-3(ZONE-5)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00
(Nearest Reduced Level 100m is assumed)

Date of starting: 11.08.17.

Date of completion: 11.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 2.00m BGL

Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cv	mv
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-		CI	0	0	70	30						49	23	26						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	5																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
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25.50																												
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26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Chunk core sample
UDS	Undisturbed Sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
TS	Triaxial Test (UU)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-2(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 12.08.17.
Date of completion: 12.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	av
0.00																												
0.50	DS	0.50						Filled up ground with reddish moorum.	0.00 to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3					1.50																			
2.00																												
2.50	UDS	2.50-2.95								CI	0	0	65	35	24	34.0	1.770	1.32	2.71	49	25	26	TS	0.16	0.00	0.30	0.25	1.05
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	3						CH	0	0	55	45	42					56	25	32						
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00								Very soft to soft ,grey to bluish grey, silty clay with decomposed vegetation.	to																			
8.50																												
9.00	DS	9.00-9.45	9.00	3																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00	UDS	11.0-11.45								CH	0	0	44	56	37	35.0	1.800	1.33	2.70	60	25	35	TS	0.25	0.00	0.55	0.23	1.03
11.50																												
12.00	DS	12.00-12.45	12.00	4																								
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	5																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					15.50																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slitpit	CR	Core Recovery
TS	Triaxial test (UC)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : IPS-2(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 12.08.17.
Date of completion: 12.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		C_c	e_0
15.50									15.00																			
16.00																												
16.50	DS	16.50-16.95	16.50	4						CH	0	0	45	55	35					62	25	37						
17.00																												
17.50								Soft to medium stiff ,dark grey to black, silty clay with decomposed vegetation.																				
18.00	DS	18.00-18.45	18.00	6					to																			
18.50	UDS	18.50-18.95								CH	0	0	45	55		31.0	1.820	1.39	2.71	60	26	34	TS	0.50	0.00	0.90	0.20	0.95
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50									20.45																			
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Tri-axial test(UU)	DT	:Direct Shear test
K	:Coefficient of Permeability		

Site : IPS-2(ZONE-6)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 12.08.17.
Date of completion: 13.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample/Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	Cv
0.00								Filled up ground with reddish	0.00	Fill																		
0.50	DS	0.50						mooram.	to 1.0																			
1.00	DS	1.00-1.45	1.00	3					1.00																			
1.50																												
2.00	UDS	2.0-2.45								CI	0	0	64	36	24	34.0	1.760	1.31	2.69	50	24	26	TS	0.18	0.00	0.35	0.23	1.05
2.50	DS	2.50-2.95	2.50	2																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	3						CI	0	0	68	32	25	–	-	-	-	50	24	26	-	-	-	-	-	-
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	3																								
7.50																												
8.00								Very soft to soft ,grey to bluish																				
8.50	DS	8.50-8.95	8.50	4				grey, silty clay with decomposed	to																			
9.00								vegetation.																				
9.50																												
10.00	DS	10.00-10.45	10.00	2																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	4																								
12.00	UDS	12.0-12.45								CH	0	0	44	56	35	36.0	1.840	1.35	2.72	65	26	39	TS	0.28	0.00	0.50	0.22	1.01
12.50																												
13.00	DS	13.00-13.45	13.00	4																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					15.00																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-2(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m estimated)

Date of starting: 12.08.17.
Date of completion: 12.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m):20.0m

Notation

DS	:Disturbed Sample	CS	:Block core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Tri-axial test(UU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	σ_0
15.50									15.00																			
16.00																												
16.50	DS	16.50-16.95	16.50	4						CH	0	0	51	49						61	25	36						
17.00																												
17.50								Soft to medium stiff, dark grey to black, silty clay with decomposed vegetation.																				
18.00	DS	18.00-18.45	18.00	7					to																			
18.50										CH	0	0	50	50		-	-	-	2.71	65	25	40	-	-	-	-	-	-
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50									20.45																			
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Sieve	CR	Core Recovery
TS	Triaxial test(CU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : IPS-1(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 18.08.17.
Date of completion: 13.8.17
Method of boring : Shelf & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	P_0
0.00									0.00																			
0.50	DS	0.50						Filled up ground with brown moorum	to 1.50	Fill																		
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	3					1.50																			
2.00																												
2.50	UDS	2.30-2.95								CH	0	0	52	48	38	34.5	1.800	1.34	2.75	68	35	43	TS	0.20	0.00	0.43	0.26	1.05
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	1																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	4																								
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	4				Soft to medium,dark grey to bluish grey, silty clay with decomposed vegetation.Peat observed closely throughout.	10	CH	0	0	44	56	38	35.0	1.820	1.35	2.72	65	25	40	TS	0.25	0.00	0.56	0.25	1.02
8.00	UDS	8.0-8.45																										
8.50																												
9.00	DS	9.00-9.45	9.00	5																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	3						OH	0	0	50	50	41					78	45	33						
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	4																								
12.50																												
13.00																												
13.50	DS	13.50-13.95	13.50	5																								
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					18.00	OH	0	0	44	56	41					81	52	29						

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-5)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 13.08.17.
Date of completion: 13.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Sliped	CR	:Core Recovery
TS	:Tri-axial test(CU)	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/W.A (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		C_c	e_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5				-do-																				
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7					18.00																			
18.50	UDS	18.50-18.95																										
19.00								Medium stiff,bluish grey silty clay	to	CI	0	0	65	35		30.0	1.830	1.41	2.66	47	23	24	TS	0.40	0.00	0.82	0.19	0.89
19.50																												
20.00	DS	20.00-20.45	20.00	8					20.45																			
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Sliped	CR:Core Recovery	
TS	:Triaxial test(UU)	DT : Direct Shear test	
K	:Co-efficient of Permeability		

Site : IPS-1(ZONE-5)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 13.08.17.
Date of completion: 13.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: AT BGL
Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	σ_0
0.00								Filled up ground with brown moorum	0.00 to 1.0	Fill																		
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4					1.00																			
1.50																												
2.00	UDS	2.0-2.45								CI	0	0	68	32	24	32.0	1.830	1.39	2.68	48	23	25	TS	0.28	0.00	0.60	0.22	0.93
2.50	DS	2.50-2.95	2.50	5																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	3						CH	0	0	45	55	33					65	25	40						
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	3				Soft to medium,dark grey to bluish grey, silty clay with decomposed vegetation.Peat observed closely throughout.																					
7.50																												
8.00									to\																			
8.50	DS	8.50-8.95	8.50	4																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	5																								
10.50	UDS	10.50-10.95								CH	0	0	48	52	32	35.0	1.800	1.33	2.74	69	23	46	TS	0.40	0.00	0.85	0.24	1.06
11.00																												
11.50	DS	11.50-11.95	11.50	4																								
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	4																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					18.00																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SI	:Signal	CR:Core Recovery	
Ts	:Unconsolidated U;	D.S :Direct Shear test	
K	:Co-efficient of Permeability		

Site : IPS-1(ZONE-5)

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 13.08.17.

Date of completion: 13.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: AT BGL

Termination Depth (m):20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	Pg
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5				-do-																				
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7					18.00																			
18.50										CI	0	0	70	30		-	-	-	-	49	24	25	-	-	-	-	-	-
19.00								Medium stiff,bluish grey silty clay	to																			
19.50																												
20.00	DS	20.00-20.45	20.00	7					20.45																			
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : IPS-1(ZONE-6)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 16.08.17.
Date of completion: 17.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Range	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	ε
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	2																								
2.00	UDS	2.0-2.45								CI	2	1	64	33	29	32.5	1.750	1.32	2.70	48	24	24	TS	0.18	0.00	0.33	0.23	1.04
2.50																												
3.00	DS	3.00-3.45	3.00	2																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2																								
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	3				Very soft,bluish grey , silty clay .Little kankar observed intermittently.	to	CI	3	3	64	30	24					45	23	22						
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	2																								
9.50	UDS	9.50-9.95								MI	0	3	74	23	21	29.0	1.900	1.39	2.65	42	28	14	TS	0.16	4.00	0.26	0.19	0.91
10.00																												
10.50	DS	10.50-10.95	10.50	3																								
11.00																												
11.50									12.00																			
12.00	DS	12.00-12.45	12.00	5					12.00																			
12.50																												
13.00								Loose,grey sandy silt /silty fine sand.Clay pockets observed occasionally.																					
13.50	DS	13.50-13.95	13.50	5					to	SM	0	62	←38→				1.72			Non Plastic			DT	0.00	28.0			
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-6)
Bore Hole No: 01(One)
R.L. of BH (m): 100.00 (Nearest Road Level (100m assumed))

Date of starting: 16.08.17.
Date of completion: 17.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed Sample	RQD: Rock Quality Designation	
SL	:Slipped	C&R:Core Recovery	
TS	:Triaxial test(UU)	SPT : Penetration Test	
K	:Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C.R (%)	R.Q.D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	ϕ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	7																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-		ML	0	31	←69→							Non Plastic								
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-6)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level :100m assumed)

Date of starting: 16.08.17.
Date of completion: 16.8.17
Method of boring : Shelf & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m):20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Sliped	CR	:Core Recovery
TS	:Tri-axial test(UU)	DT	:Direct Shear test
K	:Coefficient of Permeability		

Depth below (GL (m)	Type of sampling	Depth of sample/Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	φ (degree)		Cc	α_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	4						CH	0	0	55	45						60	24	36						
1.50																												
2.00																												
2.50	DS	2.50-2.95	2.50	3																								
3.00	UDS	3.0-3.45								CI	3	1	62	34	24	30.0	1.760	1.35	2.69	49	23	26	TS	0.19	0.00	0.40	0.22	0.99
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00																												
5.50	DS	5.50-5.95	5.50	2				Very soft,brownish grey , silty clay .Little kankar observed intermittently,Rusty brown patches observed.	to																			
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	1						CI	0	2	68	30	21					46	23	23						
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	2																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	4																								
10.50									11.00																			
11.00									11.00																			
11.50	DS	11.50-11.95	11.50	5						ML	0	15	76	9						30	28	2						
12.00																												
12.50																												
13.00	DS	13.00-13.45	13.00	6				Loose,grey sandy silt /silty fine sand.Clay pockets observed occasionally.	to	ML	0	18	←82→							31	26	5						
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : IPS-1(ZONE-6)
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00 (Normal Road Level 100m assumed)

Date of starting: 16.08.17.
Date of completion: 16.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m):20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SI.	:Slipped	CR	:Core Recovery
TS	:Tube sample(UD)	DT	: Direct Shear test
K	:Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	e_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	5				-do-		ML	0	29	←71→							Non Plastic								
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **Prop STP-2 at Manipur University**

Bore Hole No: 01(One)

R.L. at BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 17.08.17.

Date of completion: 17.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 3.00m BGL

Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Sliped	CR:Core Recovery	
TS	:Triaxial test (UU)	DT :Direct Shear test	
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Sylubol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content(WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50						Filled up ground with moorum.	to	Fill																		
1.00	DS	1.00							1.50																			
1.50	DS	1.50-1.95	1.50	4					1.50																			
2.00	UDS	2.0-2.45								CI	0	0	66	34	24	34.1	1.790	1.33	2.69	50	24	26	TS	0.25	0.00	0.50	0.23	1.02
2.50																												
3.00	DS	3.00-3.45	3.00	3				Soft to very soft,brownish grey silty clay.	to																			
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	2						CH	0	0	58	42	44					60	26	34						
5.00																												
5.50									6.00																			
6.00	DS	6.00-6.45	6.00	2					6.00																			
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	1						OH	0	0	49	51	45					82	45	37						
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	0				Very soft,dark grey organic silty clay.Decomposed wood and peat observed closely.	to																			
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	1																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	2																								
12.50	UDS	12.50-12.95								CH	0	0	52	48	36	35.0	1.790	1.33	2.69	65	26	39	TS	0.14	0.00	0.20	0.23	1.03
13.00									13.50																			
13.50	DS	13.50-13.95	13.50	4				Soft to medium stiff,bluish grey silty clay.	13.50																			
14.00									to																			
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

RIGHT SITE SURVEY
New Town,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : Prop STP-2 at Manipur University

Bore Hole No: 01(One)
R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 17.08.17.
Date of completion: 17.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 3.00m BGL
Termination Depth (m): 20.0m

Notation
DS :Disturbed Sample
UDS :Undisturbed sample
SL :Slipped
TS :Triaxial test(UU)
K :Co-efficient of Permeability
CS:Rock core sample
RQD:Rock Quality Designation
CR:Core Recovery
DT :Direct Shear test

Depth below NGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Θ (degree)		Cc	ε_0
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50	UDS	17.50-17.95								CH	0	0	54	46	36	31.0	1.840	1.40	2.71	65	25	40	TS	0.35	0.00		0.22	0.93
18.00	DS	18.00-18.45	18.00	6				-do-																				
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY
New Patna,Rajarhat,Kolkata

Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : Prop STP-2 at Manipur University
Bore Hole No: 02(Two)
R.L. of BH (m): 100.00
(Nearest Road Level/100m assumed)

Date of starting: 17.06.17.
Date of completion: 17.8.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	UCS	:Unconfined compression
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Sieved	CR	:Core Recovery
LS	:Grain size analysis	DT	:Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	Av
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	2																								
1.50																												
2.00	UDS	2.0-2.45																										
2.50	DS	2.50-2.95	2.50	2				Very soft,brownish grey silty clay.	to	CI	0	0	71	29	21	32.6	1.810	1.37	2.69	49	23	26	TS	0.14	0.00	0.22	0.21	0.97
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	2																								
4.50																												
5.00									5.50																			
5.50	DS	5.50-5.95	5.50	0					5.50		Mainly decomposed wood																	
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	1																								
7.50																												
8.00																												
8.50	DS	8.50-8.95	8.50	2				Very soft,dark grey organic silty clay.Decomposed wood and peat observed closely.	to	OH	0	0	44	56	38					83	49	34						
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	2																								
10.50																												
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	2																								
12.50	UDS	12.50-12.95								CH	0	0	55	45	43	33.0	1.750	1.32	2.69	69	25	44	TS	0.15	0.00	0.22	0.23	1.04
13.00									13.50																			
13.50	DS	13.50-13.95	13.50	4				Soft to medium stiff,bluish grey silty clay.	13.50 to																			
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	5					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **Prop STP-2 at Manipur University**

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00
(Mystical Road Level 100m assumed)

Date of starting: 17.08.17.

Date of completion: 17.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL

Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	US	:Undisturbed Sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Sieved	CR	:Core Recovery
TS	:Triaxial test(UC)	VST	:Vane Shear test
K	:Coefficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample (Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	φ
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-																				
18.50	UDS	18.50-18.95								CH	0	0	59	41	34	33.0	1.850	1.39	2.70	65	24	41	TS	0.30	9.00		0.20	0.94
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	5																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
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26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS/UCS	:Unconfined compressive strength
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Sleeped	CR	:Core Recovery
TS	:Triaxial test(UU)	DST	:Direct Shear test
K	:Co-efficient of Permeability		

Site : Prop STP-2 at Manipur University

Bore Hole No: 03(Three)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 17.06.17.

Date of completion: 17.06.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	CR (%)	RQD (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50																												
2.00	DS	2.00-2.45	2.00	2																								
2.50								Very soft,brownish grey silty clay.	to																			
3.00	UDS	3.00-3.45																										
3.50	DS	3.50-3.95	3.50	2						CI	0	0	68	32	21	31.5	1.780	1.35	2.69	49	23	26	TS	0.14	0.00	0.25	0.22	0.99
4.00																												
4.50									5.00																			
5.00	DS	5.00-5.45	5.00	2					5.00																			
5.50																												
6.00																												
6.50	DS	6.50-6.95	6.50	2																								
7.00																												
7.50																												
8.00	DS	8.00-8.45	8.00	0																								
8.50																												
9.00								Very soft,dark grey organic silty clay.Decomposed wood and peat observed closely.	to	OH	0	0	44	56	41					79	51	28						
9.50																												
10.00	DS	10.00-10.45	10.00	1																								
10.50																												
11.00																												
11.50	DS	11.50-11.95	11.50	0																								
12.00																												
12.50																												
13.00	DS	13.0-13.45	13.00	2					13.50																			
13.50									13.50																			
14.00								Soft to medium stiff,bluish-grey silty clay.	to																			
14.50	UDS	14.50-14.95								CH	0	0	54	46	42	31.0	1.830	1.40	2.69	69	25	44	TS	0.30	0.00	0.65	0.20	0.93
15.00	DS	15.0-15.45	15.00	4					20.45																			

Mainly decomposed wood

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CBR:Check Bore sample
UDS	:Undisturbed sample	RQD:Rock Quality Designation
SL	:Sieve	CR:Core Recovery
UU	:Triaxial test(UU)	DT :Direct Shear test
K	:Co-efficient of Permeability	

Site : **Prop STP-2 at Manipur University**

Bore Hole No: 03(Three)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 17.08.17.

Date of completion: 17.08.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 0.50m BGL

Termination Depth (m): 20.0m

Depth below RGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N"Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	av
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	5																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	6				-do-		CH	0	0	58	42						66	25	41						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	6																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
24.00																												
24.50																												
25.00																												
25.50																												
26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	DS(Bulk)	Bulk sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
UC	Unconfined(UCC)	DT	Direct Shear test
K	Coefficient of Permeability		

Site : Prop STP-3 at Irilbung

Bore Hole No: 01(One)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 18.08.17.

Date of completion: 18.08.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL

Termination Depth (m): 20.0m

Depth below NGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	φ (degree)		Cc	m_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	4																								
2.00	UDS	2.0-2.45						Top surface soil followed by Soft to medium stiff ,brownish grey clayey silt with traces of fine sand.		Ml	0	2	77	21	15	29.1	1.840	1.43	2.69	41	28	13	TS	0.26	3.00	0.49	0.19	0.89
2.50																												
3.00	DS	3.00-3.45	3.00	6					to																			
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	5						Ml	0	4	76	20						42	28	14						
5.00																												
5.50																												
6.00	DS	6.00-6.45	6.00	4					6.50																			
6.50									6.50																			
7.00																												
7.50	DS	7.50-7.95	7.50	6																								
8.00																												
8.50																												
9.00	DS	9.00-9.45	9.00	7																								
9.50	UDS	9.50-9.95						Medium stiff ,dark grey silty clay.Decomposed wood and peat observed closely.	to	OH	0	0	39	61	44	46.0	1.580	1.08	2.59	71	49	22	TS	0.30	0.00		0.24	1.39
10.00																												
10.50	DS	10.50-10.95	10.50	5																								
11.00																												
11.50																												
12.00	DS	12.00-12.45	12.00	6						CH	0	0	50	50	43					70	26	44						
12.50																												
13.00									13.50																			
13.50	DS	13.50-13.95	13.50	7				Medium stiff,bluish grey silty clay.	13.50 to																			
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	6					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : Prop STP-3 at Irilbung

Bore Hole No: 01(One)

R.L. of BH (m): 100.00
(Nearest Road Level 100m assumed)

Date of starting: 18.08.17.
Date of completion: 18.08.17
Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 1.00m BGL
Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Triaxial test(UU)	DT	: Direct Shear test
K	:Co-efficient of Permeability		

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N' Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI (%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	e_0
15.50																												
16.00	UDS	16.0-16.45								CH	0	0	54	46	42	30.5	1.850	1.42	2.69	65	25	40	TS	0.50	0.00	5.10	0.19	0.90
16.50	DS	16.50-16.95	16.50	8																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	7				-do-		CH	0	0	54	46						68	25	43						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	7																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
23.00																												
23.50																												
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26.00																												
26.50																												
27.00																												
27.50																												
28.00																												
28.50																												
29.00																												
29.50																												
30.00																												

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
TS	Triaxial test(UU)	DT	Direct Shear test
K	Co-efficient of Permeability		

Site : Prop STP-3 at Iribung

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 19.08.17.

Date of completion: 19.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 3.00m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm^2)	Consolidation Characteristic	
			Depth in meter	Observed N/Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm^2)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00																										
1.50	DS	1.50-1.95	1.50	5																								
2.00	UDS	2.0-2.45						Top surface soil followed by medium stiff ,brownish grey clayey silt with traces of fine sand.	to	Ml	0	3	76	21	15	29.3	1.850	1.43	2.68	44	29	15	TS	0.28	4.00	0.50	0.18	0.87
2.50																												
3.00	DS	3.00-3.45	3.00	4																								
3.50																												
4.00																												
4.50	DS	4.50-4.95	4.50	5					.	Ml	0	6	74	20						42	29	13						
5.00																												
5.50									6.00																			
6.00	DS	6.00-6.45	6.00	1					6.00																			
6.50																												
7.00																												
7.50	DS	7.50-7.95	7.50	2																								
8.00	UDS	8.0-8.45						Very soft ,dark grey silty clay.Decomposed wood and peat observed closely.	to	OH	0	0	54	46	36	52.0	1.630	1.07	2.55	79	56	23	TS	0.11	0.00		0.34	1.39
8.50																												
9.00	DS	9.00-9.45	9.00	2																								
9.50																												
10.00																												
10.50	DS	10.50-10.95	10.50	4																								
11.00									11.50																			
11.50									11.50																			
12.00	DS	12.00-12.45	12.00	14																								
12.50																												
13.00								Completely weathered shale converted to very stiff residual soil comprising clayey silt with fine sand.	to																				
13.50	DS	13.50-13.95	13.50	18																								
14.00	UDS	14.0-14.45								Ml	0	11	60	29		24.0	1.930	1.56	2.72	44	28	16	TS	0.66	9.00		0.14	0.75
14.50																												
15.00	DS	15.00-15.45	15.00	23					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	Disturbed Sample	CS	Rock core sample
UDS	Undisturbed sample	RQD	Rock Quality Designation
SL	Slipped	CR	Core Recovery
TS	Triaxial test (UU)	DST	Direct Shear test
K	Coefficient of Permeability		

Site : Prop STP-3 at Iritaung

Bore Hole No: 02(Two)

R.L. of BH (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 19.08.17.

Date of completion: 19.8.17

Method of boring : Shell & Auger, Rotary mud circulation

Static Ground Water Table: 3.00m SGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample (Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed "N" Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	25																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	31				-do-		MI	0	16	63	21						45	28	17						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	22																								
20.50																												
21.00																												
21.50																												
22.00																												
22.50																												
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RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Notation

DS	:Disturbed Sample	CS:Rock core sample	
UDS	:Undisturbed sample	RQD:Rock Quality Designation	
SL	:Slipped	CR:Core Recovery	
TS	:Triaxial test (UU)	DT : Direct Shear test	
K	:Co-efficient of Permeability		

Site : Prop STP-3 at Iribung

Bore Hole No: 03(Three)

R.L. of BH (m): 100.00 (Nearest Road Level 100m established)

Date of starting: 19.08.17.

Date of completion: 19.8.17

Method of boring : Shell &.Auger, Rotary mud circulation

Static Ground Water Table: 2.50m BGL

Termination Depth (m): 20.0m

Depth below EGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed 'N'Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
0.00									0.00																			
0.50	DS	0.50																										
1.00	DS	1.00-1.45	1.00	6																								
1.50								Top surface soil followed by medium stiff ,brownish grey clayey silt with traces of fine sand.	to																			
2.00	UDS	2.0-2.45								MI	0	6	73	21	15	29.1	1.850	1.43	2.69	44	28	16	TS	0.28	4.00	0.50	0.18	0.88
2.50	DS	2.50-2.95	2.50	6																								
3.00																												
3.50																												
4.00	DS	4.00-4.45	4.00	3																								
4.50									5.00																			
5.00									5.00																			
5.50	DS	5.50-5.95	5.50	1						OH	0	0	44	56	46					82	49	33						
6.00																												
6.50																												
7.00	DS	7.00-7.45	7.00	2																								
7.50								Very soft ,dark grey silty clay.Decomposed wood and peat observed closely.	to																			
8.00																												
8.50	DS	8.50-8.95	8.50	2																								
9.00																												
9.50																												
10.00	DS	10.00-10.45	10.00	3																								
10.50	UDS	10.50-10.95								OH	0	0	45	55	36	51.0	1.620	1.07	2.55	78	50	28	TS	0.11	0.00	0.16	0.33	1.38
11.00									12.50																			
11.50	DS	11.50-11.95	11.50	15					11.50																			
12.00																												
12.50	UDS	12.50-12.95						Completely weathered shale converted to very stiff residual soil comprising clayey silt with fine sand.	to	MI	0	8	63	29		24.0	1.930	1.56	2.72	45	29	16	TS	0.80	7.00		0.14	0.75
13.00	DS	13.00-13.45	13.00	18																								
13.50																												
14.00																												
14.50																												
15.00	DS	15.00-15.45	15.00	21					20.45																			

RIGHT SITE SURVEY New Town,Rajarhat,Kolkata		Log of Boring & Test Result

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site : **Prop STP-3 at Irilbung**

Bore Hole No: 03(Three)

R.L. of Bit (m): 100.00 (Nearest Road Level 100m assumed)

Date of starting: 19.08.17.

Date of completion: 19.8.17

Method of boring : Shell &Auger. Rotary mud circulation

Static Ground Water Table: 2.50m BGL

Termination Depth (m): 20.0m

Notation

DS	:Disturbed Sample	CS	:Rock core sample
UDS	:Undisturbed sample	RQD	:Rock Quality Designation
SL	:Slipped	CR	:Core Recovery
TS	:Tri-axial test(UU)	DT	:Direct Shear test
K	:Coefficient of Permeability		

Depth below BGL (m)	Type of sampling	Depth of sample /Run	SPT		Rock Sample		Log Symbol	Description of Strata	Thickness (m)	IS classification	Grain Size Distribution				Differential Free Swell Index (%)	Natural Moisture Content/WA (%)	Bulk Density(gm/cc)	Dry Density (gm/cc)	Specific Gravity	Atterberg Limits			Shearing Strength characteristic			UCC (kg/cm²)	Consolidation Characteristic	
			Depth in meter	Observed N Value	C R (%)	R Q D (%)					% Gravel	% Sand	% Silt	% clay						LL (%)	PL (%)	PI(%)	Type of test	Cohesion (kg/cm²)	Φ (degree)		Cc	c_v
15.50																												
16.00																												
16.50	DS	16.50-16.95	16.50	28																								
17.00																												
17.50																												
18.00	DS	18.00-18.45	18.00	22				-do-		MI	0	19	63	18						44	29	15						
18.50																												
19.00																												
19.50																												
20.00	DS	20.00-20.45	20.00	27																								
20.50																												
21.00																												
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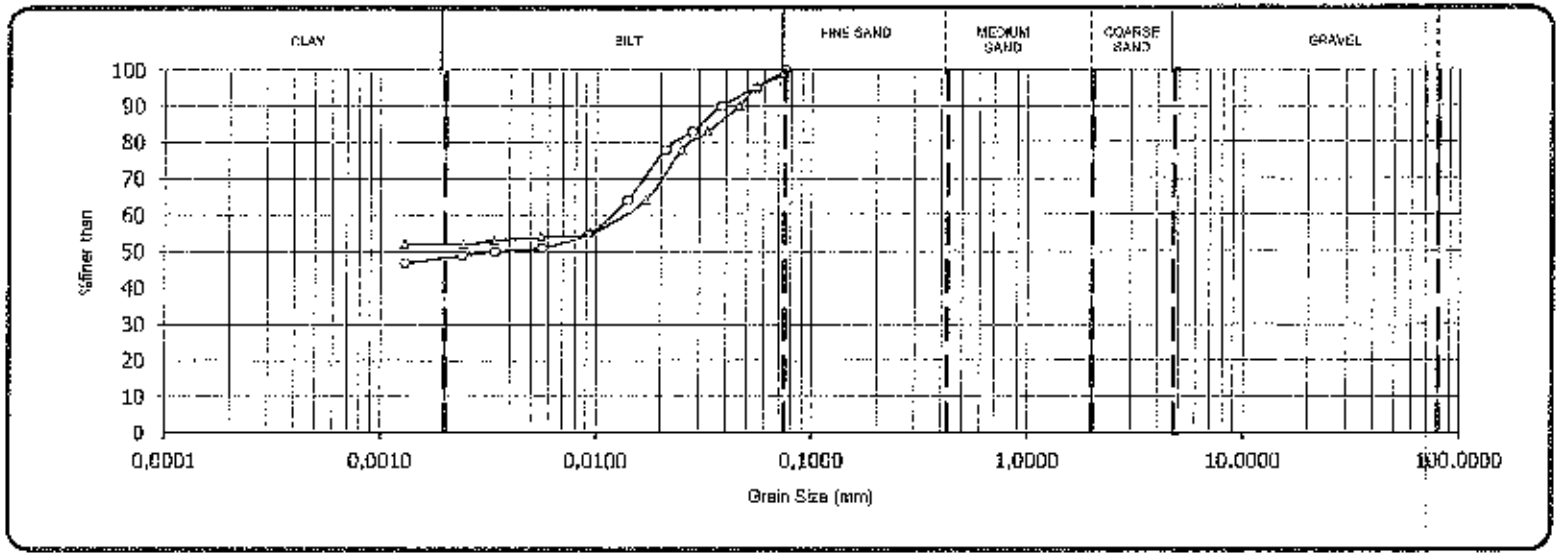
RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

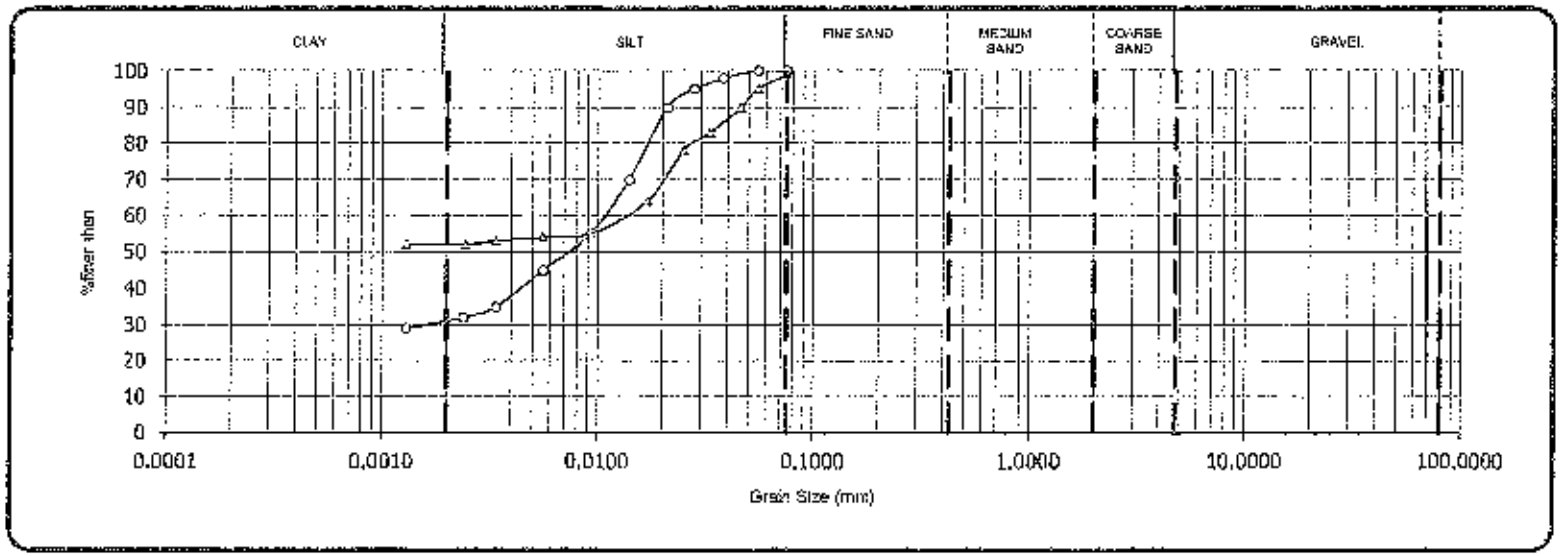


Location	Symbol	BH NO	Depth (m)
MPS-1 ZONE-1	○	1	2.50
EXIS STP-1	△	2	10.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

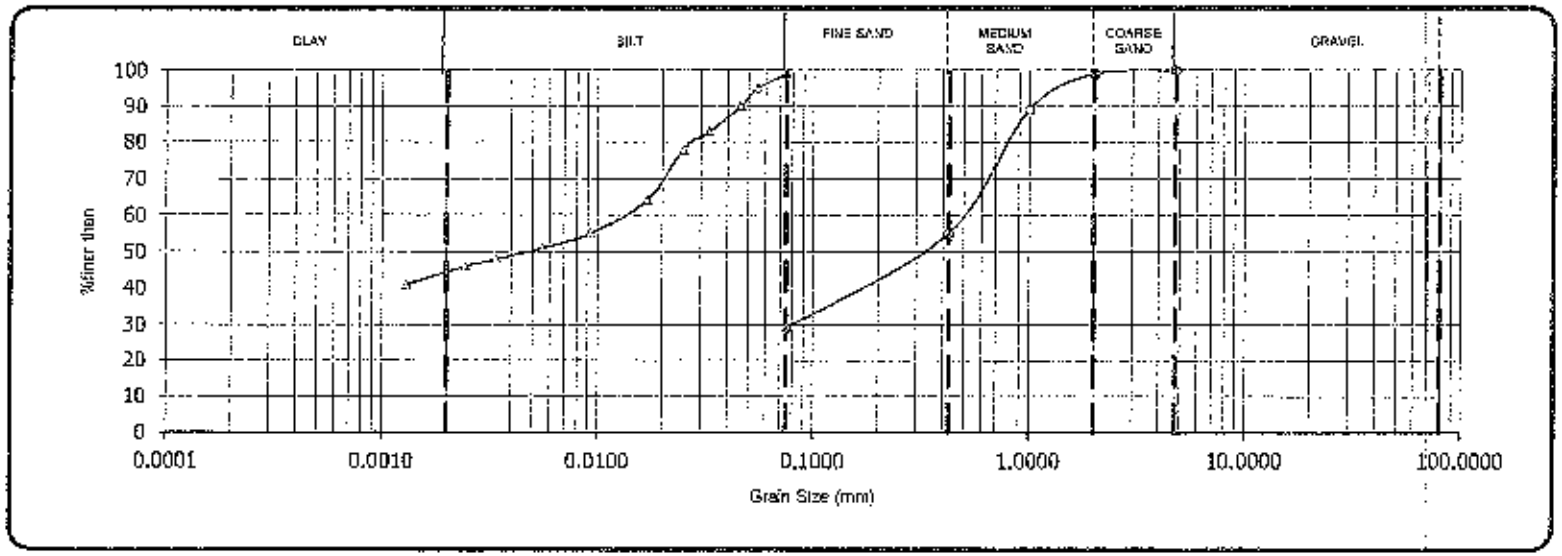


Location	Symbol	BH NO	Depth (m)
IPS 2-ZONE 2& 3	○	1	6.50
IPS-1 ZONE 2 &3	△	2	18.00

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

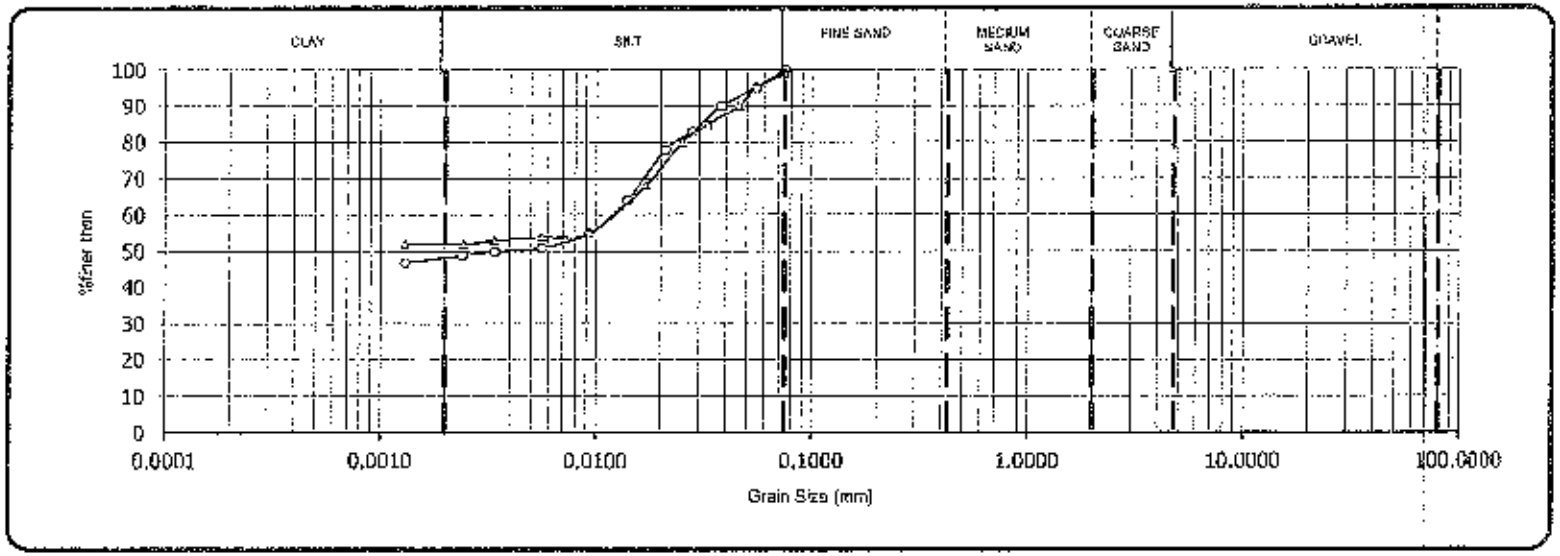


Location	Symbol	BH NO	Depth (m)
IPS-4 ZONE 2&3	O	1	6.00
IPS 5-ZONE 2&3	A	2	13.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

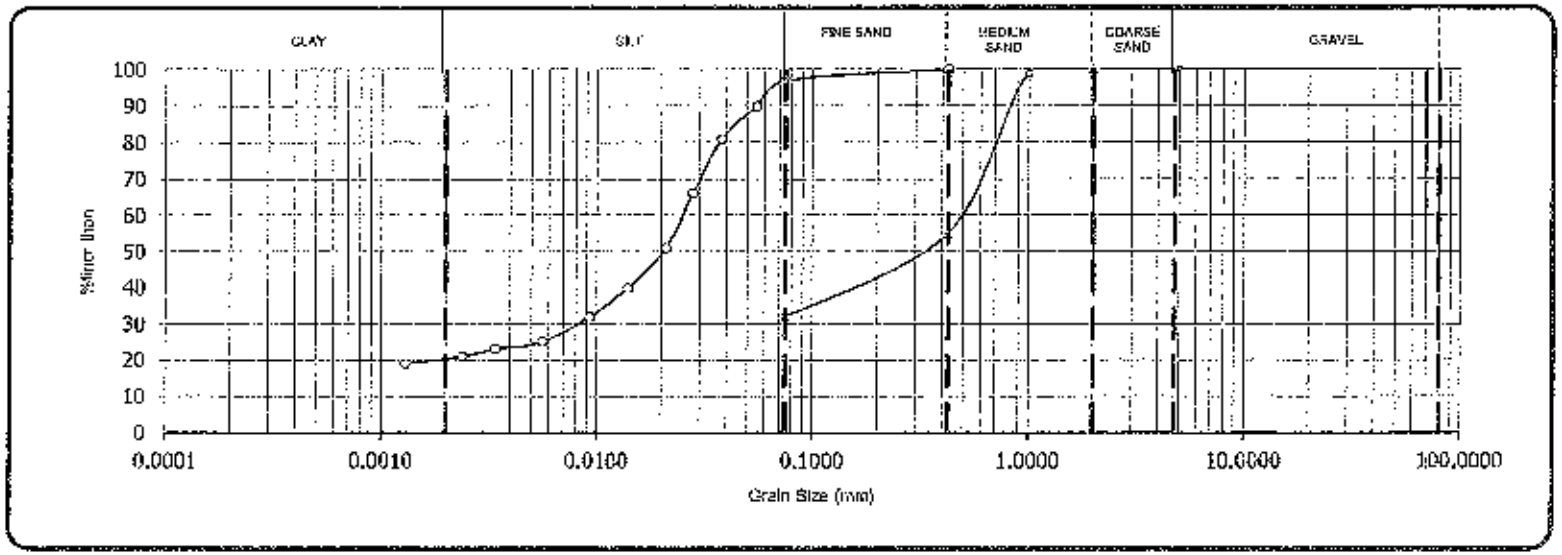


Location	Symbol	BH NO	Depth (m)
IPS-3 ZONE 2&3	○	1	2.00
IPS 6-ZONE-2&3	△	2	18.00

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

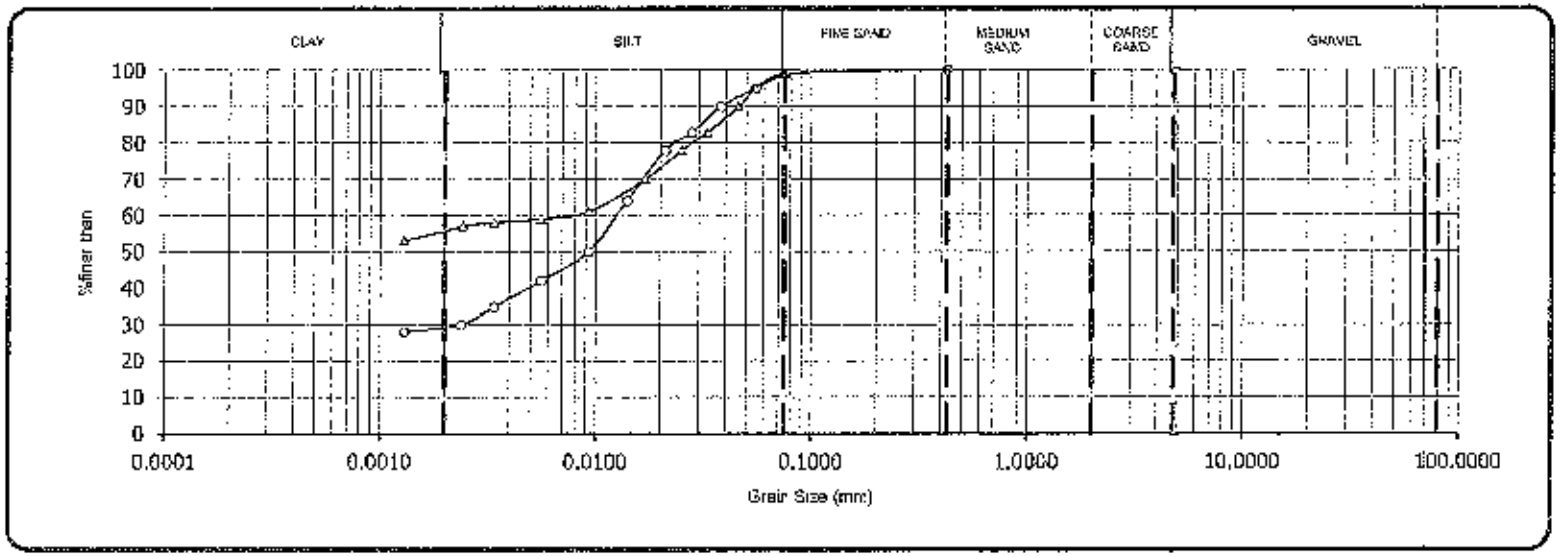


Location	Symbol	BH NO	Depth (m)
IPS-7 ZONE 2&3	O	1	6.50
IPS-8 ZONE 2&3	Δ	2	6.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

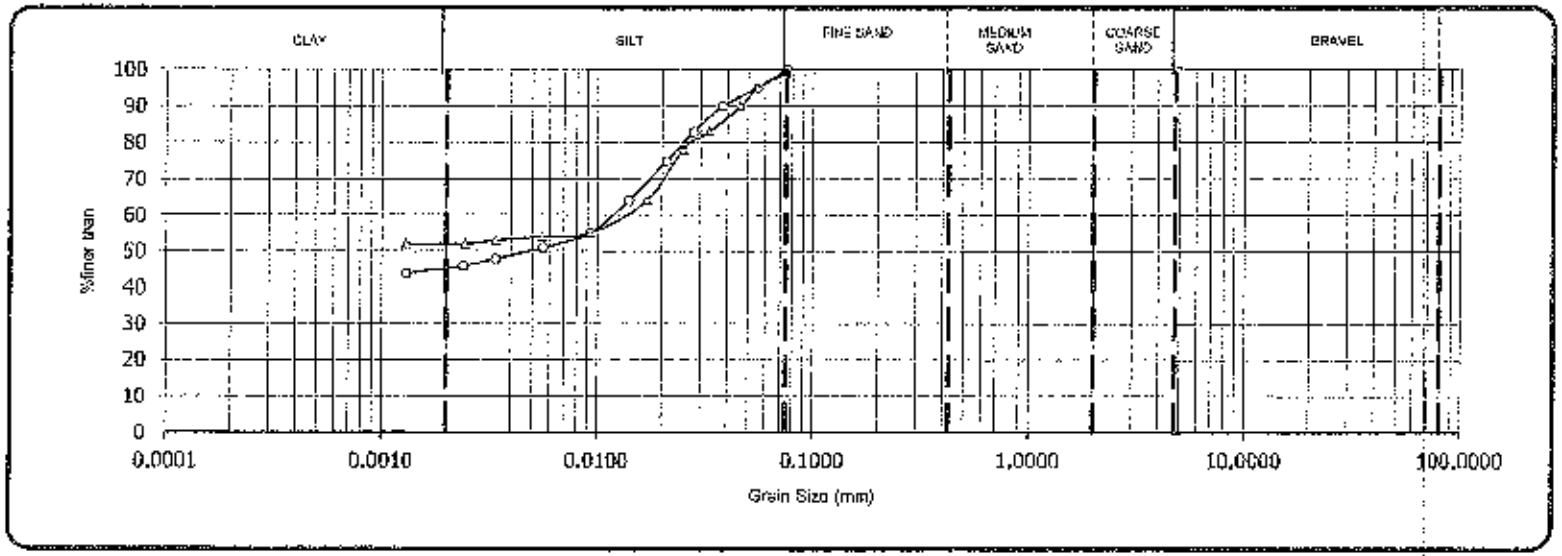


Location	Symbol	BH NO	Depth (m)
IPS 3-ZONE 4	O	2	2.00
MPS 2-ZONE-4	Δ	1	6.00

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

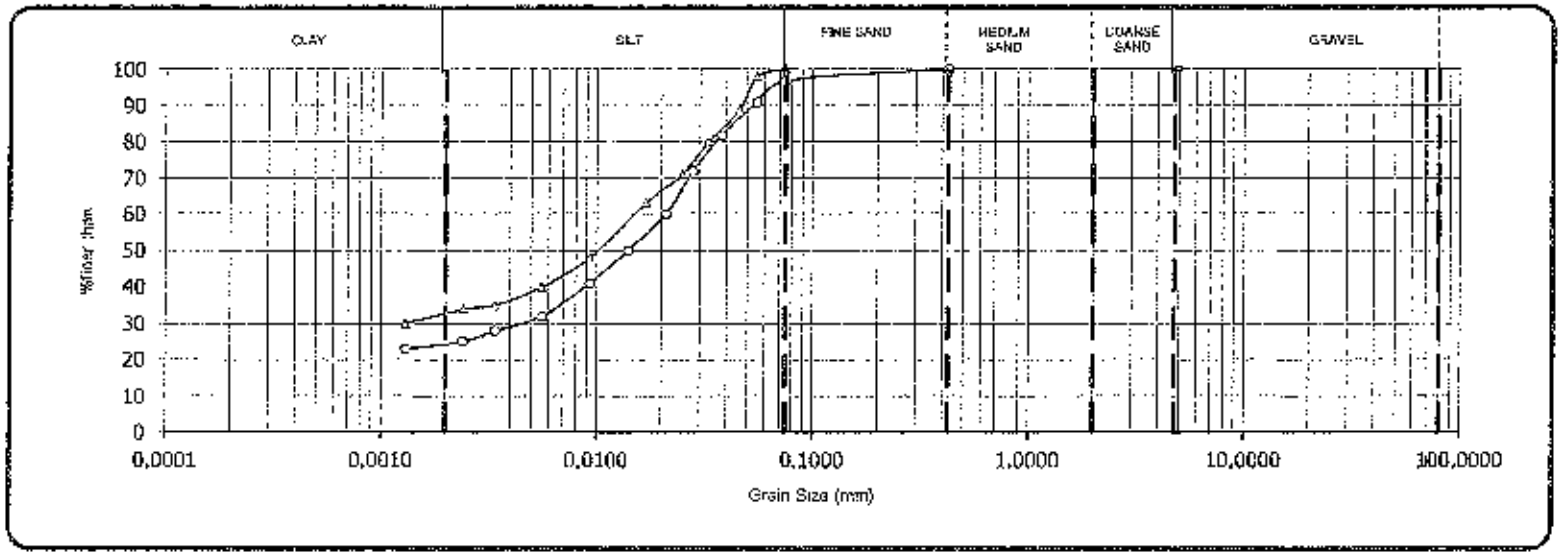


Location	Symbol	BH NO	Depth (m)
IPS 2-ZONE 4	○	1	11.00
IPS-1 ZONE 4	△	2	12.00

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

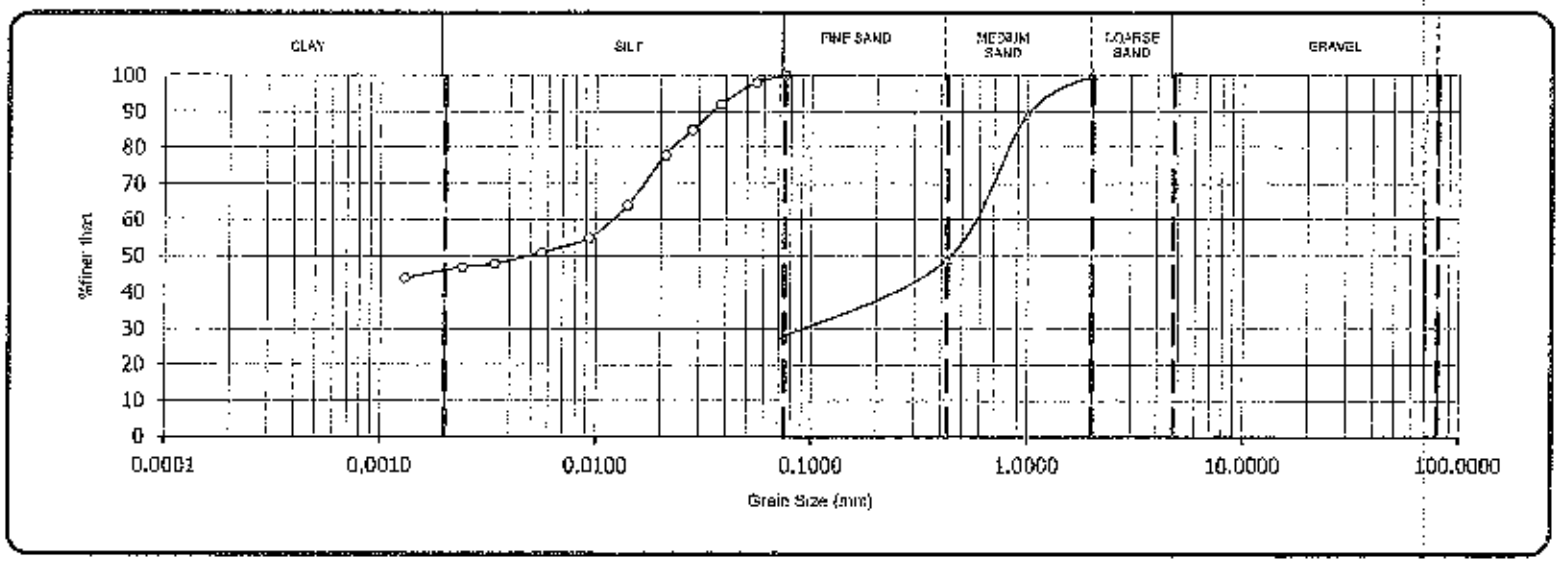


Location	Symbol	BH NO	Depth (m)
IPS-6-ZONE 5	O	1	4.50
MPS 3-ZONE-5	Δ	2	7.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

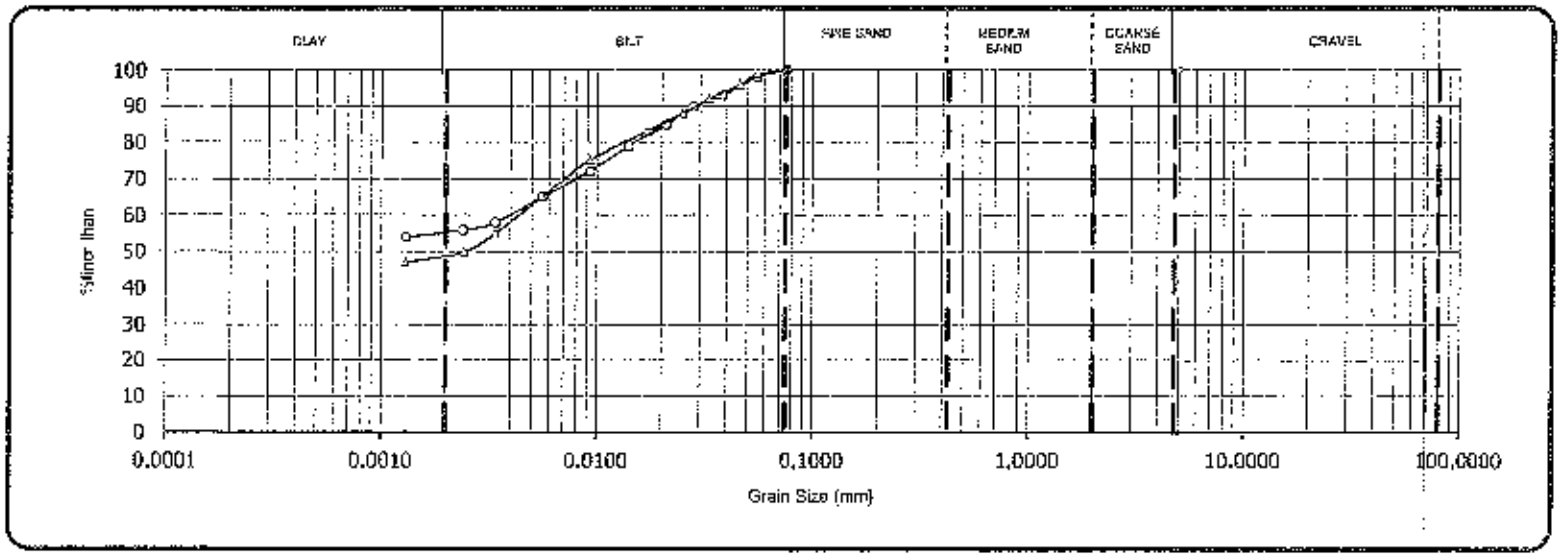


Location	Symbol	BH NO	Depth (m)
IPS 5-ZONE 5	O	2	5.50
IPS-4 ZONE-5	Δ	2	5.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

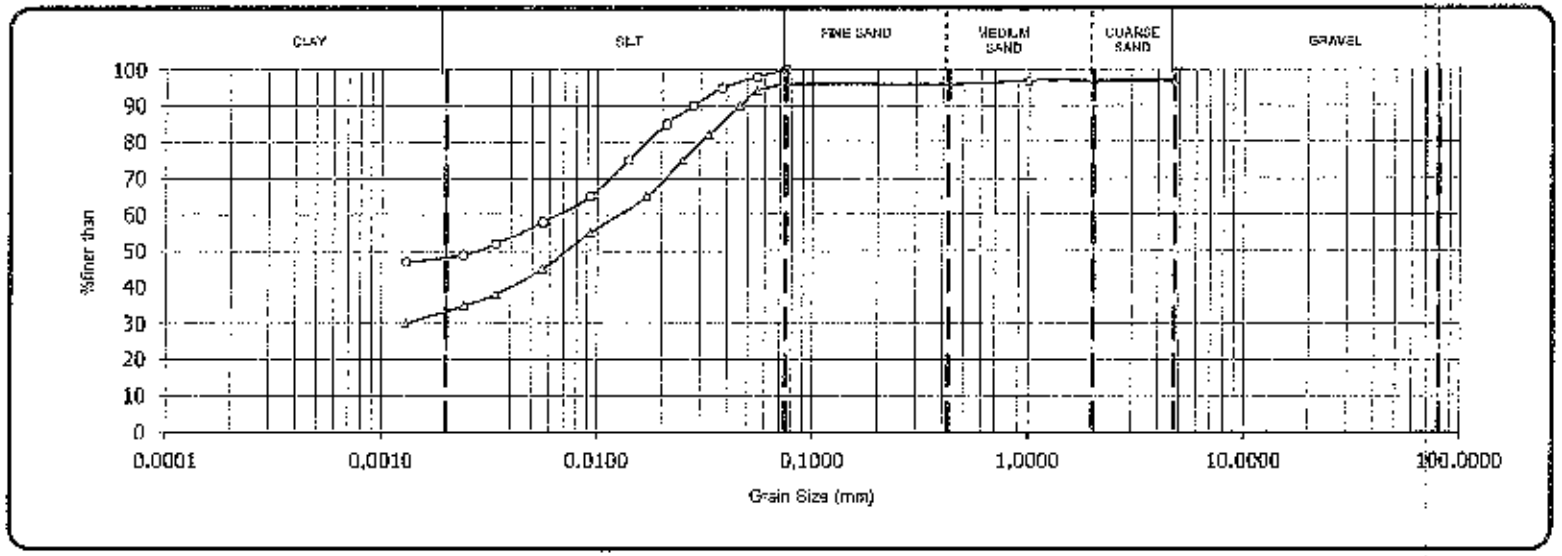


Location	Symbol	BH NO	Depth (m)
IPS3-ZONE-5	○	1	8.50
IPS 2-ZONE-5	△	2	16.50

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

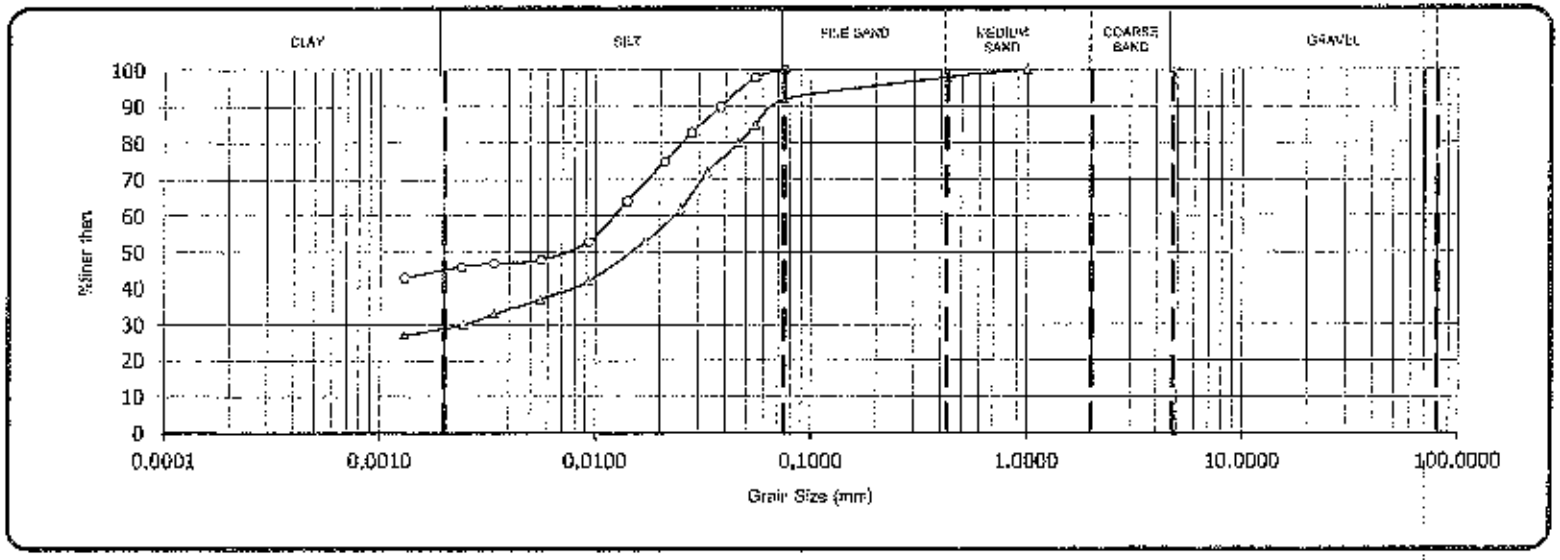


Location	Symbol	BH NO	Depth (m)
IPS-1 ZONE-5	O	1	2.50
IPS-1 ZONE 6	Δ	2	3.00

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

GRAIN SIZE DISTRIBUTION CURVE

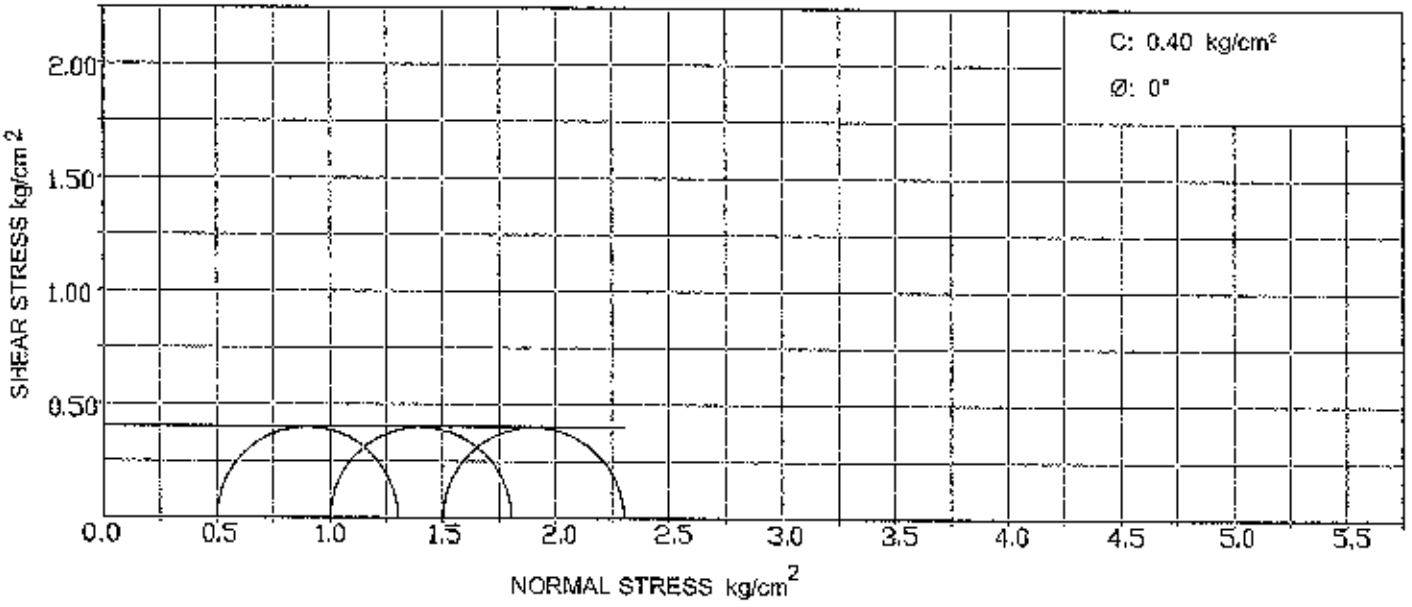


Location	Symbol	BH NO	Depth (m)
PROP STP-2	○	2	12.50
PROP-STP-3	△	3	12.50

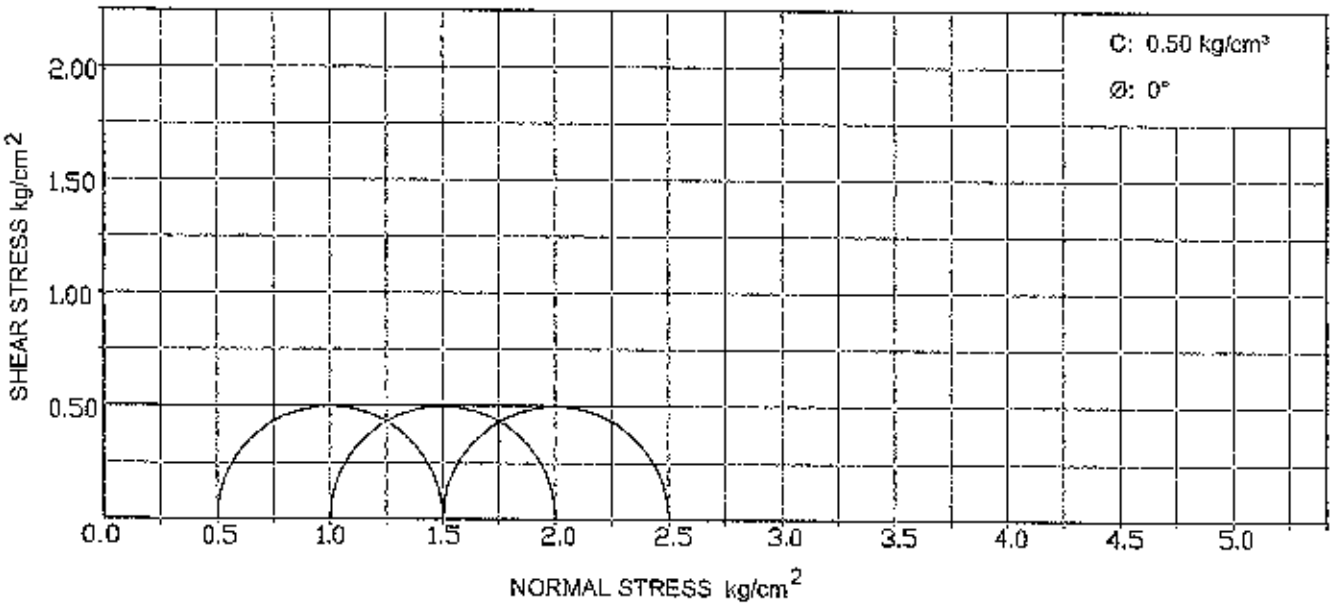
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:MPS1 ZONE 1 BOREHOLE NO:1 DEPTH (m): 11.0



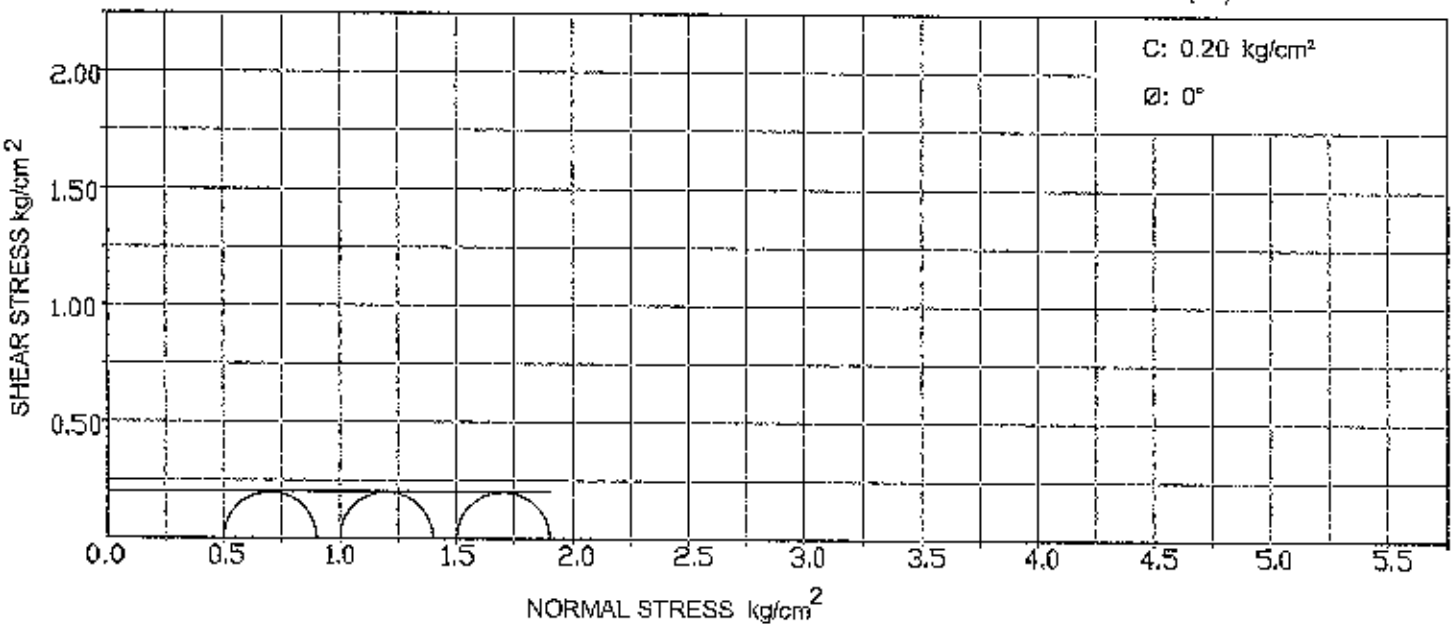
LOCATION:EXIS STP-1 BOREHOLE NO:1 DEPTH (m): 9.50



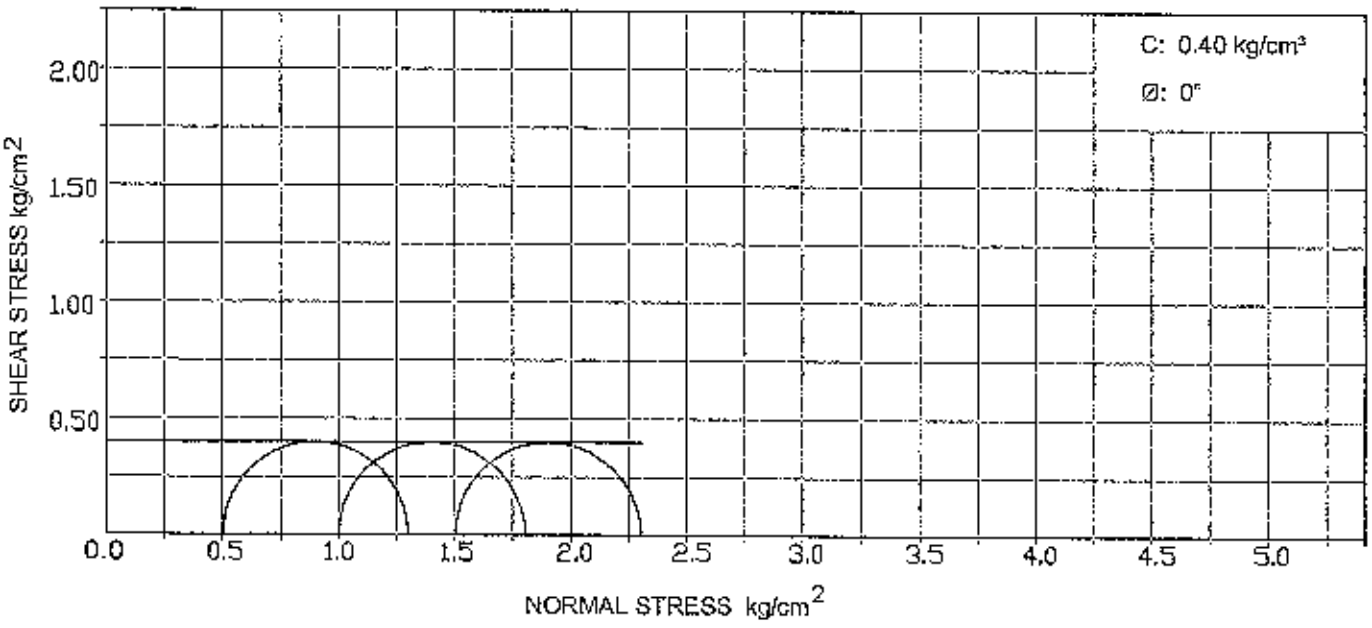
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:IPS 2 ZONE 2 & 3 BOREHOLE NO:1 DEPTH (m): 6.50



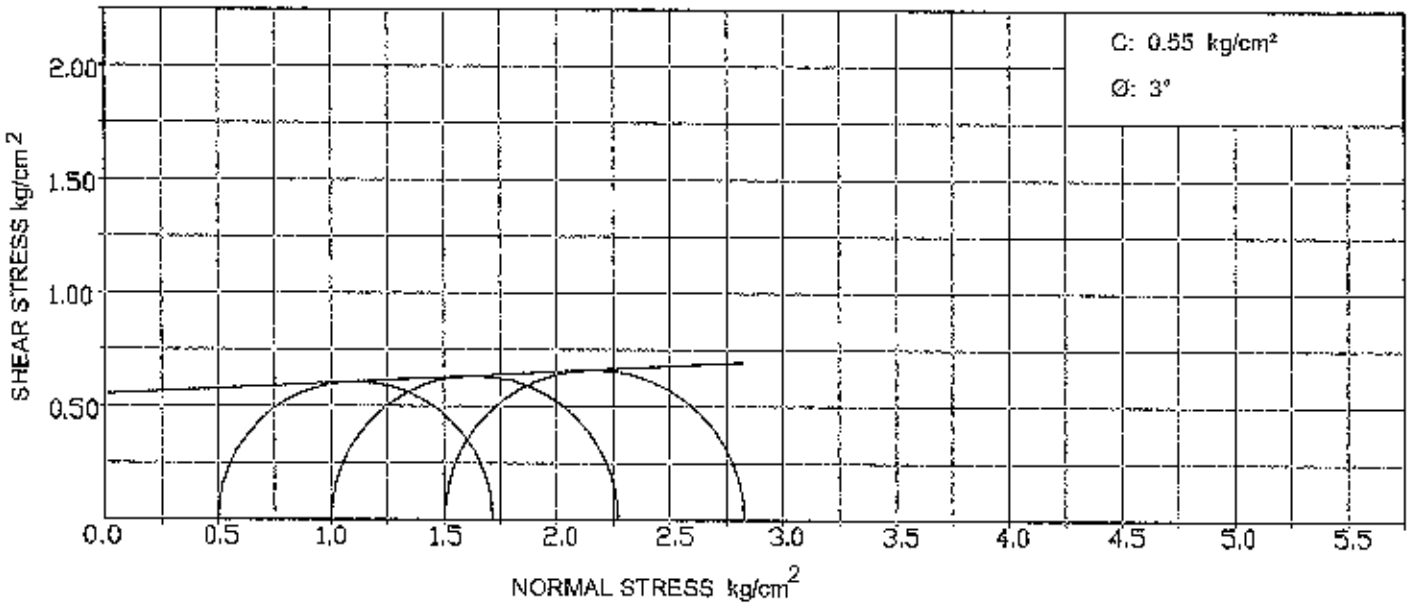
LOCATION:IPS 1 ZONE 2&3 BOREHOLE NO:2 DEPTH (m): 10.50



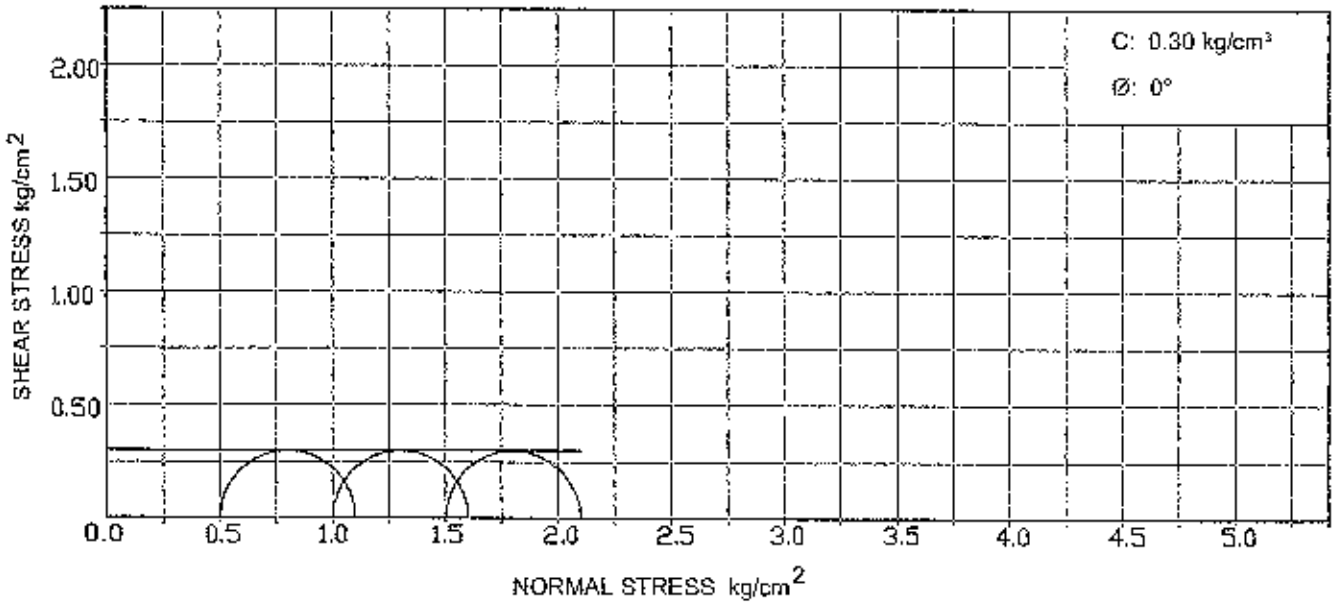
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:IPS 4 ZONE 2&3 BOREHOLE NO:1 DEPTH (m): 17.50



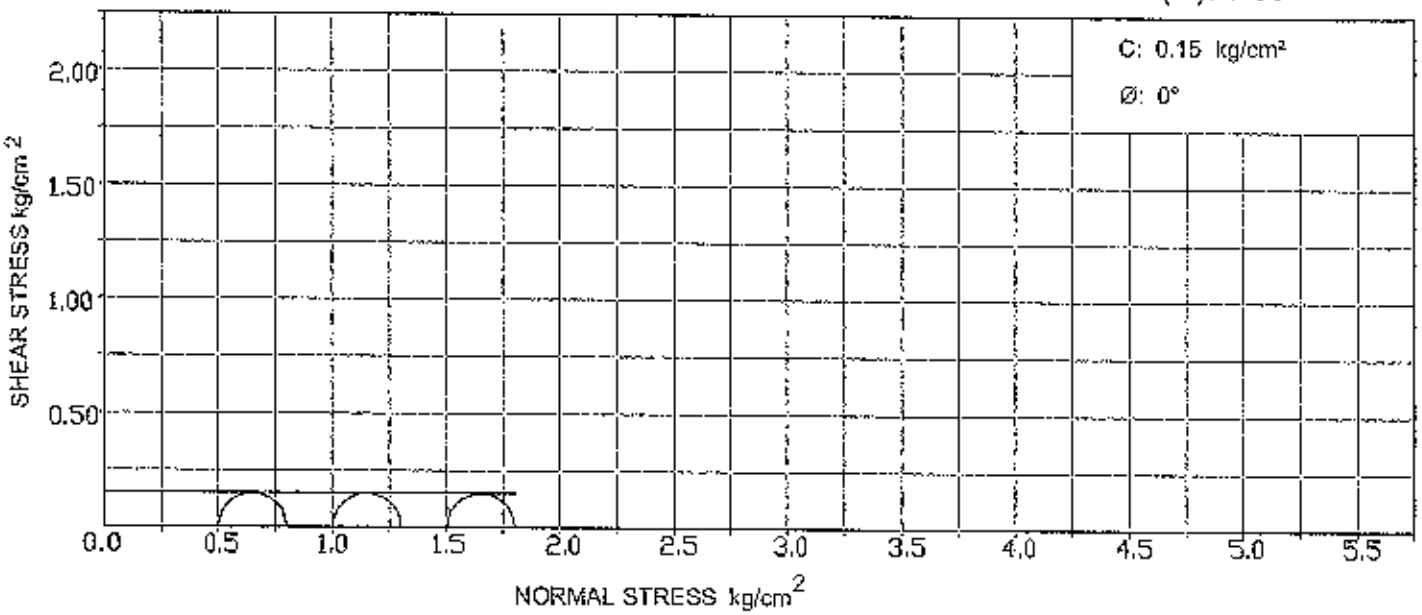
LOCATION:IPS 5 ZONE 2 &3 BOREHOLE NO:1 DEPTH (m): 14.0



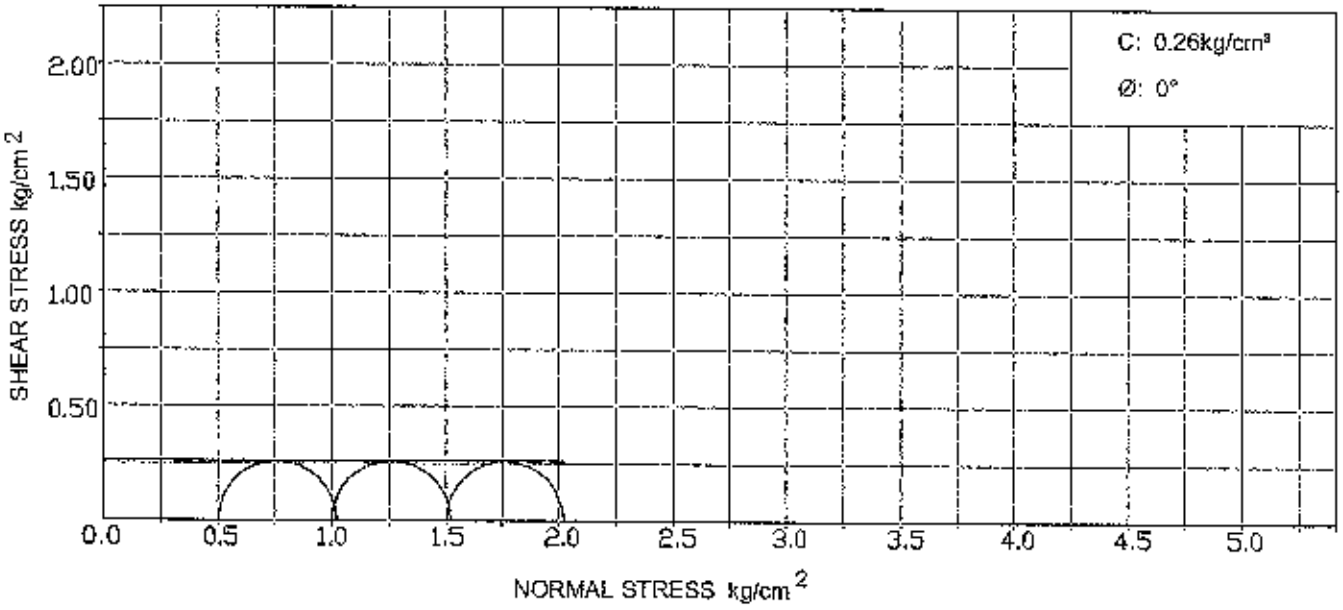
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:IPS 3 ZONE 2 & 3 BOREHOLE NO:1 DEPTH (m): 8.00



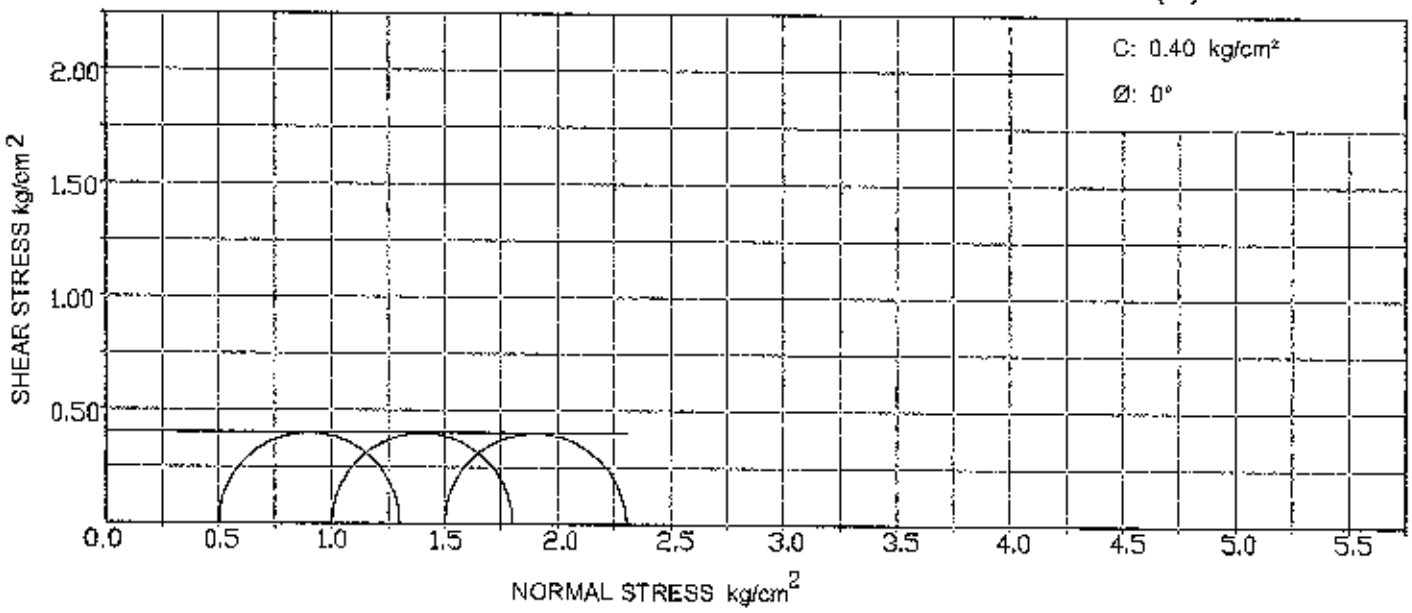
LOCATION:IPS 6 ZONE 2 & 3 BOREHOLE NO:2 DEPTH (m): 9.0



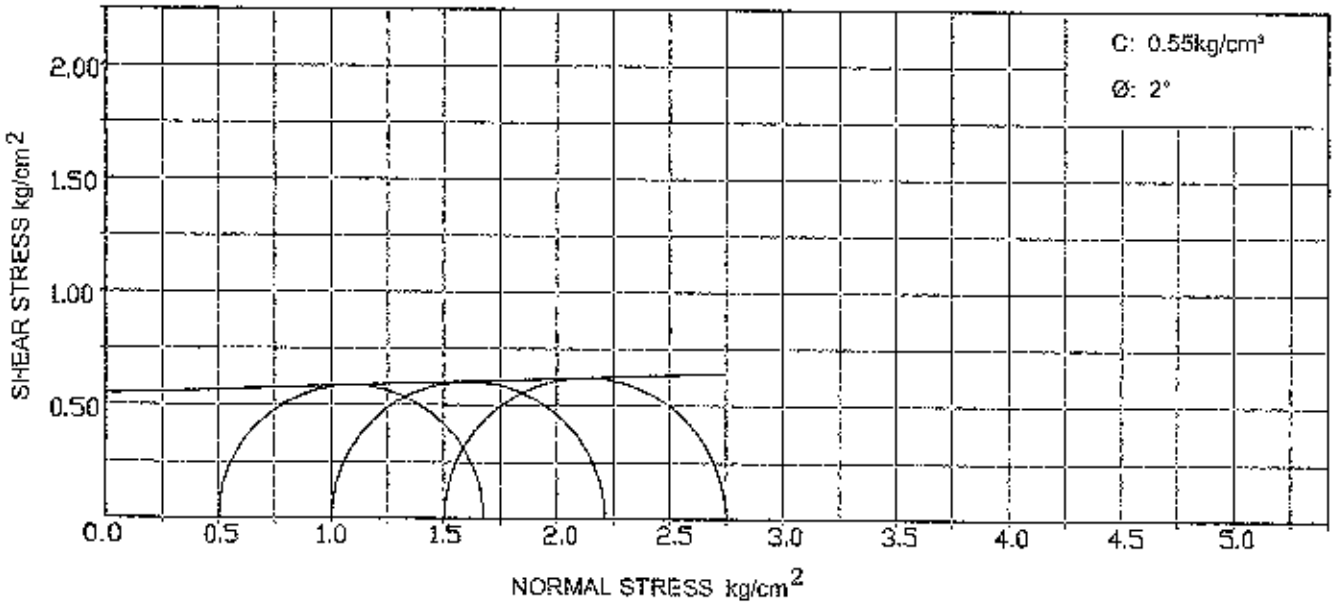
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:IPS 7 ZONE 2 & 3 BOREHOLE NO:1 DEPTH (m): 11.0



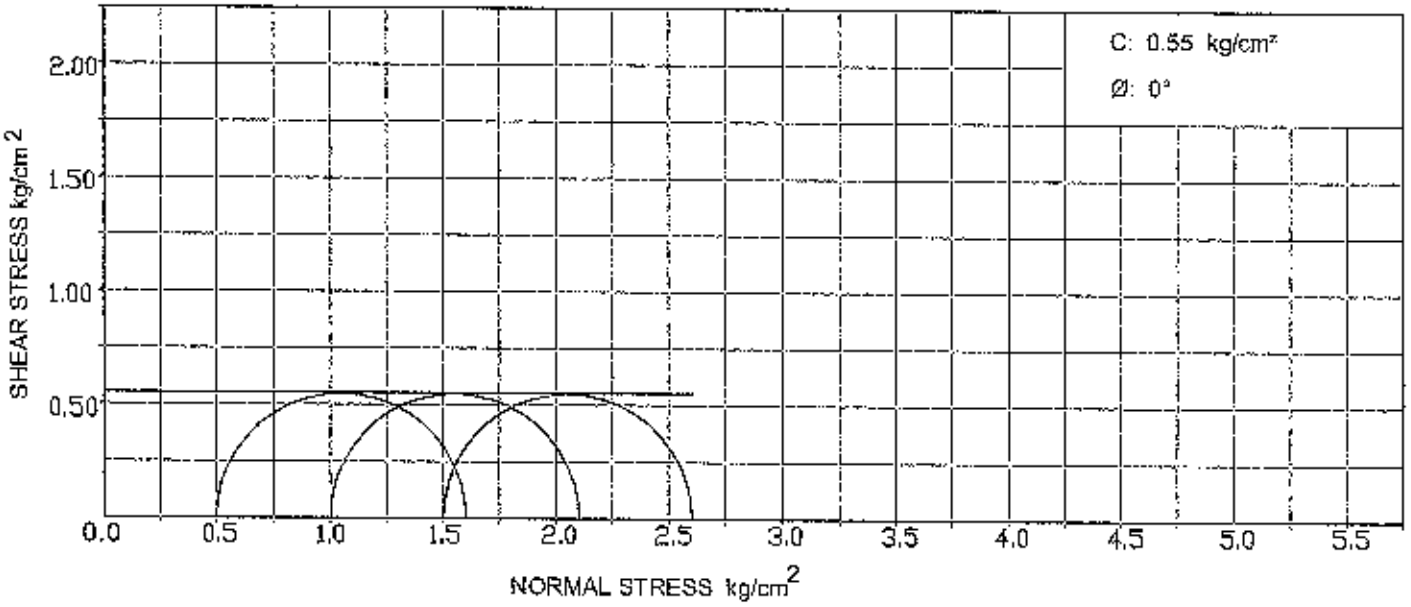
LOCATION:IPS 8 ZONE 2 & 3 BOREHOLE NO:1 DEPTH (m): 12.50



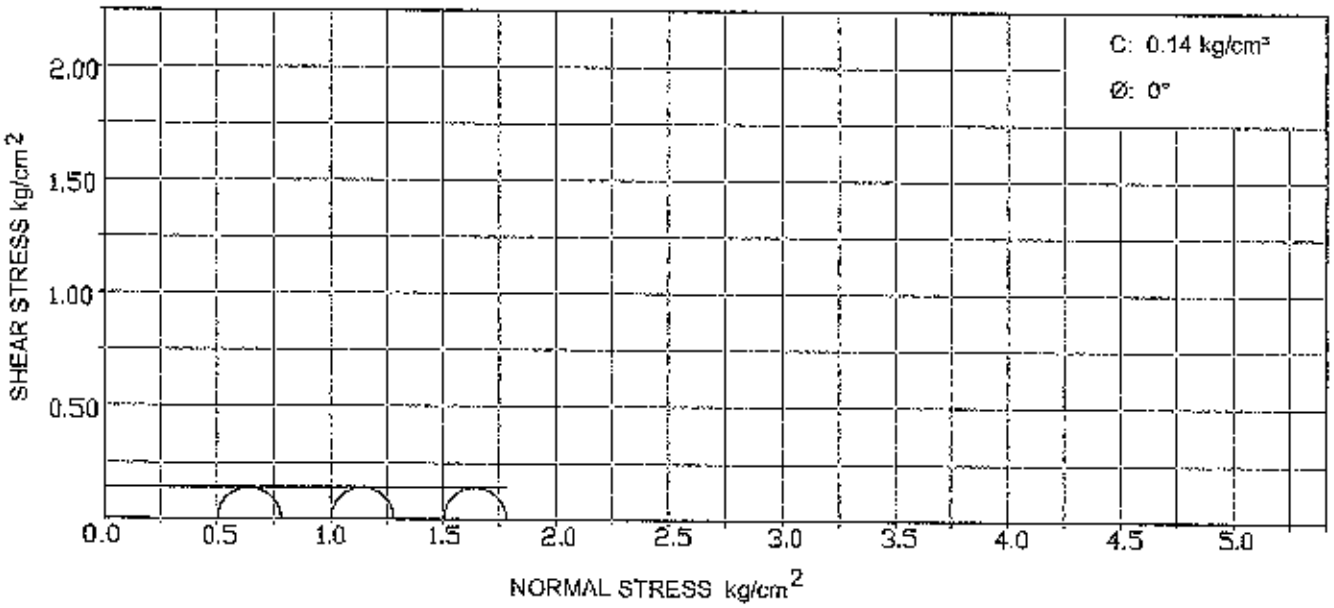
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:IPS 3 ZONE 4 BOREHOLE NO:2 DEPTH (m): 13.50



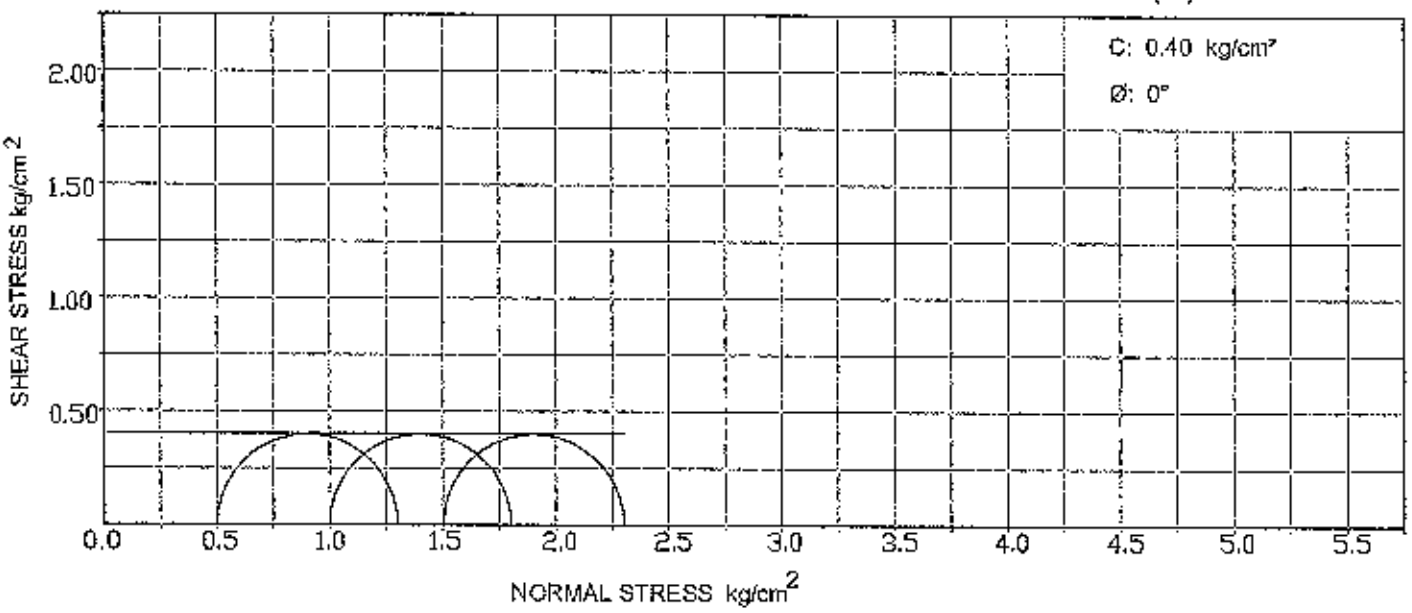
LOCATION:MPS 2 ZONE 4 BOREHOLE NO:2 DEPTH (m): 3.0



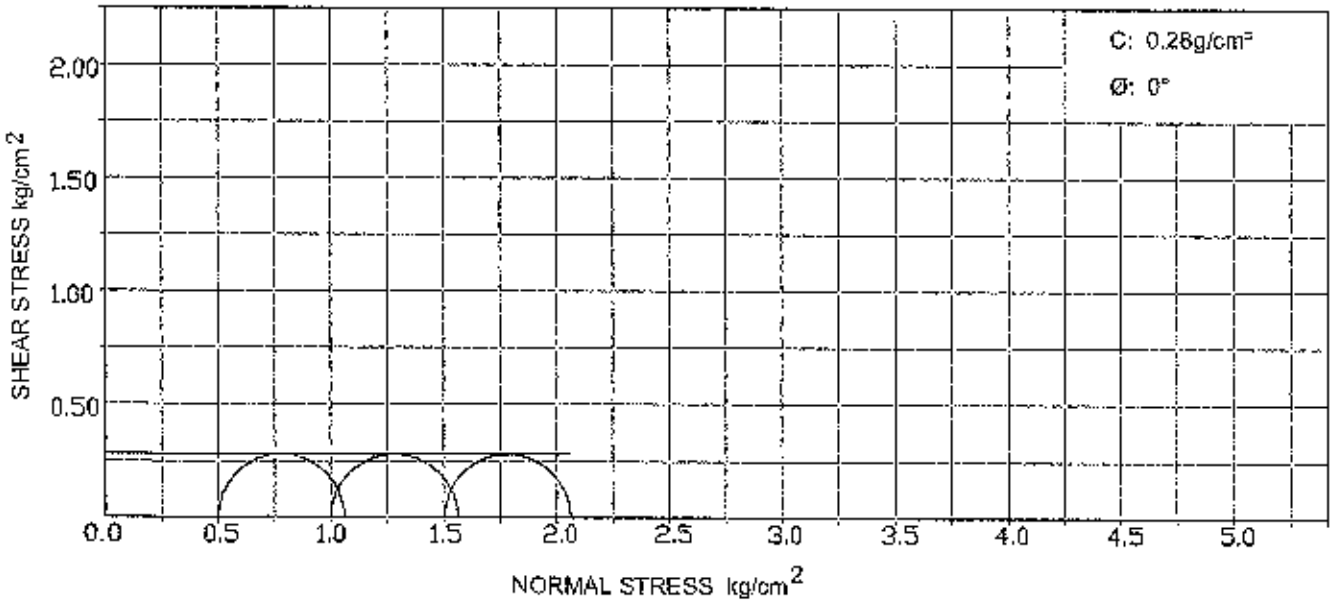
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:MPS 3 ZONE 5 BOREHOLE NO:1 DEPTH (m): 8.00



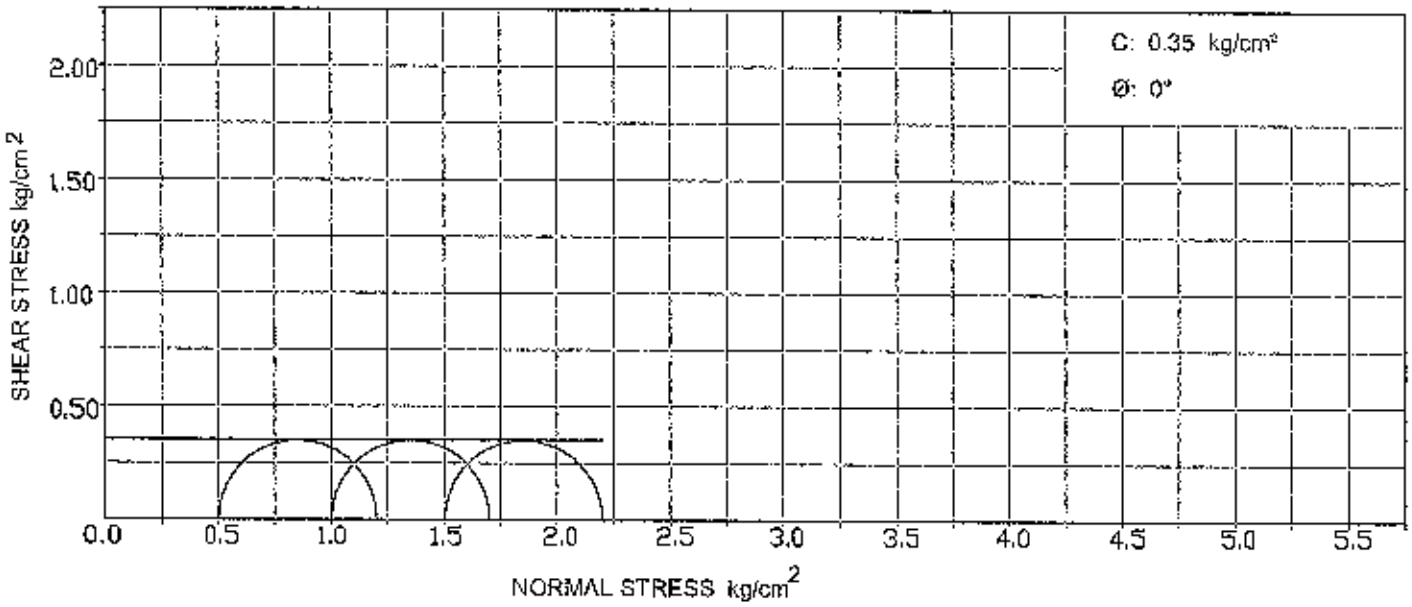
LOCATION:ISP 4 ZONE 5 BOREHOLE NO:12 DEPTH (m): 2.0



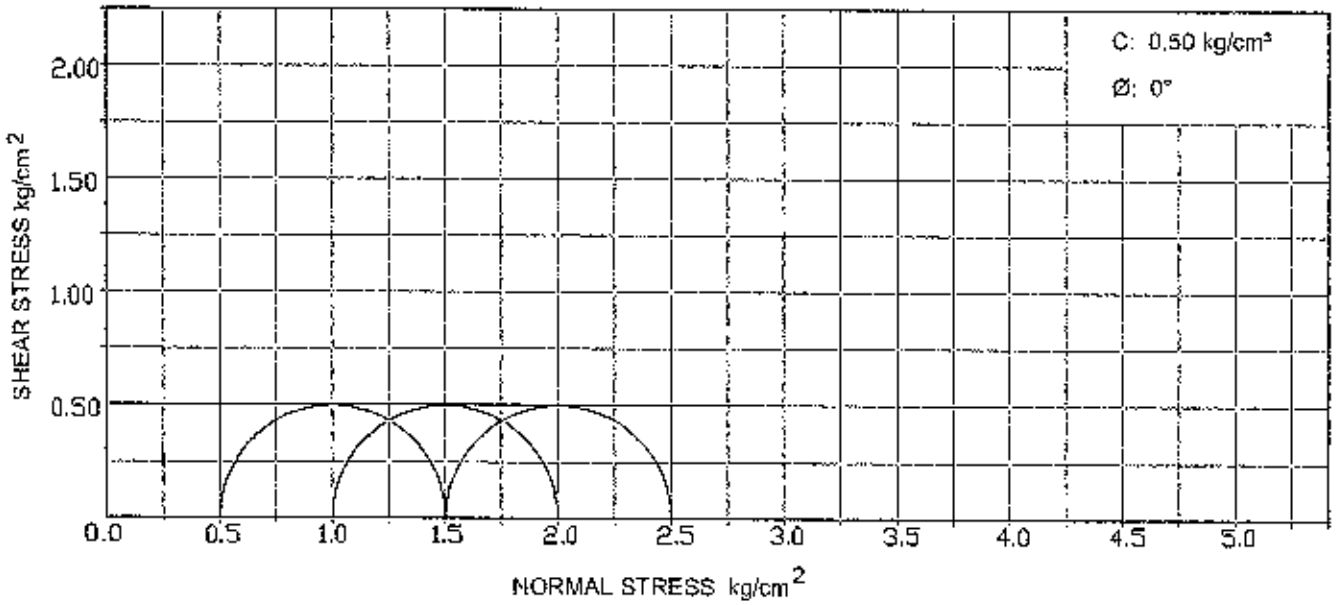
Project:Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

MOHR-COULOMB FAILURE ENVELOPE

LOCATION:PROP STP-2 BOREHOLE NO:1 DEPTH (m): 17.50



LOCATION:PROP STP 3 BOREHOLE NO:1 DEPTH (m): 16.0

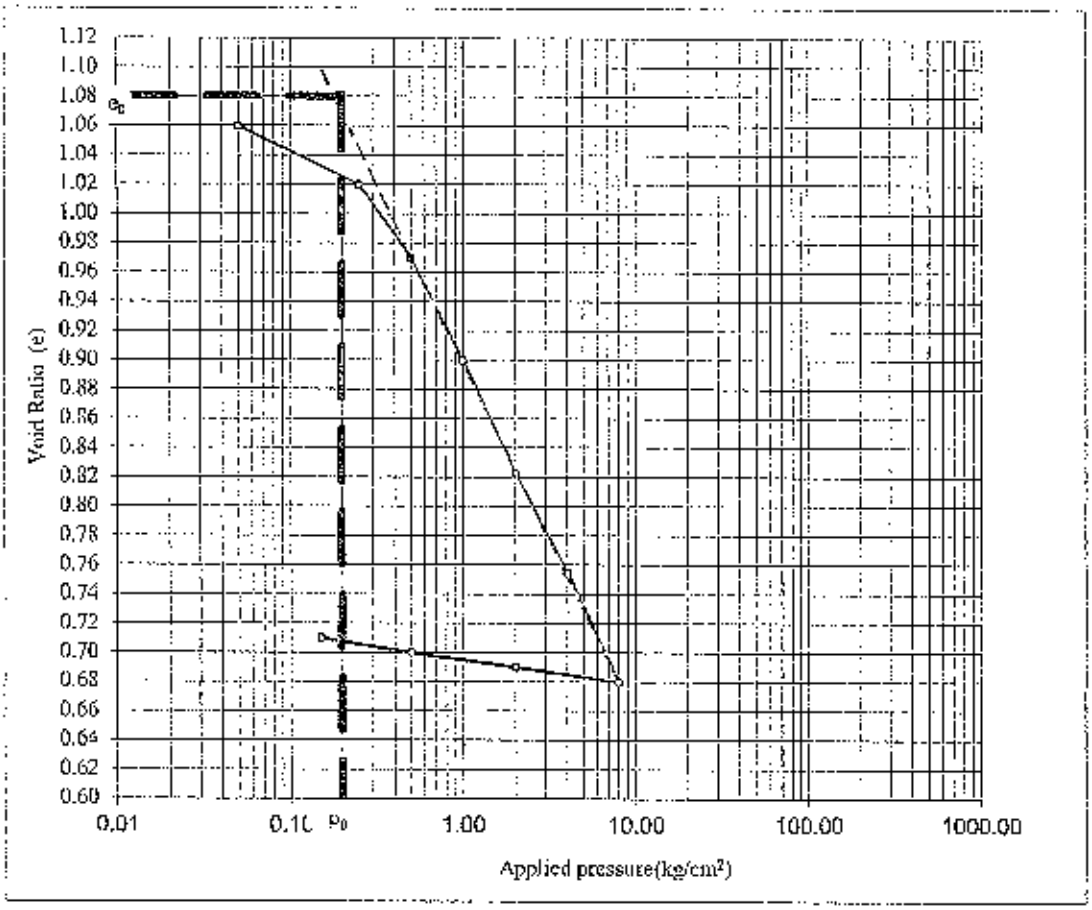


RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :EXIS STP 1 ZONE-1
BH No :3
Depth(m) : 2.50
Compression Index (Cc) = 0.24
Initial void ratio (e0) = 1.08



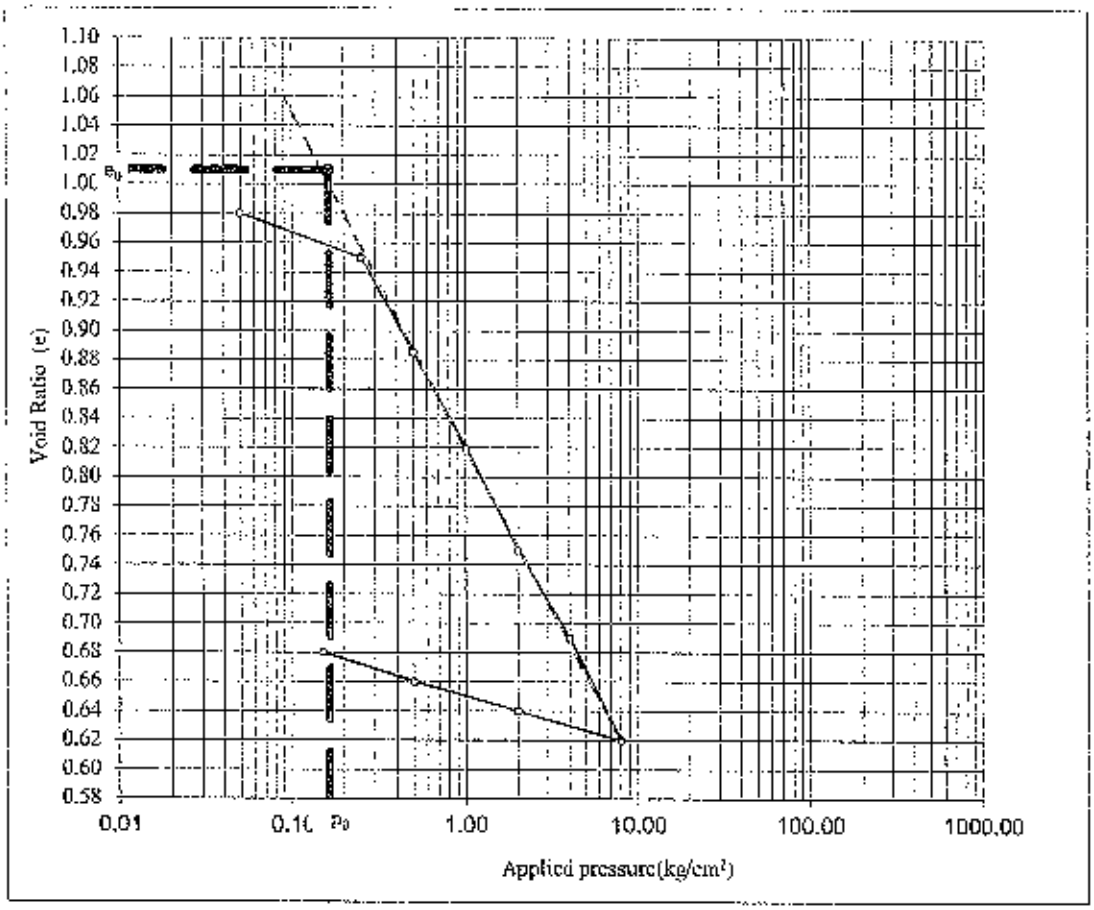
PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.099
0.50-1.0	0.071
1.0-2.0	0.041
2.0-4.0	0.019
4.0-8.0	0.011

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :IPS1 ZONE 2&3
BH No :1
Depth(m) : 2.00
Compression Index (Cc) = 0.22
Initial void ratio (e0) = 1.01

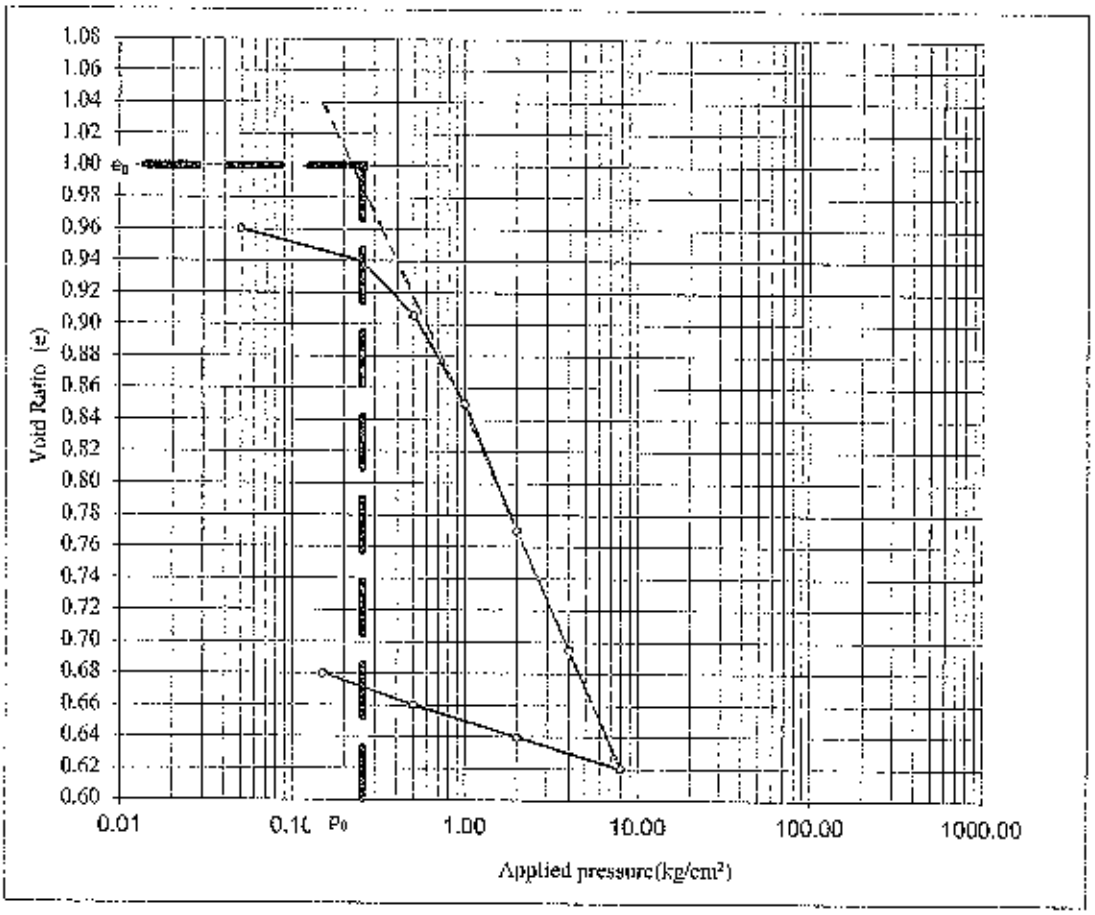


PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.133
0.50-1.0	0.069
1.0-2.0	0.038
2.0-4.0	0.017
4.0-8.0	0.010

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :IPS 3 ZONE 2&3
BH No :2
Depth(m) : 3.00
Compression Index (Cc) = 0.25
Initial void ratio (e0) = 1.00

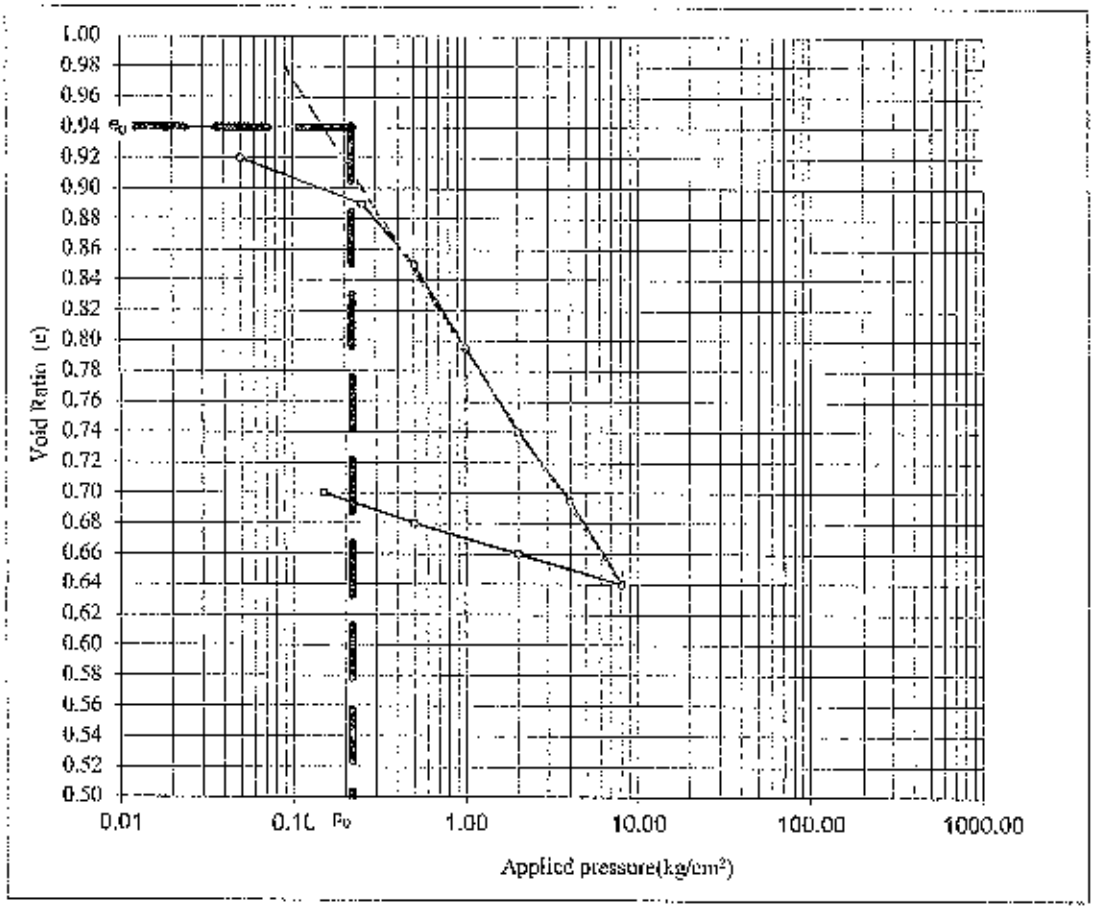


PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.070
0.50-1.0	0.059
1.0-2.0	0.043
2.0-4.0	0.021
4.0-8.0	0.011

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :IPS 8 ZONE 2 & 3
BH No :1
Depth(m) : 2.50
Compression Index (Ce) = 0.17
Initial void ratio (e0) = 0.94

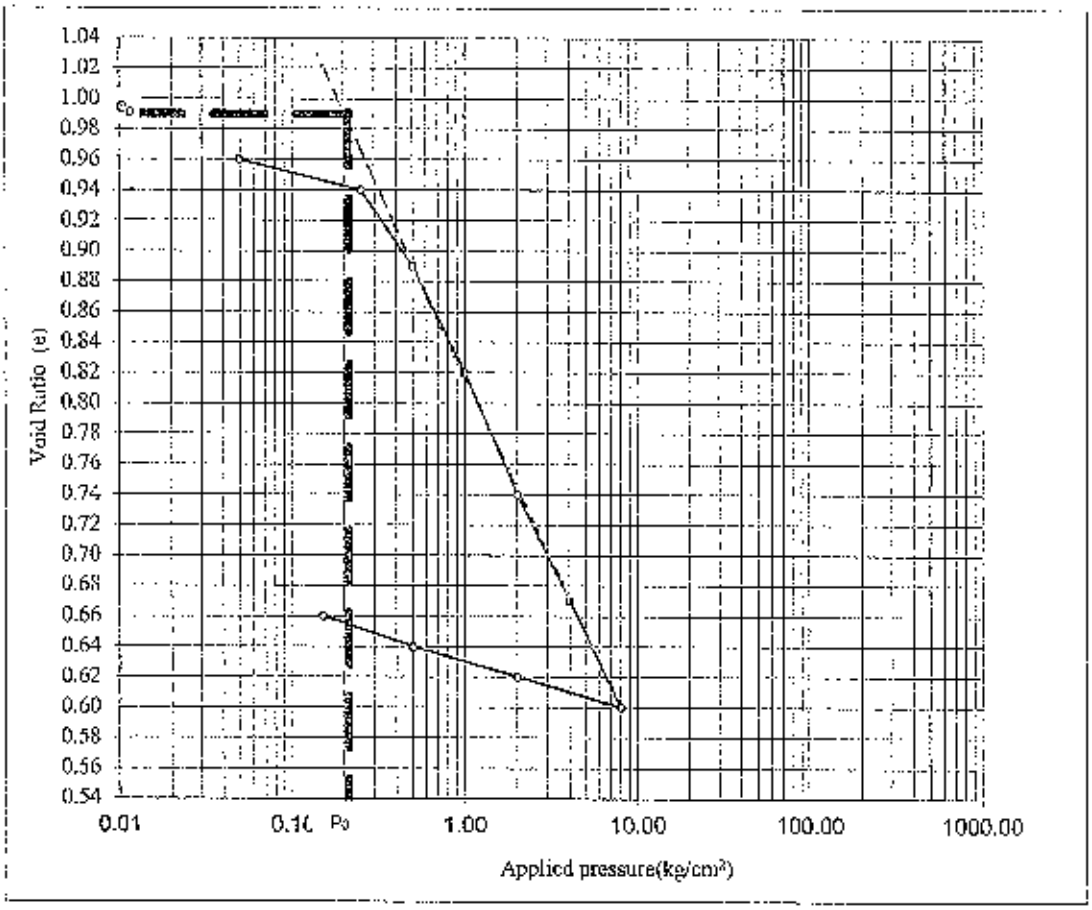


PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.085
0.50-1.0	0.059
1.0-2.0	0.031
2.0-4.0	0.013
4.0-8.0	0.008

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :MPS3 ZONE 5
BH No :I
Depth(m) : 2.50
Compression Index (Cc) = 0.24
Initial void ratio (e0) = 0.99



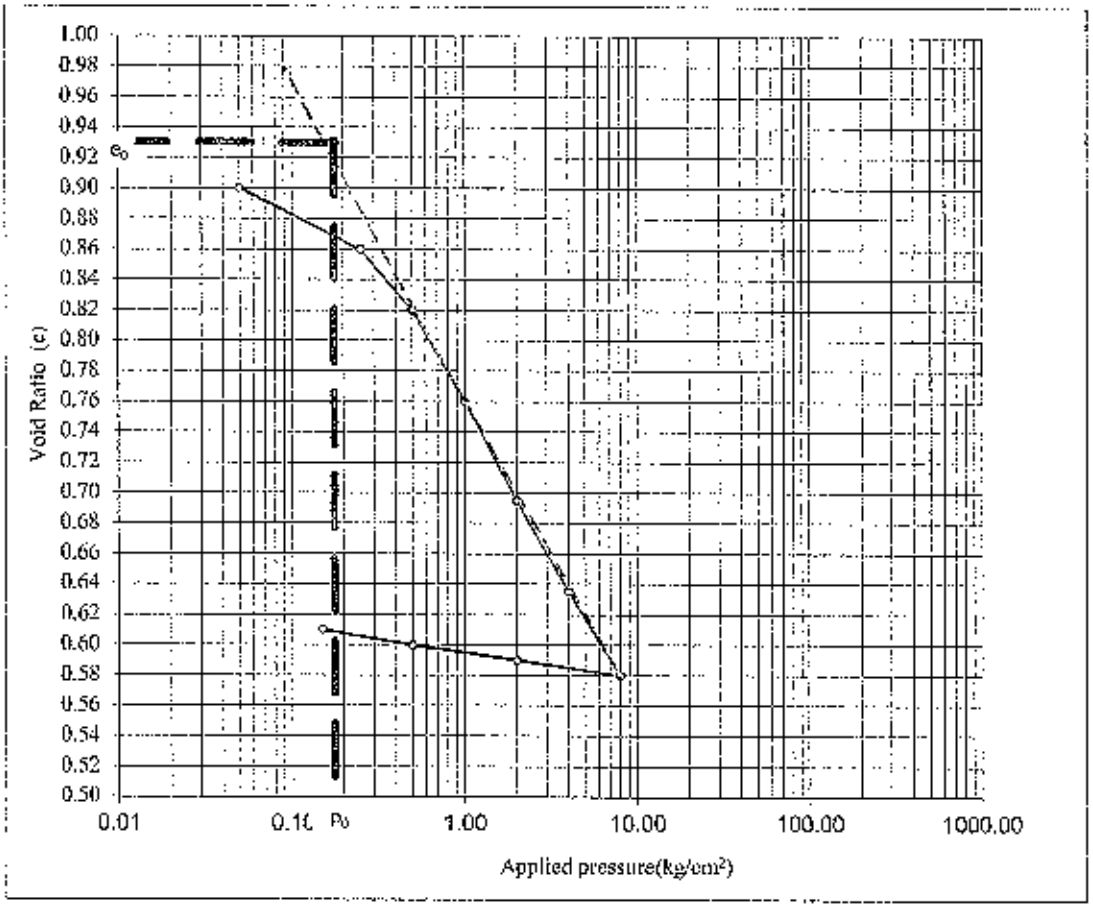
PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.103
0.50-1.0	0.074
1.0-2.0	0.044
2.0-4.0	0.020
4.0-8.0	0.010

RIGHT SITE SURVEY

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :IPS 3-ZONE 5
BH No :1
Depth(m) : 2.00
Compression Index (Cc) = 0.20
Initial void ratio (e0) = 0.93

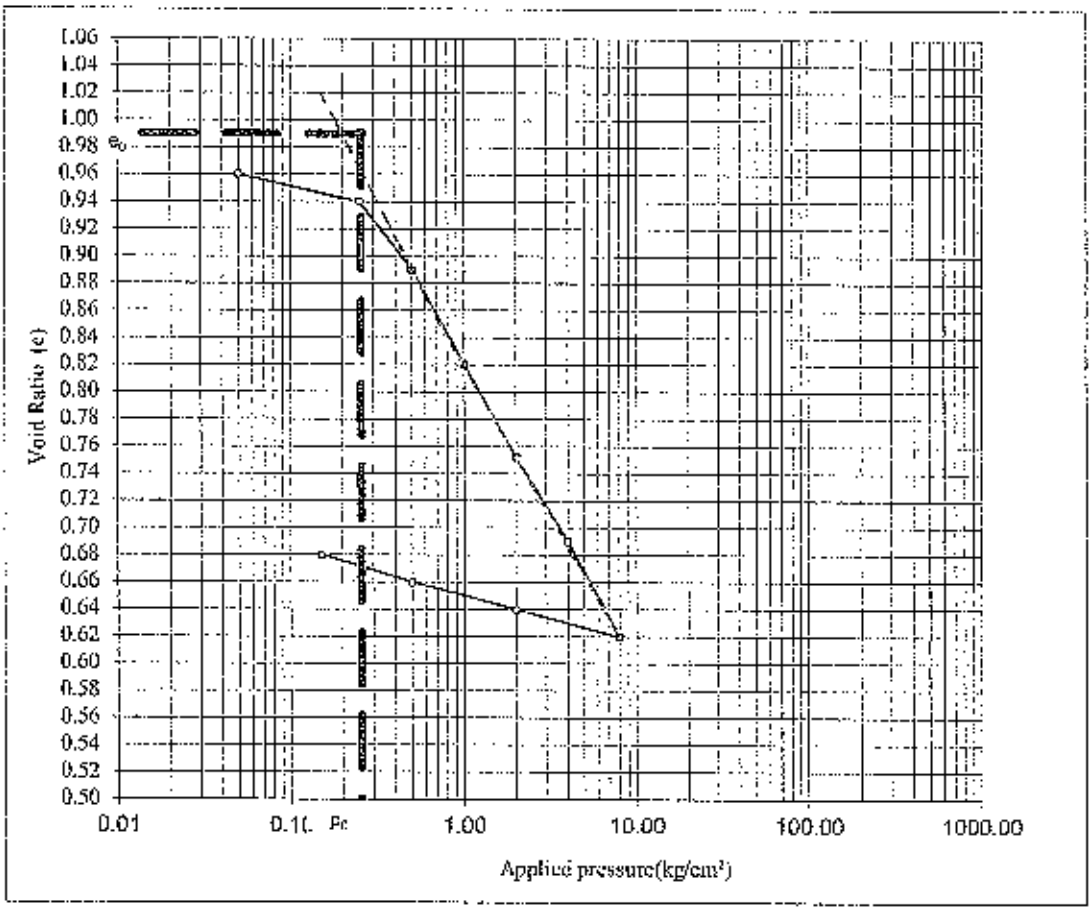


PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.086
0.50-1.0	0.066
1.0-2.0	0.037
2.0-4.0	0.018
4.0-8.0	0.008

Project :Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

e log p curve

Location :Prop STP-2 at Manipur University
BH No :3
Depth(m) : 3.00
Compression Index (Cc) = 0.22
Initial void ratio (e0) = 0.99



PRESSURE (kg/cm^2)	Mv (cm^2/kg)
0.25-0.50	0.103
0.50-1.0	0.074
1.0-2.0	0.037
2.0-4.0	0.018
4.0-8.0	0.010

ANNEXURE-3

⇒ CALCULATION OF LOAD CARRYING CAPACITY OF SOIL

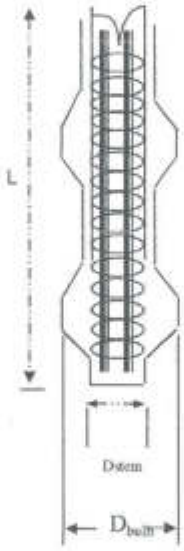
RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :MPS-1 (ZONE-1)

Frictional Resistance of Piles in Cohesive soil :		Total shaft length 12.0m Cut off 1.5.0m from EGL.	
D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	2.60	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	1.00	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	11.75	



Tip Resistance of Piles:		
D_{bulb}	Under- reamed bulbs diameter in m	0.75
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07
Aa	$0.785 \times (D_b^2 - D^2)$ m^2	0.37
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	1.00
C_p	Average cohesion at pile tip in t/m^2	4.20
N_c	Bearing Capacity factor	9.0
Q_{tip}	Tip resistance of the pile in tonnes	6.01
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	7.1
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	5.0

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

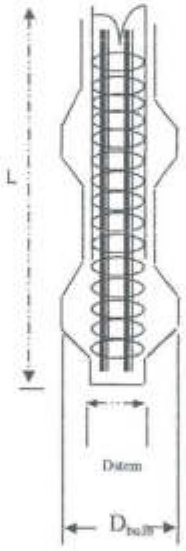
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :STP-1-Existing Site

Total shaft length 12.0m
Cut off 1.5.0m from EGL

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	3.00	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	3.00	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	13.88	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_b^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	3.00	
C_p	Average cohesion at pile tip in t/m^2	5.00	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	13.19	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	10.8	
Quift	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	8.0	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

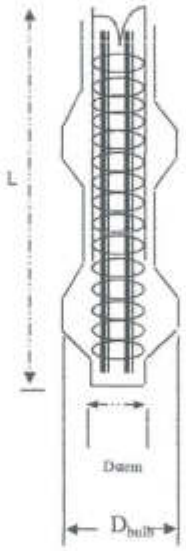
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :IPS-1 (ZONE 4)

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	2.20	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	2.70	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	10.27	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_u^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	2.70	
C_p	Average cohesion at pile tip in t/m^2	3.00	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	10.92	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	8.5	
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	6.4	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

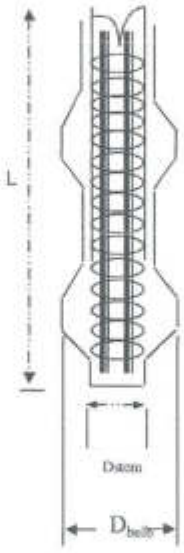
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :IPS-6(ZONE-2&3)

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	2.00	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	2.00	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	9.26	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_u^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	2.00	
C_p	Average cohesion at pile tip in t/m^2	4.70	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	9.66	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	7.6	
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	5.3	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

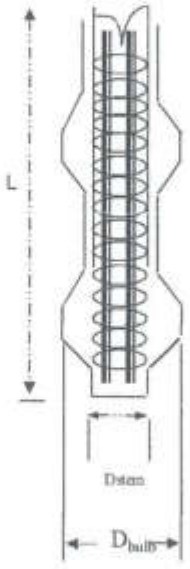
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :IPS-8(ZONE-2&3)

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	1.60	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	1.60	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	7.40	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_a^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	1.60	
C_p	Average cohesion at pile tip in t/m^2	5.20	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	8.65	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	6.4	
Quift	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	4.2	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

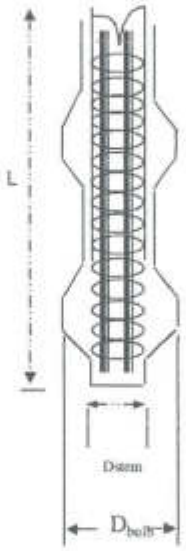
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :MPS-2 (ZONE-4)

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	2.50	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	1.60	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	11.41	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_a^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	1.60	
C_p	Average cohesion at pile tip in t/m^2	3.00	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	7.25	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	7.5	
Quift	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	5.6	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

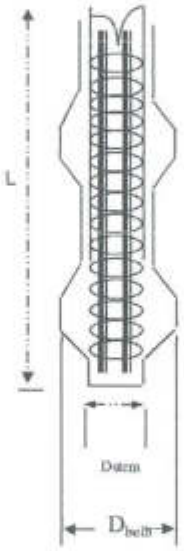
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :IPS-6(ZONE-5)

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	2.10	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	2.10	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	9.72	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_u^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	2.10	
C_p	Average cohesion at pile tip in t/m^2	3.60	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	9.30	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	7.6	
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	5.6	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

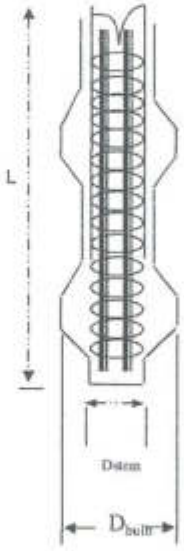
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :STP-2 at Manipur University

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	1.60	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	1.50	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	7.39	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_u^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	1.50	
C_p	Average cohesion at pile tip in t/m^2	3.00	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	6.91	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	5.7	
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	4.1	

RIGHT SITE SURVEY

COMPUTATION OF LOAD CARRYING CAPACITY OF DOUBLE UNDER-REAMED PILE

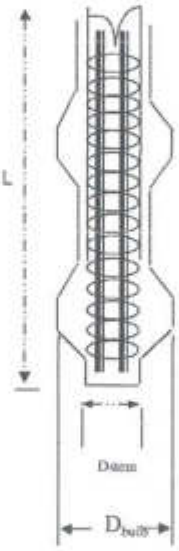
Project : Preparation of Detailed Project Report for Integrated Sewerage System for Imphal City, Manipur.

Site :STP-3 at Irilbung

Total shaft length 12.0m
Cut off 1.5.0m from EGL.

Frictional Resistance of Piles in Cohesive soil :

D_{stem}	Stem diameter of the pile in m	0.30	
L	Effective Length of the pile in m	10.50	(layer 1.50- 12.0 m)
As	Surface area of pile stem in m^2	8.90	
A's	Surface area of the cylinder circuscribing the under-reamed bulbs m^2	0.18	
C_a	Average cohesion for the strata along the pile stem in t/m^2	3.40	
Ca'	Average cohesion for the soil around the under reamed bulbs in t/m^2	1.70	
α	Reduction factor	0.50	
Q_f	Frictional resistance of the pile in tonnes	15.43	



Tip Resistance of Piles:

D_{bulb}	Under- reamed bulbs diameter in m	0.75	
Ap	Cross-sectional area of pile stem a toe level in m^2	0.07	
Aa	$0.785 \times (D_u^2 - D^2)$ m^2	0.37	
C'a	Average cohesion of soil around the under reamed bulbs (t/m^2)	1.70	
C_p	Average cohesion at pile tip in t/m^2	6.50	
N_c	Bearing Capacity factor	9.0	
Q_{tip}	Tip resistance of the pile in tonnes	9.81	
Qsafe	Safe Load carrying capacity of the pile in tonnes (Factor of safety = 2.50)	10.1	
Qulft	Safe up lift capacity of pile in tonnes (Factor of safety = 3.0)	7.0	

ANNEXURE-VII

Abstract of Full Cost Tariff, Subsidised Tariff and each Category-wise allocated subsidy for FY2022-23

	MSPDCL (FY 2022-23)	Energy	Full Cost Tariff (No subsidy)				Subsidised Retail Tariff				Govt. Subsidy	
		Annual Sales (MU)	Fixed Charge	Energy Charge	Annual Revenue (₹ Crs)	Avg. per unit (₹ /kWh)	Fixed Charge	Energy Charge	Annual Revenue (₹ Crs)	Avg. per unit (₹ /kWh)	Subsidy Amount (₹ Crs)	Avg. per unit (₹ /kWh)
1	KJ(Domestic)		Conc/kW	(₹ /kWh)			Conc/kW	(₹ /kWh)				
i)	First all kWh	4.23	25	9.01	4.25	10.03	25	2.10	1.32	3.12	2.92	6.91
2	Domestic		(₹ /CL/kW)	(₹ /kWh)			(₹ /CL/kW)	(₹ /kWh)				
i)	First 100 kWh	357.98	65	9.73	394.18	11.01	65	5.10	228.41	6.38	165.77	4.63
ii)	101 - 200 kWh	75.47	65	9.57	79.52	10.54	65	5.95	47.96	6.35	31.56	4.18
iii)	Above 200 kWh	37.25	65	11.76	41.36	11.10	65	6.75	25.08	6.73	16.28	4.37
	Total Domestic	**470.70**			**515.06**	**10.94**			**301.45**	**6.40**	**213.61**	**4.54**
3	Commercial & Non-Domestic		(₹ /CL/kW)	(₹ /kWh)			(₹ /CL/kW)	(₹ /kWh)				
i)	First 100 kWh	29.51	85	11.04	37.15	12.59	85	6.55	23.90	8.10	13.25	4.49
ii)	101 - 200 kWh	20.42	85	12.59	24.87	12.18	85	7.25	14.97	7.33	9.91	4.85
iii)	Above 200 kWh	15.23	85	13.47	22.42	14.72	85	7.65	14.58	9.57	7.85	5.15
	Sub Total	**65.16**			**84.45**	**12.96**			**53.44**	**8.20**	**31.00**	**4.76**
4	Commercial/ND HT	21.97	105	10.78	29.99	13.65	105	8.90	25.39	11.56	4.60	2.09
			(₹ /CL/kW)	(₹ /kWh)			(₹ /CL/kW)	(₹ /kWh)				
5	Public Lighting	3.69	70	13.39	5.05	13.67	70	9.60	3.65	9.88	1.40	3.80
6	Public Water Supply LT	1.29	105	13.16	1.76	13.60	105	9.80	1.32	10.24	0.43	3.37
7	Agriculture-LT	0.00	65	0.00	0.00	0.00	65	4.55	0.00	0.00	0.00	#DIV/0!
			(₹ /kVA/BD)	(₹ /kVAh)			(₹ /kVA/BD)	(₹ /kVAh)				
8	Public Water Supply HT	24.66	105	11.57	34.16	13.85	105	9.60	28.77	11.67	5.39	2.19
9	Irrigation-HT	0.75	105	9.27	0.88	11.72	105	5.15	0.54	7.14	0.35	4.61
10	Industrial		(₹ /CL/kW)	(₹ /kWh)			(₹ /CL/kW)	(₹ /kWh)				
i)	LT - Small/Micro	22.95	70	11.28	27.59	12.03	70	5.60	14.55	6.34	13.04	5.68
			(₹ /kVA/BD)	(₹ /kVAh)			(₹ /kVA/BD)	(₹ /kVAh)				
ii)	HT-Medium Industries	4.62	105	10.48	6.03	13.04	105	8.00	4.75	10.28	1.27	2.76
iii)	Large Industrial - HT	10.66	105	11.00	14.78	13.86	105	9.10	12.53	11.75	2.25	2.11
15	Bulk Supply HT	93.98	105	11.65	128.59	13.68	105	9.25	103.48	11.01	25.11	2.67
		724.67			**852.58**	**11.77**			**551.20**	**7.61**	**301.38**	**4.16**

CL- denotes Contracted Load BD- denotes Billng Demand

Summary of previously issued Clarification/Addendum/Corrigendum			
S.No.	**Reference No.**	**Date of Issue**	**Brief Detail/ Description**
1	**CE/PHE/3-94/NDB (S-W)/P-V/2022/631**	**24-05-2022**	**Date Corrigendum**