

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

Guwahati - 781 039, Assam

Phone: (0361) 2582065, 2692072 Fax : (0361) 2692771, 2690762



TENDER DOCUMENT

IITG/IPM/NIT/C/2022-23/15, dated: 15.11.2022

Part- A: Technical Bid

NAME OF WORK

**Design, Supply, Installation & Commissioning of 30.50mtr (100 feet)
High National Flag Mast at IITG campus**



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
Guwahati - 781 039, Assam
Phone : (0361) 2582065, 2692072 Fax : (0361) 2692771 , 2690762

NOTICE INVITING TENDER

Tender No- IITG/IPM/NIT/C/2022-23/15, dated: 15.11.2022

Sealed tenders in two-bid system are invited from experienced & competent contractors registered with CPWD/MES/Railways/State PWDs/MSME or authorized dealer/agency from OEM and those who have worked for Govt. /Semi Government organizations/Academic or Research Institute /PSU/ Corporate establishment of repute for following works at IITG campus:

Name of works	Design, Supply, Installation & Commissioning of 30.50 mtr (100 feet) high National Flag Mast at IITG campus.
E Tender Web Site	www.tenderwizard.com/IITG
Estimated Cost	₹ 25,00,000.00
Cost of tender Document	₹1000.00 (Demand draft/ Banker's cheque or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/ RTGS in favour of 'IIT Guwahati' payable at 'Guwahati')
Earnest Money	₹ 50,000.00 (Demand draft/ Banker's cheque or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/ RTGS in favour of 'IIT Guwahati' payable at 'Guwahati')
Tender Processing Fees	As applicable online (Through e-Payment using Debit Card, Credit Card, Net Banking)
Time of Completion	03 (Three) months
Critical dates	
Tender document download/ sale start	18.11.2022 to 29.11.2022 Up to 14:59 Hrs
Last Date & time for online Submission	Up to 15:00 Hrs. on 29.11.2022
Date & time for Technical bid Opening	At 15:30 Hrs. on 29.11.2022
Date & Time for Financial bid Opening	Will be informed in due course.

Qualifying criteria for participation in the Tender:

- (1) Registered with Govt. / Semi Govt. Dept. / Govt. Autonomous Body
- (2) Minimum Annual Turnover from Construction works during last 3 consecutive years should not be less than **₹25.00 Lakh** during the immediate last three consecutive years.
- (3) Experience in Work : Contractors of CPWD/MES/Railways/State PWDs/MSME or authorized dealer/agency from OEM and those who have worked for Govt. /Semi Government organizations/Academic or Research Institute /PSU/ Corporate establishment of repute and have successfully carried out Design, Supply,

Installation, testing, commissioning of flag mast of height 30.05mtr or more during the last seven years as follows:

(a) One work of value not less than ₹ 12.50 lakh against a single work order OR (b) two works of each value not less than ₹10.00 lakh each against two separate work order OR (c) three works of each value not less than ₹7.50 lakh each against three separate work orders in Govt./ Semi Govt. department / Autonomous body during last seven years.

Note: Financial turn over and values of completed works of previous years shall be given weightage of 7% per year and part thereof to bring them to the present price level.

Tender papers shall be downloaded from the website www.tenderwizard.com/IITG & to be submitted though online only.

1. The intending bidder must read the terms and conditions carefully. He should submit his bid only if he considers himself eligible and he is in possession of all the documents required.
2. Tender cost shall be deposited along with the tender in the form of Demand draft/ Banker's cheque in favour of 'IIT Guwahati' payable at 'Guwahati or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT. (Scanned copy of transaction should be uploaded in the Fee/Technical cover). Hard copy of the DD/ Banker's cheque should be submitted to HoS, Engineering on or before the last submission date of the tender.
3. Information and Instructions for bidders posted on website shall form part of bid document.
4. The bid document consisting of Technical bid (eligibility bid) & the Financial bid i/c plans, specifications, drawings etc. to be executed and the set of terms and conditions of the contract to be complied with contractor whose bid may be accepted and other necessary documents can be seen on website www.tenderwizard.com/IITG.
5. Work experience certificate and other documents as specified in the technical bid/eligibility bid document shall be scanned and uploaded to the e-Tendering website within the period of bid submission.
6. The bidder should submit the valid electrical contract license and if the contractor does not have such license they should submit and undertaking to engage a party which fulfills the qualifying criteria. In such cases, Electrical License with his acceptance to take up the work shall be submitted.
7. Online technical bid documents submitted by intending bidders shall be considered only of those bidders whose original documents scanned and uploaded are found in order.
8. IIT Guwahati reserves the right to not consider tender papers of any contractor engaged in one or more ongoing works in the IITG Campus, if in the opinion of the Institute, the progress of the ongoing works of the contractor has not been found satisfactory and they will not be able to handle a new work till the completion of their ongoing work(s). IITG also reserves the right to accept or reject any or all of the tenders without assigning any reason thereof.
9. The rates include cost of all operations and all inputs of labour, material, T&P, scaffolding, wastages, watch and ward, other inputs, all incidental charges, all taxes including GST, cess, duties, levies, etc. required for execution of the work.
10. The downloading & submission of tender paper to by a contractor does not automatically mean the tenderer is considered qualified for the price part of the bid.
11. The acceptance of tender will rest with the authority of IIT Guwahati who does not bind itself to accept the lowest tender and reserves itself the right to reject any or all the tenders received

without assigning any reason thereof. The work may be allotted in part or whole at the discretion of competent authority of the Institute.

12. For all clarifications regarding site conditions, items of works or any other related matters to the tender, Head, Engineering (IPM Section) may be contacted during office hours on all working days or through email hos_engg@iitg.ac.in
13. In case, the day of opening of the tender happens to be a holiday on account of Govt. notification and tender cannot be opened; the tender shall be opened on the next working day at the same time.
14. The tender document shall be submitted through online only.
15. Part-A (Technical bid) of the tender shall be opened on the date and time as mentioned above. But price bids of only of those tenderers whose technical bid are found acceptable shall be opened on a later date.
16. Only the authorized person(s) to attend tender opening. All the bidders shall send their representative(s) to attend tender opening with proper authorization during opening of the tenders.
17. EMD is exempted for Firms which are specifically registered for the required items of the tender with NSIC/MSME. However, no price preference will be given. If exemption is sought from submission of EMD, the same should clearly be mentioned and copy of valid NSIC/MSME registration must be uploaded in place of EMD document.

Thanking You,

Yours faithfully,

**HoS, Engineering
(IPM Section)**

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

Submission of Tender

From :.....

**To
The Dean (IPM),
Indian Institute of Technology Guwahati
GUWAHATI - 781 039**

1. I/We hereby tender for execution of the work **“Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) high National Flag Mast at IITG campus.”** as per tender document within the time schedule mentioned therein and accepted by me/us, at the rates quoted by me/us for the whole work in accordance with terms and conditions, specifications, drawings, as detailed in the tender document. It has been explained to me/ us that the time stipulated for job and completion of works in all respects and in different stages mentioned in the “Time schedule” of completion of work and signed and accepted by me/us is the essence of the Contract.
2. It has been explained to me/ us that the time stipulated for job and completion of works in all respects and in different stages mentioned in the “Time schedule” of completion of work and signed and accepted by me/us is the essence of the Contract. I/We agree that in the case of failure on my/ our part to strictly observe the time of completion mentioned for work or any of them and to the final completion of works in all respects according to the schedule set out in the tender, I/We shall pay compensation to the Owners as per provision and stipulations contained in the relevant clause of Contract and I/We agree to the recovery being made as specified therein. In exceptional circumstances extension of time which shall always be in writing may, however, be granted by the Engineer-in-Charge at his entire discretion for some items of work, and I/We agree that such extension of time will not be counted for the extension of completion dates stipulated for work and for the final completion of works as stipulated in the said “Time Schedule” of Completion of work.
3. I/We agree and accept the terms and conditions laid down in the memorandum below in this respect.

MEMORANDUM

- | | |
|---------------------------------------|---|
| (a) General description of work | Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) high National Flag Mast at IITG campus. |
| (b) Earnest Money | : ₹50,000.00 (Demand draft/ Banker’s cheque or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/RTGS in favour of ‘IIT Guwahati’ payable at ‘Guwahati’) |
| (c) Performance guarantee | 3% (Three percent) of the tendered amount. |
| (d) Time allowed for starting of work | : Fifteen (15) days from the date of issue of LOI. |

1. Should this tender be accepted I /We hereby agree to abide by and fulfill all terms and conditions referred to above and in default thereof, to forfeit and pay to the Owner or

its successors or its authorized nominees such sums of money as are stipulated in conditions contained in Notice Inviting Tender and other tender documents.

2. I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in IIT Guwahati in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Performance Guarantee.
3. If I/We fail to commence the work specified in the memorandum herein above, or I/We fail to deposit the amount of Performance guarantee specified in the Memorandum, I/We agree that the said Owner and its successors without prejudice to any other right or remedy be at liberty to cancel the notice of acceptance of tender if I/We fail to deposit the Performance guarantee as aforesaid or to execute an agreement or to start work as stipulated in the tender documents.
4. I/we hereby certify that all the statement made and information supplied are true and correct.
5. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
6. I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works:

Sl. No.	Name of work	Certificate from
1		
2		
3		

CERTIFICATE:

It is certified that the information given in the tender are correct. It is also certified that I/we shall be liable to be debarred, disqualified in case any information furnished by me/us found to be incorrect.

Date.....day of.....2022

Witness:

Name in Block Letters:

Address:

Signature of Tenderer(s), with the seal of Firm

**PROFORMA FOR ACKNOWLEDGEMENT LETTER OF BIDDING DOCUMENT
(TO BE SUBMITTED IN BIDDER'S OWN LETTER HEAD)**

Ref no.

Date:

To

The HoS, Engineering IPM

IIT Guwahati

Guwahati-781039, Assam

Sub: Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) high National Flag Mast at IITG campus.

Ref: NIT No -IITG/IPM/NIT/C/2022-23/15, dated: 15.11.2022.

Dear Sir,

We hereby acknowledge receipt of a complete set of bidding document along with all enclosures for the subject work for preparation and submission of the Bid.

We undertake that the contents of the above Bidding document shall be kept confidential, further that specifications and documents shall not be transferred, and that the said documents are to be used only for the purpose for which they are intended.

(A) We intend to bid as requested for the subject works and furnish following details with respect to our quoting office:

- (i) POSTAL ADDRESS :
- (ii) TELEPHONE NUMBER :
- (iii) MOBILE NO. :
- (iv) TELEFAX NUMBER :
- (v) CONTACT PERSON :
- (vi) DESIGNATION :
- (vii) EMAIL ADDRESS :
- (viii) REGISTERED OFFICE :

BIDDER'S NAME :

SIGNATURE:

NAME :

DESIGNATION :

DATE :

E- tendering Instruction to Bidder

P.C. connected with internet (Preferred broadband).

- Registration with Service provider portal <https://www.tenderwizard.com/IITG>
- The vendor should possess a Class III Digital Signature certificate (Mandatory).
(Bids will not be recorded without Digital Signature Certificate.)

For registration, Submission procedure and method of correspondence etc. please visit our website- <https://www.tenderwizard.com/IITG> and click on the link. Vendor Help and download the manuals.

1. Help for participating in e-tender:

The detailed method for participating in the e-procurement is available in the website www.tenderwizard.com/IITG . The bidders have to Log on to ITI's web site and then click on the specified link "Vendor Help" to start participating in the e-procurement process.

2. Digital Certificates:

For integrity of data and its authenticity/ non-repudiation of electronic records, and be compliant with IT Act 2000, it is necessary for each user to have a Digital Certificate (DC). also referred to as Digital Signature Certificate (DSC), of Class 3, issued by a Certifying Authority (CA) licensed by Controller of Certifying Authorities (CCA) [refer <http://www.cca.gov.in>].

3. Method for submission of bid documents:

In this tender the bidder has to participate in ITI Limited e-tender portal (<https://www.tenderwizard.com/IITG>) online.

4. Registration

To use the Portal (<https://www.tenderwizard.com/IITG>) Vendor needs to register on the portal by uploading the PAN & GST Registration Certificate.

Note: Please contact ITI Limited Helpdesk (as given below),if facing any kind of problem to get register.

Helpdesk No. 9073677150/151/152

Mr. Rishi Shankar Chatterjee: - 09674758726

Mr. Siddhartha SundarMondal – 09674758723

Mr. Siddhartha Jana – 09674758719

Note: Any support related mail problem should be sent to helpinetenderwizard@gmail.com and helpline8tenderwizard@gmail.com

5. Price schedule / BOQ

Utmost care may kindly be taken to upload price schedule / BOQ. Any change in the format of price schedule / BOQ file shall render it unfit for bidding. Following steps may be followed:

- i. Download price schedule / BOQ in .xls format.
- ii. Fill rates in downloaded price schedule / BOQ as specified in .XLS format
- iii. Price has to be filled in the same file and the same has to be uploaded.

- iv. Save filled copy of downloaded price schedule / BOQ file in your computer and remember its name & location for uploading correct file (duly filled in) when required.

6. Other Instructions

For further instructions, the vendor should visit the home-page of the portal (<https://www.tenderwizard.com/IITG>) and go to the register link. A vendor Registration page will be opened and their all required information regarding bidder online registration process mentioned read carefully and registered himself

- 6.1 Authorized e-Tendering agency namely M/s ITI Limited.
- 6.2. Bidder shall have to pay one-time annual registration fee through electronic transfer for participating any e-bid published by IIT Guwahati through ITI.
- 6.3. On registration with ITI bidder shall be provided access to ITI e-Tender web portal for accessing and down loading and uploading bid document. It may please be noted that bidder can access and download bid document but cannot participate in tendering process without registering themselves with ITI e-tender portal.

7. Minimum Requirements at Bidders end

- 2 Mbps Broadband connectivity with UPS.
- Microsoft Internet Explorer 9.0 or above
- Computer System with good configuration (Min P IV,2 GB RAM, Windows 7)
- Digital Certificate(s) for user

8. Documents must be submitted through online.

- 8.1 List of Documents to be filled in by the bidders in various forms and other documents to be scanned and uploaded under cover-1 (Technical bid) within the period of bid submission:

- 1) Certificate of registration with Govt. / Semi Govt. Dept. / Autonomous Body.
- 2) Complete set of the tender document downloaded duly filled in and signed by the tenderer as prescribed in different clauses of the tender document with all addenda/corrigenda issued duly signed
- 3) Work order with BOQ and completion certificate to be uploaded as proof of eligibility criteria.
- 4) Certificate of Financial Turnover for the last three years from Chartered Accountant.
- 5) Electrical contractors license
- 6) Bank Solvency Certificate from a Scheduled Bank
- 7) The tenderer shall submit copies of PAN, GST, registration under EPF, ESIC whatever is applicable to this contract.
- 8) EMD details
- 9) GST Registration Certificate of the State in which the work is to be taken up, if already obtained by the bidder. If the bidder has not obtained GST registration in the State in which the work is to be taken up, Or as required by GST authorities then in such a case bidder shall furnish undertaking as given in Form-‘G’
- 10) Power of Attorney or a true copy thereof duly attested by Gazetted Officer/ Notary in case an authorized representative has signed the tender
- 11) Any other important document mentioned in the bidding documents.

8.2 List of Documents to be uploaded up to the last date and time mentioned above in Cover-2 (Financial Bid) :

1) Duly filled in priced BOQ.

Kindly note that **no physical submission** of duly filled in BOQ is required and it is to be uploaded only on e-tendering website.

SPECIAL CONDITIONS OF CONTRACT (SCC)

1. GENERAL: Special conditions of Contract shall be read in conjunction with General Conditions of Contract. Technical Specification, Drawings and any other documents forming part of this contract wherever the context so required.

2. SCOPE OF WORK: The scope of work includes Structural design-detailing of foundation for flag mast, Supply, Installation, testing and Commissioning of 100ft National Flag Mast.

3. Sub soil data: Sub soil investigation data of 2 nos. 20m deep bore log near the location of site is made available with the tender document.

4. Soil improvement technique: Before starting the foundation work Soil improvement shall be done with stone boulder soling of minimum of 300mm thick at the founding level as per SSI report

5. DRAWINGS: On award of work, the successful tenderer shall prepare structural and architectural drawing of RCC foundation in accordance with the drawing specifications of the 30.50mtr high flag mast and Sub soil data. The structural design and drawings should be vetted through the Civil Engineering Department of IIT Guwahati before start of the work. In case the design and drawings are not found acceptable by the vetting authority, the contractor has to execute the work as per the modified design and drawing without any additional cost. Necessary vetting charges payable to the CE Department of IITG shall be borne by the contractor. The tenderer shall furnish layout drawing for approval by the Engineer-in-charge including ducting, cable route etc. Such details shall be based upon specifications, local laws and regulations.

6. MATERIALS: All the materials required for this work should conform to relevant IS specifications and from list of Approved makes attached. The copies of Purchase Vouchers should be produced along with the materials, if required. The test certificates are also to be submitted, if required.

7. STORAGE OF MATERIALS: The contractor shall provide proper and adequate storage facilities to protect all the materials and equipment against damage from any cause whatsoever. The watch & ward of the stores, equipment & materials shall be the responsibility of the contractor till the completion, commissioning & handing over to IITG. Necessary store should be made by the contractor if required. The contractor shall take away the balance of any materials left at the site after commissioning of the system.

8. SAMPLES: The Contractor shall require to provide samples of the materials, wherever applicable, sufficiently in advance at free of cost to obtain approval of IITG. Rejected materials shall be removed from the site immediately under the supervision of EIC.

9. TESTING AND MEASURING EQUIPMENTS: Equipment for measurement of work and testing the installation shall be procured by the Contractor for their use at their own cost.

10. SITE MAINTENANCE DURING EXECUTION OF WORK: The Contractor shall from time to time clear and remove all rubbish and obstructions from the site and the work area shall be kept clear and unobstructed at all times. Nothing extra shall be paid on this account.

11. CONFORMITY TO IE ACT, IE RULES AND REGULATIONS: All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act-1910, Indian electricity rules – 1956 amended up to date (date of call of tender unless

specified otherwise) and the State Electrical Inspectorate. The works shall also conform to relevant Indian Standard Codes of Practice (COP) for the type of work involved. All materials to be used in work shall be ISI marked. In all electrical works, relevant safety codes of practices shall be followed.

12. CONFORMITY TO MINISTRY OF HOME AFFAIRS GUIDELINES REGARDING NATIONAL FLAG: All upto date guidelines, Flag codes & instructions of Ministry of Home Affairs, Govt. of India regarding National Flag must be strictly followed pertaining to the above said work.

13. OTHER WORKS: The contractor shall be responsible for any damage resulting from his negligence to existing facilities /installations and will restore, replace or repair any such damages at his cost to the complete satisfaction of IITG.

14. COMPLETION DRAWINGS/OPERATION & MAINTENANCE MANUALS: On completion of works, the contractor shall submit two sets of "As – Built" drawings (Hard &Soft) and Operation & maintenance manual to IITG before submission of the final bill.

15. BYE-LAWS: The contractor shall comply with all bye-laws and regulations of local and statutory authorities having jurisdiction over the works and shall be responsible for obtaining prior approval. The Contractor shall comply with proper and legal orders and directions of local or public authority or municipality and abide by their rules and regulations and pay all fees and incidental charges which may be liable during the contract period.

16. SAFETY: Only properly tested and marked material handling equipment shall be used. All supporting arrangements and fixing details shall be checked periodically and necessary rectifying actions are to be taken in order to ensure safe handling of loads during different operations. The contractor shall be responsible for all damages and accidents caused due to negligence on his part.

17. COMMISSIONING ON COMPLETION: After the work is completed, it shall be ensured that the installation is tested and commissioned. All the test /calibration certificates shall be submitted to IITG before handing over of the system.

Water and Power

18. Water :The contractor shall arrange water fit for the purpose of drinking and construction at their own cost.

19. Power :Owner will supply power at a point near the work site as decided by the Institute, from where the contractor will make his/their own arrangement for distribution. All the works of the contractor shall be done as per Indian Electricity Act and Rules framed there under and approved by the Engineer-in-Charge. The temporary lines will be removed forthwith after the completion of the work or if there is any hindrance caused to the other work due to the alignment of these lines, the contractor will re-route or remove the temporary lines at his own cost.

20. The contractor at his own cost will also provide suitable electric meters, fuses, switches etc. These shall be in the custody and control of the Owner. The cost of power supply shall be payable to the Owner every month at the prevailing rates from time to time or will be deducted from the running account bills.

21. Owner, however, does not guarantee uninterrupted power supply and this does not relieve the contractor of his responsibility for the timely completion of various works as stipulated, nor any compensation shall be paid to the contractor for any failure or short supplies of Power. The contractor shall therefore make their own arrangement for standby power supply at his own cost.

- 22. Abnormally High Quoted Rates:** In case the quoted rates of items exceed the estimated rates by more than +50%, such items shall be called “**Abnormally High Rated Items**”, and there would be a ceiling of 15% in excess of quantities provided in BOQ for these items. For such items, if quantities to be executed are more than 15% over the quantities indicated in BOQ, rates for quantities in excess beyond 15%, of BOQ shall be the average of rates quoted by other bidders for payment. If the average rates are more than the rates quoted by the contractor then the rate of the contractor will be considered.
- 23. Finalization of Rates of Extra items:** The rates of extra items, substitute items or new items required for completion of the contract shall be finalized base on market rates. However, rate may be finalized based on latest CPWD schedule in source with local area index if the item is available in the schedule. If it is not a schedule item, rate may analyzed based on the market rate and finalized through a committee comprising of member from contract, site and finance wing submitted for acceptance from the contractor.
- 24. Anti-Corruption Policy:** IIT Guwahati’s anti-corruption policy requires the bidders, suppliers and contractors associated with the Institute to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, terms set forth below are as follows:
- i) They are not to indulge in any corrupt practices. These are defined as giving, receiving or soliciting directly or indirectly, anything of value to influence improperly the actions of the Institute.
 - ii) In case there is any improper demand from any employee of the Institute (directly or indirectly), they are to inform the Institute’s Chief Vigilance Officer (CVO). Currently the CVO is

Prof. T. Punniyamurthy

Telephone no. 0361-2582705,

Email: tpunni@iitg.ac.in

Fax: + 91 - (0) 361 – 2690762

25. Compensation for Delay

If the contractor fails to maintain the required progress or to complete the work and clear the site on or before the contract or justified extended date of completion as well as any extension granted in the event of any deviations resulting in additional cost over the tendered value.

The contractor without prejudice to any other right or remedy available under the law to IITG on account of such breach, pay as compensation the amount calculated at the rates stipulated below on the amount of accepted Tendered Value of the work for every completed day/month (as determined) that the progress remains below that specified or that the work remains incomplete.

Compensation for delay of work: With maximum rate @ 1% (one percent) month of delay to be computed on per day basis based on quantum of damage suffer due to stated delay on the part of Contractor.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10 % (ten percent) of the accepted Tendered Value of work or of the accepted Tendered Value.

Other Terms and conditions

1. The rates shall be firm up to the completion of work. No price escalation will be paid on any account.
2. The rate shall be inclusive of all taxes including GST @ 18% (eighteen). All other taxes including forest Royalty as applicable to the work as per state/central government shall be deducted from the bills. Loading, unloading and transportation etc. of all the materials to work site at IITG campus, Guwahati-39 shall be inclusive of quoted rate.
3. All the pages of the tender document shall be signed and dated at the lower right hand corner by the tenderer. If the tender is signed by a person holding power of attorney, power of attorney authorizing him to sign on behalf of the tenderer should be submitted along with the tender.
4. The documents submitted along with the application for tender in respect of Experience, registration will be verified by the Institute with respect to that stated in the NIT for qualifying for the tender. If after verification any such data/ information are not found true or has attempted to conceal any unfavorable data/ information, his/her tender shall be summarily rejected.
5. The owner reserves the right to take inputs regarding performance of a bidder on any similar work (on-going or completed) from a client whether disclosed in the tender or not. If any such report from the client is found to be unsatisfactory, the tender is liable to be rejected.
6. Any tender submitted without the qualifying documents mentioned in the relevant clause of NIT, it shall be considered as incomplete tender and the tender will be rejected for which no communication will be made.
7. In case the work involves electrical works, the contractor must have electrical contract license and if the contractor does not have such license they should submit and undertaking to engage a party which fulfills the qualifying criteria. In such cases, Electrical License with his acceptance to take up the work shall be submitted.
8. The contractor shall arrange all the plants, equipment, machineries etc. required for the works for which no extra charges will be paid.
9. The contractor will arrange for water and electricity at his own. However, the Institute may provide electricity on the request of the contractor on payment basis under the terms and conditions fixed by the institute.
10. Care shall be taken by the contractor to avoid damage to any part of the building or its finishing. He/they shall be responsible for repairing all damages and resorting the same to their original finish at his own cost. He / they shall also remove at his own cost all unwanted wastage and materials arising out of his work from the site.
11. Any abnormal rate quoted in the tender will summarily be rejected for which no communication will be made.
12. Earnest money of **₹50,000.00** shall be deposited in the form of deposited in the form of **Demand draft/ Banker's cheque** or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/RTGS in favour of 'IIT Guwahati' payable at 'Guwahati
13. **Payment of Bills:** The successful bidder if desire may submit their Running Account Bill as per progress of work and actual execution. Site Engineer will prepare RA Bill for release of payment subject to his satisfaction in progress of work.

After successful completion of work, as per specification and requirement, the contractor must submit their Final Bill including detail measurement along with Forest Department or other department clearance if necessary within one month from the date of completion of work. On submission, the site engineer will prepare the bill subject to his satisfaction and put up for payment within fifteen days.

17. Performance Guarantee: Performance Bank Guarantee (PBG):

- i) The successful bidder shall submit an irrevocable Performance Guarantee of 3% (Three percent) of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within 15 days from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in- Charge on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge. This guarantee shall be in the form of Banker's Cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay Order of any scheduled bank or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the form annexed hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to IITG as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to IITG to make good the deficit.
- ii) The Performance Guarantee shall be valid up to the stipulated date of completion plus minimum 12 months beyond that. To cover the defect liability period of 12 months of the work, the Performance Guarantee shall be retained as Security Deposit. The same shall be returned after expiry of the defect liability period without any interest.
- iii) The Engineer-in-Charge shall not make any claim under the performance guarantee except for amounts to which IITG is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
 - a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.
 - b) Failure by the contractor to pay IITG any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge.
- iv) In the event of the contract being determined or rescinded under provision of any of the Clause/Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of IITG.

Clause no.17 (i) to (iv) above shall supersede clause no. 19.1 & 19.2 of the General Conditions of Contract. The term Initial Security Deposit/Security deposit used elsewhere in the tender document shall be read as Performance Guarantee.

18. All legal disputes will be subjected to jurisdiction of Gauhati High Court only.
19. All Specification of the work will be followed as per CPWD manuals or manufacturer specification.
20. If the lowest bid is below 10% of the estimate, additional initial security deposit of value by which the quote is below 10% of the estimate will have to be submitted by the bidder along with Performance Guarantee within 15 days from the date of issue of Letter of

Intent offering the work. The additional security deposit shall be refunded immediately after completion of the work. In case the lowest bidder is not able to complete the work, the performance guarantee and the additional security deposit will be forfeited and the contractor will be debarred for 2 years from participating in the tenders floated by the Institute after issuing a show case notice.

21. The performance guarantee and additional security deposit will be in the form as specified in the tender. In case the lowest bidder fails to submit the performance guarantee and additional security deposit within the stipulated time, the offer will be cancelled and fresh tender will be invited.
22. Lowest quotes above 10% of the estimated cost will not be accepted in any case and fresh tender will be invited.
23. In case the lowest bidder fails to submit the Performance Guarantee within the stipulated time mentioned in the tender, their offer will be cancelled.
- 24. Shop drawings for the steel fabrication work should be furnished by the contractor for approval of Engineer in charge before execution of the work.**
25. All other terms & conditions shall be as per provision of General Conditions of Contract followed by the institute.

Head, Engineering (IPM Section)

Date:

To,

The HoS, Engineering IPM
Indian Institute of Technology Guwahati
Guwahati – 39

Sub: Submission of tender for the “Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) high National Flag Mast at IITG campus..”

Sir,

I/we do hereby submit our tender for “Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) high National Flag Mast at IITG campus.”, as per Notice Inviting Tender No IITG/IPM/NIT/C/2022-23/15, dated: 15.11.2022. The rates quoted by me / us are for the whole work in accordance with Notice Inviting Tender and Terms & Conditions.

Name of Firm/ Contractor :

Address for correspondence :

Signature of Contractor with seal :

Date :

Contact Phone No –

email id :

Enclosure :

- 1.
- 2.
- 3.
- 4.
- 5.

Seal & Signature of Contractor

FORM 'A'**FINANCIAL INFORMATION**

1. Financial Analysis – Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Years

Year	2018-19	2019-20	2020-21	2021-22
Gross Annual turnover on construction works ₹ in lakhs				
Profit / Loss.				

* The bidder should give information strictly in above format.

- I. Financial arrangements for carrying out the proposed work.
- II. Solvency Certificate from Bankers of the bidder in the prescribed Form "B".

Signature of Chartered Accountant with Seal Signature of Bidder(s).

FORM "B"

FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that
M/s./Sh.....having marginally noted
address,.....a
customer of our bank are/is respectable and can be treated as good for any engagement
upto a limit of
Rs.....(Rupees.....
.....). This certificate is issued without any
guarantee or responsibility on the bank or any of the officers.

(Signature) For the Bank

NOTE

- (1) Bankers certificates should be on letter head of the Bank, addressed to tendering authority.
- (2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.
- (3) Solvency certificate should not be more than 6 months old.

FORM 'C'

DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DATE OF SUBMISSION OF TENDERS

S.	Name of work/project and location	Owner or sponsoring organization	Cost of work	Date of commencement per contract	Stipulated date of completion	Actual date of completion	Litigation/arbitration cases pending/in progress with details	Name and address/telephone number of office	Whether the work was done on back-to-back basis Yes/No
1	2	3	4	5	6	7	8	9	10

* Indicate gross amount claimed and amount awarded by the Arbitrator.

Signature of Bidder(s)

FORM 'D'

PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "C"

1. Name of work/project & location
2. Agreement no.
3. Estimated cost
4. (i) Tendered cost
(ii) Value of work done
5. Date of start
6. Date of completion
 - (i) Stipulated date of completion
 - (ii) Actual date of completion
7. (a) Whether case of levy of compensation for delay has been decided or not
Yes/No

(b) If decided, amount of compensation levied for delayed completion, if any
8. Performance Report

(1) Quality of work	Outstanding/Very Good/Good/Poor	(2)
Financial soundness	Outstanding/Very Good/Good/Poor	(3) Technical
Proficiency	Outstanding/Very Good/Good/Poor	(4) Resourcefulness
Outstanding/Very Good/Good/Poor	(5)	General Behaviour
Outstanding/Very Good/Good/Poor		

Dated: _____ Executive Engineer or Equivalent

Note: If Name of Work is not clearly defining scope of work as specified in the definition of similar work, bidders are advised to upload copy of Agreement/ final bill or any other relevant document in support of their proposed completed work conforming to the definition of similar work.

FORM "E"**STRUCTURE & ORGANISATION**

1. Name & address of the bidder
2. Telephone no./Telex no./Fax no.
3. Legal status of the bidder (attach copies of original document defining the legal status)
 - (a) An Individual
 - (b) A proprietary firm
 - (c) A firm in partnership
 - (d) A limited company or Corporation
4. Particulars of registration with various Government Bodies (attach attested photocopy)

Organisation/Place of registration

Registration No.

1.

2.

3.

5. Names and titles of Directors & Officers with designation to be concerned with this work.
6. Designation of individuals authorized to act for the organization
7. Has the bidder, or any constituent partner in case of partnership firm Limited Company/Joint Venture, ever been convicted by the court of law? If so, give details.
8. In which field of Civil Engineering construction the bidder has specialization and interest?
9. Any other information considered necessary but not included above.

Signature of Bidder(s)

FORM "F"Affidavit

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in IIT Guwahati in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Performance Guarantee.

Signature of Notary with seal

Signature of Bidder(s) or an authorized
Officer of the firm with stamp

FORM "G"

Undertaking regarding obtaining GST registration Certificate of The State, in which work is to be taken up

If work is awarded to me, I/we shall obtain GST registration Certificate of the State, in which work is to be taken up within one month from the date of receipt of award letter or before release of any payment by IITG, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by IITG or GST department in this regard.

Signature of Notary with seal

Signature of Bidder(s) or an authorized
Officer of the firm with stamp

FORM "H"

Compliance to requirement of tender documents:

We confirm that our tender complies with the total techno-commercial requirements of bidding document without any deviation.

Signature of Company/ Contractor

FORM "I"**TENDER VALIDITY**

Tender shall remain valid for acceptance for a period of 120(One hundred twenty) days from the date of opening of the tender. The tenderer shall not be entitled during the said period to revoke or cancel his tender or to vary the tender given or any term thereof. In case of tenderer revoking or cancelling his tender or varying any term in regard thereof, the OWNER shall reject the tender. Tender shall be revalidated for extended period as required by Owner in writing.

Signature of Company/ Contractor

TECHNICAL SPECIFICATIONS

The scope of this specification covers the Design, drawing, manufacture, transport, construction, installation, testing and commissioning of the complete flag system, using Raising and Lowering type of flag mast towers, including prepare structural and architectural drawing of RCC foundation in accordance with the drawing specifications of the 30.50mtr high flag mast and Sub soil data. The structural design and drawings should be vetted through the Civil Engineering Department of IIT Guwahati before start of the work. In case the design and drawings are not found acceptable by the vetting authority, the contractor has to execute the work as per the modified design and drawing without any additional cost. Necessary vetting charges payable to the CE Department of IITG shall be borne by the contractor. The tenderer shall furnish layout drawing for approval by the Engineer-in-charge including ducting, cable route etc. Such details shall be based upon specifications, local laws and regulations.

Details of scope:

- Supply of 30.5 meter flag mast.
- Supply of foundation bolts.
- System for Raising and Lowering of flag.
- Supply of System & Aviation Obstruction light.
- Supply of Four numbers 5 mtr hot dip galvanized octagonal pole with 350W LED light.
- Supply of national flag of size 30 ft.(l) x 20 ft.(h)
- Construction of foundation for 30.5 meter flag mast with M 20 grade RCC.
- Erection of 30.5 meter flag mast {30 ft.(l) x 20 ft.(h)}
- Provision of GI pipe earthing for 30.5 meter height flag mast.
- Painting of flag mast.
- SITC of outdoor type dust and vermin proof 3P Street lighting panel
- Construction of foundation for 5m pole and erection.
- And other works/job as per BOQ.

1. APPLICABLE STANDARDS.

The applicable codes followed for high mast designs are as follows: -

- (a) TR. No. - 7 : High Masts for Lighting of ILE, UK
- (b) IS 875 Part – 3 : Wind Loading (Basic wind speed :- 62.5mtr/sec)
- (c) BS EN 10025:1993 : High Tensile Steel Sheets
- (d) BS EN ISO 1461 : Galvanization
- (e) SABS 0225:1991 : High Mast natural frequency calculation
- (f) IS 2062 Mild Steel
- (g) IS 3459 /2256 : Stainless Steel Wire Rope
- (h) IS 325 : Motor

2. FLAG MAST :

(a) Pole:

(i) Structure details. The Flag Mast shall be continuously tapered, polygonal cross sections (twenty sided) with the pulley box arrangement at the top. The structure gives good visual appearance and is based on proven design confirming to relevant Indian standards, to give assured performance, reliability and

service. The Masts are constructed from steel conforming to BSEN 10025 and cut and folded to form twenty sided section and is telescopically jointed and fillet welded. Mast section delivered to site shall not have any intermediate joint. The Mast is provided with full-penetrated flange, which is free from any lamination or incursion. The welded connection of the base flange is fully developed to the strength of the entire section. The base flange is provided with supplementary gussets between the bolts to ensure elimination of helical stress concentration. For metal protection of the Mast, the entire fabricated Mast is hot dip galvanized internally and externally in single dip. The external surface of the mast is also applied with suitable Poly Urethane paint. A vandal resistant, weather proof, lockable door of suitable size is provided at the base of high mast to access comfortably the components at the base compartment for normal operation & for maintenance.

(ii) Dynamic Loading of Mast.

The mast structure shall be suitable to sustain an assumed maximum reaction arising from a wind speed as per IS 875 (Basic wind speed 62.5 m/sec) and are measured at a height of 10 metres above ground level. The designed life of the mast should be 25 Years.

(i) Winch:

The winch shall be high speed completely self sustaining without the need for brake shoe, springs or clutches. There is a permanent oil bath for self-lubrication. The drums are to be properly grooved to provide a perfect seat for wire ropes. The raising time of the flag shall not be more than 3 minutes. The winch is normally being operated by an electrical power tool however there should be provision for manual operation also by means of manual handle. The winches are type tested through reputed institutions like IIT/NIT as consultants or NABL certified Lab's/Govt. Lab and the type test reports are submitted along with offer. A test certificate is to be submitted along with supplies.

(ii) Head Frame.

The hot dip galvanized head frame is to be designed as a capping unit of the mast is of welded steel construction and provided with guides and separators between the ropes and cable. The LM6 Aluminium pulleys with bush bearing mounted through stainless steel shaft shall be suitable to accommodate wire ropes and multi core trailing cable. The head frame

is provided with guides and stops with PVC buffer for the docking of luminaires carriage. The pulley assembly is covered by a hot dip galvanized canopy.

(iii) Stainless Steel Wire Ropes.

The stainless steel wire ropes are generally be of 6 mm dia, 7/19 construction with central core being stainless steel only. The grade of wire ropes are in accordance to AISI 316. The breaking load of each rope is not less than 2350 Kg giving a factor of safety of more than 5 for the system at full load as per the Technical Report No -7. The end construction of rope for the winch drum is fitted with copper talurit and for two continuous ropes, the end termination in luminaires carriage 3 are with stainless steel thimble and copper splicing and for others with stainless steel thimble and bull dog grips.

(iv) Power Tool for Winch.

Three phase, single speed, 06 pole high-powered motor of suitable rating as per India Standard Certification are to be provided at the base of mast to facilitate raising & lowering operation of flag/ luminaires carriage. The motors are to be coupled with the winch shaft through chain & sprocket. A mechanical torque limiter is to be mounted on motor shaft to stop transmission of motion from motor to winch in case of excess load and thus prevent the damage to winch and breakage of rope.

(c) Other Accessories:

(i) Lightening Finial.

One number of FRP ornamental finial (DOME) shall be provided for each FLAG mast on the head arrangement is to be provided.

(ii) Aviation Obstruction Lights.

LED aviation lights are mounted on the lantern carriage to comply to the aviation norms where applicable. The 15 connection for these aviation obstruction lights shall be made using 3C X 2.5 sq mm copper un armoured cables.

(iii) Earthing Terminals.

Earth terminal using 12 mm diameter hot dip galvanized bolts are provided on the door stiffener of the mast for lightning and electrical earthing of the mast.

(iv) Feeder Pillar / Control Box.

Each Mast shall be provided with a panel box , housing 32A TPN MCB incomer along with 2 no. 9A contactors & switches for forward/ reverse operation of motor & to provide supply to the poles. The box is constructed of 14 SWG CRCA sheet IS finished with two Coates of red

oxide primer & grey enamel paint of shade 631 of IS 5. It should have 4 nos of 10A SPMCB to control 2 nos of aviation lamp and 2 nos offlood light.

(d) POLES WITH FLOOD LIGHT FITTINGS:

Two numbers of 05 Mtrs Octagonal poles with LED Flood Light Luminaries type 350W fittings shall be provided to illuminate the national flag.

(e) HARDWARES.

Hardwares play a very important role on the overall performance of high flag mast systems. Hardware materials are to be chosen carefully so that there is no compromise on safety or risk to the human lives. Appropriate grade and size of materials are absolutely necessary to ensure full safety. Single & double grooves clamps & W.G clamps are mandatory to ensure the proper operation of raising & lowering systems.

(f) ELECTRICAL SYSTEM, CABLE AND CABLE CONNECTIONS.

The power cable from base compartment to junction box at the top shall be 1.1 KV grade PVC insulated, fire retardant, PVC sheathed copper conductor of size minimum 3 core X2.5 sqmm wiring from junction box to aviation light is to be done using 3 core 2.5 sqmm PVC insulated, PVC sheathed, copper conductor flexible cable. Suitable arrangement is to be provided in the base compartment to receive and terminate incoming power cable and MCB in a box for isolation of incoming power supply.

(g) INCOMING POWER CABLE.

The power cable of 4c 16 sqmm upto the feeder pillar from supply point shall be carried out as per BOQ

(h) LUMINARIES.

The flood light luminaries should be 350W LED with minimum output of 100 lumen/watt, IP 66 rated, and must have minimum 10 KV surge protection. It should have power coated die cast aluminum housing with frame, heat resistant clear toughened glass fixed to the frame with silicon. This flood light shall be installed on suitable pole on plinth with supply & laying of 3Cx2.5 sqmm copper cable for the individual wiring of the luminaire.

(i) PU Painting.

Flag mast shall be finished with polyurethane (PU) paint (white color) over galvanized surface after application of Etch primer and primer coat.

(j) Flag .

The national Flag of the size 20 feet x 30 feet in 100% knitted polyester (140 gsm) as relent OS code, with reinforced super strong nylon webbing on all 3 sides & rope / toggle sleeve. Flag shall confirm the Flag Code of India, 2002 & its updated amendments.

TECHNICAL DETAILS FOR 30.5 MTR. FLAG MAST

High Mast system

Make : Bajaj/Philips/ Siska/ Valmont or Equivalent approved make.

Height of Mast : 30.5 Mtr.

Sections : Three

Material construction : BS- EN10025 S 355 grade

Base dia. and top diameter (A/F): Top: 150 mm, Bottom- 610 mm, Plate thickness : op- 3mm, Middle-4mm, Bottom- 5mm

Cross section of Mast : 20 side polygon

Standard for of galvanization : As per BS EN ISO 1461(1500 X 400mm)(Size of opening and door at base)

Diameter of base plate : 840mm Thickness of base plate : 30mm

Max. Wind speed : As per IS: 875 (Part-III) Number of foundation bolts : 16 nos.

Type/diameter/length of foundation bolts : 850mm : TS 600/30mm dia./850mm long Power cable cable for Aviation : Copper, 3 core, 2.5Sqmm Armored cable

Winch/ Power tool

Type/SWL of winch Method of operation : Double Drum, SWL 70 Kg (SGDD 30/6 PB) : Integral motor Motor capacity : 2HP

No of speeds :6/ 4 Pole single speed

Torque limiter : With mechanical tripping facility

Wire rope for flag Grade/construction :Galvanised No of ropes :100mm long X 1 Nos. Diameter (mm) : 6 mm

**EVALUATION PROCEDURE FOR TECHNICAL BID TO QUALIFY FOR OPENING OF PRICE
BID**

Sl. No.	Qualifying Criteria	DOCUMENTS REQUIRED FROM THE BIDDER
1	Total tender document including addenda, corrigendum etc.	Complete set of the tender document downloaded duly filled in and signed by the tenderer as prescribed in different clauses of the tender document with all addenda/corrigenda issued duly signed.
2	Certificate of registration with Govt. / Semi Govt. Dept. / Autonomous Body.	Valid registration certificate with Govt./ Semi Govt. Dept./ Govt. Autonomous Body
3	Work experience	Satisfactory completion certificates supported by respective Work order / detailed BOQ/ final bill etc. for works executed in Govt./ Semi Govt. Department/ Govt. Autonomous Body.
	Shall have experience in Design, Supply, Installation & Commissioning of 30.50mtr (100 feet) High National Flag Mast at IITG campus	
	(ii) One work of value not less than ₹ 12.50 Lakh against a single work order or two works of each value not less than ₹ 10.00 lakh each against two separate work order or three works of each value not less than ₹ 7.50 lakh each against three separate work orders in Govt./ Semi Govt. department / Autonomous body during last seven years.	
4	Engagement specialized agency for the Electrical work	Valid electrical contractor's licence of the bidder. Alternatively, an undertaking may be submitted for engagement of electrical sub-Contractor. In that case detail experiences along with electrical licence of the sub-contractor have to be submitted.
5	Minimum Annual Turn Over during last 3 consecutive years shall not be less than ₹ 25.00 lakh .	Certificate of Financial Turnover for the last three years from Chartered Accountant or Audited Balance sheet for the last 3 years
6	Bankers Solvency Certificate	Bankers' certificate from a scheduled bank as per Form-B
7	Earnest Money Deposit	₹ 50,000.00 shall be deposited in the form of deposited in the form of Demand draft/ Banker's cheque or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/RTGS in favour of 'IIT Guwahati' payable at 'Guwahati
8	GST Registration	GST registration certificate should be submitted.
9	PAN	Copy of PAN Card
11	Power of Attorney of authorized representative of the contractor	Power of Attorney duly attested by Gazetted Officer/ Notary in case an authorized representative has signed the tender

GENERAL CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT (GCC)**SECTION - 1****1. Definition of Terms**

In the contract document as herein defined where the context so admits, the following words and expressions will have the following meanings:

- 1.1 "The Owner" means the Indian Institute of Technology Guwahati having its registered office at Guwahati-781039.
- 1.2 "The Contractor" means the person or the persons, firm or company whose tender has been accepted by the Owner and includes the Contractor's legal representative, his successor and permitted assignees.
- 1.3 The "Engineer-in-Charge" shall mean the person designated as such by the Owner and shall include those who are expressly authorized by the Owner to act for and on his behalf for operation of this contract.
- 1.4 The "Work" shall mean works to be executed in accordance with the contract or part thereof as the case may be and shall include all extra, additional altered or substituted works as required for the purpose of the contract.
- 1.5 The "Permanent work" means works as handed over to the Owner by the Contractor on completion of the contract.
- 1.6 "Construction Equipment" means all applications and equipment of whatsoever nature for the use in or for the execution, completion, operation or maintenance of the work unless intended to form part of the Permanent work.
- 1.7 "Site" means the areas on which the permanent Works are to be executed or carried out and any other places provided by the Owner for purpose of the contract.
- 1.8 "Contract Document" means collectively the Tender Document, Designs, Drawings, Specifications, agreed variations, if any, and such other documents constituting the tender and acceptance thereof.
- 1.9 "The Sub-Contractor" means any person or firm or Company (other than the Contractor) to whom any part of the work has been entrusted by the Contractor, with the written consent of the Engineer-in-Charge, and the legal personal representatives, successors and permitted assigns of such person, firm or company.
- 1.10 The "Contract" shall mean the Agreement between the Owner and the Contractor for the execution of the works including therein all contract documents.
- 1.11 The "Specification" shall mean the various technical specifications attached and referred in the tender documents. It shall also include the latest edition including all addenda/corrigenda of relevant Indian Standard Specifications published before entering into Contract.
- 1.12 "The Drawings" shall include maps, plans and tracings or prints thereof with any modifications approved in writing by the Engineers-in-Charge and such other drawings as may required, from time to time, or furnished or approved in writing by the Engineer-in-Charge.
- 1.13 The "Tender" means the tender submitted by the Contractor for acceptance by the Owner.
- 1.14 The "Alteration Order" means an order given in writing by Engineer-in-Charge to effect additions to or deletion from and alteration in the work.
- 1.15 The "Completion Certificate" shall mean the certificate to be issued by the Owner when the works have been completed to his satisfaction.
- 1.16 The "Final Certificate" in relation to a work means the certificate issued by the Owner after the period of liability is over.

- 1.17 The "Period of Liability" in relation to a work means the specified period from the date of issue of completion certificate up to the date of issue of final certificate during which the Contractor stands responsible for rectifying all defects that may appear in the works.
- a. The "Appointing Authority" for the purpose of arbitration shall be the Director, Indian Institute of Technology, Guwahati or any other person so designated by the Owner.
 - b. 'Tendering period' means the period from the date of invitation of tender to date of submission of tender.
 - c. 'Consultant' means the consultant engaged by the 'Owner' for the work which shall be reported to the contractor.

Definition of Terms

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- 1.3 The "Engineer-in-Charge" shall mean the person designated as such by the Owner and shall include those who are expressly authorized by the Owner to act for and on his behalf for operation of this contract.
- 1.4 The "Work" shall mean works to be executed in accordance with the contract or part thereof as the case may be and shall include all extra, additional altered or substituted works as required for the purpose of the contract.
- 1.5 The "Permanent work" means works as handed over to the Owner by the Contractor on completion of the contract.
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- d. The "Appointing Authority" for the purpose of arbitration shall be the Director, Indian Institute of Technology, Guwahati or any other person so designated by the Owner.
- e. 'Tendering period' means the period from the date of invitation of tender to date of submission of tender.
- f. 'Consultant' means the consultant engaged by the 'Owner' for the work which shall be reported to the contractor.

SECTION – 2

2. GENERAL INFORMATION

2.1 Location and Accessibility of Site

The IIT Guwahati Campus is located on the North Bank of the river Brahmaputra. This is accessible by road via NH 31 as well as via North Guwahati - Hajo Road from the junction point of North approach of Saraighat Bridge and Guwahati Hajo by-lane.

2.2 Scope of Work

The scope of work is defined in the special conditions of Contract and specifications. The Contractor shall provide all necessary materials, equipment, labour etc. for the execution and maintenance of the work till completion unless otherwise mentioned in this tender document. All materials required for the work shall be approved by Engineer-in-Charge prior to procurement and use.

2.3 Water Supply

The Contractor will have to make his arrangements for supply of water to his labour camps and for works. All pumping installations, pipe network and distribution system will have to be carried out by the Contractor at his own cost.

2.4 Power Supply

The Contractor will make his own arrangement for his requirement of power to carry out the work. Owner will not be supplying power for this work. All the works by the Contractor in this regard will be done as per the Indian Electricity Act and rules framed there under and as approved by the Engineer-in-Charge.

2.5 Land for Contractor's Field Office, Go-down and Workshop

The Owner will at his own discretion and convenience and for the duration of the execution of the work make available near the site, the land for construction of Contractor's field office, go-downs, workshops and assembly yard required for the execution of the contract. The Contractor shall at his own cost construct all these temporary buildings and provide suitable water supply and sanitary arrangement approved by the Engineer-in-Charge.

2.6 Land for Residential Accommodation

Land for residential accommodation for staff and labour of the Contractor will be made available at the discretion of the Engineer-in-Charge within the campus free of rent. However, development of such land, access roads, if necessary, shall be done by the contractor at his own cost.

2.7 Site clearance

On completion of the works undertaken by the Contractor, he shall remove all temporary works erected by him and have the site cleaned as directed by the Engineer-in-Charge. If the Contractor shall fail to comply with these requirements, the Engineer-in-Charge may at the expense of the Contractor remove such surplus and rubbish materials and dispose of the same as he deems fit and get the site cleared as aforesaid; and the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed off as aforesaid. But the Owner reserves the right to ask the Contractor any time during the pendency of the contract to vacate the land by giving seven days notice on security reasons or on material interest or otherwise.

SECTION - 3**GENERAL INSTRUCTIONS TO TENDERER****3. Submission of Tender**

- 3.1 Tender must be submitted through <https://www.tenderwizard.com/IITG> & also in original and without making any additions, alterations and as per details given in other clauses in tender document. The requisite details shall be filled in by the Contractor in page 1 and 2 of Tender document. The rate shall be filled in the Schedule given format as provided in online. Reservations, if any, regarding the tender conditions and schedule rates should be clearly brought out in a separate letter.
- 3.2 Addenda/Corrigenda to this tender document, if issued, must be signed and submitted along with the tender document. The tenderer should write clearly the revised quantities in schedule of rates of Tender Document and should price the work based on revised quantities when amendments for quantities are issued in addenda.
- 3.3 The Original tender copy duly completed and signed on each page should be submitted online along with the offer.
- 3.4 The tender must be placed through online using the portal www.tenderwizard.com/IITG & the original copies of Earnest Money Deposit (offline) should be reached to IITG office, address i.e. Dean(IPM), IPM section, Estate Building, Indian Institute of Technology Guwahati, Guwahati-781 039, Assam, India on or before the closing date & time of submission of the tender as per NIT.

4. Documents must be submitted through online

- 4.1 The tenders, as submitted, shall consist of the following:
- (i) Complete set of the "Original Copy" of the tender document as sold/downloaded duly filled in and signed by the tenderer as prescribed in different clauses of the tender document with all addenda/corrigenda issued duly signed.
 - (ii) Earnest money in the manner specified in clause no. 6 hereof of GCC.
 - (iii) Power of Attorney or a true copy thereof duly attested by Gazetted Officer/ Notary in case an authorized representative has signed the tender, as required under clause 4.5 of GCC.
 - (v) Information regarding tenderers in the Performa enclosed under the head "Information about Tenderer".
 - (vi) Details of work of similar type and magnitude carried out by Tenderer in the Performa enclosed.
 - (vii) Organization chart giving details of field management at site proposed by the tenderer for this work.
 - (viii) Details of construction plant and equipment available with the Tenderer for use in this work in Performa enclosed under the head "Information Regarding Equipment which the Tenderer proposes to use for this work."
 - (ix) Solvency Certificate from a Scheduled bank to prove the financial ability to carry out the work tendered for.

- (x) The tenderer shall submit copies of PAN, GST, registration under EPF and MP Act1952, ESIC whatever is applicable to this contract.

4.2 All pages to be initialed

All the pages of tender document shall be initialed at the lower right hand corner and signed wherever required in the tender by the tenderer or by a person holding power of attorney authorizing him to sign on behalf of the tenderer before submission of tender.

4.3 Corrections and Erasures

All corrections and alterations in the entries of tender document will be signed in full by the tenderer with date. No erasures or over-writings are permissible.

4.4 Signature of Tenderer

- 4.4.1 The tender shall contain the name, residence and place of business of person or persons making the tender and shall be signed by the tenderer with his usual signature. Partnership firms shall furnish the full name of all partners in the tender. It should be signed in the partnerships name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a corporation shall be signed by an authorized representative and a power of attorney in that behalf

shall accompany the tender. A copy of the constitution of the firm with names of all partners shall be furnished.

4.5 Witness

Witness and sureties shall be persons of status and property and their names, occupation and address shall be stated below their signature.

4.6 Details of Experience

The tenderer should enclose documents to show that he has previous experience in having successfully completed in the recent past works of the same nature, together with the names of Owners, location of sites and values of contract.

5. Transfer of Tender Documents

Transfer of tender documents purchased by one tenderer to another tenderer is not permissible.

6. **Earnest Money deposit (EMD):** The tenderer shall pay Earnest money as given in the detailed Notice Inviting Tender. Tenders without EMD are liable to be rejected. The Earnest Money up to ` 20.00 lakhs shall be paid in Demand Draft/ Banker's cheque only or through online i.e. Debit Card/ Credit Card/ Net Banking/ NEFT/RTGS and the balance amount exceeding ` 20.00 lakhs lakhs may be paid in the form of Bank Guarantee from any Nationalized / Schedule Bank in favour of "Indian Institute of Technology Guwahati" payable at 'Guwahati'. (Scan copy of EMD should be uploaded in the Fee/Technical cover) EMD is exempted for Firms which are specifically registered for the required items of the tender with NSIC/MSME. However, no price preference will be given. If exemption is sought from submission of EMD, the same should clearly be mentioned and copy of valid NSIC/MSME registration must be uploaded in place of EMD document.

Note: No interest shall be paid by the Owner on the Earnest Money deposited by the tenderer. **The earnest money of the unsuccessful tenderers will be refunded within a period of 120 days from the date of award of the contract.**

The earnest money deposited by successful tenderer will remain towards the security deposit for the fulfillment of the contract but shall be forfeited if the tenderer fails to deposit the requisite initial security deposit as per **clause no. 10** herein under and **or fails to execute the agreement within 25 days from the date of issue of the Letter of Intent.**

7. Validity

Tenders submitted shall remain valid for acceptance for a period of **120 days** from the date of opening of the tender. The tenderer shall not be entitled during this period of 120 days, without the consent in writing of the Owner, to revoke; or cancel his tender or to vary the tender given or any term thereof. In case of tenderer revoking or cancelling his tender or varying any term in regard thereof without the consent of Owner in writing, the Owner shall forfeit earnest money paid by him along with tender.

8. Addenda/Corrigenda :

- 8.1 Addenda/Corrigenda to the tender document may be issued prior to the date of opening of the tenders to clarify documents or to reflect modification in the design or contract terms.
- 8.2 Each addenda/Corrigenda issued by the Owner will be distributed in duplicate to each person or organization to whom a set of tender documents has been issued. Each tenderer will retain one copy of each addenda/Corrigenda for submission along with his tender and return one signed copy to the Engineer-in-Charge as acknowledgement of receipt of the same. All addenda/Corrigenda issued by the Owner shall become part of tender Documents.

9. Right of Owner to Accept or Reject Tender:

The right to accept the tender will rest on the Owner. The Owner, however, does not bind itself to accept the lowest tender, and reserves to itself authority to reject any or all the tenders received without assigning any reason whatsoever.

Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/or the prescribed conditions are not fulfilled are liable to be rejected.

Canvassing in connection with tenders is strictly prohibited and tender submitted by the Tenderer who resort to canvassing will be liable to rejection

10. Security Deposit

The person/persons whose tender may be accepted (hereafter called the Contractor) shall within 15 days from the date of issue of the Letter of Intent, remit the initial security deposit of 2 % of the accepted value of the tender to the Indian Institute of Technology Guwahati in the manner stipulated in clause 19 of General Conditions of Contract.

11. Time Schedule

The time allowed for carrying out the job is as shown in this document. This shall be signed and submitted along with the tender. Requests for revision for construction time after tenders are opened will not be received for consideration.

12. Collection of Data Tenderer's Responsibility

The tenderer shall visit the site and acquaint himself fully of the site and no claims whatsoever will be entertained on the plea of ignorance or difficulties involved in execution of work or carriage of materials.

13. Retired Government and Institute Officer

No Engineer of Gazetted rank or other Gazetted Officer, employed in Engineering or Administrative duties in an Engineering Department of the State/Central Government or of the Owner is allowed to work as Contractor for a period of two years after his retirement

from Government Service, or from the employment of the Owner without the previous permission of the Owner. The contract, if awarded, is liable to be cancelled if either the Contractor or any of his employees is found at any time to be such a person, who had not obtained the permission of the State/Central Government or the Owner as aforesaid before submission of tender or engagement in the Contractor's service as the case may be.

14. Signing of the Contract

The successful tenderer shall be required to execute an agreement in the proforma attached with tender document within 25 days from the date of issue of the Letter of Intent. In the event of failure on the part of the successful tenderer to sign the agreement within the above-stipulated period, the earnest money or his initial security deposit shall be forfeited and the acceptance of the tender shall be considered as cancelled.

15. Field Management

15.1 The field management will be the responsibility of the Engineer-in-Charge who will be nominated by the Owner. The Engineer-in-Charge may also authorize his representatives to perform his duties and functions.

15.2 Clause 61 of the General Conditions of Contract shall be referred to in this connection.

15.3 Co-ordination of Work

The Engineer-in-Charge shall co-ordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It shall be the responsibility of the Contractor to plan and execute the works strictly in accordance with site instructions to avoid hindrance to the work being executed by other agencies.

15.4 Identity Card

Identity Card to all the workers / labourers under contractor's seal and signature for a specified period as per the terms of the contract and instructing them to carry the same during their movement/ work inside the IIT Guwahati campus. A list of labourers with their address to be submitted to the Engineer-in-charge & Security Officer of the Institute certifying that Identity Cards for them have been issued.

On completion of the work, the workers/ labourers must leave the campus within 3 days from the date of completion and the dwelling camps must be demolished within this period. The final or any bill of the work after completion will not be passed for payment without a certificate of vacation and demolition of the dwelling camp from the Security Officer.

SECTION - 4**GENERAL OBLIGATIONS****16. Interpretation of Contract Documents**

16.1 Except if and to the extent otherwise provided by the Contract, the provisions of the General Conditions of Contract and special conditions shall prevail over those of any other documents forming part of the contract. Several documents forming the contract are to be taken as mutually explanatory. If there be any discrepancy, inconsistency, error or omission in the contract or any of them the matter may be referred to the Engineer-in-Charge who shall consult the competent authorities and give his decisions and issue to the Contractor instructions directing in what manner the work is to be carried out. The decision of the Engineer-in-Charge shall be final and conclusive and the Contractor shall carry out work in accordance with this decision.

16.2 Works shown upon the drawing but not mentioned in the specifications or described in the specifications without being shown on the drawing shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawing and described in the specifications.

16.3 Headings and Marginal Notes

All headings and marginal notes to the clause of these General Conditions of Contract or to the specifications or to any other tender document are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof of the contract.

16.4 Singular and Plural

In these contract documents unless otherwise stated specifically, the singular shall include the plural and vice-versa wherever the context so requires. Words imputing persons shall include relevant corporate companies/registered associations/body of individuals/firm of partnership.

17. Special Conditions of Contract

17.1 Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, specifications of work, Drawings any other documents forming part of this contract wherever the context so requires.

17.2 Notwithstanding the subdivision of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

17.3 Where any portion of the General Conditions of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract then, unless a different intention appears the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations prevail.

17.4 Wherever it is mentioned in the specifications that the Contractor shall perform certain work or provide certain facilities, it is understood that the Contractor shall do so at his cost.

17.5 The materials, design and workmanship shall satisfy the relevant Indian Standards, the job specifications contained herein and codes referred to. Where the job specifications stipulate requirements in addition to those contained in the standard codes and specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

18. Contractor to Obtain His Own Information

The Contractor in fixing his rate shall for all purposes whatsoever be deemed to have himself independently obtained all necessary information for the purpose of preparing his tender. The correctness of the details, given in the Tender Document to help the Contractor to make up the tender is not guaranteed.

The Contractor shall be deemed to have examined the Contract Documents to have generally obtained his own information in all matters whatsoever that might affect the carrying out the works at the scheduled rates and to have satisfied himself to the sufficiency of his tender. Any error in description of item and quantity or omission there from shall not vitiate the contract or release the Contractor from executing the work comprised in the contract according to drawings and specifications at the scheduled rates. He is deemed to have known the scope, nature and magnitude of the works and the requirements of materials and labour involved etc., and as to what all works he has to complete in accordance with the contract documents whatever be the defects, omission or errors that may be found in the Contract documents. The Contractor shall be deemed to have visited surroundings to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of the Railways, roads, bridges and culverts, means of transports and communications, whether by land, water or air, and as to possible interruptions thereto and the access to and egress from the site, to have made enquiries, examined and satisfied himself as to the sites for obtaining sand stones, bricks and other materials, the site for disposal of surplus materials, the available accommodation as to whatever required, depots and such other buildings as may be necessary for executing and completing the works, to have made local independent enquiries as to the sub-soil, subsoil water and variations thereof, storms, prevailing winds, climatic conditions and all other similar matters affecting these works. He is deemed to have acquainted himself as to his liability for payment of Government taxes, customs duty and other charges.

Any neglect or failure on the part of the Contractor in obtaining necessary and reliable information upon the foregoing or any other matters affecting the contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the works at the schedule rates and time in strict accordance with the contract documents.

No verbal agreement or inference from conversation with any officer or employees of the Owner either before or after the execution of the contract agreement shall in any way affect or modify any of the terms of obligations herein contained.

19 Security Deposit

- 19.1 A sum equivalent to 10% of the accepted value of the tender shall be deposited by the person/persons (hereafter called the Contractor) as security deposit with the Owner. This may be deposited initially at 2% of the value of the contract (referred as initial Security Deposit) within 15 days from the date of issue of Letter of Intent and the balance 8% will be recovered in installments through deductions @ 10% of the value of each running account bill till the total security deposit amount is collected, after which no further deductions from bills will be made on this account, subject to Cl. 19.3 below.

The earnest money deposited with the tender shall be adjusted towards security deposit, provided it is furnished in demand draft only.

Alternatively, the Contractor may, at his option, deposit the full amount of 10% of the accepted value of the tender towards the security deposit within 15 days from the date of issue of the Letter of Intent.

- 19.2 The Contractor shall furnish the initial security deposit amount equivalent to 2% of the accepted value of work in the form of Demand draft / Banker's Cheque in favour of "Indian Institute of Technology Guwahati" payable at Guwahati/ an irrevocable bank guarantee bond of any scheduled bank in the prescribed form. Security deposit recovered in cash in excess of 50% of the security deposit including the initial security deposit of 2% may be later on converted at the request of the contractor to either interest bearing Govt. securities or FDR of a scheduled "A" bank duly endorsed in favour of "Indian Institute of Technology

Guwahati” and hypothecated with the Owner or may be replaced by a bank guarantee of a scheduled “A” bank.

- 19.3 If the Contractor/Subcontractor or their employees shall break, deface or destroy any property belonging to the Owner or others during the execution of the contract, the same shall be made good by the Contractor at his own expenses and in default thereof, the Engineer-in Charge may cause the same to be made good by other agencies and recover expenses from the Contractor (for which the certificate of the Engineer-in-Charge shall be final).
- 19.4 All compensation or other sums of money payable by the Contractor to the Owner under terms of this contract may be deducted from or paid by the sale of a sufficient part of his security deposit or from any sums which may be due or may become due to the Contractor by the Owner on any account whatsoever and in the event of his security deposit being reduced by reasons of any such deductions or sale of aforesaid, the Contractor shall within ten days thereafter make good in cash, bank drafts or Government securities endorsed as aforesaid any sum or sums which may have been deducted from or realized by sale of his Security Deposit, or any part thereof. No interest shall be payable by the Owner from sums deposited as security deposit.
- 19.5 Half of the security deposit for the job concerned may however be refunded after the expiry of half the period of liability for that particular Job, at the discretion of the Engineer-in-charge and the balance half on the full period of liability.

20. Time of performance

- 20.1 The work covered by this contract shall be commenced from the 25th day from the date of issue of the Letter of Intent and be completed in stages on or before the dates as mentioned in the time schedule of completion of work. The Contractor should bear in mind that time is the essence of this agreement, unless such time is extended pursuant to the provision of clause No. 22. Request for revision of construction time after tenders are opened will not receive any consideration.

20.2 Time Schedule of Construction

The general time schedule of construction is given in the tender document. The Contractor should prepare a detailed monthly or weekly construction programme jointly with the Engineer-in-Charge within one month from the date of issue of Letter of Intent or acceptance of tender. The work shall be executed strictly as per the time schedule given in this document. The period of construction given includes the time required for testing, rectifications, if any, retesting and completion in all respects to the entire satisfaction of the Owner.

21. Force Majeure

Any delays in or failure of the performance of either party hereto shall not constitute default hereunder or give rise to any claims for damages, if any, to the extent such delays or failure of performance is caused by occurrences such as Acts of God or the public enemy, expropriation or confiscation of facilities by Government authorities, compliance with any order or request of any Governmental authorities, acts of war, rebellion or sabotage or fires, floods, explosions' riots or illegal strikes.

22. Extension of Time

If the Contractor shall desire an extension of the time for completion of the work on the grounds of his having been unavoidably hindered in its execution or on any other grounds, he shall apply in writing to the Engineer-in-Charge within ten days of the date of the hindrance on account of which he desires such extension as aforesaid, and the Engineer-in-Charge shall, after consulting the competent authorities, is satisfied that reasonable grounds have been shown thereof, authorize such extension of time as may, be necessary or proper without any extra cost / liability to the Owner.

No compensation for any resources, labourer etc. brought to site' in idle period will be paid to contractor.

23. Sum Payable by Way of Compensation to be considered as Reasonable Compensation without Reference to Actual Loss

All sums payable by way of compensation under any of the conditions shall be considered as reasonable compensation without reference to the actual loss or damage, which shall have been sustained.

24. Rights of the Owner to Forfeit Security Deposit

Wherever any claim against the Contractor for the payment of a sum of money arises out of or under the contract, the Owner shall be entitled to recover such by appropriating in part or whole, the security deposit of the Contractor, and to sell any Government Securities etc. forming whole or part of such security. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable, as the case may be, shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor. The Contractor shall pay to the Owner on demand any balance remaining due.

25. Failure by the Contractor to Comply with the Provisions of the Contract:

25.1. If the contractor refuses or fails to execute the WORK or any part thereof with such diligence as will ensure its completion within the time specified in the contract or extension thereof or fails to perform any of this obligation under the Contract or in any manner commits a breach of any of the provisions of the Contract, it shall be open to the Owner at its option by written notice to the contractor, by registered post or recorded delivery specifying the default.

a) to determine the Contract in which event the Contract shall stand terminated and shall cease to be in force and effect on and from the date appointed by the Owner on that behalf, whereupon the Contractor shall stop forth with any of the Contractor's work then in progress, except such WORK as the Owner may, in writing, require to be done to safeguard any property or WORK, or installations from damage, and the OWNER, for its part, may take over the work remaining unfinished by the Contractor

Or

b) Without determining the Contract to take over the work of the Contractor or any part thereof and complete the same through a fresh tender.

25.2 In such events as above:

25.2.1 The Earnest Money Deposit, Security Deposit already recovered and Initial security Deposit under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Owner.

25.2.2 After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the balance work.

25.2.3 The contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract.

25.3 Before determining the Contract, provided in the judgment of the Owner, the default or defaults committed by the Contractor is/ are curable and can be cured by the contractor if an opportunity is given to him, then the Owner may issue notice in writing calling the Contractor to cure the default within such time specified in the notice.

25.4 The Owner shall also have the right to proceed or take action as per above, in the event that the Contractor becomes bankrupt, insolvent, compounds with his creditors assigns the Contract in favour of his creditors or any other person or persons or being a company or a corporation goes into voluntary liquidation, provided that in the said events it shall not be necessary for the Owner to give any prior notice to the Contractor.

25.5 Termination of the Contract as provided for in sub-clause 25.1 (a) above shall not prejudice or affect the rights of the Owner which may have accrued upto the date of such termination.

26. No Compensation for Alteration in or Restriction of Work

If at any time from the commencement of the work the Owner shall for any reason whatsoever not require the whole or part thereof as specified in the tender to be carried out the Owner shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of full amount of the work not having been carried out neither shall he have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated.

27. Change in Constitution

Where the Contractor is a partnership firm the prior approval, in writing, of the Owner shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern, such approval as aforesaid shall, likewise be obtained before such a Contractor enters into any agreement with other parties, where under the reconstituted firm would have right to carry out the work hereby undertaken by the Contractor. In either case if prior approval as aforesaid is not obtained, the contract shall be deemed to have been allotted in contravention of clause 35 hereof and the same action may be taken and the same consequence shall ensue as provided in the said clause.

28. If the Contractor Dies

Without prejudice to any of the rights or remedies under this contract, if the Contractor dies, the Owner shall have the option of terminating the contract without compensation to the contract.

29. Members of the Owner not individually Liable

No employee of the Owner shall in any way be personally bound or liable for the acts or obligations of the Owner under the contract or answerable for any default or omission in the observance or performance of any of the matters or things which are herein contained.

30. Owner not Bound by Personal Representations

The Contractor shall not be entitled to any increase on the schedule rates or any other right or claim whatsoever by reason of representation, explanation or statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

31. Contractor's Office at Site

The Contractor shall provide and maintain an Office at the site for the accommodation of his agent and staff and such office shall be open at all reasonable hours to receive instructions notices or other communications.

32. Contractor's Subordinate Staff and their Conduct

32.1 The Contractor, on or after award of the work shall name and depute qualified Engineers having sufficient experience in carrying out work of similar nature, to whom the equipments, materials, if any, shall be issued and instructions for works given. The Contractor shall also provide to the satisfaction of the Engineer-in-charge sufficient and qualified staff to superintend the execution of the works, competent sub-agents, foremen

and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the contract in such manner as will ensure work of the best quality, expeditious working. Whenever in the opinion of the Engineer-in-charge additional properly qualified supervisory staff is considered necessary, they shall be employed by the Contractor without additional charge on account thereof. The Contractor shall ensure to the satisfaction of the Engineer-in-charge that sub-contractors, if any, shall provide competent and efficient supervision over the work entrusted to them.

- 32.2 If and whenever any of the Contractor's or sub-Contractor's agents, sub-agents, assistants, foremen or other employees shall in the opinion of Engineer-in-Charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the Owner or the Engineer-in-Charge, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the Contractor, if so directed by the Engineer-in-charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the works without the written permission of the Engineer-in-Charge. Any person so removed from the works shall be immediately replaced at the expense of the Contractor by a qualified and competent substitute. Should the Contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.
- 32.3 The Contractor shall be responsible for the proper conduct of all the staff, foremen, workmen and others and shall exercise a proper degree of control over them and in particular and without prejudice to the said generality, the Contractor shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employee so tress - passing, the Contractor shall be responsible therefore and relieve the Owner of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-Charge upon any matter arising under this clause shall be final.
- 32.4 If and when required by the Owner all the Contractor's personnel entering upon the Owner's premises shall be properly identified by badges of a type acceptable to the Owner which must be worn at all times on the Owner's premises.

33. Sub-letting of Work

- 33.1 No part of the contract nor any share or interest therein shall in any manner or degree be transferred, assigned or sublet by the Contractor directly or indirectly to any person, firm or corporation whatsoever except as provided for in the succeeding sub-clause, without the consent in writing of the Owner.

33.2 Sub-Contracts for Temporary Works etc.

The Owner may give written consent to sub-contract for the execution of any part of the works at the site, being entered into by the Contractor provided each individual sub-contract is submitted to the Owner before entered into and is approved by the Owner.

33.3 List of Sub-Contractors to be Supplied

At the commencement of every month the Contractor shall furnish to the Engineer-in-Charge list of all sub-Contractors or other persons or firms charged by the Contractor (who must have been previously approved by the owner as per 35(ii)) and working at the site during the previous month with particulars of the general nature of the sub-contract of works.

33.4 Contractor's Liability not Limited by Sub-Contractors

Notwithstanding any sub-letting with such approval as aforesaid and notwithstanding that the Owner shall have received copies of any sub-contracts, the Contractor shall be and shall remain solely responsible for the quality and proper and expeditious execution of works and the performance of all the conditions of the contract in all respects as if such sub-letting or sub-contracting had not taken place and as if such work had been done directly by the Contractor.

33.5 **Owner may Terminate Sub-Contracts**

If any sub-Contractor engaged upon the works at the site executes any work which in the opinion of the Owner is not in accordance with the contract documents, the Owner may by written notice to the Contractor request him to terminate such sub-contract and the Contractor upon the receipt of such notice shall terminate such sub-contract and the latter forthwith leave the works, failing which the Owner shall have the right to remove such sub-Contractors from the site.

33.6 **No Remedy for Action Taken under this Clause**

No action taken by the Owner under the clause shall relieve the Contractor of any of his liabilities under the contract or give rise to any right to compensation, extension of time or otherwise, failing which the Owner shall have the right to remove such sub-Contractors from the site.

34. **Power of Entry**

If the Contractor shall not commence the work in the manner previously described in the contract documents or if he shall at any time in the opinion of the Owner

- 34.1 fail to carry out the works in conformity with the contract documents, or
- 34.2 fail to carry out the works in accordance with the time schedule, or
- 34.3 Substantially suspend work or the works for a period of fourteen days without authority from the Owner, or
- 34.4 Fail to carry out and execute the works to the satisfaction of the Owner, or
- 34.5 Fail to supply sufficient or suitable constructional plant, temporary works, labour, materials or things, or
- 34.6 commit or suffer or permit any other breach of any of the provisions of the contract on his part to be performed or observed or persist in any of the above mentioned breaches of the contract for the fourteen days, after notice in writing shall have been given to the Contractor by the Owner requiring such breach to be remedied, or
- 34.7 if the Contractor shall abandon the works, or
- 34.8 if the Contractor during the continuance of the contract shall become bankrupt, make any arrangement or composition with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction then in any such case, the Owner shall have the power to enter upon the works and take possession thereof and of the materials, temporary works, constructional plant, and stock thereon, and to revoke the Contractor's license to use the same, and to complete the work by his agents, other Contractors or workmen, or to relate the same upon any terms and to such other person firm or corporation as the Owner in his absolute discretion may think proper to employ and for the purpose aforesaid to use or authorize the use of any materials, temporary works constructional plant, and stock as aforesaid, without making payment or allowance to the Contractor for the said materials other than such as may be certified in writing by the Engineer-in-charge to be reasonable, and without making any payment or allowance to the Contractor for the use of temporary said works, constructional plant and stock or being liable for any loss or damage thereto, and if the Owner shall by reason of his taking possession of the works or of the works being completed by other Contractor (due account being taken of any such extra work or works which may be omitted) then the amount of such excess as certified by the Owner shall be deducted from any money which may be due for work done by the Contractor under the contract and not paid for. Any deficiency shall forth with be made good and paid to the Owner by the Contractor and the Owner shall have power to sell in such manner and for such price as he may think fit all or any of the constructional plant, materials etc. constructed by or belonging to and to recoup and retain the said deficiency or any part thereof out of the proceeds of the sale.

35. Contractor's responsibility with the Mechanical, Electrical Intercommunication System, Air Conditioning Contractors and other Agencies

Without repugnance to any other conditions, it shall be the responsibility of the Contractor executing the work of Civil construction to work in close corporation and coordinate the works with the mechanical, electrical, air conditioning and intercommunication Contractor's and other agencies or their authorize representatives in providing the necessary grooves, recesses, cuts and openings etc., in wall, slaves, beams and columns etc. and making good the same to the desired finish as per specifications, for the placement of electrical, intercommunication cables, conduits, air conditioning inlets and outlets grills and other equipment etc. where required. For the above said requirements in the false ceiling and other partition, the Contractor before starting up the work shall in consultation with the electrical, mechanical, intercommunication, air conditioning Contractors and other agencies prepare and put up a joint scheme, showing the necessary openings, grooves recesses, cuts the methods of fixing required for the works of the aforesaid, and the finishes therein, to the Engineer-in Charge and get the approval. The Contractor before finally submitting the scheme to the Owner, shall have the retain agreement of the other agencies. The Owner before communicating his approval of the scheme, with any required modifications, shall get the final agreement of all the agencies, which shall be binding. No claim shall be entertained on account of the above. The Contractor shall conform in all respects with the provisions of any statutory regulations, ordinances or by laws of any local or duly constituted authorities of public bodies which may be applicable from time to time to the workers or any temporary works. The Contractors shall give the Owner indemnified against all penalties and liabilities of every kind, arising out of non-adherence to such statutes, ordinances, laws, rules, regulations etc.

36. Other Agencies at Site

The Contractor shall have to execute the work in such place and condition where other agencies will also be engaged for other works such as site grading, filling and leveling, electrical and mechanical engineering works, etc. No claim shall be entertain due to work being executed in the above circumstances.

37. Notices

Any notice here under may be served on the Contractor or his duly authorized representative at the job site or may be served by registered mail direct to the address furnished by the Contractor. Proof of issue of any such notice could be conclusive of the Contractor having been duly informed of all contents therein.

38. Rights of Various Interests

- 38.1 The Owner reserves the right to distribute the work between more than one Contractor the Contractor shall corporate and afford other Contractors reasonable opportunity for access to the works for the carriage and storage of materials and execution of their works.
- 38.2 Wherever the work being done by any department of the Owner or by other Contractors employed by the Owner is contingent upon work covered by this contract, the respective rights of the various interests involved shall be determined by the Owner to secure the completion of the various portion to the work in general harmony.

39. Right of Owner to Determine/Terminate contract

- 39.1 Owner shall, at any time, be entitled to determine and terminate the contract, if in the opinion of the Owner the cessation of the work becomes necessary owing to paucity of funds or for any other cause whatsoever, in which case the cost of approved materials at the site at current market rates as verified and approved by the Owner and of the value of the work done to date by the Contractor shall be paid for in full at the rates specified in the contract. A notice in writing from the Owner to the Contractor of such determination and termination and the reason, therefore shall be the conclusive proof of the fact that the contract has been so determined and/terminated by the Owner.

39.2 Should the contract be determined under sub-clause (i) of this clause and the Contractor claims payments to compensate expenditure incurred by him in the expectation of completing the whole of the work, the Owner shall consider and admit such claim as are deemed fair and reasonable and are supported by vouchers to the satisfaction of the Owner. The Owner's decision on the necessity and propriety of any such expenditure shall be final and conclusive and binding on the Contractor.

40. Patents and Royalties

The Contractor, if licensed under any patent covering equipment, machinery, materials or compositions of matter to be used or supplied or methods and process to be practiced or employed in the performance of this contract, agrees to pay all royalties and licence fees which may be due with respect thereto. If any equipment, machinery, materials or composition of matters to be used on, supplied or methods and processes to be practiced or employed in the performance of this contract, is covered by the patent under which the Contractor is not licensed than the Contractor before supplying or using the equipment, machinery, materials, composition method or processes shall obtain such licenses and pay such royalties and license fees as may be necessary for performances of this contract. In the event the Contractor fails to pay any such royalty or obtain any such license, any suit for infringement of such patents which is brought against the Contractor or the Owner as a result of such failure will be defended by the Contractor at this own expense and the Contractor will pay any damages and costs awarded on such suit. The Contractor shall promptly notify the Owner if the Contractor has acquired knowledge of any plant under which a suit for infringement would be reasonably brought because of the use by the Owner of any equipment, machinery, materials, process, methods to be supplied hereunder. The Contractor agrees to and does hereby grant to Owner, together with the right to extent the same to any of the subsidiaries of the Owner as irrevocable royalty-free license to use in any country, any invention made by the Contractor or his employee in or as a result of the performance of the work under the contract.

The Owner shall indemnify and save harmless the Contractor from any loss on account of claims against Contractor for the contributory infringement of patent rights arising out and based upon the claim that the use by the Owner of the process included in the design prepared by the Owner and used in the operation of the plant infringes on any patent right with respect to any sub-contract entered into by Contractor pursuant to the provision of the relevant clause thereof, the Contractor shall obtain from the sub-Contractor and undertaking to provide the Owner with the same patent protection that Contractor is required to provide under the provisions of the clause.

41. Liens

If, at any time, there should evidence any lien of claim for which the Owner might have become liable and which is chargeable to the Contractor, the Owner shall have the right to retain out of any payment any due or thereafter to become due an amount sufficient to completely indemnify the Owner against such lien or claim and if such lien or claim be valid the Owner may pay and discharge the same and deduct the amount so paid from any money which may be or may become due and payable to the Contractor. If any lien or claim remain un-settled after all payments are made, the Contractor shall/ refund or pay to the Owner all moneys that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses.

SECTION – 5**PERFORMANCE OF WORK****42. Execution of works**

All the works shall be executed in strict conformity with the provisions of the contract documents and with such explanatory detail drawings, specifications and instructions as may be furnished from time to time to the Contractor by the Owner whether mentioned in the contract or not. The Contractor shall be responsible for ensuring that works throughout are executed in the most substantial proper and workman light manner with the quality of material and workmanship in strict accordance with specifications and to the entire satisfaction of the Owner

43. Coordination and inspection of works

The coordination and inspection of the day-to-day work under the contract shall be responsibility of the Engineer-in-Charge. The written instructions regarding any particular job will normally be passed by the Engineer-in-Charge or his authorized representative. A work order book will be maintained by the Contractor for each sector in which the aforesaid written instruction will be entered. This will be signed by the Contractor or his authorized representative by way of acknowledgement within 12 hours.

44. Work in monsoon and dewatering

- 44.1. The completion of the work may entail working in monsoon also. The Contractor must maintain minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered such work in monsoon.
- 44.2. During monsoon and other period, it shall be the responsibility of the Contractor to keep the construction work site free from water at his own cost.

45. Work Sundays and holidays

For carrying our work on Sundays and holidays, the Contractor will approached the Engineer-in-Charge or his representative at least two days in advance and obtain permission in writing.

46. General conditions for construction and erection mark

- 46.1. The working time at the time of work is 48 hours per week. Over timework is permitted in cases of need and the Owner will not compensate the same. Shift working at 2 or 3 shifts per day will become necessary and the Contractor should take this aspect in to consideration for formulating his rates for quotation. No extra claims will be entertained by the Owner on this account.
- 46.2. The Contractor must arrange for the placement of workers in such a way that delayed completion of the work or any part thereof for any reason whatsoever will not affect their proper employment. The Owner will not entertain any claim for idle time payment whatsoever.
- 46.3. The Contractor shall submit to the Owner reports at regular intervals regarding the state and progress of work. The details and proforma of the report will be mutually agreed after the award of the contract.

47. Drawings to be supplied by the Owner.

- 47.1. Where drawings are attached with a tender, this shall be for the general guidance of the Contractor to enable him to visualize the type of work contemplated and scope of work involved. The Contractor will be deemed to have studied the drawings and formed an idea about the work involved.
- 47.2 Detailed working drawing on the basis of which actual execution of the work is to proceed will be furnished from time to time during the progress of work. The Contractor shall be deemed to have gone through the drawings supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the Engineer-in-Charge discrepancies, if any, therein before actually carrying out the work.
- 47.3. Copies of all detailed working drawings relating to the works shall kept at the Contractor's office on the site and shall be made available to the Engineer-in-Charge at any time during the contract. The drawings and other documents issued by the Owner shall be returned to the Owner on the completion of the work.

48. Drawings to be supplied by the Contractor.

- 48.1 Where drawings/ data are to be furnished by the Contractor, they shall be as enumerated in the special conditions of contract, and shall be furnished within the specified time.
- 48.2. Where approval of drawings before manufacture/ construction/ fabrication has been specified, it shall be the Contractors responsibility to have these drawings prepared as per the direction of the Owner and got approved before proceeding with the manufacture/ construction/ fabrication as the case may be. Any change that may have become necessary in these drawings during the execution of the work shall have to be carried out by the Contractor to the satisfaction of the Owner at no extra cost. All final drawings shall bear the certification stamp as indicated below, duly signed by both the Contractor and the Owner or his authorized representative.

"Certified true for

..... Project

Agreement No.....

Signed.....

(Contractor)

(Engineer-in-Charge)

- 48.3. A period of three weeks from the date of receipt shall be required for approval of drawings by the Owner.

49. Setting out works

- 49.1. The Engineer-in-Charge shall furnished the Contractor with only the four corners of the work site and a level bench mark and the Contractor shall set out the works and shall provide and efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.
- 49.2 The Contractor shall/provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and other similar things and shall take necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The Contractor shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and centre line

marks, either existing or supplied and fixed by the Contractor. The work shall be set out to the satisfaction of the Owner. The approval thereof or joining with the Contractor by the Owner in setting out the work, shall not relieve the Contractor or any of his responsibilities.

- 49.3 Before beginning the works, the Contractor shall at his own cost, provide all necessary reference and level posts, pegs, bamboo, flags, ranging rods, strings and other materials for proper layout of the work in accordance with the scheme for bearing marks acceptable to the Owner. The Centre, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct marks at the centre to enable a theodolite to be set over it. No work shall be started until all these points are checked and approved by the Engineer-in-Charge in writing but such approval shall not relieve the Contractor of any of his responsibility. The Contractor shall also provide all labour, material and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction.
- 49.4 Pillars bearing geodetic marks located at the sites of units of works under construction should be protected and fenced by the Contractor.
- 49.5 On completion of works, the Contractor must submit the geodetic documents according to which the work was carried out.

50. Responsibility for level and alignment

The Contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the work and shall rectify effectually any errors or imperfections therein. Such rectifications shall be carried out by the Contractor, at his own cost, when instructions are issued to that effect by the Engineer-in-Charge.

51. Materials to be supplied by Contractor

The Contractor shall procure and provide the whole of the materials required for the construction including M.S. rods, cement and other building materials, tools, tackles, construction plant and equipment for the completion and maintenance of the works except the materials which will be issued by Owner and shall make his own arrangement for procuring such materials and for the transports thereof. The Owner may give necessary recommendation to the respective authority if so desired by the Contractor but assumes no further responsibility of any nature. The Owner will insist on the procurement of materials which bear ISI stamp and/or which are supplied by reputed suppliers borne on DGS & D list.

52. Stores supplied by Owner

- 52.1 If the specification of the work provides for the use of any material of special description to be supplied from the Owner's stores or it is required that the Contractor shall use certain stores to be provided by the Owner, such materials and stores, and price to be charged therefore as hereinafter mentioned being so far as practicable for the convenience of the Contractor, but not so as in any way to control the meaning or effect of the contract, the Contractor shall be bound to purchase and shall be supplied such materials and stores as are from time to time required to be used by him for the purpose of the contract only. The sums due from the Contractor for the actual value of materials supplied by the Owner will be recovered from the running account bill on the basis of the actual consumption of materials in the works covered and for which the running account bill has been prepared. After the completion of the works, however, the Contractor has to account for the full quantity of materials supplied to him as per relevant clauses in this document.
- 52.2 The value of the stores/materials as may be supplied to the Contractor by the Owner will be debited to the Contractor's account at the rates shown in the schedule of materials and if they are not entered in the schedule, they will be debited at cost price, which for the purpose of the contract shall include the cost of carriage and all other expenses whatsoever such as normal storage supervision charges which shall have been incurred in obtaining the same at the Owner's stores. All materials so supplied to the Contractor shall remain the absolute property of the Owner and shall not be removed on any account from the site of the work, and shall be at all times open for inspection to the Engineer-in-

Charge. Any such materials remaining unused at the time of the completion or termination of the contract shall be returned to the Owner's stores or at a place as directed by the Engineer-in-Charge in perfectly good condition at the Contractor's cost.

53. Conditions for Issue of Materials

- 53.1 Materials specified as to be issued by the Owner will be supplied to the Contractor by the Owner from his stores. It shall be the responsibility of the Contractor to take delivery of the materials and arrange for its loading, transports and unloading at the site of work at his own cost. The materials shall be issued between the working hours and as per the rules of the Owners as framed from time to time.
- 53.2 The Contractor shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued to him.
- 53.3 Materials specified as to be issued by the Owner shall be issued in standard sizes as obtained from the manufacturers.
- 53.4 The Contractor shall construct suitable godowns at the site of work for storing the materials safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward establishment for the purpose.
- 53.5 It shall be duty of the Contractor to inspect the materials supplied to him at the time of taking delivery and to satisfy himself that they are in good condition. After the materials have been delivered by the Owner, it shall be the responsibility of the Contractor to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/or replaced by him at his own cost according to the directions of the Engineer-in-Charge.
- 53.6 The Owner shall not be liable for delay in supply or non-supply of any materials which the Owner has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transports and procurement difficulties and any circumstances beyond the control of the Owner. In no case, the Contractor shall entitled to claim any compensation or loss suffered by him on this account.
- 53.7 It shall be the responsibility of the Contractor to arrange in time all materials required for the works other than those to be supplied by the Owner. If, however, in the opinion of the Engineer-in-Charge the execution of the work is likely to be delayed due to the Contractor's inability to make arrangement for supply of materials which normally he has to arrange for, the Owner shall have the right at his own discretion to issue such materials if available with the Owner or procure the materials from the market or elsewhere and the Contractor will be bound to take such materials at the rates decided by the Owner. This however, does not in any way absolve the Contractor from the responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur, nor shall this constitute a reason for the delay in the execution of the work.
- 53.8 None of the materials supplied to the Contractor will be utilised by the Contractor for manufacturing item which can be obtained as supplied from standard manufacturer in finished form.
- 53.9 The Contractor shall, if desired by the Owner, be required to execute an indemnity bond in the prescribed form, for safe custody and accounting of all materials issued by the Owner.
- 53.10 The Contractor shall furnish to the Owner sufficiently in advance a statement showing his requirement of the quantities of the materials to be supplied by the Owner and the time when the same will be required by him for the work so as to enable the Owner to make necessary arrangements for procurement and supply of the material.
- 53.11 A day account of the materials issued by the Owner shall be maintained by the Contractor indicating the daily receipt consumption and balance in hand. This account shall be contained in a manner prescribed by the Owner along with all connected papers viz, requisitions, issues etc. and shall be always available for inspection in the Contractor's office at site.

- 53.12 The Contractor should see that only the required quantities of materials are not issued. The Contractors shall not be entitled to cartage and incidental charges for returning the surplus materials, if any, to the stores where from they were issued or to the place as directed by the Engineer-in-Charge.
- 53.13 Material/Equipment supplied by Owner shall not be utilized for any other purpose (s) than issued for.

54. Material Procured with Assistance of Owner.

Notwithstanding anything contained to the contract in any or all the clauses of this contract where any materials for the execution of the contract are procured with the assistance of the Owner either by issue from Owner's stock or purchases made under orders or permits or licences issued by Government, the contractor shall hold the said materials as trustee for the Owner and use such materials economically and solely for the purpose of the contract and not dispose them off without the permission of the Owner and return them having due regard to the condition of the materials. The price allowed to the Contractor, however, shall not exceed the amount charged to him excluding the storage charges, if any. The decision of the Owner shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the Contractor shall in terms of the licences or permits and/or for criminal breach of trust, be liable to compensate the Owner at double rate or any higher rate, in the event of those materials at the time having higher rate or not being available in the market, then any other rate to be determined by the Owner and his decision shall be final and conclusive.

55. Materials Obtained from Dismantling

If the Contractor in the course of execution of the work is called upon to dismantle any part for reasons other than those stipulated in clauses 61 and 65 hereunder, the materials obtained in the work of dismantling etc., will be considered as the Owner's property will be disposed off to the best advantage of the Owner.

56. Articles of Value Found

All gold, silver and other minerals of any description and all precious stones, coins, treasure, relics antiquities and other similar things which shall be found in, under or upon the site, shall be the property of the Owner and the Contractor shall dully preserve the same to the satisfaction of the Owner and shall from time to time deliver the same to such person or persons indicated by the Owner.

57. Discrepancies between Instructions

Should any discrepancy occur between the various instructions furnished to the Contractor, his agents or staff or any doubt arise as to the meaning of any such instructions or should there be any misunderstanding between the Contractor's staff and the Engineer-in-Charge's staff, the Contractor shall refer the matter immediately in writing to the Engineer-in-Charge whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, doubts or misunderstanding shall in any event be admissible.

58. Alterations in Specifications & Designs, Drawings, Extra Works, Deviation of quantities.

- A. The Owner shall have power to make any alterations in, omission from, addition to, or substitutions for, the schedule of items, the original specifications, drawings designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the Contractor shall be bound to carry out such altered extra new items of work in accordance with any instructions which may be given to him in writing signed by the engineer-in-charge and such alterations, omissions, additions or substitutions shall not invalidate the contract and any altered, additional or substituted work which the

Contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main work. The time for completion of work may be extended additions or substitutions of the work, as he may consider as just and reasonable. The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions.

- (a) If the rates for the additions, altered or substituted work are specified in the contract for the work, the Contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract.
- (b) If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for similar class of work as are specified in the contract for the work. The opinion of the Owner, as to whether or not the rates can be reasonably so derived from the items in this contract, will be final and binding on the Contractor.

NOTE : Individual trade means the trade sections into which the schedule of rates in the agreement is divided such as excavation and earthwork, concrete, woodwork and joinery, piping etc.

- (c) If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub-clause (a) & (b) above, then the Contractor shall, within 7 days of the date of receipt of order to carry out the work, inform the Engineer-in-Charge of the rate which it is his intention to charge for such class of work, supported by analysis of the rate or rates claimed, and the Owner shall determine the rate or rates on the basis of the prevailing market rates, labour cost as per Labour Wages circular published by Ministry of Labour & Employment, Govt of India plus 15% to cover Contractor's supervision, overheads and profit and pay the Contractor accordingly. The opinion of the Engineer-in-Charge as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the Contractor.
- (d) Provisions contained in sub-clause (a) to (c) above shall not however apply in the following cases:
 - (i) Where the alterations, additions or substitutions in respect of items individually exceed by or are less than plus/minus 30% of the value for that particular items specified in contract.
 - (ii) Where the alterations, additions or substitutions in respect of items of any individual trade included in the contract exceed by or are less than plus/minus 50% of the value of that trade as a whole in the contract or 30% of the total value of the contract whichever is less.
- (B) In case of the items which individually exceed the value stipulated in the contract by more than the limits given in clause (d) above, the Contractor shall within 15 days from the receipt of order, claim revision of the rates supported by proper analysis in respect of such items for quantities in excess/ reduction of the above limits, notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provisions of sub-clause (b) of clause (58) and the Owner may revise their rates, having regard to the prevailing market rates and the Contractor shall be paid in accordance with the rates so fixed. But under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates of items falling under this clause.

All the provisions of the preceding paragraph shall equally apply to the decrease in the rate of items for quantities in excess of the limits specified in clause (d) notwithstanding the fact that the rates for such items exist in the tender with the provisions of sub-clause (b) of Clause 58, and the Engineer-in-Charge may revise such rates having regard to the prevailing market rates. Notwithstanding anything contained in paras 26 & 70 (viii) the parties to this agreement mutually agree that paragraphs 58 A & B shall be applicable to work done under unit rate basis only.

59. Action where no Specification is Issued

In case of any class of work for which there is no such specification supplied by the Owner as mentioned in the tender documents such work shall be carried out in accordance with

Indian Standard specifications and if the Indian Standard Specifications do not cover the same, the work should be carried out as per standard Engineering Practice subject to the approval of the Engineer-in-Charge.

60. Abnormal Rates

The Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract. This will avoid loss of profit or gain in case of curtailment or change of specification for any item. In case it is noticed that the rates quoted by the tender for any item are unusually high or unusually low it will be sufficient cause for the rejection of the tender unless the Owner is convinced about the reasonableness of the rates on scrutiny of the analysis for such rate to be furnished by the tenderer on demand.

61. Inspection of Works

- 61.1 The Engineer-in-Charge will have full power and authority to inspect the works at any time wherever in progress either on the site or at the Contractor's premises/workshops wherever situated, premises workshops of any person, firm or corporation where work in connection with the contract may be in hand or where materials are being or are to be supplied, and the Contractor shall afford or procure for the Engineer-in-Charge every facility and assistance to carry out such inspection. The Contractor shall, at all time during the usual working hours and at all other times at which reasonable notice of the intention of the Engineer-in-Charge or his representative to visit the work shall have been given to the Contractor, either himself be present to receive orders and instructions, or have responsible agent duly accredited in writing present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than seven days notice in writing to the Engineer-in-Charge before covering up or otherwise placing beyond reach of inspection and measurement any work in order that the same may be inspected and measured. In the event of breach of above the same shall be uncovered at Contractor's expense for carrying out such measurement or inspection.
- 61.2 No material shall be dispatched from the Contractor's godown before obtaining the approval in writing of the Engineer-in-charge.

The Contractor is to provide at all times during the progress of the work and the maintenance period proper means of access with ladders, gangways etc. and the necessary attendance to move and adopt as directed for inspection or measurement of the works by the Engineer-in-Charge.

61.3 Access of Architect to the works

The Architect and his representatives, upon duly authorized in writing by the Owner for the purpose, shall at all reasonable times have access to the works and to the workshops or other places of the contractors or sub-contractors, if any, where work is being prepared for the contract and the contractors shall do all things reasonably necessary for the Architect to carry out the inspection. All modifications/ rectifications as may be pointed out by the Architect shall be conveyed by the engineer-in-Charge to the contractor and the same shall be carried out accordingly.

62. Assistance to the Engineers

The Contractor shall make available to the Engineer-in-Charge free of cost all necessary instruments and assistance in checking of setting out of works and in the checking of any work made by the Contractor for the purpose of setting out and taking measurement of work.

63. Tests for quality of Works

- 63.1 All workmanship shall be of the respective kind described in the contract documents and in accordance with the instructions of the Engineer-in-Charge and shall be subjected from

time to time to such test at Contractor's cost as the Engineer-in-Charge may direct at the place of manufacture or fabrication or on the site or at all or any such places. The Contractor shall provide assistance, instruments labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required by the Engineer-in-Charge.

- 63.2 All the tests that will be necessary in connection with the execution of the work as decided by the Engineer-in-Charge shall be carried out at the field testing laboratory of the Owner/approved Agency by paying the charges as decided by the Owner from time to time. In case of non-availability of testing facility with the Owner, the required test shall be carried out at the cost of Contractor at government or any other testing laboratory as directed by Engineer-in-Charge.
- 63.3 If any tests are required to be carried out in connection with the work or materials or workmanship not supplied by the Contractor, such tests shall be carried out by the Contractor as per the instructions of Engineer-in-Charge and cost of such tests shall be reimbursed by the Owner.

64. Samples

The Contractor shall furnish to the Engineer-in-Charge for approval when requested or if required by the specifications adequate samples of all materials and finishes to be used in the work. Such samples shall be submitted before the work is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finished and finishes applied in actual work shall be full equal to the approved samples.

65. Action and compensation in case of Bad Work

If it shall appear to the Engineer-in-Charge that any work has been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of the work are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance within the contract, the Contractor shall on demand in writing from the Engineer-in-Charge or his authorized representative specifying the work, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified and provide other proper and suitable materials or articles at his own charge and cost, and in the event of failure to do so within a period to be specified by the Engineer-in-Charge in his demand aforesaid, the Contractor shall be liable to pay compensation at the rate of one percent of the estimated cost of the whole work, for every week limited to a maximum of 10 percent of the value of the whole work, while his failure to do so shall continue and in the case of any such failure the Engineer-in-Charge may on expiry of notice period rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respects of the Contractor. The decision of the Engineer-in-Charge as to any question arising under this clause shall be final and conclusive.

66. Suspension of Works

- (i) Subject to the provisions of sub-para (ii) of this clause the Contractor shall if ordered in writing by the Engineer-in-Charge or his representative, temporarily suspend the works or any part thereof for such period and such item as so ordered and shall not, after receiving such written order, proceed with the work therein ordered to be suspended until he shall have received a written order to proceed therewith. The Contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the works aforesaid. An extension of time for completion, corresponding with the delay caused by any such suspension of the works as aforesaid will be granted to the Contractor should he apply for the same provided that suspension was not consequent to any default or failure on the part of the Contractor.
- (ii) In case of suspension of entire work, ordered in writing by Engineer-in-Charge, for a period of more than two months, the Contractor shall have the option to terminate the contract.

67. Owner may do Part of Work

Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this contract the Owner has the alternative right, instead of assuming charge of entire work, to place additional labour force, tools, equipments and materials on such parts of the work, as the Owner may designate or also engage another Contractor to carry out the work. In such cases, the Owner shall deduct from the amount which otherwise might become due to the Contractor, the cost of such work and materials with ten percent added to cover all departmental charges and should the total amount thereof exceed the amount due to the Contractor shall pay the difference to the Owner.

68. Possession Prior to completion

The Engineer-in-Charge shall have the right to take possession of or use any completed or partially completed work or part of the work. Such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the contract agreement. If such prior possession or use by the Engineer-in-Charge delays the progress of work, suitable adjustment in the time of completion will be made and the contract agreement shall be deemed to be modified accordingly.

69. Twelve Month's Period of Liability from the Date of Issue of Completion Certificate

69.1 The Contractor shall guarantee the installation/work for a period of 12 months from the date of issue of completion certificate. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificate, connected in any way with the equipment or materials supplied by him or in the workmanship, shall be rectified or replaced by the Contractor at his own expense as deemed necessary by the Engineer-in-Charge or in default, the Engineer-in-Charge may cause the same to be made good by other workmen and deduct expenses (of which the certificate of Engineer-in-Charge shall be final) from any sums that may be then or at any time thereafter, become due to the Contractor or from his security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof.

69.2 If the Contractor feels that any variation in work or in quality of materials or proportions would be beneficial or necessary to fulfill the guarantees called for, he shall bring this to the notice of the Engineer-in-Charge in writing.

69.3 Care of Works

From the commencement to completion of the works, the Contractor shall take full responsibility for the care for all works including all temporary works land in case any damages or loss shall happen to the works or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so that at completion the work shall be in good order and in conformity in every respect with the requirements of the contract and the Engineer-in-Charge's instructions.

69.4 Defects prior to take over

If at any time, before the work is taken over, the Engineer in Charge shall decide that any work done or materials used by the Contractor or any sub-Contractor is defective or not in accordance with the contract or that the works or any portion thereof are defective or do not fulfill the requirements of contract (all such matters being herein called 'Defects' in this clause) as soon as reasonably practicable, he shall give to the Contractor notice in writing of the said decision, specifying particulars of the defects alleged to exist or to have occurred and the Contractor shall at this own expense and with all speed make good the defects so specified.

In the case Contractor shall fail to do so, the Owner may take, at the cost of the Contractor, such steps as may in all circumstances, be reasonable to make good such defect. The expenditure so incurred by the Owner will be recovered from the amount due to the Contractor. The decision of the Engineer-in-Charge with regard to the amount to be recovered from the Contractor will be final and binding on the Contractor. As soon as the

works have been completed in accordance with the contract (except in minor respects that do not affect their use for the purpose for which they are intended and except for maintenance thereof provided in clause **69.1** of General Conditions of the Contract) and have passed the tests on completion. The Engineer-in-Charge shall issue a certificate (hereinafter called completion certificate) in which he shall certify the date on which the works have been so completed and have passed the said tests and the Owner shall be deemed to have taken over the works on the date so certified. If the works have been divided into various groups in the contract, the Owner shall be entitled to take over any group or groups before the other or others and there upon the Engineer-in-Charge shall issue a completion certificate which will, however, be for such group or groups so taken over only.

69.5 Defects after Taking Over

In order that the Contractor could obtain a completion certificate he shall make good with all possible speed any defect arising from the defective materials supplied by the Contractor or workmanship or any act or omission of the contract or that may have been noticed or developed, after the works or group of the works has been taken over, the period allowed for caring out such work will be normally one month. If any defect be not remedied within a reasonable time, the Owner may proceed to do the work at Contractor's risk and expense and deduct from the final bill such amount as may be decided by the Owner.

If by reason of any default on the part of the Contractor a completion certificate has not been issued in respect of every portion of the works within one month after the date fixed by the contract for the completion of the works, the Owner shall be at liberty to use the works or any portion thereof in respect of which a completion certificate has not been issued, provided that the works or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the issue of completion certificate.

SECTION – 6**CERTIFICATES AND PAYMENTS****70. SCHEDULE of RATES and PAYMENTS****(i) Contractor's Remuneration**

The price to be paid by the Owner to Contractor for the whole of the work to be done and the performance of all the obligations undertaken by the Contractor under the contract documents shall be ascertained by the application of the respective schedule of rates (the inclusive nature of which is more particularly defined by way of application but not of limitation, with the succeeding sub-clause of this clause) and payment to be made accordingly for the work actually executed and approved by the Engineer-in-Charge. the sum so ascertained shall (excepting only as and to the extent expressly provided herein) constitute the sole and inclusive remuneration of the Contractor under the contract and no further other payment whatsoever shall be or become due or payable to the Contractor under the contract.

(ii) Schedule of Rates to be Inclusive

The price/ rates quoted by the Contractor shall remain firm till the issue of final certificate and shall not be subject to escalation. Schedule of rates shall be deemed to include and cover all costs, expenses and liabilities of every description and all risk of every kind to be taken in executing, completing and handing over the work to the Owner by the Contractor. The Contractor shall be deemed to have known the nature, scope, magnitude and the extent of the works and materials required though the contract document may not fully and precisely furnish them. He shall make such provision in the schedule of rates as he may consider necessary to cover the cost of such items of work and materials as may be reasonable and necessary to complete the works. The opinion of the Engineer-in-Charge as to the items of work which are necessary and reasonable for completion of work shall be final and binding on the Contractor, although the same may not be shown on or described specifically in contract documents.

Generally of this present provision shall not be deemed to cut down or limited in any way because in certain cases it may and in other cases it may not be expressly stated that the Contractor shall do or perform a work or supply articles or perform services at his own cost or without addition of payment or without extra charge or words to the same effect or that it may be stated or not stated that the same are included in and covered by the schedule of rates.

(iii) Schedule of Rates to cover constructional Plant, Materials, Labour etc.

Without in any way limiting the provisions of the proceeding sub-clause the schedule of rates shall be deemed to include and cover the cost of all constructional plant, temporary work (except as provided for herein), pumps, materials, labour, insurance, fuel, stores, and appliances to be supplied by the Contractor and all other matters in connection with each item in the schedule of rates and the execution of the works or any portion thereof finished, complete in every respect and maintained as shown or described in the contract documents or may be ordered in writing during the continuance of the contract.

(iv) Schedule of Rate to Cover Royalties, Rents and Claims

The schedule of rates shall be deemed to include and cover the cost of all royalties and fees for the articles and processes, protected by letters, patent or otherwise incorporated in or used in connection with the works, also all royalties, rents and other payments in connection with obtaining materials of whatsoever kind for the works and shall include and indemnity to the Owner which the Contractor here-by gives against all actions,

proceedings, claims damages, costs and expenses arising from the incorporation in or use on the works of any such articles, processes or materials. Octroi or other municipal or local board charges if levied on materials, equipment or machineries to be brought to site for use on work shall be borne by the Contractor.

(v) Schedule of Rates to cover Taxes and Duties

No exemption or reduction of customs duties, excise duties, sales tax, contract quay or any port dues, transports charges, stamp duties or Central or State government or local body or Municipal Taxes or duties, taxes or charges (from or of anybody), whatsoever, will be granted or obtained, all of which expenses shall be deemed to be included in and covered by the schedule of rates. The Contractor shall also obtain and pay for all permits or other privileges necessary to complete the work.

(vi) Schedule of rates to cover Forest Royalties.

All the responsibilities for obtaining all forest permits and payment of forest royalties etc. for use of all forest produces shall lie with the contractor. The contractor shall deposit royalty and obtain necessary permit for supply of all forest produces from local authorities. If pursuant to or under any law, notification or order, any royalty, cess or the like becomes payable by the Institute and does not any time become payable by the contractor to the State Government/Local authorities, in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the Institute and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor. The schedule of rates shall be inclusive of all forest royalties, monopolies and all admissible taxes from time to time as per rules of Government of Assam.

(vii) Schedule of Rates to cover Risks of Delay

The schedule of rates shall be deemed to include and cover the risk of all possibilities of delay and interference with the Contractor's conduct for work which occur from and cause including orders of the Owner in the exercise of his powers and on account of extension of time granted due to various reasons and for all other possible or probable causes of delay.

(viii) Schedule of Rates cannot be altered

For work under unit rate basis, no alteration will be allowed in the schedule of rates by reason of works or any part of them being modified altered, extended, diminished or omitted. The schedule of rates are fully inclusive rates which have been fixed by the Contractor and agreed to by the Owner and cannot be altered.

For lump sum contracts, the payment will be made according to the work actually carried out, for which purpose an item-wise, or work-wise, schedule of rates shall be furnished, suitable for evaluating the value of work done and preparing running account bills. Lump sum contracts shall also allow for any increase or decrease in the total quantity of work upto approximately 10% for the quoted price and the contract value shall be adjusted accordingly.

71. Procedure for Measurement/Billing of Work in Progress

(i) Measurements

All measurement of all the items having financial value (more than 15.00 lacs) shall be entered by the contractor and compiled in the shape of computerized Measurement Book having pages of A-4 size as per the format of the Department so that a complete record is obtained of all the items of work performed under the contract. The measurement upto 15.00 lacs shall be recorded in the conventional M.B. For computerized Measurement Book, all such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of work

The contractor would initially submit draft computerized measurement sheet and these measurements would be got checked/tests checks in his draft computerized

measurements, and submit to the department a computerized measurement Book, duly bound, and with its pages numbered. The Engineer In Charge and/or his authorized representative would thereafter check this MB.

After the necessary corrections made by the Engineer in Charge, the measurement sheet shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer In Charge for Signatures by the Engineer In Charge and the contractors or their representatives in token of their acceptance.

ii) Billing

The final fair computerized measurement Book along with Abstract of Cost and the bill based on these measurements (with two separate copies of the Bill) given by the contractor, duly bound, with its pages numbered should be 100% correct, and no cutting or overwriting in the measurements would thereafter be allowed. If at all any error is noticed, the contractors shall have to submit a fresh computerized MB with its page duly numbered and bound, after getting the earlier MB cancelled by the department. Thereafter the MB shall be taken in the Engineering/Maintenance cell records and allotted a number as per the registrar of Computerized MBs. This should be done before the corresponding bill is submitted to the Finance & A/c's Section for payment. The contractor shall submit two spare copies of such computerized MBs for the purpose of reference and record by the various officers of the department.

(iii) Secured Advance on Materials

In case of tenders for completed item of work, Contractor may be allowed 'Secured Advance' on the security of materials brought to site for execution of the contracted item of works to the extent of 90% of the value of materials as assessed by the Engineer-in-Charge provided that the materials are of an imperishable nature and that a formal agreement is drawn up with the Contractor under which the Owner secures a lien on the materials and is safeguarded against losses due to the Contractor postponing the execution of the work or to the storage or misuse of the materials and against the expense entitled for their proper watch and safe custody. Recoveries of advances so made would not be postponed until the whole of the work entrusted to the Contractor is completed. They should be adjusted from his bills for work done as the materials are used, the necessary deductions being made whenever the items of work in which they are used are billed for.

(iv) Dispute in Mode of Measurement

In case of any dispute as to the mode of measurement not covered by the contract to be adopted for any item of work, mode of measurement as per latest Indian Standard Specifications shall be followed.

72. Lump-sums in Tender

For the item in tender where it includes lump-sum in respect of parts of work, the Contractor shall be entitled to payment in respect of the items at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-Charge capable of measurement or determination, the Owner may at his discretion pay the lump-sum amount entered in the tender or a percentage thereof and the certificate in writing of the Engineer-in-Charge shall be final and conclusive against the Contractor with regards to any sum or sums payable to him under the provisions of this clause.

73. Running Account Payments to be regarded as Advances

All running account payments shall be regarded as payment by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the contract, or any part thereof, in this respect, or of the accruing of

any claim by the Contractor, nor shall it conclude, determine or affect in any way the powers of the Owner under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the contract. The final bill shall be submitted by the Contractor within one month of the date of physical completion of the work, otherwise, the Engineer-in-Charge's certificate of the measurement and of total amount payable for the work accordingly shall be final and binding on all parties.

74. Notice of Claims for Additional Payment

Should the Contractor consider that he is entitled to any extra payment or compensation or to make any claims whatsoever in respect of the works he shall forthwith give notice in writing to the Engineer-in-Charge that he claims extra payment and/or compensation. Such notice shall be given to the Engineer-in-charge within ten days from the ordering of any work or happening of any event upon which the contractor bases such claims and such notice shall contain full particulars of the nature of such claim with full details and amount claimed. Failure on the part of the Contractor to put forward any claim with the necessary particulars as above within the time above specified shall be an absolute waiver thereof. No omission by the Owner to reject any such claim and no delay in dealing therewith shall be waiver by the Owner of any rights in respect thereof.

75. Payment of Contractor's Bill

No payment shall be made for works estimated to cost less than ` 10,000.00 till the whole of the work shall have been completed and a certificate of completion given. But in case of works estimated to cost more than Rs. 20,000/- the Contractor on submitting the bill thereof be entitled to receive a monthly payment proportionate to the part thereof approved and passed by the Engineer-in-Charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the Contractor. This payment will be made after making necessary deductions as stipulated elsewhere in the contract document for materials, security deposit etc.

Payment due to the Contractor shall be made by the Owner if so directed by the Owner by Crossed Account Payee cheque forwarding the same to registered office or the notified office of the Contractor. In no case will Owner be responsible if the cheque is mislaid or misappropriated by unauthorised person/persons. In all cases, the Contractor shall present his bill duly pre-receipted on proper revenue stamp.

All payments shall be made in Indian currency.

76. Receipt of Payment

Receipt for payment made on account of work when executed by a firm, must be signed by a person holding due power of attorney in this respect on behalf of the Contractor, except when the Contractors are described in their tender as a limited company in which case the receipts must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the company.

77. Completion Certificate

77.1 Application for Completion Certificate

When the Contractor fulfils his obligation under clause 69.4 shall be eligible to apply for completion certificate. the Contractor may apply for separate completion certificate in respect of each such portion of the work by submitting the completion documents along with such application for completion certificate.

The Engineer-in-charge shall normally issue to the Contractor the completion certificate within one month after receiving and application therefore from the Contractor after verifying from the completion documents and satisfying himself that the work has been completed in accordance with and as set out in the construction and erection drawings and the contract documents.

The Contractor, after obtaining the completion certificate, is eligible to present the final bill for the work executed by him under the terms of contract.

77.2 Completion Certificate

Within one month of the completion of the work in all respects, the Contractor shall be furnished with a certificate by the engineer-in-Charge of such completion, but no certificate shall be given nor shall the work be deemed to have been executed until all scaffolding, surplus materials and rubbish is cleaned of the site completely nor until the work shall have been measured by the Engineer-in-Charge whose measurements shall be binding and conclusive. The work will not be considered as complete and taken over by the Owner, until all the temporary works, labour and staff colonies etc.; constructed, are removed and the worksite cleaned to the satisfaction of the Engineer-in-Charge.

If the Contractor shall fail to comply with the requirements of this clause on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expenses of the Contractor remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit and clean of such dirt as aforesaid, and the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

77.3 Completion Certificate Documents

For the purpose of clause 77 the following documents will be deemed to form the completion documents.

- (i) The technical documents according to which the work was carried out.
- (ii) Three sets of construction drawings showing therein the modification and corrections made during the course of execution signed by the Engineer-in-Charge.
- (iii) Completion certificate for 'embedded' and 'covered' up works.
- (iv) Certificates of final levels as set out for various works.
- (v) Certificates of tests performed for various works.
- (vi) Materials appropriation Statement for the materials issued by the Owner for the works and list of surplus materials returned to the Owner's store duly supported by necessary documents.

78. Final Decision and Final Certificate

Upon expiry of the period of liability and subject to the Engineer-in-Charge being satisfied that the works have been duly maintained by the Contractor during monsoon or such period as herein before provided in clause 69.1 and that the Contractor has in all respect duly made up any subsidence and performed all his obligations under the contract, the Engineer-in-Charge shall (without prejudice to the rights of the Owner to retain the provisions of relevant clause hereof) otherwise give a certificate herein referred to as the final certificate to that effect and the Contractor shall not be considered to have fulfilled the whole of his obligations under the contract until Final Certificate shall have been given by the Engineer-in-Charge notwithstanding any previous entry upon the work and taking possession, working or using of the same or any part thereof by the Owner.

79. Certificate and Payments no Evidence of completion

Except the final certificate, no other certificates or payments against a certificate or on general account shall be taken to be an admission by the Owner of the due performance of the contract or any part thereof or of occupancy or validity for any claim by the Contractor.

SECTION – 7**TAXES AND INSURANCE****80. Taxes, Duties etc.**

The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, duties etc. now or hereafter imposed, increased, or modified from time to time in respect of works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by any Central or State governmental authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Law or any other law affecting employer-employee relationship and the Contractor further agrees to comply and to secure the compliance of all sub-Contractors, with all applicable Central State, Municipal and local laws and regulations and requirements of any Central, State or Local, Government agency or authority. Contractor further agrees to defend, indemnify and hold harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason of any violations by Contractor or or requirements and also from all claims, suits or proceedings that may be brought against the Owner arising under growing out of, or by reason of the work provided for by this contract, by third parties, or by Central or State government authority or any administrative sub-division thereof.

80.1 GST:

GST should be included in the quoted rates. GST/IGST @12% will be deducted on works / maintenance contract.

All other taxes, Duties, Levies, Building and other Construction Workers Welfare Cess or any other Cess in respect of this contract applicable at the time of submission of this tender shall be payable by the Contractor and the Institute shall not entertain any claim whatsoever in this respect. Taxes, Cess etc. shall be deducted as per applicable rules from the bills of the contractor at the rates prevailing on the day of submission of the tender.

80.2.

Any fresh imposition of taxes, duties, levies etc, imposed after receipt of tender shall be reimbursed by the Institute on actual on production of proof of imposition of the tax.

Any increase in the rates of any existing taxes/duties/levies/royalties etc shall be borne by the Institute. If there are any decreases the amounts payable will be reduced accordingly.

81. Insurance

Contractor shall at his own expense carry and maintain insurance with reputable insurance companies to the satisfaction of the Owner as follows:

(i) Employees State Insurance Act

The Contractor agrees to and does hereby accept full and exclusive liability for compliance with all obligations imposed by the Employees State Insurance Act, 1948, and the Contractor further agrees to defend, indemnify and hold Owner harmless from any liability or penalty which may be imposed by the Central, State or Local authority by reason of any asserted, violation by Contractor or sub-Contractor of the Employees State Insurance Act, 1948, and also from all claims, suits or proceeding that may be brought against the Owner arising under, growing out of or by reasons of the work provided for by this contract

whether brought by employees of the Contractor, by third parties or by Central or State Government authority or any political sub-division thereof.

The Contractor agrees to fill in with the Employee's State Insurance Corporation, the Declaration Forms, and all forms which may be required in respect of the Contractors or sub-Contractors employees, whose aggregate remuneration is Rs. 15000.00 per month or such amount as prescribed under the Employees State Insurance Act, 1948 from time to time and who are employed in the work provided for or those covered by ESI from time to time under the Agreement. The Contractor shall deduct and secure the agreement of the sub-Contractor to deduct the employee's contribution as per the first schedule of the Employee's State Insurance Act form wages and affix the Employee's contribution Cards at wages payment intervals. The Contractor shall remit and secure the agreement of the sub-Contractor to remit to the State Bank of India, Employees' State Insurance Corporation. Account, the Employees contribution as required by the Act. the Contractor agrees to maintain all cards and records as required under the Act in respect of employees and payments and the Contractor shall secure the agreement of the sub-Contractor to maintain such records. Any expenses incurred for the contributions, making contributions or maintaining records shall be to the Contractor's or sub-Contractor's account.

(ii) Workman's compensation and employer's Liability Insurance

Insurance shall be effected for all the Contractor's employees engaged in the performance of this contract. If any of the work is sublet, the Contractor shall require the sub-Contractor to provide Workman's Compensation and employer's liability insurance for the latter's employees if such employees are not covered under the Contractor's Insurance.

(iii) Any other Insurance Required Under Law or Regulations or by Owner

Contractor shall also carry and maintain any and all other insurance which may be required under any law or regulation from time to time. He shall also carry and maintain any other insurance, which may be required by the Owner.

(iv) The ESI and EPF contribution on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of the employer paid by the contractor shall be reimbursed by the Engineer-in-charge to the contractor on actual basis. The applicable and eligible amount of EPF and ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment provided same are in order.

82. Damage to Property

(i) Contractor shall be responsible for making good to the satisfaction for the Owner any loss or and any damage to all structures and properties belonging to the Owner or being executed or procured or being procured by the Owner or of other agencies within the premises of all the work of the Owner, if such loss or damage is due to fault and/or the negligence or willful acts or omission of the Contractor, his employees, agents, representative or sub-Contractors.

(ii) The Contractor shall indemnify and keep the Owner harmless of all claims or damage to property other than Owner's property arising under or by reason of this agreement if such claims result from the fault and/or negligence or willful acts or omissions of the Contractor, his employees, agents representative or sub-Contractors.

SECTION – 8

LABOUR LAWS AND SAFETY REGULATIONS

83. Labour Laws

- (i) **All matters regarding the labour shall be in accordance to Contract labour (Regulation and Abolition) Act, 1970, minimum wage Act 1948 and other applicable acts under law.**
- (ii) No labour below the age of fifteen years shall be employed on the work.
- (iii) The Contractor shall not pay less than what is provided under law to labourers engaged by him on the work.
- (iv) The Contractor shall at his expense comply with all labour laws and keep the Owner indemnified in respect thereof.

84. Implementation of apprentices Act 1961

The Contractor shall comply with the provisions of the Apprentices Act 1961 and the Rule and orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Engineer-in-Charge may, at his discretion, cancel the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provision of the Act.

85. Contractor to Indemnify the Owner

- (i) The Contractor shall indemnify the Owner and every member, officer and employee of the Owner, also the Engineer-in-Charge and his staff against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of or in connection with the matters referred to in clause 84 and elsewhere and all actions, proceedings, claims, demands, costs and expenses which may be made against the Owner for or in respect of or arising out of any failure by the Contractor in the performance of his obligations under the contract documents. The Owner shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or his sub-Contractor and Contractor shall indemnify and keep indemnified the Owner against all such damages and compensations and against all such damages and compensations and against all claims, damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- (ii) **Payment of Claims and Damages**
Should the Owner have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the Owner shall be charged to and paid by the Contractor and the Contractor shall not be at liberty to dispute or question the right of the Owner to make such payments notwithstanding the same may have been made without his consent or authority or in law or otherwise to the contrary.
- (iii) In every case in which by virtue of the provisions of section 12, sub-section (1) of workmen's compensation act, 1923 or other applicable provisions of Workmen's Compensation Act or any other Act, the Owner is obliged to pay compensation to a workman employed by the Contractor in execution of the works, the Owner will recover from the Contractor the amount of the compensation so paid, and without prejudice to the rights of Owner under section 12, sub-section (2) of the said Act, Owner shall be at liberty to recover such amount or any part thereof by deducting if from the security deposit or from any sum due to the Contractor whether under this contract or otherwise. The Owner shall not be bound to contest any claim made under section 12 sub-section (1) of the said act, except on the written request of the Contractor and upon his giving to the Owner full

security for all costs for which the Owner might become liable in consequence of contesting such claim.

86. Health and Sanitary Arrangements for Workers

In respect of all labour directly or indirectly employed in the work for the performance of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with all the rules and regulations of the local sanitary and other authorities or as framed by the Owner from time to time for the protection of health and sanitary arrangements for all workers.

87. Safety Regulations

- (i) In respect of all labour, directly or indirectly employed in work for the performance of Contractor's part of this agreement, the Contractor shall at his own expense arrange for all the safety provisions as per safety codes of C.P.W.D., Indian Standards Institution, The Electricity Act, Mines Act and such other acts as applicable.
- (ii) The Contractor shall observe and abide by all fire and safety regulations of the Owner. Before starting construction work Contractor shall consult with Owner's safety Engineer or Engineer-in-Charge and must make good to the satisfaction of the Owner any loss or damage due to fire to any portion of the work done or to be done or to be done under this agreement or to any other Owner's existing property.

88. A) Settlement of Disputes and Arbitration

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter:

- (i) If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawings, record or decision given in writing by the Engineer-in-Charge or if the Engineer in Charge considers any act or decision of the contractor on any matter in connection with or arising out of the contract or carrying out of the work, to be unacceptable and is disputed, such party shall promptly within 15 days of the arising of the disputes request the Dean(IPM), who shall refer the disputes to Dispute Redressal Committee (DRC) within 15 days along with a list of disputes with amounts claimed if any in respect of each such dispute. The Dispute Redressal Committee (DRC) give its decision within a period of 60 days extendable by 30 days by consent of both the The constitution of Dispute Redressal Committee (DRC) shall be as indicated in clause of SCC. Provided that no party shall be represented before the Dispute Redressal Committee by an advocate/legal counsel etc.

The DRC will submit its decision to Dean(IPM) .If the Dispute Redressal Committee (DRC) fails to give its decision within the aforesaid period or the Dean(IPM) fails to give his decision in the aforesaid time limit or any party is dissatisfied with the decision of Dispute Redressal Committee (DRC)/ concerned authority then either party may within a period of 30 days from the receipt of the decision of Dispute Redressal Committee (DRC)/ Dean(IPM) or on expiry of aforesaid the time limits available to DRC/ Dean (IPM), may give notice to the Director for appointment of Arbitrator

It is a term of contract that each party invoking arbitration must exhaust the aforesaid mechanism of settlement of claims/disputes prior to invoking arbitration.

88. B) Arbitration

All disputes of difference whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof of this Contract or the rights touching or concerning the works or the execution or maintenance thereof this Contract of the construction meaning operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after completion of the contract or whether before or after determination, foreclosure or breach of the contract (other than those in respect of which the decision of any person is by the Contract expressed to be final and binding) shall after written notice by either party to the Contract to the other of them and to the Owner hereinafter mentioned be referred for adjudication to a sole Arbitrator to be appointed as herein after provided.

For the purpose of appointing the sole arbitrator referred to above, the appointing Authority will send within thirty days of receipt of the notice to the Contractor a panel of three names of persons who shall all be presently unconnected with the organization for which the work is executed.

The Contractor shall on receipt of the names as aforesaid, select any one of the persons named to be appointed as a sole Arbitrator and communicate his name to the Appointing Authority within thirty days of receipt of the names. The Appointing Authority shall thereupon without any delay appoint the said person as the sole Arbitrator. If the Contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the sole Arbitrator.

If the Appointing Authority fails to send to the Contractor the panel of three names as aforesaid within the period specified, the Contractor shall send to the Appointing Authority a panel of three names of persons who shall all be unconnected with either party. The Appointing Authority shall on receipt of the names as aforesaid select any one of the persons named and appoint him as the sole Arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole Arbitrator shall be entitled to appoint one of the persons from the panel as the sole Arbitrator and communicate his name to the Appointing Authority.

If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reasons whatsoever another sole Arbitrator shall be appointed as aforesaid.

The work under the Contract shall, however continue during the arbitration proceedings and no payment due or payable to the Contractor shall be withheld on account of such proceedings.

The Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties fixing the date of the first hearing.

The Arbitrator may, from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

The Arbitrator shall give a separate award in respect of each dispute or difference referred to him.

The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The costs of the reference and of the award including the fees, if any of the Arbitrator shall be in the discretion of the Arbitrator who may direct to any by whom and in what manner, such costs or any part thereof shall be paid and may fix or settle the amount of costs to be so paid.

The award of the Arbitrator shall be final and binding on both the parties.

Subject to aforesaid the provisions of the Arbitration and conciliation Act 1996 or any statutory modification or re-enactment thereof and the rules made thereunder, and for the time being in force, shall apply to the arbitration proceeding under this clause.

89. Jurisdiction

The contract shall be governed by and construed according to the laws in force in INDIA. The Contractor hereby submits to the jurisdiction of the Courts situated at Guwahati for the purposes of actions and proceedings arising out of the contract and the courts at Guwahati only will have the jurisdiction to hear and decide such actions and proceedings.

SECTION - 9**SAFETY CODE****A. General**

Contractor shall adhere of safe construction practice and guard against hazardous and unsafe working conditions and shall comply with Owner's safety rules as set forth herein. Prior to start of construction, Contractor will be furnished of Owner's "Safety Code" for information and guidance, if it has been prepared.

B. First Aid and Industrial Injuries

- (1) Contractor shall maintain first aid facilities for his employee and those of his sub-Contractors.
- (2) Contractor shall make out side agreements for ambulance service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to the Owner prior to start of construction and their telephone numbers shall be prominently posted in Contractor's field office.
- (3) All critical industrial injuries shall be reported promptly to the Owner, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to the Owner.

C. General Rules

Smoking within the battery area, tank farm or dock limits is strictly prohibited. Violators of the no smoking rules shall be discharged immediately.

D. Contractor's Barricades

- (1) Contractor shall erect and maintain barricades required in connection with his operation to guard or protect.
 - (a) Excavations.
 - (b) Hoisting areas.
 - (c) Areas adjudged hazardous Contractor's or Owner's inspectors.
 - (d) Owner's existing property subject to damage by Contractor's perations.
 - (e) Rail road unloading spots.
- (2) Contractor's employees and these of his sub-Contractors shall become acquainted with Owner's barricading practice and shall respect the provisions thereof.
- (3) Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

E. Scaffolding

- (i) Suitable scaffolding should be provided for workmen for all works that safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder shall be given an inclination not steeper than 1 in 4 (1horizontal and 4 vertical).
- (ii) Scaffolding or staging more than 4 meters above the ground or floor, swing suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise rewarded at least 3 ft. high above the

floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

- (iii) Every opening of the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1 metre.
- (iv) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform of the gangway or the stairway is more than 4 meters above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (ii) above.
- (v) Safe- means of access shall be provided to all working platforms and other working places, every ladder should be securely fixed. No portable single ladder shall be over 9 meters in length while the width between side rails in rung ladder shall in no case be less than 30cms for ladder up to and including 3metres in length. For longer ladder this width should be increased at least 5 mm for each additional foot of length. Uniform steps spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the site of work shall be so stacked or placed to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary fencing and light to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit, action or other proceedings of law that may be brought by any person for injury sustained owing to neglect of the above precautions and pay any damages and costs which may be awarded in any such suit or action or proceedings to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.

F. Excavation and Trenching

All trenches 1.2 metres or more in depth, shall at all times be supplied with at least one ladder for each 50 metres length or fraction thereof.

Ladder shall be extended from bottom of the trench to at least 1 metre above the surface of the ground. The sides of the trenches which are 1.5 metres in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 metres of the edge of the trench or half of the trench width whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.

G. Demolition

- (i) Before any demolition work is commenced and also during the progress of the work.
 - (a) All road and open areas adjacent to the work site shall either be closed or suitably protected.
 - (b) No electric cable or apparatus which is liable to be a source of danger shall remain electrically charged.
 - (c) All practical shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so over-loaded with debris or materials as to render it unsafe.
- (ii) All necessary personal safety equipment as considered adequate by the Engineer-in-charge, should be kept available for the use of the persons employed on the site

and maintained in condition suitable for immediate use, and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned.

(a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

(b) Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eyes shall be provided with protective goggles.

(c) Those engaged in welding and cutting works shall be provided with protective face and eye shields, hand gloves etc.

(d) Stone breakers shall be provided with protective goggles and protective clothing, and seated sufficiently safe intervals.

(e) When workers are employed in sewers and manholes, which are in use, the Contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to gate in to the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or board to prevent accident to the public.

(f) The Contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken,

(1) No paint containing lead or lead product shall be used except in the form of paste or ready-made paint.

(2) Suitable face masks should be supplied for use by the workers when Paints is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

(3) Overalls shall be supplied by the Contractor to the workmen and adequate Facilities shall be provided to enable the working painters to wash them during and on cessation of.

(iii) When the work is done near any place where there is a risk of drowning, all Necessary safety equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

(iv) Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions:-

(a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good working order.

(b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.

(c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 12 years should be in charge of any hoisting machine including any scaffolding, which or give signals to the operator.

(d) In case of every hoisting machine and of every chain ring hook , shackle, swivel, and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. every hoisting machine and all gears referred to above shall be plainly marked with the safe working load of the conditions under which it is applicable which shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

(e) In case of departmental machine, the safe working load shall be notified by the Engineer-in-charge. As regards Contractor's machines, the Contractor shall notify the

safe working load of the machine to the Engineer-in-charge whenever he brings any machinery to site of work and get it verified by the Engineers concerned.

- (v) Motors, gearing transmission, electric wiring and other dangerous part of hoisting appliances should be provided with such means as to reduce to the minimum the accidental descent of the load, adequate precautions should be taken to reduce to the minimum the risk of any part or any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves, and boots as may be necessary should be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.
- (vi) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
- (vii) These safety provisions should be brought to the notice of all concerned by the displaying on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.
- (viii) To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Welfare Officer, Engineer-in-Charge or safety Engineer of the administration or their representatives.
- (ix) Notwithstanding the above clauses there is nothing in these to exempt the contractor from the operations of any other Act or rules in force in the Republic of India.

The works throughout including any temporary works shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpaths at the site or in the vicinity thereto or any existing works whether the property of the Administration or of a third party.

In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. Safety Code and Indian standard Safety Code framed from time to time.

PROFORMA OF AGREEMENT

CONTRACT AGREEMENT FOR THE WORK OF.....

DATED.....20.....(.....Two Thousand.....) Between M/s
 in the town of
hereinafter called the “**CONTRACTOR**” which term shall
 unless excluded by or repugnant to the subject or context include its successors and permitted
 assignees of the one part and the Indian Institute of Technology Guwahati hereinafter called the
 “**OWNER**” (Which term shall, unless excluded by or repugnant to the subject or context include
 its successors and permitted assignees) of the other part.

Whereas :

A. The Owner being desirous of having provided and executed certain works mentioned, enumerated or referred to in the tender documents including short Tender notice, General Tender Notice, General Conditions of Contract, Special conditions of Contract, Specifications, Drawings, Plans, Time Schedule of Completion of Jobs, Agreed Variations, other documents has called for Tender.

B. The Contractor has inspected the site and surroundings of the works specified in the tender documents and has satisfied himself by careful examination before submitting his tender as to the nature of the surface strata, soil, sub-soil and ground, the form and nature of site and local conditions, the qualities, nature and magnitude of the work, the availability of labour and materials necessary for the execution of work, the means of access to site, the supply of power and water thereto and accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and things referred to, or implied in the tender documents or having any connection therewith, and has considered the nature and extent of all probable and possible situations, delays, hindrances or interferences to or with the execution and completion of the work to be carried out under the contract, and has examined and considered all other matters, conditions and things and probable and possible contingencies, and generally all matters incidental thereto and ancillary thereof affecting the execution and completion of the work and which might have influenced him in making his tender.

C. The Notice Inviting Tender, General Conditions of Contract, Special Conditions of Contract Specifications, Drawings, Plans, Time Schedule of Completion of Jobs, and other documents, copies of all which are hereto annexed and marked “A”, The letter of submission of Tender and Acceptance of tender and any statement of agreed variation with its enclosures, copies of which are also hereto annexed and marked “B” form part of this contract though separately set out herein and are included in the expression “CONTRACT” wherever herein used

And Where as

The Owner accepted the Tender of the Contractor for the provision and the execution of the said work at the rates stated in the schedule of quantities of works and finally approved by Owner (herein after called the “Schedule of Rates”) upon the terms and subject to the conditions of contract.

Now This Agreement Witnesseth And it is hereby agreed and declared as follows :-

1. Inconsideration of the payment to be made to the Contractor for the work to be executed by him, the Contractor hereby covenants with the Owner that the Contractor shall and will duly provide, execute and complete the said works and shall do and perform all other acts and things in the contract mentioned or described or which are to be implied there from or may be reasonably necessary for the completion of the said works and at the said times and in the manner and subject to the terms and conditions or stipulations mentioned in the contract.

2. In consideration of the due provision execution and completion of the said works, Owner does hereby agree with the Contractor that the Owner will pay to the Contractor the respective amount for the work actually done by him and approved by the Owner at the Schedule of Rates and such other sum payable to the Contractor under provision of Contract, such payment to be made at such time in such manner as provided for in the Contract.

AND

3. In consideration of the due provision, execution and completion of the said works the Contractor does hereby agree to pay such sums as may be due to the Owner for the services rendered by the Owner to the Contractor, such as power supply, water supply and others as set for in the said contract and such other sums as may become payable to the Owner towards the controlled items of consumable materials or towards loss, damage to the Owner's equipment, materials construction plant and machinery, such payments to be made at such time and in such manner as is provided in the Contract.

It is specifically and distinctly understood and agreed between the Owner and the Contractor that the Contractor shall have no right, title or interest in the site made available by the Owner for execution of the work executed or in the buildings, structures or works executed on the said site by the Contractor or in the good articles, materials etc. brought on the said site unless the same specifically belongs to the Contractor and the Contractor shall not have or deemed to have any lien whatsoever change for unpaid bills nor will be entitled to assume or retain possession or control of the site or structures and the Owner shall have an absolute and unfettered right to take full possession of site and to remove the Contractor, their servants, agents and materials belonging to the Contractor and laying on the site.

The Contractor shall be allowed to enter upon the site for execution of the works only as a licensee simpliciter and shall not have any claim, right, title or interest in the site or the structures erected thereon and the Owner shall be entitled to terminate such license at any time without assigning any reason.

The material including sand, gravel, stone, loose earth, rock etc., dug up or excavated from the said site shall, unless otherwise expressly agreed under the contract exclusively belong to the Owner and the Contractor shall have no right to claim over the same and such excavations and materials should be disposed of on account of the Owner according to the Instructions in writing issued from time to time by the Engineer-in-charge.

In witness whereof the parties have executed these presents in the day and the year first above written.

Signed and Delivered for and on behalf
Owner Indian Institute of Technology
Guwahati

Signed and Delivered for and on
behalf of Contractor

Date :

Date :

Place :

Place :

In presence of the Witnesses

1.....

1.....

.....

.....

.....

.....

2.....

2.....

PROFORMA OF BANK GUARANTEE

(On non-judicial paper of appropriate value)

To

Indian Institute of Technology Guwahati
GUWAHATI, Assam

Dear Sir,

M/s..... have taken
tender for the work of.....

for Indian Institute of Technology Guwahati.

The tender Conditions of Contract provide that the Contractor shall pay a sum of `.....

(Rupees.....) as Performance Security deposit in the form therein mentioned. The form of payment of Performance Guarantee /Security deposit includes guarantee executed by Schedule 'A' Bank, undertaking full responsibility to indemnify Indian Institute of Technology Guwahati in case of default.

The said..... has approached us and at their request and in consideration of the promises we.....

having our office at have agreed to give such guarantee as hereinafter mentioned.

1. We.....
hereby undertake and agree with you that if default shall be made by M/s.....
in performing any of the terms and conditions of the tender or in payment of any money payable to Indian Institute of Technology Guwahati we shall on demand pay to you in such manner as you may direct the said amount of Rupees..... only or such portion thereof not exceeding the said sum as you may from time to time require.
2. You will have the full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said and to enforce or to forbear from endorsing any powers or rights or by reason of time being given to the said which under law relating to the sureties would but for provision have the effect of releasing us.
3. Your right to recover the said sum of `..... (Rupees.....) from us in manner aforesaid will not be affected or suspended by reason of the fact that any dispute or disputes have been raised by the said M/s..... and/or that any dispute or disputes are pending before any officer, tribunal or court.
4. The guarantee herein contain shall not be determined or effected by the liquidation or winding up, dissolution or change of constitution or insolvency of the said.....but shall in all respects and for all purposes be binding and operative until payment of all money due to you in all respect of such liabilities is paid.
5. Our liability under this guarantee is restricted to Rupees.....Our guarantee shall remain in force until.....unless a suit or action to enforce a claim under Guarantee is filed against us within six months from(which

is date of expiry of guarantee) all your right under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.

6. We have power to issue this guarantee in your favour under Memorandum and Articles of Association and the undersigned has full power to do under the power of Attorney dated.....granted to him by the bank.

Yours faithfully,

Bank

.....
By it's Constituted Attorney

Signature of a person duly authorised to
sign on behalf of the bank.

GUARANTEE AGAINST ADVANCE PAYMENT

This deed of Guarantee made this

day of.....between

.....and wherever the context so requires includes its successors and assigns hereinafter called "They Surety" and.....a Company registered under the Companies Act of 1956 and having its Registered Office at..... and wherever the context so requires includes its successors and assigns, hereinafter called "the Owner".

WHEREAS M/s.....(a company registered under the Companies Act of 1956 having its registered office at(Wherever applicable) and wherever the context so requires includes its successors and assigns, hereinafter called the " Contractor" has undertaken to the terms and conditions mentioned in the :

(a) Letter of Intent No.....dated.....

OR

(b) Agreement No.....dated..... referred to as "the said Contract"

AND WHEREAS the Owner has agreed to make an advance of `(Rupees..... being) % value of the contract on as provided in the contract as the said advance to the Contractor carrying no interest.

AND WHEREAS the Contractor has agreed with the Owner authorising him to deduct under the terms of the said contract from the amount that becomes due the payable to the Contractor as per the terms and conditions described under the clause "Terms and Conditions of Payments" of the Contract on proper execution of the Contract.

Now this deed witnesseth that in consideration of the said advance or any balance thereof made by the Owner to the Contractor, the surety hereby GUARANTEES the payment of the said advance by the Contractor, undertakes to pay the Owner on demand the said sum of ` subject to the following conditions.

(a) "Surety hereby gives an irrevocable guarantee and declares that its liability under this bond shall extend to the payment of the whole of the amount viz. `paid as advanced as provided for in the contract "as the said advance"

(b) this guarantee shall remain in force and effect so long as the said advance of any part thereof remains outstanding and shall expire and become ineffectual only after the recovery of the entire sum of ` covered by the Guarantee and upon intimation thereof being given by the Owner to the Surety, in which event, the Surety shall be discharged by the Owner.

(c) the Surety shall not be discharged or released from the Guarantee by any arrangement made between the Owner and the Contractor with or without the Consent of the surety or by any alteration in the obligations of the parties or by any indulgence, forbearance, whether as to payment , time performance or otherwise.

(d) The Guarantee shall come in to force from the date Contractor receives from the Owner the said advance.

(e) Notwithstanding anything stated above, the liability of the Surety under the guarantee is given is not completed or fully performed, the surety (bank) hereby agrees to further extend the Guarantee till such time as is required to fulfill the contract.

INDENTURE FOR SECURED ADVANCE

THIS INDENTURE made.....
 day.....20.....
 between.....

..... (hereinafter called the Contractor which expression shall where the context so admits or implies be deemed to include his executors, administrator and the assigns) of one part and Indian Institute of Technology Guwahati (hereinafter called the IIT -G which expression shall where the context so admits or implies be deemed to include its successors in office and assigns) of the other part.

WHEREAS by an agreement No.....dated..... (hereinafter called the said agreement the Contractor has agreed..... and WHEREAS the Contractor has applied to the IIT-G that he may be allowed advance on the security of materials absolutely belonging to him and brought by him to site of the works, the subject of the said agreement for use in the construction of such of the works a he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges) and where as the IIT-G has agreed to advance to the Contractor an amount upto `.....(Rupees.....

.....only) on the security of the quantities and other particulars of the materials on the security of which the advance or advances are made as detailed in the secured advance account forming part of the running account bill preferred from time to time and signed by the Contractor for the said works.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of amounts aggregating to the sum of `.....(Rupees.....

.....only) on or after the execution of these presents paid to the Contractor by the IIT-G (the receipt where of the Contractor hereby acknowledge) Contractor doth hereby covenant and agree with the IIT-G declare as follows :

1. That the said sum aggregating to `.....(Rupees.....

.....only) so advanced by the IIT-G to Contractor as aforesaid shall be employed by the Contractor in or towards expending the execution of the said works and for no other purpose whatsoever.

2. That the materials detailed in the said Running Account Bills which have been offered to and accepted by the IIT-G as Security are absolutely the Contractor's own property, and free from encumbrances of any kinds and Contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the Contractor hereby agrees to indemnify the IIT-G against all claims to any materials in respect of which an advance has been made to him as aforesaid.

3. That the materials detailed in the said Running Account Bills (hereinafter called the said materials) shall be used by the Contractor solely for the execution of the said works in accordance with the directions of the Engineer-in-Charge and in terms of the said agreement.

4. That the Contractor shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risk of the said materials and that until used in construction as aforesaid the said materials shall remain at the site of the said works in the Contractor's custody and on his own responsibility and shall at all times be open to inspection, by the event of the said materials or any part thereof being stolen, destroyed or damaged the Contractor will forthwith replace the same with other materials of like quality or repair and make good same as required by the Engineer-in-Charge.

5. That the said materials shall not on any account be removed from the site of the said works except with the written permission of the Engineer-in-Charge or an officer authorised by him on that behalf.

6. That the advance shall be repayable in full when or before the Contractor receives payment from the IIT-G of the price payable of him or the said works under the terms and provisions of the said agreement provided that if any intermediate payments are made to the Contractor on account of the work done then on the occasion of each such payment the IIT-G

will be at liberty to make recovery from the Contractor's bill for such payment by deducting there from the value of the said materials then actually used in the construction and in respect of which recovery has not been made previously the value for this purpose being determined in respect of each description of materials at the rates at which the amounts of the advances made under these presents were calculated.

7. That if the Contractor shall at any time make any default in the performance or observance in any of the terms and provisions of the said agreement the total amount of the advances that may still be owing in the IIT-G together with the interest thereon at twelve percent per annum from the date or respective dates of such advance to the dates of payment will with all costs, charges, damages and expenses incurred by the IIT-G in the recovery thereof or the enforcement of the security or otherwise by reason of the default of the Contractor shall become payable by the Contractor hereby covenants and agrees with the IIT-G to repay and pay the same respectively to him accordingly.

8. That the Contractor hereby gives charge all the said materials for the repayment to the IITG of the said sum aggregating to(Rupees.....)

.....only) and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS AND it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and whenever the money owing shall not be paid in accordance herewith the IIT-G may at any time thereafter adopt all or any of the following courses as he may deem best :-

a) Seize and utilise the said materials or any part thereof in the completion of the said works on behalf of the Contractor in accordance with the provisions in that behalf contained in the said agreement debiting the Contractor with the actual cost of effecting such completion and the amount due in respect of advance under these presents and crediting the Contractor with the value of work done as if he had carried it out in accordance with the said agreement and the rates thereby provided. If the balance is against the Contractor he is to pay same to IIT-G on demand.

b) Remove and sell by the public auction the seized materials or only part thereof and out of the moneys arising from the sales retain all the sums aforesaid repayable to the IIT-G under these presents and pay over the surplus (if any) to the Contractor.

c) Deduct all or any, part of the money owing out of the security deposits or any sum due to the Contractor under the said agreement.

9. That in event of any conflict between the provisions of these presents and the said agreement the provisions of the said agreement shall prevail and in the event of any dispute or difference arising over the construction or effect of these presents the settlement of which has not been herein before expressly provided for, the same shall be referred to arbitration as provided in the said agreement.

IN WITNESS WHEREOF..... and..... IIT-G by the order and under the directions of IIT-G have herein to set their respective hands the day and year first above written.

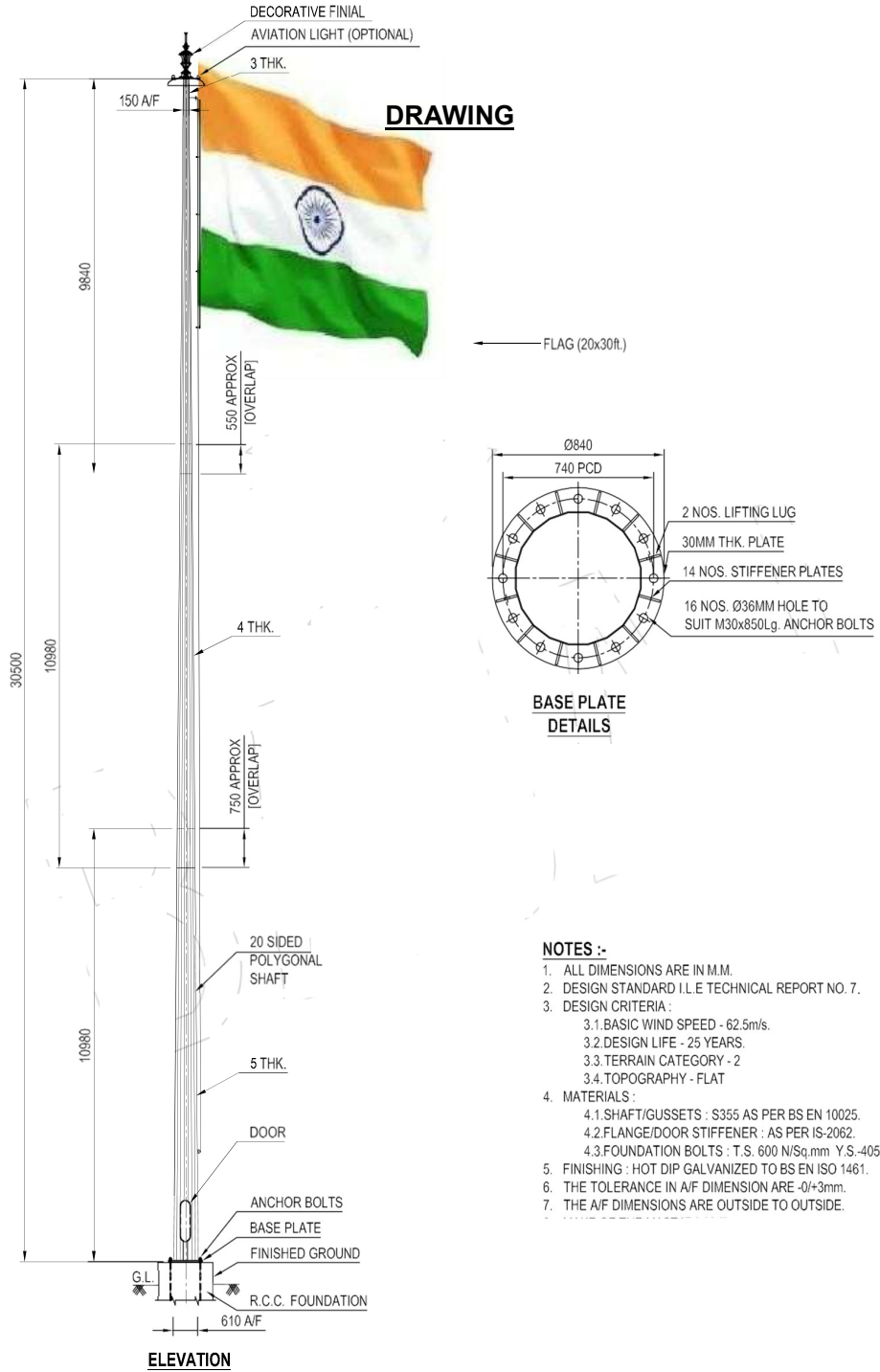
Signed, sealed and delivered by the said Contractor in the Presence of Witness Signature : Name :

Address :

Address :

Witness :

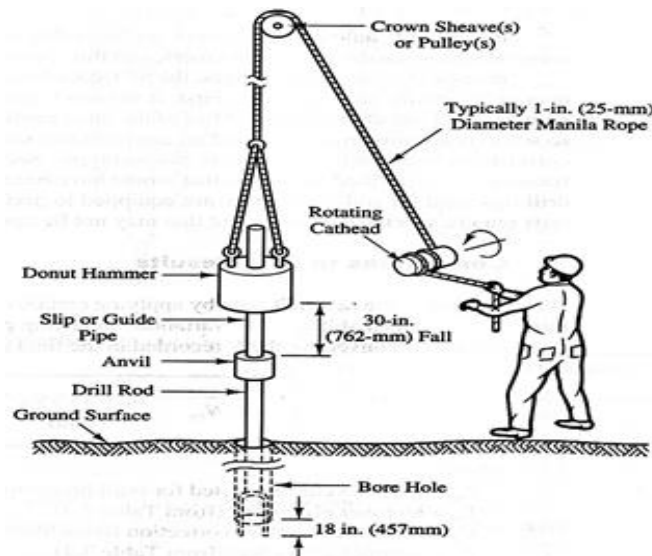
ALL DIMENSIONS ARE IN M.M. UNLESS OTHERWISE MENTIONED.



**REPORT ON SUB-SOIL INVESTIGATION WORK
FOR
HIGH MAST TOWER
AT
IIT GUWAHATI, KAMRUP DISTRICT OF ASSAM**

Name of work:

Sub-Soil Investigation works for the Installation of Proposed high Mast National Flag At IIT Guwahati, Kamrup(M) District of Assam



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GEOTECHNICAL INVESTIGATION REPORT

FOR PROPOSED CONSTRUCTION OF HIGH MAST TOWER AT IIT GUWAHATI, KAMRUP DISTRICT OF ASSAM

CONTENTS

SL NO	DESCRIPTION	PAGE NO
1.	INTRODUCTION	1
2.	OBJECTIVE	1
3.	TIME OF FIELD WORK	1
4.	INVESTIGATION INFORMATION	1-2
5.	BRIEF DETAILS OF PROPOSED CONSTRUCTION SITE	2
6.	LABORATORY INVESTIGATION	2-4
7.	ANALYSIS OF FIELD DATA	5
8.	STANDARD PENETRATION RESISTANCE	5
9.	GROUND WATER TABLE	5
10.	TABLE OF STANDARD PENETRATION RESISTANCE TEST VS DEPTH	6
11.	TABLE OF SUB SOIL WATER TABLE	6
12.	LABORATORY TEST DATA	7
13.	TABLES OF GRAIN SIZE ANALYSIS & CONSISTENCY PARAMETER OF SOIL	7
14.	TABLES OF MOISTURE CONTENT, DENSITY , SPECIFIC GRAVITY & VOID	7
15.	TABLES OF SHEAR PARAMETER & CONSOLIDATION PARAMETER OF SOIL	7
16.	DESCRIPTION SUB-SOIL HORIZON	8
17.	FOUNDATION ANALYSIS	9-10
18.	ALLOWABLE BEARING CAPACITY OF SOIL (SAMPLE CALCULATION)	11-12
19.	SETTLEMENT ANALYSIS SHALLOW FOUNDATION (SAMPLE CALCULATION)	12
20.	TABLE ALLOWABLE BEARING CAPACITY OF SOIL	13
21.	SAMPLE CALCULATION OF BORED CAST IN-SITU RCC PILE	14-16
22.	TABLE OF SAFE BEARING LOAD CAPACITY OF BORED CAST IN-SITU RCC PILE	17
23.	DISCUSSION & RECOMMENDATION	18
24.	DRAWINGS & CURVES	19-23
25.	REFERENCE	24

September

2022

INTRODUCTION:

Sub-soil investigation was carried out at the site of investigation for the Installation of Proposed high Mast National Flag At IIT Guwahati, Kamrup (M) District of Assam.

Altogether two (02) numbers of boreholes was drilled at the site of investigation up-to the depth 20.00m from existing ground level for boreholes BH-01 & BH-02 respectively. Sub-soil investigation was carried out at the site of construction to ascertain the physical and engineering properties for the purpose of construction.

OBJECTIVE:

This report describe the finding of sub-soil investigation and laboratory tests conducted on these soil sample and the data required for design of foundation together with recommended allowable bearing capacity for the structure and assessment of soil strata for construction ,design and estimation.

TIME OF FIELD WORK:

The field investigation work was carried out on 6th & 8th September, 2022. It comprised of both field and laboratory tests in accordance with BIS & IRC code of practice.

INVESTIGATION INFORMATION:

In an attempt for optimization in the design of foundation for the proposed structure to be constructed at this site, Geo-technical Investigation was done. The entire investigation work had been divided mainly into two parts (i) Field works & (ii) Laboratory tests.

- **FIELD INVESTIGATION:** Field works determine the types of sub-soil deposit and their characteristics. including making 150mm diameter borehole at designated location up to depth 20m from existing ground level for boreholes BH-01, Bh-02 respectively, Preparation of borehole chart mentioning the depositional features along with other characteristics of the sub-soil strata, carrying out standard penetration test (S.P.T) at an interval of 1.5M in each borehole and recording in the borehole chart
- **LABORATORY INVESTIGATION:** Laboratory tests help in determining the relevant geo-technical properties of the sub-surface deposits leading to finalization of foundation depth of the structure basing on Bearing Capacities of the foundation strata as well as the influence zone. Final depths of boring and observation of water table for each borehole are given below.
- **BORING PROCESS:** The borehole was drilled by using post holes type augur boring technique up to a depth of 2.00m from EGL and remaining depth of the borehole was drilled by wash boring technique operated manually up to the depth of depth 20m from existing ground level for boreholes BH-01, Bh-02 respectively.
- **SAMPLING:** Representative soil samples collected from boreholes were confirming to IS: 1892-1979 code in categories Disturb Sample & undisturbed sample along with proper leveling.
- **DISTURBED SOIL SAMPLES:** Disturbed soil samples were reasonably collected from cutting shoe of undisturbed soil samples and recovered were logged, labeled depth wise and placed in polythene bags for conducting necessary laboratory tests.

- **UNDISTURB SOIL SAMPLES:** Undisturbed soil samples were recovered by using thin walled metal sampling tubes as per IS 1932-1963 specification. The Sampling tubes were lubricated before use so as to minimize the wall friction. The samples so recovered were sealed with molten paraffin at the both ends so that the in situ properties were retained.
- **GROUND WATER TABLE:** The information about the fluctuation of underground water table is essential for correct assessment of soil parameters. If the water table is much below the depth of boring, this information should be collected from nearby bores, bore well or tube well etc. Ground water table has furnished in the table in this report.
- **LOGS OF BORING:** A boring log is a written record of information about the soil removed from a hole drilled in the earth which contains the soil stratification, N-values and details of samples. Logs of Boring, which represent the field data
- **BRIEF DETAILS OF PROPOSED CONSTRUCTION SITE:** The site is a plane land and the boreholes were drilled up to depth 20m from existing ground level for boreholes BH-01, Bh-02 respectively. Field identification such as colour, change of strata etc. were made visually during the time of field investigation and recorded in the borehole chart.
In this proposed construction site N-values are graphically represented in borehole log enclosed with this report

LABORATORY INVESTIGATION:

For proper identification & classification of the sub-soil strata and for deriving adequate information regarding its relevant Geo-technical properties of the site under investigation, the following laboratory tests were conducted on the soil samples collected from boreholes-

1.1 GRAIN SIZE ANALYSIS AS PER IS: 2720, part-IV

- **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. For this purpose an oven dry pulverized soil sample is sieved through the set of sieves 20mm, 10mm, 4.75mm, 2.0mm, 1.0mm, 600micron, 300micron, 150micron and 75micron. The amounts of soil retained on each sieve are noted down. The % retained, cumulative % retained and % passing are computed by these retained weights.

If the % passing 75micron sieve is appreciable, Hydrometer method is used to find the % fraction of particle sizes from 75micron to 2micron

- **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

1.2 SOIL CONSISTENCY AS PER IS: 2720, part-V

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

1.3 MOISTURE CONTENT AS PER IS: 2720, part-IX

For this test the soil sample of known quantity (W_m) is taken in a container. The container with this soil sample is placed in an oven for drying at 105-110°C for 16-24 hours. After drying the dry sample is again weighed to determine the dry weight of sample (W_d)

The moisture content is computed by the following equation:

$$W_n = (W_m - W_d) / W_d$$

1.4 DRY DENSITY AND BULK DENSITY AS PER IS: 2720, part-IX

For determination of bulk density, a sample of known volume 'V' is extracted from the undisturbed sample. Its bulk weight 'W' and moisture content 'W_n' is determined by oven drying method.

The bulk density is determined by following equation;

$$\gamma_b = W / V$$

And

$$\text{Dry density } \gamma_d = \gamma_b / (1 + W_n).$$

The Bulk density & Dry density values of the samples have been given in the enclosed laboratory sheet.

1.5 SPECIFIC GRAVITY AS PER IS: 2720, part-III

The Specific Gravity of the soil samples was determined by adopting standard procedure. The soil sample was dried in oven dried for 24 hours and pulverized. The sample was then poured into a specific gravity bottle and topped up with distilled water. The specific gravity bottle was stirred and heated to eliminate air bubbles. The weight of the specific gravity bottle was recorded along with the temperature of the sample.

For this test 5-10g (W_2) sample of oven dry, cool soil is taken in 50ml capacity density bottle and its weight is noted down. The soil is covered with distilled water and left for sufficient period for suitable soaking. The entrapped air is removed by vacuum. The soil in bottle is filled full with water and its is noted down as w_3 . The mass of empty bottle (w_1) and bottle with full distilled water also noted (w_4).

The specific gravity is found by the following equation.

$$G = \frac{w_2 - w_1}{[(w_2 - w_1) - (w_3 - w_4)]}$$

1.6 DIRECT SHEAR TEST AS PER IS: 2720, part-XIII

Direct Shear Test is a strength test which is performed on the soil sample to determine the value of angle of internal friction. The direct shear test is generally conducted on cohesion less soil as consolidated drained (CD) test. In the present case, the soil samples were prepared for various depths and were tested in the Direct Shear Apparatus under CD-condition.

1.7 TRI-AXIAL SHEAR TEST AS PER IS: 2720, part-XII

The shear strength properties of soil play an important role in the determination of the bearing of soil. The values of “C” and “ ϕ ” are obtained from Mohr’s circle drawn as required in IS: 2720 (part-XII) for the soil samples tested in unconsolidated un-drained triaxial compression without measurement of pore pressure.

1.8 CONSOLIDATION TEST AS PER IS: 2720, part-XV

To obtain specimens for consolidation test, the odometer ring was placed on the trimmed horizontal faces of the soil within the 10 cm diameter sampling tube and the soil around the cutting edge was gradually removed with a spatula as the ring was gently pushed into the soil. The ring with the soil was then removed by cutting across the soil core with the help of a piano wire saw. Consolidation tests were run in floating ring type odometers, in single & four unit consolidation frames under standard load increment ratio starting from 0.25 kg/sq.cm and going up to 16 kg/sq.cm in general. The pressure vs void ratio curves are given in this report.

1.9 UNCONFINED COMPRESSIVE STRENGTH TEST AS PER IS : 2720, part-XI

The UCC test was carried out on the saturated undisturbed soil samples. Which is gives the tentative idea of safe bearing pressure of soil at different depth.

1.10 CHEMICAL TEST OF SOIL AND WATER SAMPLES

As per specifications, soil samples at depths of 2.0m from the borehole and water sample also have been analyzed to determine the presence and percentage to determine pH, Chloride (Cl) and Sulphate (S04) ions.

ANALYSIS OF FIELD DATA:

From proper geotechnical investigation all parameter of the soil profile collected from during field investigation-

❖ STANDARD PENETRATION RESISTANCE

As per IS: 2131:1981, Standard Penetration Test requires one drop hammer of 63.5Kg weight, a string of drill rods (A-type rods of 41.27mm OD and 28.57mm ID) of suitable length, casing, one split spoon sampler, one guide to transfer the impulse load from drop hammer to the drill rods and a mechanism to elevate the load and to release the same on the drill rods.

First the sampler is driven into the borehole with the drill rods to the required depth, at which we are going to take the S.P.T. value. The sampler is first driven in to the soil by light blows of hammer to a seating penetration of 15cm. Then the sampler is driven under full blows of the 63.5Kg hammer falling from a height of 75cm, to an additional penetration of 30cm and the no. of blows are recorded as the 'Standard Penetration Resistance' N -value.

The observed value of N has to be corrected for (i) submergence correction and ii) Overburden pressure correction.

(i) **Submergence correction** :-In very fine or silty sand, situated bellow the water table, an apparent increase in penetration resistance occurs. Tarzaghi and Peck have recommended the use and equivalent penetration resistance N_e in place of actually observed N, when N is greater than 15. N_e is given by the following relation:

$$N_e = 15 + 0.5(N - 15) \dots\dots\dots(i)$$

(ii) **Overburden pressure correction** :-For a constant density index the N-value increase with increasing effective overburden pressure for which correction have been proposed by Gibbs and Holtz, peck, Thornburn, Whitman and others.

Peck (1974) proposed that N-values be reported at a reference overburden pressure of 100KN/m², and the normalized value of N (corrected for overburden as pressure) be expressed as follows :

$$N_0 = c_n \cdot N$$

Where, N_0 = Corrected value for overburden effect,

N = Actual values (observed),

c_n = Normalizing factor ,

$$= 0.77 \times \log_{10}(2000/\sigma'),$$

Where σ' = Effective overburden pressure (KN/m²)

❖ GROUND WATER TABLE:

The information about the fluctuation of underground water table is essential for correct assessment of soil parameters. If the water table is much below the depth of boring, this information should be collected from nearby bores, bore well or tube well etc. Ground water table has furnished in the table in this report.

STANDARD PENETRATION RESISTANCE TEST VS DEPTH

(As per IS: 2131)

BH NO.	Depth (M)	N	N _o	N _E
1	1.50	3	3	3
	3.00	2	2	2
	4.50	9	9	9
	6.00	12	12	12
	7.50	14	14	14
	9.00	15	15	15
	10.50	21	21	18
	12.00	17	17	16
	13.50	19	19	17
	15.00	19	19	17
	16.50	15	15	15
	18.00	15	15	15
	19.50	16	16	16
2	1.50	5	5	5
	3.00	3	3	3
	4.50	4	4	4
	6.00	14	14	14
	7.50	15	15	15
	9.00	15	15	15
	10.50	22	22	19
	12.00	17	17	16
	13.50	18	18	17
	15.00	21	21	18
	16.50	17	17	16
	18.00	16	16	16
	19.50	18	18	17

- Depth (M) = Depth in meter below the existing Ground surface level.
N = Standard penetration Resistance, N-Value recorded in field
N_E = Corrected N-value for N exceeding 15.
N_O = Adjusted N-Value in respect of existing over burden
R = Refusal N-value

Note: Standard Penetration test value correction only for sandy soil using IS: 2131 & IS: 1893

SUB-SOIL WATER TABLE:

The ground water level was recorded in each borehole during exploration and is furnished below.

Borehole No	Depth Above the EGL in meter
1	2.00m
2	2.00m

LABORATORY TEST DATA

From proper geotechnical investigation all parameter of the soil tested in laboratory has furnished in the table for respective boreholes in details as follows-

GRAIN SIZE DISTRIBUTION, SOIL CONSISTENCY PARAMETER, MOISTURE CONTENT, DENSITIES, SPECIFIC GRAVITY VOID RATIO, SHEAR & CONSOLIDATION PARAMETERS

(As per IS: 2720, Part-IV & Part-V, Part-III & Part-IX, Part-XI, Part-XII, Part-XIII & Part-XV)

BH. No.	Disturbed Soil Samples parameter										Undisturbed Soil Samples parameter									
	Depth below EGL in meter	Particle Size Distribution					Atterberg's Limit			Shrinkage Limit	Depth Below the EGL in meter	In-Situ Properties of Soil					Shear parameter		Consolidation parameter C_c	UCC in t/m^2
		Clay	Silt	Sand	Gravels	IS Classification	Liquid limit (%)	Plastic limit (%)	Plastic Index (%)			Moisture Content in %	Bulk Density in t/m^3	Dry Density in t/m^3	Specific Gravity	Void Ratio	Cohesion in t/m^2	ϕ in degree		
1	3.00	23.00	71.00	6.00	0.00	CI	47.44	29.09	18.35	---	2.50	28.063	1.902	1.485	2.621	0.765	2.73	3	0.1973	---
	6.00	19.00	69.00	12.00	0.00	CI	40.08	25.04	15.03	---	5.50	26.235	1.915	1.517	2.622	0.728	2.98	6	---	---
	9.00	17.00	67.00	16.00	0.00	CL	---	---	---	---	8.00	22.015	1.920	1.574	2.629	0.671	2.69	15	---	---
	12.00	15.00	62.00	23.00	0.00	CL	---	---	---	---	11.00	21.526	1.924	1.583	2.628	0.660	2.64	16	---	---
	15.00	14.00	59.00	27.00	0.00	CL	34.38	22.91	11.47	---	14.00	21.032	1.922	1.588	2.630	0.656	2.53	16	---	---
	18.00	15.00	58.00	27.00	0.00	CI	32.75	22.01	10.74	---	18.50	20.989	1.926	1.592	2.630	0.652	2.70	16.5	---	---
2	3.00	21.00	69.00	10.00	0.00	CI	42.52	26.38	16.13	---	2.50	27.989	1.902	1.486	2.619	0.762	2.83	3	0.1969	---
	6.00	20.00	72.00	8.00	0.00	CI	41.86	26.02	15.84	---	5.50	27.330	1.905	1.496	2.622	0.753	2.78	3	---	---
	9.00	15.00	63.00	22.00	0.00	CL	32.76	22.02	10.74	---	8.00	22.635	1.919	1.565	2.630	0.681	2.56	15.5	---	---
	12.00	14.00	62.00	24.00	0.00	CL	---	---	---	---	11.00	20.845	1.926	1.594	2.629	0.650	2.69	16	---	---
	15.00	16.00	65.00	19.00	0.00	CL	32.57	21.91	10.66	---	14.00	20.326	1.924	1.599	2.627	0.643	2.57	16.5	---	---
	18.00	12.00	69.00	19.00	0.00	CL	---	---	---	---	18.50	20.156	1.925	1.602	2.630	0.642	2.64	16.5	---	---

BRIEF DESCRIPTION AND CLASSIFICATION OF THE SUB-SOIL PROFILE:

The borehole log and particle size distribution curves reveal the following underlying sub-soil strata as per IS: 1498 specification below the investigation area-

BH No	CI: Brownish to Greyish/light ash coloured silty clay, impervious, low compressibility, sticky, medium plasticity, low compressibility, impervious layer, fair to moderate in consistency, traces of non-plastic silt in some layer, saturated, inorganic, cohesive soil in	CL: Light Brownish to Greyish/Greyish/Ash colour silty clay, fairly Sticky, impervious layer, low compressibility, impervious layer, low to medium plasticity, fairly saturated, inorganic soil in-
1	From EGL to 6.50m,	From 6.50m to 19.50m
3	From EGL to 6.00m	From 6.00m to 19.50m

Note:

- Relative stiffness of clayey horizons and compactness of Sandy Strata’s at different depths of each Bore hole may be pursued from the record of N-Values shown in the Bore hole log profiles

FOUNDATION ANALYSIS:

Foundation of a structure is to be designed from considerations of superstructure loading as well as subsoil condition at the site. Suitable foundations for a structure should satisfy the following basic design criteria. For ultimate bearing capacity, groundwater table calculation is not needed for clayey soil as per IS: 6403. However, parameters have been considered for saturated condition with water table at ground surface. There must be adequate factor of safety of the foundations against any possible bearing capacity failure and the settlement of the foundations must be within permissible limits. On the basis of requirement, both shallow and deep foundation may be adopted at the site for different types of structures. Hence both shallow and deep foundation has been studied as follows:

- **SHALLOW FOUNDATION: As per IS 6403: 1981**, the Net safe bearing capacity from C-Φ values has been calculated by applying the following formula for various footing is as follows :-

For General shear failure,

$$q_a = \frac{1}{F} \left[C \times N_c \times S_c \times i_c + \gamma \times D \times (N_q - 1) \times S_q \times d_q \times i_q + 0.50 \times B \times \gamma \times N_\gamma \times S_\gamma \times d_\gamma \times i_\gamma \times w' \right]$$

For Local shear failure,

$$q_a = \frac{1}{F} \left[\frac{2}{3} \times C \times N_c' \times S_c \times i_c + \gamma \times D \times (N_q' - 1) \times S_q \times d_q \times i_q + 0.50 \times B \times \gamma \times N_\gamma' \times S_\gamma \times d_\gamma \times i_\gamma \times w' \right]$$

Where,

F=Factor of safety

C=Cohesion

γ=Submerged density

D=Depth of footing.

B= Width of footing

W/=Water table correction

Φ/ =Tan-1(0.667×tanΦ) (Which is consider for Local shear failure)

N_c, N_q, N_γ & N_c', N_q', N_γ' are the bearing capacity factors depending upon the Φ & Φ' values respectively.

S_c, S_q, S_γ are the shape factors

Shape of footing	S_c	S_q	S_γ
Square footing	1.3	1.2	0.80
Circular footing	1.3	1.2	0.60
Rectangular footing	1+0.2(B/L)	1+0.2(B/L)	1-0.4(B/L)
Continuous footing	1.0	1.0	1.0

d_c, d_q, d_γ are the depth factors

$$d_c = 1 + 0.2 \frac{D}{B} \tan \left(45^\circ + \frac{\phi}{2} \right), \quad d_q = d_\gamma = 1 \text{ when } \Phi < 10$$

$$d_q = d_\gamma = 1 + 1.1 \left(\frac{D}{B} \right) \tan \left(45^\circ + \frac{\phi}{2} \right) \text{ when } \phi > 10^\circ$$

i_c, i_q, i_γ are the inclination factors of inclined loads.

- **DEEP FOUNDATION:** Deep foundation in the form of RCC bored cast-in-situ piles has been investigated. Pile toe may be kept at various depths below the Existing Ground Level. Cut-off level may be considered as per investigation area soil profile below the EGL. The ultimate load carrying capacity (Qu) of bored cast in-situ RCC pile foundation of different pile dimension were evaluated using as per **IS code: 2911(part 1/Sec 2): 2010**

The ultimate load capacity of the piles in tones

$$Q_u = A_p N_c C_p + \sum_{I=1}^n K_i \cdot P_{Di} \cdot \tan \delta_i \cdot A_{Si} + \sum_{i=1}^n \alpha_i C_i A_{Si}$$

Or,

The ultimate load capacity of the piles in tones

$$Q_u = A_p \left(\frac{1}{2} D \gamma N_\gamma + P_D N_q \right) + \sum_{I=1}^n K_i \cdot P_{Di} \cdot \tan \delta_i \cdot A_{Si} + \sum_{i=1}^n \alpha_i C_i A_{Si}$$

Where

A_p = Cross-sectional area of pile tip in m^2

N_c = Bearing capacity factor = 9

N_q = Bearing Capacity factor

N_γ = Bearing capacity factor depending upon internal friction angle

C_p = Average cohesion at pile tip in t/m^2

K_i = Coefficient of earth pressure ith layer

P_{Di} = Effective overburden pressure for ith layer.

P_D = Effective overburden pressure at the pile tip.

δ_i = Angle of wall friction between pile and soil for ith layer.

A_{si} = Surface area of pile shaft in the ith layer in m^2

α_i = Adhesion factor for the ith layer depending on the consistency of soil.

D = Diameter of the pile shaft

ALLOWABLE BEARING CAPACITY OF SOIL FROM SHEAR PARAMETER OF SOIL:
SAMPLE CALCULATION

As per soil horizon of borehole No-01, consider the parameter for the significant depth as follows-

Basic data:

Depth of the foundation (d_f)	: 2.50m
Type of foundation	: ISOLATED FOOTING
Width of the foundation (B)	: 1.50m
Length of foundation (L)	: 1.50m
Y_{sub} (Submerged density)	: 0.90t/m ³
q (Affective surcharge)	: 2.26t/m ²
C_{av} (Cohesion)	: 2.73t/m ²
Φ_{av} (I.F. angle)	: 3°
W' (Water table correction factor)	: 0.50

Since

$\Phi < 29^\circ$ and Void (e_0) > 0.55 , As per criteria of IS: 6403: 1981, For local shear failure

$$\Phi'_m = \tan^{-1}(0.667 \times \tan \Phi) = 2^\circ$$

Different factors of SBC					
General Shear Failure			Local Shear failure		
Nc	Nq	Ny	Nc'	Nq'	Ny'
5.87	1.31	0.24	5.60	1.20	0.15
Sc	Sq	Sy	Sc	Sq	Sy
1.30	1.20	0.80	1.30	1.20	0.80
dc	dq	dy	dc	dq	dy
1.21	1.00	1.00	1.20	1.00	1.00
ic	iq	iy	ic	iq	iy
1.00	1.00	1.00	1.00	1.00	1.00

Therefore,

For General Shear Failure,

$$Q_d = C \times N_c \times S_c \times d_c \times i_c + \gamma \times D_f \times (N_q - 1) \times S_q \times d_q \times i_q + 0.5 \times Y \times B \times N_y \times S_y \times d_y \times i_y \times W'$$

$$= 29.08 \text{t/m}^2 \dots\dots\dots (i)$$

For Local Shear Failure,

$$Q_{d'} = (2/3) \times C \times N_c' \times S_c \times d_c \times i_c + \gamma' \times D_f \times (N_q' - 1) \times S_q \times d_q \times i_q + 0.5 \times Y' \times B \times N_y' \times S_y \times d_y \times i_y \times W'$$

$$= 18.46\text{t/m}^2 \dots\dots\dots (ii)$$

As per IS 6403: 1981, Interpolate between (i) and (ii) with respect to void ratio

$$Q_d = 19.95\text{t/m}^2$$

$$\therefore Q_{ns} = Q_d / \text{FoS} = 6.65\text{t/m}^2 \text{ (where FoS=3)}$$

Hence, Net safe bearing capacity (q_{ns})= 6.65t/m² for square footing 1.5m x 1.5m at 2.50m depth below the EGL.

SETTLEMENT ANALYSIS OF SHALLOW FOUNDATION: The Net safe bearing capacity of soil from shear parameter of soil has check for settlement failure as per IS: 8009 (part-I) & IS: 1904

Basic data for Settlement Analysis:

Width of the foundation (B) : 1.50M

Z = significant depth below base of the foundation = 3.00m

$$q_s = \text{Net safe Bearing capacity} = 6.65\text{Tone/M}^2$$

$$\text{Compression index (Cc)} = 0.199$$

$$\text{Void ratio (} e_o \text{)} = 0.75;$$

$$\text{Thickness of compressed Stratum (H)} = Z = 3000 \text{ mm}$$

$$P_o = 3.61\text{MT/SM, at the middle of the compressed stratum;}$$

$$\Delta P = 0.74\text{MT/SM}$$

Therefore,

$$S_c = HC_c / (1+e_o) \times \log[(P_o + \Delta P) / P_o] = 27.70\text{mm}$$

Since, no sandy layer exist within significant depth so, consider $S_i = 0.00\text{mm}$

$$\text{Total Settlement (} S_t \text{)} = S_i + S_c = 27.70\text{mm,}$$

Also $S_t < 50\text{mm}$, (i.e., maximum permissible settlement under isolated RCC footing as per IS:1904)

Hence, Net safe bearing pressure (q_{ns}) = 6.65t/m² for square footing 1.5m x 1.5m at 1.50m depth below the EGL.

\therefore From the Shear criteria & Settlement Criteria of soil, it is concluded that the allowable bearing capacity (q_a) = 6.65tons/m² for Square footing 1.50M x 1.50M Size at 2.50M depth.

ALLOWABLE BEARING CAPACITY OF SOIL FROM SHEAR CRITERIA
AND
SETTLEMENT CRITERIA IN t/m²

D(M) Below EGSL	BH NO	FOOTING SIZE OF 1.5M × 1.5M	FOOTING SIZE OF 2.00M × 2.00M	FOOTING SIZE OF 2.5M × 2.5M	FOOTING SIZE OF 3.00M × 3.00M
2.50	BH-01	6.65	6.25	6.01	5.85
3.00		7.38	6.54	6.25	6.06
3.50		7.78	6.81	6.47	6.24
4.00		9.52	8.05	7.60	7.31
4.50		10.09	8.41	7.90	7.57
2.50	BH-02	6.92	6.50	6.25	6.09
3.00		7.66	6.80	6.50	6.31
3.50		8.08	7.09	6.73	6.49
4.00		8.47	7.33	6.92	6.65
4.50		8.94	7.64	7.17	6.87

Note: SBC of the fill-up soil layer has not furnished in the above table

SAMPLE CALCULATION OF BORED CAST IN-SITU RCC PILE

Basic Data: In pile calculation minimum data has been consider from respective borehole area of BH-01 in respective depth.

Length of the Pile from EGL	10.00m
Length of the pile (Embedded)	8.00m
Cutoff length from EGL	2.00m
Diameter of the pile	450mm
Depth of the pile top from EGL	1.00m
Max. overburden pressure acts upto the effective length	6.75m
Factor of Safety for safe load Capacity of pile	2.5
Factor of Safety for safe Uplift Capacity of pile	3.0

In pile calculation, shear parameter & effective unit weight has considered as per layer of the construction area, which are furnished in table.

Parameter for the pile friction calculation as follows-

Pile depth from cut off (M)	Thickness of layer (m)	C (t/m ²)	Φ In Degree	Effective unit weight γ/ (t/m ²)	P _{Di} γ/D (t/m ²)	Co-efficient of earth pressure (Ki)	Adhesion factor (α)
2m-4m	2.00	2.73	3.00	0.902	1.80	1.00	1.00
4m-7m	3.00	2.98	6.00	0.915	4.55	1.00	1.00
7m-9m	2.00	2.69	15.00	0.920	6.42	1.00	1.00
9m-10m	1.00	2.64	16.00	0.924	7.36	1.00	1.00

Parameter for the pile end bearing calculation as follows-

Cross sectional of pile toe	0.19625m ²
Value of Φ at toe	16.5 ⁰
Cohesion at the Tip (C)	2.70t/m ²
N _c (Bearing capacity factor)	9.00
N _q (Bearing capacity factor)	4.54
N _γ (Bearing capacity factor)	3.28
Effective overburden pressure at toe of the pile (P _D)	6.24t/m ²

As per IS: 2911(part-I, Sec-2), Skin friction and End bearing has furnished in table-

Pile depth from cut off (M)	Thickness of layer (m)	Friction Contribution in		End Bearing in	
		Clay	Sand	Clay	Sand
2m-4m	2.00	7.71	0.27	---	---
4m-7m	3.00	12.63	2.03	---	---
7m-9m	2.00	7.60	4.86	---	---
9m-10m	1.00	3.73	2.98	3.86	3.41

Total Skin friction of the pile & the End bearing of the pile = 41.81tone/m²
= 7.27tone/m²

From the above data,

Ultimate load capacity of the piles = 49.08tone/pile
Safe load Capacity of the Piles = 19.63tone/pile
Uplift Capacity of the Pile = 14.57tone/pile

Also, As per IS 1893(Part-I)-2016,

Seismic Safe working Load of the Piles = 24.54tone/pile

Horizontal capacity of the pile:

Basic Data:

Young's modulus of pile (E) = 2738612Mpa (for M30 grade of concrete)

Average N-value = 13

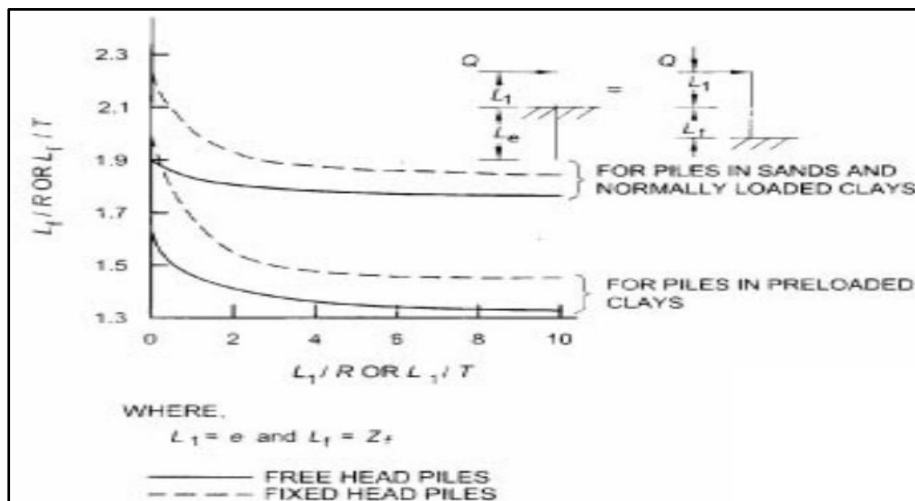
Moment of inertia of the pile cross Section (I) = 0.002m⁴

From the table 3 of IS 2911 part-I (sec-2),
Interpolating for N-value $\eta_h = 1.88\text{mn/m}^3$

Stiffness factor (T) = 1.96m

As per IS: 2911 (part 1/Sec-2)

Minimum embedded length of the pile required = 4T= 7.86m <8.0m. It is O.K



From the above IS : 2911(part-1/sec-2) figure we get

$L_f/T=2.20$ (Fixed headed)

$L_f/T=1.90$ (Free headed)

Depth of fixity to be adopted (Z_f) = 4.32m for Fixed headed

Depth of fixity to be adopted (Z_f) = 3.73m for Free headed

Deflection(y)=4.5mm (In IRC:78 (2014):Fixed head pile max allowable deflection of the pile head(y)=1% of the diameter)

As per IS: 2911(Part-1/Sec-2)

$$\text{Deflection (y)} = \frac{H(e+Z_f)^3}{3EI} \times 10^3 \text{ for free headed pile}$$

&

$$\text{Deflection (y)} = \frac{H(e+Z_f)^3}{12EI} \times 10^3 \text{ for fixed headed pile}$$

Where,

H = Lateral Load in KN

y = Deflection of pile head in mm

E = Young's Modulus of pile material in KN/m²

Z_f = depth of point of fixity in m

E = Cantilever length above the ground/bed to the point of Load application in m

∴ Horizontal load capacity of the pile = 3.68tons for Fixed headed pile

&

Horizontal load capacity of the pile = 1.43tons for Free headed pile

SAFE LOAD ON BORED CAST IN-SITU RRC PILE

(Area covered by BH-01, BH-02)

Pile Length from EGL	Pile Length from cutoff level (cutoff=1.00m)	Diameter of the pile in mm	Safe working Load (non-Seismic) t/Pile	Safe working Load (Seismic) t/Pile	Safe uplift working Load t/Pile	Horizontal load capacity of the pile (Fixed headed)	Horizontal load capacity of the pile (Free headed)
10.00	8.00	400	17.04	21.31	12.89	2.71	1.05
12.00	10.00		22.30	27.87	17.40	2.71	1.05
14.00	12.00		28.30	35.37	22.52	2.71	1.05
10.00	8.00	450	19.63	24.54	14.57	3.68	1.43
12.00	10.00		25.54	31.93	19.66	3.68	1.43
14.00	12.00		32.29	40.37	25.44	3.68	1.43
10.00	8.00	500	22.36	27.95	16.27	4.84	1.88
12.00	10.00		28.93	36.16	21.94	4.84	1.88
14.00	12.00		36.43	45.54	28.39	4.84	1.88
10.00	8.00	550	25.24	31.55	17.98	6.20	2.41
12.00	10.00		32.46	40.58	24.24	6.20	2.41
14.00	12.00		40.71	50.89	31.36	6.20	2.41

Note: Pile diameter 400mm has been taken off from IS: 2911(part-II/ sec-2): 2010. The data of 400mm diameter has been furnished in the above table only for designer information.

Recommendation & conclusion:

From the careful study it is concluded that the sub soil horizons in investigated detailed in soil investigation area was undertaken to assess the quality of the existing subsoil and to suggest suitable foundation systems for the proposed structures. Based on field and laboratory tests and analysis of the results the following recommendations may be made.

I. In proposed construction area, top soil consists of fill-up soil upto 2.50m below the EGL and then homogeneous soft silt clay layer up to 6.50below the EGL followed by sand clay layer encountered upto terminal level of the boreholes. **Shallow foundation is not suitable for the proposed construction area without proper soil improvement.**

II. Looking to the soil profile and soil strength along with proposed construction, a pile section shall be used for the proposed construction and the recommended design data as follows-

Total length of the pile	= 10.00m below the EGL
Cut off of the pile	= 2.00m
Diameter of the pile	= 450mm
Embedded length of the pile	= 8.00m
Safe working load (non-seismic condition)	= 19.63ton/Pile
Safe working load (seismic condition)	= 24.54ton/pile
Uplift working load	= 14.57ton/pile
Safe horizontal load (fixed headed)	= 3.68ton/pile
Safe horizontal load (fixed headed)	= 1.43ton/pile

- An initial load test as per IS: 1888 (both single and in group) shall be conducted for authentication of theoretical values. Two nos. minimum random routine load test shall preferably be carried out to ascertain the actual soil-pile behavior under vertical and horizontal loadings.
- Appropriate reduction of safe loads shall be required to be made using suitable group efficiency factor inconsonance with pile group geometry
- Construction area is included in the zone V of earthquake with high seismic intensity of $Z=0.36$. Hence due precautions may be taken to design the foundations of building as per IS: 4326 and IS:1893
- Adequate grade of concrete considering zero lateral support upto a depth of 3.0M below the existing ground surface level
- If required, ground improvement techniques, appropriate to the site condition may be adopted and proper scheme has to be designed for that purpose based on the soil data presented in this report

However, the type of foundation and depth may be decided by the design engineer based on various data furnished in the report for safety and economy.

---XXXXX---

DRAWINGS & CURVES

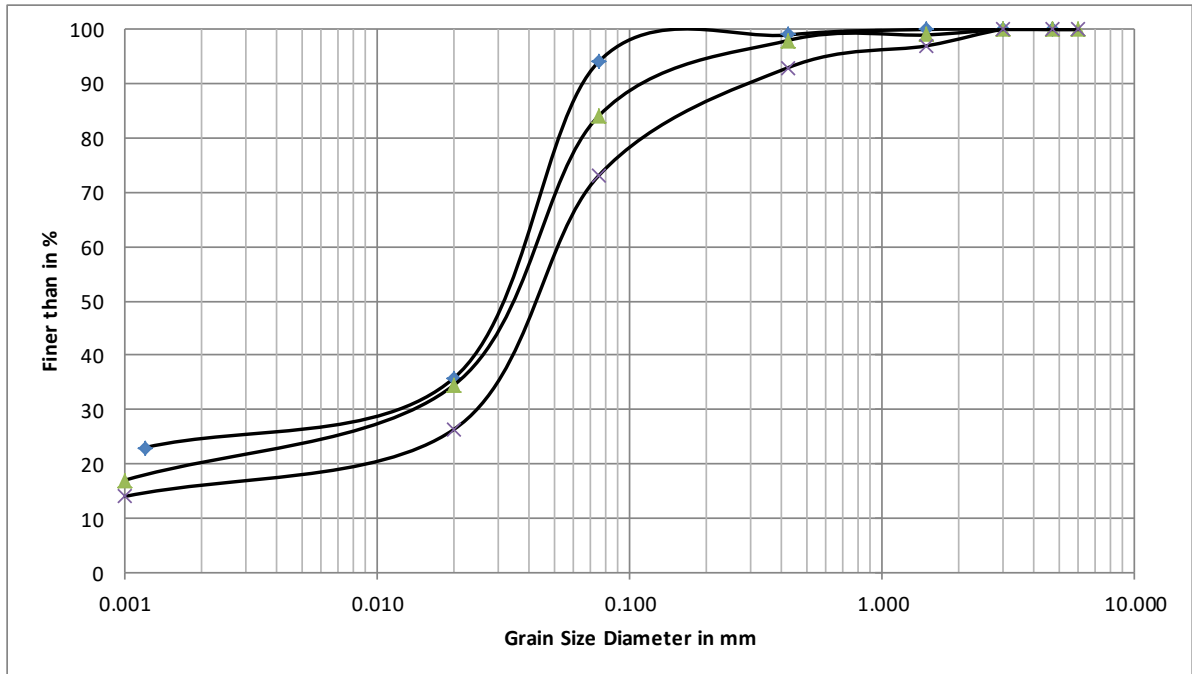
SUB-SOIL INVESTIGATION FOR THE INSTALLATION OF PROPOSED HIGH MAST NATIONAL FLAG AT IIT GUWAGHATI CAMPUS, KAMRUP DISDRICT OF ASSAM					
Date commenced:		06.09.2022	BOREHOLE NO-01		TYPE OF BORING: AUGUR & WASH BORING
Date of completed:		06.09.2022			GROUND WATER TABLE: 2.00m below the EGL
Depth Below EGSL	TYPE OF SAMPLE	N-Value	VISUAL DESCRIPTION OF SOIL PROFILE	BH LOG	GRAPHICAL REPRESENTATION OF N-VALUE -o- Observed N-value -x- Corrected N-value
1.50-1.95	SPT	3	Fill-up soil upto 2.50m below EGL	FILL-UP SOIL	
2.00	UDS	---			
3.00-3.45	SPT	2	Greyish to Browniah coloured silty clay mixed with non-plastic silt, low medium plasticity, soft to fairly sticky cohesive soil upto 6.50m below the EGL (CI)		
3.50	UDS	---			
4.50-4.95	SPT	9			
5.00	UDS	---			
6.00-6.45	SPT	12			
7.50-7.95	SPT	14			
8.00	UDS	---			
9.00-9.45	SPT	15			
10.00	UDS	---			
10.50-10.95	SPT	21			
11.00	UDS	---	Greyish to Browniah coloured sandy clay mixed with non-plastic silt, low plasticity, inorganic, cohesive soil up to 19.50m below the EGL (CL)		
12.00-12.45	SPT	17			
13.50-13.95	SPT	19			
14.00	UDS	---			
15.00-15.45	SPT	19			
16.50-16.95	UDS	15			
18.00-18.45	SPT	15			
18.50	UDS	---			
19.50-19.95	SPT	16			

*** SPT=Standard Penetration test, UDS= Undisturbed Soil Sample, RM= Remoulded Soil Sample

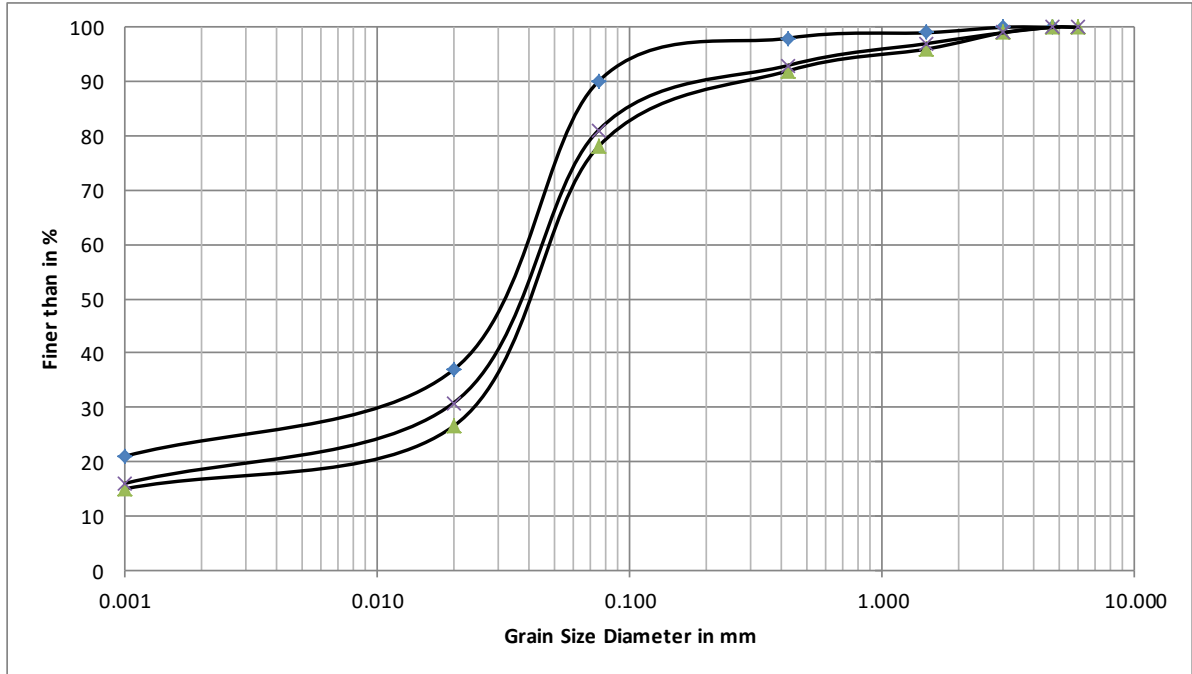
SUB-SOIL INVESTIGATION FOR THE INSTALLATION OF PROPOSED HIGH MAST NATIONAL FLAG AT IIT GUWAGHATI CAMPUS, KAMRUP DISDRICT OF ASSAM					
Date commenced:		08.09.2022	BOREHOLE NO-02		TYPE OF BORING: AUGUR & WASH BORING
Date of completed:		08.09.2022			GROUND WATER TABLE: 2.00m below the EGL
Depth Below EGSL	TYPE OF SAMPLE	N-Value	VISUAL DESCRIPTION OF SOIL PROFILE	BH LOG	GRAPHICAL REPRESENTATION OF N-VALUE -o- Observed N-value -x- Corrected N-value
1.50-1.95	SPT	5	Fill-up soil upto 2.50m below EGL Greyish to Browniah coloured silty clay mixed with non-plastic silt, low medium plasticity, soft to fairly sticky cohesive soil upto 6.00m below the EGL (CI)	FILL-UP SOIL	
2.00	UDS	---			
3.00-3.45	SPT	3			
3.50	UDS	---			
4.50-4.95	SPT	4			
5.00	UDS	---			
6.00-6.45	SPT	14			
7.50-7.95	SPT	15			
8.00	UDS	---			
9.00-9.45	SPT	15			
10.00	UDS	---	Greyish to Browniah coloured sandy clay mixed with non-plastic silt, low plasticity, inorganic, cohesive soil up to 19.50m below the EGL (CL)		
10.50-10.95	SPT	22			
11.00	UDS	---			
12.00-12.45	SPT	17			
13.50-13.95	SPT	18			
14.00	UDS	---			
15.00-15.45	SPT	21			
16.50-16.95	UDS	17			
18.00-18.45	SPT	16			
18.50	UDS	---			
19.50-19.95	SPT	18			

*** SPT=Standard Penetration test, UDS= Undisturbed Soil Sample, RM= Remoulded Soil Sample

GRAIN SIZE ANALYSIS CURVE OF BOREHOLE NO-01						
Depth (M)	Index	Clay %	Silt %	Sand %	Gravel %	Remarks
3.00	□	23.00	71.00	6.00	0.00	
9.00	Δ	17.00	67.00	16.00	0.00	
15.00	*	14.00	59.00	27.00	0.00	



GRAIN SIZE ANALYSIS CURVE OF BOREHOLE NO-02						
Depth (M)	Index	Clay %	Silt %	Sand %	Gravel %	Remarks
1.50	□	21.00	69.00	10.00	0.00	
9.00	Δ	15.00	63.00	22.00	0.00	
16.50	*	16.00	65.00	19.00	0.00	



REFERENCE

1. IS : 1892; *Field investigation Work;*
2. IS : 2131;1963. *Standard Penetration Test*
3. IS : 2720; *Part IV,1965. Grain size Analysis;*
4. IS : 2720; *Part III. Specific Gravity;*
5. IS : 1498; *Classification of Soil ;*
6. IS : 2720; *part V, 1965-85. Liquid & Plastic Limit;*
7. IS : 2720; *part IX. Moisture content & unit weights;*
8. IS : 2720; *part XI. Unconfined compression test;*
9. IS : 2720; *part XII. Triaxial shear test;*
10. IS : 2720; *part XIII. Direct shear test;*
11. IS : 2720; *part XV. Consolidation properties of soil*
12. IS: 6403; 1981; *Bearing capacity of shallow foundation*
13. IS : 8009; *part I, 1976. Settlement analysis of soil;*
14. IS : 2911(part-1/Sec-2): 2010; *Design & construction of pile foundation*
15. *Soil Mechanics & Foundation; Dr. B.C. Punmia, Ashok Kr. Jain & Anil Kr. Jain.*
16. *Soil Mechanics & Foundation Engineering Dr. K. R. Arora.*
17. *Principles of Soil Mechanics & Foundation Engineering V.N.S Murthy.*
18. *Indian Road Congress (IRC) 78:2000.*