OFFICE OF THE SUPERINTENDING ENGINEER
PROGRAMMING CIRCLE,W&S SECTOR, KMDA
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Kolkata Metropolitan Development Authority

Detailed e-NIT

No: 60/SE (Prog)/W&S/KMDA **Dated: 30.01.2025**

e-NIT No.: 05/KMDA/W&S/SE(Prog) of 2024-25 (2nd Call) Dated:30.01.2025

Notice inviting e-Tender on **Turnkey Basis** is invited by the **SUPERINTENDING ENGINEER, PROGRAMMING CIRCLE, W&S SECTOR, KMDA** on behalf of the Kolkata Metropolitan Development Authority (KMDA) for the works mentioned in the list given below, through electronic tendering (e-tendering) from eligible, experienced and resourceful contactors with sufficient financial capacity having credentials as per Eligibility Criteria Sated below within last 5(five) years in any Govt./Semi-Govt. / Undertaking /Autonomous Bodies / Statutory Bodies and Local Bodies.

Sl. No.	Name of Work	Estimated Amount Rs.	Earnest Money Rs.	Time of Completion
1	2	3	4	6
1.	Civil work including Survey, Investigation, Planning with detail design, drawing, construction, erection & commissioning of 84 MLD capacity Fixed type RC Raw water Intake Jetty with Gangway, Jetty Mounted Pump house, Sub-Station Building, construction of Boundary wall for substation, Construction of Paver block approach road, river bank protection work etc. at Kedar Ghaton Hooghly (tidal) river at Ward No-05, for existing Water Treatment plant near by Belur Math of Bally Municipality on Turnkey basis under AMRUT 2.0. ProjectCode:10/Water & Sanitation/KMA/64/1	Rate to be Quoted	10,00,000/-	18 (Eighteen) Month

Note: The bidders have no adverse report for execution of any project work during last 5(five) years. This clause will lead for rejection of application even after fulfillment of other eligibility criteria.

Additional Terms and Conditions:

- An affidavit to be submitted separately that a full-fledged technically supported spot decision making Corporate Office exists in West Bengal which may be verified in due course.
- Security period for the work will be 5 years from the date of completion.
- Since the work will be executed near Kedar Ghat on Hooghly river at Ward No-05, of Bally Municipality, the successful bidder will take every precaution while execution to safeguard the installations within the working site/location and will make good the damages if any occur during execution of work within working site/location.
- Department will not supply any construction materials like cement, steel, MS Pipe etc. to the contractors for execution of works. The contractors will have to arrange proper stacking, guarding and transportation from nearest delivery point at site including loading & unloading etc. All construction materials have to be supplied by the contractor at their own cost.
- Intending bidders will have to quote a single rate which will be considered GST and all other taxes. The proposed site should be visited/ observed by the bidders before their rate quote.

**** Before issuance of the Acceptance / Work Order, the tender inviting authority may verify the credential & other documents of the lowest bidder if found necessary. After verification, if it is found that such documents submitted by the lowest tender is either manufactured or false in that case, work**

Descriptions of Proposed Fixed type RC Raw Water Intake Jetty with Jetty Mounted Pump house, Carriage way/ Gang way, Pump house, Electrical Sub Station building etc.

Location of the work: Intake jetty location Latitude: 22 degree 38' 46.1"N, Longitude: 88 degree 21' 06.2" E

The Major Components:

i) All Civil Works for Construction of Raw Water Intake Setup at Kedar Ghat on the river Hooghly.
ii) RCC Intake Well, Mounted Pump House of Required Size & Shape will be pin pointed on location as mentioned in (Sl No-1) as per recommendation of feasibility study done by the KOPT.
iii) Connecting RCC Jetty from river bank to Intake Well by RCC pipe carriage way supported by suitable pile foundation of required length & width (not less than 3 m width) to accommodate all required provisions including Pipe Carriage way, Gangway, Cable Trench etc.
iv) River Bank Protection Wall of minimum 50 M with inclined Boulder pitching in the vicinity of intake structure as per side requirement.
v) Construction of 630 KVA Intake Sub Station Building (Not less than 200 sqm area or as designed) along with all necessary allied work like land development, construction of retaining wall etc
vi) It is required to construct a boundary wall along with 3 ply 12 gauge barbed wire fencing with operable locked gates to isolate the Intake Setup from surroundings.
vii)Construction of Concrete Paver block approach Road M-35 grade as per IRC SP-063-2004.
viii) Construction of Masonry Drains minimum 300 mm X 250 mm inner section as per required design.

- Civil Construction of fixed type jetty for facilitating erection of suction assembly, accommodating pumping machinery, working bay and also act as marine protection to the pump and other assemblies etc in tidal rivers supported on piles of appropriate size with tentative depth of 45m from HFL. [**Approx area 281.25SqM**]
- Civil Construction of pipe carriage way/ Gang wayof RCC, approx03.00 M width to carry suction delivery pipe up to the bank of the river with suitable RCC structure supported on column and adequate foundation/piles where necessary.[**Approx area 192.50 SqM**]
- Civil Construction of Pump House for pumping machineries over intake jetty (excluding Electro-Mechanical work). [**Approx area 80 SqM**]
- Civil Construction of two storied Sub-Station building & administrative building for intake jetty(excluding Electro-Mechanical work) [**Approx area 185.0 SqM**]

  Note- Depending upon the potential requirements of the site, the Electrical Sub-Station Building would be constructed over the gangway or individually to the river bank. In this regards necessary decision will be given by the Concerned E M sector, KMDA
- Supplying, Laying, Fitting and fixing minimum **800** mm Dia MS Raw water pipe line from Common Manifold upto River bank including Thrust Block.
- Construction of River Bank Protection with inclined boulder pitching.
- Construction of Paver Block Approach Road for Sub-station Building, Masonry Drains minimum 300 mm X 250 mm inner section as per required design & drawing, RCC boundary wall for Substation site, Dismantling of existing building at Intake location Etc.

Eligibility Criteria:

- i) Intending Tenderer should produce similar nature of Credentials of successfully completed work **at least 85 SqM Pump floor area of fixed type Intake Jetty, 58 SqM Gang way area, 24 SqM Pump House Area with other associate works for Raw water intake Jetty** as mentioned above in this e-NIT in a single tender during last 5(five) years prior to the date of issue of this tender notice in any Govt./Semi-Govt. / Undertaking /Autonomous Bodies / Statutory Bodies and Local Bodies; or,

- ii) Intending Tenderer should produce Credentials of successfully completed 2(two) work each of **at least 70.50 SqM Pump floor area of fixed type Intake Jetty, 48.20 SqM Gang way area, 20 SqM Pump House Area with other associate works for Raw water intake Jetty** as mentioned above in this e-NIT during last 5(five) years prior to the date of issue of the tender notice in any Govt./Semi-Govt. / Undertaking /Autonomous Bodies / Statutory Bodies and Local Bodies.
- iii) Intending Tenderer should produce Credentials of a single running work which has been completed to the extent of 75% or more and the value of **minimum pump floor area** of fixed type Intake jetty, Gangway area, Pump House area will have to be **99,68**, **28sqm** respectively. In case of running works in any Govt./Semi-Govt. / Undertaking /Autonomous Bodies / Statutory Bodies and Local Bodies, only those tenderers who will submit the certificate of satisfactory running work from the concerned executive Engineer, or equivalent competent authority with required credentials will be eligible for the tender in the required certificate it should

be clearly stated that the work is in progress satisfactorily and also that no penal action has been initiated against the executed agency i.e. the bidder.

The authority reserves the right to reject or accept any or all tender without assigning any reason.

Documents to be produced in support of Credential:

A successful performance and completion certificate supplemented with work order along with payment certificate issued by the competent authority shall have to be furnished in support of credibility in terms with eligibility criteria depicted in this Notice **(Eligibility to participate in the tender)**. Besides this, following documents shall have to be furnished:

a) Particulars of ownership/partnership or Board of Directors pertaining to the Organization/Company/Firm.
b) Copies of valid PAN Card, GST, E.P.F & E.S.I Registration Certificate with latest challan, Professional Tax clearance Certificate, Trade License, and Last three (03) financial years IT returns.
c) Bank solvency Certificate not less than Rs.1.00 Crore (Rupees One Crore only) from any Scheduled Bank and valid for 1 (One) year upto the date of e-NIT.
d) List of machines &equipment's necessary for field works as well as laboratory test for all materials.
e) List of Technical Personnel employed under the organization in details of manpower, qualification, experience and address with contact number.
f) Corresponding address should be within West Bengal together with Fax, Telephone nos., Contact mobile no. & Email no. of the tenderer.
g) The average annual turnover of last three financial years, of the intending bidder, shall have to be at least Rs. 2.70 Crores (Rupees Two point seven Crores only).

All documents in original to be produced in due course of time as & when asked by the Tender Inviting Authority

The Rate is to be quoted considering GST and all other statutory taxes as applicable present Govt. Norms.

Intending bidders desirous of participating in the tender are to log on to the website https://kmda.wb.gov.in (the web portal of the KMDA) and click on to the "e-procurement" link provided. They may also visit the website https://wbtenders.gov.in for the tender. The tender can be searched by typing KMDA in the search engine provided in the website.

Bidders willing to take part in the process of e-tendering are required to obtain Digital Signature Certificate (DSC) from any authorized Certifying Authority (CA) under CCa, Govt. of India (viz. NIC, nCode Solution, Safescrypt, e-Mudhra, TCS, MTNL, IDRBT) DSC is given as a USB e-Token. After obtaining the Class 2 or Class 3 Digital Signature Certificate (DSC) from the approved CA they are required to register the fact of possessing the Digital Signature Certificates through the registration system available in the website.
Tenders are to be submitted online and intending bidders are to download the tender documents from the website stated above, directly with the help of the e-Token provided. This is the only mode of collection of tender documents. Details of submission procedure are given below under "General terms and conditions and information".

Last date & time of submission of bids online is **14.03.2025 at 14.00 Hrs.**

The intending bidder must read the terms and conditions of the NIT carefully. He should particularly go through the eligibility criteria required and satisfy himself of the requirements for eligibility. He should only submit his bid if the considers himself eligible and he is in possession of all the documents required.
All information posted on the website consisting of NIT and related documents, Form No I, BOQ, Corrigendum etc. and Drawings if any, shall from part of the tender document.

General Terms and Conditions and Information

1. **Eligibility for participation:**
   Bonafide Resourceful Contractors, Registered Engineers Co-operative Societies, Partnership firms registered with the State Government are eligible to participate, depending on the criteria as detailed below.
   Note: Only works completed successfully will be treated as credential. Joint venture, Consortiums etc. are not allowed.

2. Submission of Tenders

2.1 General process of submission

Tenders are to be submitted online through the website stated. All the documents uploaded by the Tender Inviting Authority form an integral part of the contract. Tenderers are required to upload all the tender documents along with the other documents, as asked for in the tender, through the above website within the stipulated date and time as given in the Tender. Tenders are to be submitted in two folders at a time for each work, one is Technical Proposal and the other is Financial Proposal. The tenderer shall carefully go through the documents and prepare the required documents and upload the scanned documents in Portable Document Format (PDF) to the portal in the designated locations of Technical Bid. He needs to fill up the rates of items / percentage in the BOQ, downloaded for the work, in the designated Cell and upload the same in designated location of Financial Bid. The documents uploaded are virus scanned and digitally signed using the Digital Signature Certificate (DSC). Tenderers should specifically take note of all the addendum / corrigendum related to the tender and upload the latest documents as part of the tender.

2.2 Technical Proposal

The Technical Proposal should contain scanned copies and / or declarations in the following standardized formats in two covers (folders).

A **Technical File (Statutory Cover) containing**:

i. **Application for Tender**(Vide Form-1) (to be submitted in 'Forms' folder)

ii. **Notice Inviting Tender (NIT)**(to be submitted in 'NIT' folder)

iii. Earnest Money Deposit (EMD) – Earnest Money will be deposited by the bidder electronically: online through his net banking enabled bank account, maintained at any bank **or** offline through any bank by generating NEFT/RTGS Challan from the e-tendering portal. Intending Bidder will get the Beneficiary details from e-tender portal with the help of Digital Signature Certificate and may transfer the **EMD** from their respective bank as per the Beneficiary Name and Account No., Amount, Beneficiary Bank Name (ICICI) and IFSC Code and also e-procurement Ref. No.

If the L1 bidder does not agree to execute the job after opening of Financial Bid, the Earnest Money will be forfeited without any further intimation and may be construed as an attempt to disturb the tendering process and dealt with accordingly legally including debarment upto 3(three) years from KMDA of the Bidder.

iv) Scanned Copy of One **affidavit before Notary** will have to be submitted for each serial mentioning the correctness of the documents and a declaration of penalty debarment etc. faced by him under any Govt. /Semi-Govt./Autonomous body/Institution online at desired location (as per Format Attached).

Note: Tenders will be summarily rejected if any item in the statutory cover is not uploaded.

B. Tenderer should upload following Documents in "All Other Important Documents" Folder in Statutory Cover

(I). Certificates:

1) Valid trade License.

2) Declaration of Affidavit.

3) Latest Professional Tax Paid Challan & P-TAX Enrolment Certificate and PAN Card details. Application for such addressed to the competent

Authority may also be considered.

4) Valid 15 digit Goods and Services Taxpayer Identification Number (GSTIN) under GST Act, 2017)

5) Valid Bank solvency Certificate as per prescribed **Annexure-III format** for work in sl.no.1 should be minimum of Rs.1.00 Crore (Rupees One Crore) only from any Scheduled Bank and with minimum one year validity and which shall have to **remain valid** on '**date of opening of technical bid'.**

6) IT Return and Audited Balance Sheet for last 3 (three) financial years.

7)Valid EPF and ESI Certificates with latest up to date Challan, labour license to be obtained and uploaded at the time of bidsubmission ORSubmitted to the Engineer in Charge before the processing of 1st R.A. bill in that case a self

Undertaking/declaration must be uploaded.

8) The average annual turnover of last three financial years, of the intending bidder, shall have to be at least Rs. **2.70** Crores (Rupees Two point seven Crores) only.

9) The prospective bidders shall have in their full-time engagement or in contract experienced technical personal, With the sufficient knowledge of PART/CPM, must have **one no Degree holder Civil Engineer** (with min. 3 Yrs. of experience in similar nature of work) &**one no Diploma holder Civil Engineer** (with min. 3 Yrs. of experience in similar nature of work).Authenticated documents in respect of qualification and proper experience certificate shall be furnished for Technical Evolution.

(II)Company Details

1. Registered Deed for Partnership Firm from Registrar of Assurances. More application for registration will not be considered. However in cases where the applicant is yet to receive registration certificate from Registrar of Assurances, the application is to submit an affidavit in non-judicial stamp paper along with the application pledging that "the registration certificate of the Partnership firm will have to be submitted to the Tender Inviting Authority before making agreement with the Tender Accepting Authority in case he is found lowest". In case of in-ordinate delay in submitting the document his bid is liable to be rejected and his EMD deposited will stand forfeited. Any change in the constituents of the consortium / partnership firm should also be registered prior to the date of application of tender otherwise his application will be rejected.

Note: An affidavit regarding authorized user of DSC for consortiums and a declaration regarding such authorization for Limited companies is to be submitted.

2. Trade License for Proprietorship Firms.

3**.** Memorandum of Articles for Limited Companies

4. Society Registration and Bye-Laws for Cooperative Societies.

(III) Credential:

Credential Certificate issued by an officer not below the rank of **Executive Engineer / Divisional Engineer / District Engineer / Project Manager** of the other State / Central Government Departments / Organizations along with Work Order and Payment Certificate to be submitted in 'Credential' folder. The scanned copy of the Certificate should be uploaded with the non-statutory cover. However, Credential Certificate issued to sub-contractor by Central or State Govt. undertaking /Govt. Enterprise shall not be accepted.

(IV)Balance Sheet:

Audited Balance Sheets and I.T. Return of last three financial years regarding annual turnover from contracting business in each year.
(If the company was set up less than three years ago, balance sheet for the no of years since inception is to be submitted)

(V)Addenda / Corrigendum:

Contractors are to keep track of all the Addendum / Corrigendum (if any) issued with a particular tender and upload the same digitally signed along with the NIT Tenders submitted without the Addendum / Corrigendum will be informal and liable to be rejected.

(VI) Others: Any other documents found necessary

Note: Failure of submission of any one of the above mentioned documents will render the tender liable to summary rejection. This above mentioned documents should be upload in "All Other Important Documents" folder in Technical Cover.

(VII) The bidder should not have record of poor performance or they should not have been blacklisted by any employer during the last five years prior to the date of the NIT. Such abandonment or punishment will be considered as disqualification towards eligibility. A declaration in this respect through affidavit has to be

furnished by the prospective bidders as per Format IV **without which the Technical Bid shall be treated as non responsive**. The scanned copy of the affidavit should be uploaded with the non-statutory cover and the hard copy should **preferably be submitted** along with the non-statutory documents.

2.3Financial Proposal

The financial proposal should contain the following documents in **one cover (folder).**

i) **Bill of Quantities (BOQ):** The bidder has to **quote the rate for each item in the BOQ**, online in the space marked for quoting rate in the BOQ (only downloaded copies of the above documents are to be uploaded, virus scanned and digitally signed by the contractor).

3. Completion Certificate:

i. **Completion Certificates for fully completed works during the last five financial years will only be accepted. Certificates issued for partly completed works will not be considered.**

ii. Completion Certificate of work executed in KMDA will be considered. Completion Certificate of works executed in other Departments of State Government or organizations, like Public Works & Public Works (Roads) Department, Irrigation & Waterways Department, Public Health Engineering Department, Sundarban Affairs Department and various other State Government Departments, ZillaParishads, West Bengal Housing Infrastructure Development Corporation Limited (WBHIDCO), West Bengal State Electricity Distribution Company Limited (WBSEDCL), Kolkata Metropolitan Development Authority (KMDA), Kolkata Metropolitan Water Sanitation Authority (KMW&SA), Kolkata Municipal Corporation (KMC), Other Municipalities, Hooghly River Bridge Commissioner (HRBC), Engineering Departments of Central Government and Organizations like Farakka Barrage Project (FBP) Authority, Railways, Kolkata Port Trust (KoPT), and companies owned or managed by the State Government, i.e. Mackintosh Burn Ltd., Westinghouse Saxby Farmer Limited & Britannia Engineering Ltd. may also be considered. Such Completion Certificates are to be issued by an officer not below the rank of Executive Engineer / Divisional Engineer / District Engineer / Project Manager of the other State / Central Government Departments / Organizations.

3.1 **Penalty for suppression / distortion of facts**

If any tender fails to produce the original hard copies of the documents (especially Completion Certificates and audited balance sheets), or any other documents on demand of the Tender Evaluation Committee within a specified time frame or if any deviation is the hard copies from the uploaded soft copies of if there is any suppression, the Tender Evaluation Committee upon suggesting suitable punitive measures will bring the matter to the notice of the Chief Engineer concerned immediately and the tenderer may be suspended from participating in the tenders on e-Tender platform of Water Supply Sector, KMDA as per approval of the Chief Engineer for a minimum period of 3 (three) years. In addition, his Earnest Money Deposit will stand forfeited to KMDA. The Chief Engineer concerned will issue the necessary orders under intimation to the other Chief Engineers, e-Tendering Cell and also the Department, copy of such order should also invariably to be communicated to the Nodal Officer, e-Governance of this Department with a request to upload the same in the Departmental website. **Suspension& debarment: Will be applied as per clause no. 547-W(C)/1M-387/15 dated 16/11/2015 and no. 724/W(C)/1M-953/19 dated 19/12/2019.**

3.2**Taxes & duties to be borne by the Contractor**

Income Tax, LabourCess, GST and Other Taxes as per Govt. Rule to be borne by the contractor and the rate should be quoted accordingly after consideration of all these charges. Income Tax, GST and Other Taxes as per latest Finance Rules (**No.:-4691 F(Y) Dated: - 22.11.2022**) to be borne by the contractor and the rate should be quoted accordingly after consideration of all these charges.

3.3**Site inspection before submission of tender**

Before submitting any tender, the intending tenderers should make themselves acquainted thoroughly with the local conditions prevailing at site by actual inspection of the site and taking into consideration all factors and difficulties like to be involved in the execution of work in all respect including transportation of materials, communication facilities, climate conditions, hydrological features, nature of soil, availability of local labour and market rate prevailing in the locality etc. and no claim, whatsoever, will be entertained on these account afterwards. In this

connection intending tenderers may contact the office of the Executive Engineer of concerned Division between 11.30 hours to 16.30 hours on any working day prior to date of submission of tenders.

3.4 Agency shall have to arrange required land for installation of Plant & machineries, storing materials, labour shade etc. at their own cost and responsibility nearest to the work site.

3.5**Conditional and incomplete tender**

Conditional and incomplete tenders are liable to summary rejection.

4. Opening and evaluation of tender

4.1 Opening of Technical Proposal

a) Technical proposals will be opened by the Tender inviting authority or his authorized representative electronically from the website stated above, using their Digital Signature Certificate.

b) Intending tenderers may remain present at the time of opening if they so desire.

c) Cover (Folder) for Statutory Documents (vide Clause 3.2A) will be opened first and if found in order, Cover (Folder) for Non-statutory Documents (vide Clause 3.2.B) will be opened. If there is any deficiency in the Statutory Documents, the tender will summarily be rejected.

d) Decrypted (transformed into readable formats) documents of the Non-statutory Cover will be evaluated to finalize eligible tenderers.

4.2 Tender Evaluation Committee (TEC)

Committee already constituted for issuance of tender papers for high value tenders, vide CEO, KMDA's order will continue to function as Tender Evaluation Committee (TEC), for evaluation of Technical Proposals of the tenders, until further order.

4.3 Uploading so summary list of technically qualified tenderers (1st round)

i. Pursuant to scrutiny and decision of the Technical Evaluation Committee (TEC), the summary list of eligible tenderers for a particular serial of work whose Financial Proposals will be considered will be uploaded in the web portals.

ii. While evaluation, the Committee may summon the tenderers and seek clarification / information or original hard copy of any of the documents already submitted and if these cannot be produced within the stipulated timeframe, their proposals will be liable for rejection.

4.4 Opening and evaluation of Financial Proposal

i. Financial proposals of the tenderers declared technically eligible will be opened electronically by the Tender Inviting Authority from the web portal stated above on the prescribed date.

ii. After opening of the financial proposal the preliminary summary result containing inter-alia, name of contractors and the rates quoted by them will be uploaded.

iii. If the Tender Accepting Authority is satisfied that the rate obtained is fair and reasonable and there is no scope of further lowering down of rate, he may after having the comparative statement checked, upload the final summary result containing the name of contractors and the rates quoted by them against each work after acceptance of the rate.

iv. The Tender Accepting Authority may ask any of the tenderers to submit analysis to justify the rate quoted by that tenderer.

5. **Bid Validity:** The Bid will be valid for **180 days**from the date of opening of the financial bid.

6. Acceptance of Tender

Lowest valid quoted amount for the work should normally be accepted. However, the Tender Accepting Authority does not bind himself to do so and reserves the right to reject any or all the tenders, for valid reasons.

6.1 **Tender Accepting Authority**

As per prevalent orders of UD&MA& KMDA, Tender Accepting Authority for different tenders is as follows:

a) For tenders above upto 2.5crore: Superintending Engineer,
b) For tenders above 2.5 croreupto 5.0 crores: Chief Engineer

c) For tenders of value 5.0 crores or more : Reconstituted Works and Tender Committee

6.2 **Execution of Formal tender after acceptance of tender**

The tenderers, whose tender is approved for acceptance, shall within 20days of the receipt of Letter of Acceptance (LOA) to him, will have to execute 'Formal Agreement' with the Tender Accepting Authority in seven/ten copies and one original copy of KMDA Form No. I which may be purchased on Cash Payment/Demand Draft from the office of the Executive Engineer concerned with the work.

6.3 The NIT shall form a part of the contract agreement. On acceptance of the bid, the successful bidder shall have to sign the contract consisting of NIT, instruction to bidders, special terms and conditions, specification, BoQ, Drawing, Rate quoted, LoA and Tender Form I.

7. Payment

The payment of R/A bills as well as final bill for any work will be made according to the availability of fund and no claim to delay in payment will be entertained.

8.**Security Deposit:**

i) The Earnest money deposited by the lowest bidder (hereinafter shall be called the contractor) shall be converted into security deposit.

ii) The authority making payment shall deduct such sum which togetherwith the Earnest Money already deposited and converted into security deposit, shallamount to 3% of the value of works executed at the material point of time and paidduring the progressive running accounts bills, so that total deduction against Security deposit together withEarnest Money constitute 3% of the tendered value of work actually done.

iii) After completion of the work, the Contractor may opt for refund of the Security Deposit by replacing equal amount of Bank Guarantee of scheduled Bank valid up to 3 months beyond the defect liability period.

iv)**For Civil work defect liability period should be observed for 5 (Five) Year from date of completion**or from the date of commissioning of the project, whichever is later.

a) No security deposit shall be refunded to the contractor for1st (first) 3 years from the actual date of completion of the work;

b) 30% of the security deposit shall be refunded to the contractor on expiry of 4 (four) years from the actual date of completion of the work;

c) The balance 70% of the security deposit shall be refunded to the contractor on expiry of 5 (five)years from the actual date of completion of the work.

9. **Defect Liability:**

i) The contract will have the **Defect liability for a period of 5 (five) Years** from the date of successful completion of the work

ii) Prospective Bidder shall have to execute the work in such manner so that appropriate service level of the work under improvement is to be maintained during progress of the work and **during Defect Liability Period**from the date of successful completion of the work up to the entire satisfaction of the Engineer in Charge. If any defect / damage is detected during this period as mentioned above the contractor shall make the same good at his own expense to the satisfaction of the of the Engineer in Charge or in default the Engineer in Charge may cause the same to be made good by other agency and deduct the cost (of which the certificate of the Engineer in Charge shall be final) from his security deposit or any sums that may be then, or at any time thereafter become due to the contractor. Security Deposit shall become payable only during Defect Liability Period as mentioned in clause for Security Deposit in NIT after making necessary deduction if applicable.

10.If any discrepancy arises between two similar clauses on different notifications, the clause as stated in later notification will supersede former one in following sequence :

a) Printed Tender Form No. I of KMDA, b) Notice Inviting Tender

c) Special Terms and Condition, d) Financial Bid and e) Letter of Acceptance.

11. **Withdrawal of Tender**

As per NIC Rules.

12. **Schedule of Dates for e-Tendering**

Sl. No	Activity	Date & Time
1.	Publishing Date	19.02.2025
2.	Document Download start date	19.02.2025at 14.00 Hrs.
3.	Bid submission start date	19.02.2025 at 14.00 Hrs.
4.	Submission of Pre Bid Queries	24.02.2025 at 14.00 Hrs.
5.	Pre Bid Meeting	25.02.2025 at 15.30 Hrs.
6.	Uploading of reply to Pre Bid queries	27.02.2025 at 16.00 Hrs.
7.	Document Download end date	14.03.2025 at 14.00 Hrs.
8.	Bid submission end date	14.03.2025 at 14.00 Hrs.
9.	Technical Bid opening date	17.03.2025 at 13.00 Hrs.
10.	Uploading of preliminary list of Technically qualified bidders.	To be notified later
11.	Uploading of final list of Technically qualified bidders.	Do
12.	Financial Bid opening date	Do
13.	Uploading of Financial Bid evaluation sheet	Do

13. **Pre Bid Queries:**

The intending bidders has to submit their queries in online through the specified e-mail ID (seebws861@gmail.com) to the Tender Inviting Authority before date of Submission of Pre Bid-Queries (Mentioned sl.no-4 as on schedule of dates) meeting to be held at SE/Prog/Unnayan Bhavan, 2nd Floor Block-C

Additional Terms & Conditions

1. The Executive Engineer of the Division concerned will be the Engineer-in-Charge in respect of the contract and all correspondence concerning rates, claims, change in specification and/or design and similar important matters will be valid only if made by the Engineer-in-Charge. If any correspondence of above tender is made with Officers other than the Engineer-in-charge for speedy execution of works, the same will not be valid unless copies are sent to the Engineer-in-Charge and approved by him. The instruction given by the Assistant Engineer and the Technical Assistant on behalf of the Engineer-in-Charge shall also be valid (who have been authorized to carry out the work on behalf of the Engineer-in-Charge) regarding specification, supervision, approval of materials and workmanship. In case of dispute, the decision of Engineer-in-Charge shall be final and binding.
   The acceptance of the tender will rest with the Tender Accepting Authority. The accepting authority reserves right to reject any or all tenders without assigning any reason thereof. Canvassing in connection with the e-tenders is strictly prohibited and thetenders submitted by bidder who take resort to canvassing will be liable torejection
2. There shall be no provision for arbitration.
3. The Bidder shall have to comply with the provisions of (a) Contract labour (Regulation & abolition) Rules, 1970(b) Minimum Wages Act 1948 or the modification thereof or any other laws relating thereto as will be in force from time to time.
4. Persons having authenticated and having registered Power of Attorney may be considered lawfully becoming to be acting on and for behalf of the Bidder.
5. Department shall not entertain any claim whatsoever from the contractor for payment of compensation on account of idle labour on any ground including non-possession of land.
6. The Government shall not be held liable for any compensation due to machines becoming idle for any circumstances including untimely rains, other natural calamities, strike etc.
7. No Adjustment of Price or Price Escalation of any kind will be allowed.
8. Imposition of any duty / tax / royalty etc. whatsoever of its nature (after work order / Commencement and completion of the work) is to be borne by the bidder. Original challans of those materials, which are procured by the bidder, may be asked to be submitted for verification.
9. No mobilization / secured advance will be allowed unless specified otherwise.
10. Income Tax, GST and other Taxes if any are to be paid by the contractor. No extra payment will be made for these. The rates of supply and finished work items are inclusive of these.
11. All working tools and plants, scaffolding, construction of vats & platforms will have to be arranged by the contractor at his own cost.
12. The contractor shall supply mazdoors, bamboos, ropes, pegs, flags etc. for layi0ng out the work and for taking and checking measurements for which no extra payment will be made.

13. The contractor should see the site of works and tender documents, drawings etc. before submitting tender and satisfy himself regarding the condition and nature of works and ascertain difficulties that might be encountered in executing the work, carrying materials to the site work, availability of drinking water and other human requirements and security etc. The Engineer-in-Charge may order the contractor to suspend any work that may be subjected to damage by climate conditions. No claim will be entertained on this account. The contractor will not be entitled to any claim or extra rate on any accounts.

Kolkata Metropolitan Development Authority

14. A machine page numbered Site Order book (with triplicate copy) will have to be maintained at site by the contractor and the same has got to be issued from the Engineer-in-Charge before commencement of the work. Instructions given by inspecting officers will be recorded in this book and the contractor must note down the action taken by him in this connection as quickly as possible.
15. The work will have to be completed within the time mentioned in the tender notice. A suitable work program is to be submitted by the contractor within 7(seven) days from the date of receipt of work order which should satisfy the time limit of completion. The contractor should inform in writing the name of his authorized representative at site within 7 (seven) days from the date of receipt of work order who will receive instruction of the work, sign measurement book, bills and other Govt. papers etc.
16. No compensation for idle labour, establishment charge or on other reasons such as variation of price index etc. will be entertained.
17. All possible precautions should be taken for the safety of the people and work force deployed at worksite as per safety rule in force Contractor will remain responsible for his labour in respect of his liabilities under the Workmen's Compensation Act etc. He must deal with such cases as promptly as possible. Proper road signs as per P.W.D. practice will have to be made by the contractor at his own costs while operating a republic thoroughfare.
18. The contractor will have to maintain qualified technical employees and/or Apprentices at site as per prevailing Apprentice Act or other Department Rules & Orders circulated from time to time.
19. The contractor will have to accept the work program and priority of work fixed by the Engineer-in-Charge so that most vulnerable reach and / or vulnerable items be completed before the date needed by the Department due to impending monsoon or rise of water level or for other reasons.
20. The quantities of different items of work mentioned in the tender schedule or in work order are only tentative. In actual work, these may vary considerably. Payment will be made on the basis of works actually done in different items. Payment for individual item of work in the BOQ will be made on the basis of actually executed quantity of work and its corresponding quoted rate. For execution of quantitative excess of any item beyond 10% or supplementary works, approval of the Superintending Engineer / Chief Engineer would be required depending on whoever be the Tender Accepting Authority, before making payment. In no case the final bill value will exceed the accepted tendered amount for the work.

SUPERINTENDING ENGINEER

PROGRAMMING CIRCLE

W&S SECTOR, KMDA

OFFICE OF THE SUPERINTENDING ENGINEER
Programming Circle,W&S Sector, KMDA
2ND Floor, Block-C, Unnayan Bhavan
Salt Lake City, Kolkata-700091.

EMAIL ID:-ws.kmda@gmail.com

No: 60/1(12)/SE(PROG)/W&S/KMDA Dated:-30.01.2025

Copy forwarded for information to:

1. The Executive Officer, Bally Municipality.
2. The Director General (Water and Sanitation Sector) KMDA.
3. The Chief Engineer, W&S Sector, KMDA
4. The Dy. Secretary, Public Relation Cell, KMDA along with four copies of this NIT for publication

Kolkata Metropolitan Development Authority

KMDA and Govt. of West Bengal as per CEO's order No. 192(2)(18)N-316/KMDA/FA000/05 Dated 10.01.2008.

5. The Director of Finance, KMDA.
6-9. The Superintending Engineer, West Circle/South Circle/FAWS/FAWS-II Circle/East Circle/D&P/EB/GRWW W&S Sector, KMDA.
9. The Superintending Engineer, EM-II, E&M Sector, KMDA
10. The Accounts Officer, W&S Sector, KMDA, Committee Member
11. The Estimator, Programming Circle, W&S Sector, KMDA.
12. Office copy.

SUPERINTENDING ENGINEER
PROGRAMMING CIRCLE
W&S SECTOR, KMDA

KMDA

OFFICE OF THE SUPERINTENDING ENGINEER
PROGRAMMING CIRCLE,W&S SECTOR, KMDA
2ND FLOOR, BLOCK-C, UNNAYAN BHAVAN
SALT LAKE CITY, KOLKATA-700091.
EMAIL ID:-ws.kmda@gmail.com

Abridged e-NIT

No: 60 /SE (Prog)/W&S/KMDA **Date:30.01.2025**

e-NIT No.: 05/KMDA/W&S/SE(Prog) of 2024-25 Date : 30.01.2025

Notice inviting e-Tender on **Turnkey Basis** is invited by the **SUPERINTENDING ENGINEER, PROGRAMMING CIRCLE, W&S SECTOR, KMDA** on behalf of the Kolkata Metropolitan Development Authority (KMDA) for the works mentioned in the list given below, through electronic tendering (e-tendering) from eligible, experienced and

Kolkata Metropolitan Development Authority

Sl. No.	Name of Work	Estimated Amount Rs.	Earnest Money Rs.	Time of Completion
1	2	3	4	6
1.	Civil work including Survey, Investigation, Planning with detail design, drawing, construction, erection & commissioning of 84 MLD capacity Fixed type RC Raw water Intake Jetty with Gangway, Jetty Mounted Pump house, Sub-Station Building, construction of Boundary wall for substation, Construction of Paver block approach road, river bank protection work etc at Kedar Ghat on Hooghly (tidal) river at Ward No-05, for existing Water Treatment plant near by Belur Math of Bally Municipality on Turnkey basis under AMRUT 2.0. Project Code: 10/Water & Sanitation/KMA/64	Rate to be Quoted	10,00,000/-	18 (Eighteen) Month

Intending bidders desirous of participating in the tender are to log on to the website https://kmda.wb.gov.in (the web portal of the KMDA) and click on to the "e-procurement" link provided. They may also visit the website https://wbtenders.gov.in for the tender. The tender can be searched by typing KMDA in the search engine provided in the website.

Last date & time of submission of bids online is **14.03.2025** at**14.00** Hrs.

SUPERINTENDING ENGINEER

W&S SECTOR, KMDA

PROGRAMMING CIRCLE

OFFICE OF THE SUPERINTENDING ENGINEER
Programming Circle,W&S Sector, KMDA
2ND Floor, Block-C, Unnayan Bhavan
Salt Lake City, Kolkata-700091.

EMAIL ID:-ws.kmda@gmail.com

No: 60/1(12)/SE(PROG)/W&S/KMDA Dated: -30.01.2025

Copy forwarded for information to:

1. The Executive Officer, Bally Municipality.
2. The Director General, Water and Sanitation Sector,KMDA.
3. The Chief Engineer, W&S Sector, KMDA
4. The Dy. Secretary, Public Relation Cell, KMDA along with four copies of this NIT for publication in three leading dailies of which one must be in English and for display this NIT in website of KMDA and Govt. of West Bengal as per CEO's order No. 192(2)(18)N-316/KMDA/FA000/05 Dated 10.01.2008.
5. The Director of Finance, KMDA.

6-8. The Superintending Engineer, West Circle/South Circle/FAWS/FAWS-II Circle/East Circle/D&P/EB/GRWW W&S Sector, KMDA.

9. The Superintending Engineer, EM-II, E&M Sector, KMDA

10. The Accounts Officer, W&S Sector, KMDA, Committee Member

11. The Estimator, Programming Circle, W&S Sector, KMDA.

12. Office copy.

SUPERINTENDING ENGINEER

PROGRAMMING CIRCLE

W&S SECTOR, KMDA

FORM 1

APPLICATION FOR TENDER

To
The Superintending Engineer
PROGRAMMING CIRCLE, W&S SECTOR, KMDA

Tender No. .....

Serial No. of Work applied for: .....

Amount put to tender: .....

Dear Sir,

Having examined the Statutory, Non statutory & NIT documents, I/We hereby like to state that I/we willfully accept all your conditions and offer to execute the works as per Tender no and Serial no. stand above. I/We also agree to remedy the defects after/during execution of the above work in conformity with the conditions of contract, specifications, drawings, bill of quantities and addenda.

Dated this _____day of _____201_____

Full name of applicant: _____

Signature: _____

In the capacity of : _____

Duly authorized to sign bids
For & on behalf of (Name of Firm): _____
(In block capitals or typed)

Office address: _____
_____

Telephone no(s) (office): _____

Mobile No. _____

Fax No. _____

E-mail ID : _____

(Annexure-I)

(Affidavit before Notary on a Stamp Paper of relevant value)

E-NIT No. -Date: -

I/we the undersigned is the individual /proprietor/Business partner/Authorized signatory etc. of the firm of _____.

1. I/we, the undersigned _____ of the firm do

hereby declared that, all the submitted documents including statements uploaded in the tender are valid, genuine, true, correct & authenticate. The undersigned also hereby declared that neither our firm _____ & nor any constitute firm had been debarred/penalized/blacklisted by any Govt./Semi-Govt./Govt. Undertaking/Autonomous body (constituted under the State/Central statute)/ Statutory Bodies and Local Bodies ever.

2. Partnership Details:
3. Reference NIT No, Sl. No
4. That any information/Statements uploaded in the tender are appear to be false or concealed, the Bid may be rejected/cancelled at any stage of the tender and no objection / claim will be raised by the undersigned and the department may take any legal action against the firms/companies.
5. The undersigned would authorized and request any firm or Corporation or any institutions or person to furnish pertinent information as deemed necessary and /or as requested by department to verify this statements.
6. The undersigned understands that farther qualifying information may be requested and agree to furnish any such information at the request of the department.
7. That I am a citizen of India

_____	_____	_____
Signature of Tenderer	Signature of Tender Inviting Authority	Signature of Tender Accepting Authority

(Annexure-II)

DECLARATION BY THE TENDERER

e-NIT No. - Date: -

I / We have inspected the entire site of works and have made me / us fully acquainted with local conditions on and around the site of works. I / We shall be bound by the conditions laid down in the Notice Inviting Tenders, Special Terms & Conditions, Technical Specifications,

General Specifications, Specific Priced Schedule, scope of work, printed Tender Form No. – I KMDA, Bill of Quantities (BOQ), all Corrigendum's and Addendum's and all other documents uploaded before the last date of submission of tender which will be the part & parcel of the Contract Document. I/We shall be bound to sign all hard copies of uploaded documents under the NIT, during execution of formal agreement. My / Our tenders is offered taking due consideration of all the stipulations of contract documents.

Full Address with Phone No & valid Email Id
Of Tenderer:
Name of the Tenderer:-

Signature of the Tender:-

Valid e-mail ID & Phone No.:-

Signature of Tenderer	Signature of Tender Inviting Authority	Signature of Tender Accepting Authority

(**Annexure-III)**

Bank Solvency Certificate Format

(On Banks Letter Head)

Ref no: Date:

A/c to (Company Name and Address)

SOLVENCY CERTIFICATE

We the (Bank Name) do hereby certify that (Name of Proprietor/Business partner/Company/firm) having their Registered Office at (Registered OfficeAdd**ress**) is **solvent to the extent/as good as** of Rs.(Amountin digits)(Rs. Amount in words) as disclosed by the information and records which are available with the aforesaid bank &remain valid for upto…….

In is further notified that the certificate is being issued at the request of (**Name of Proprietor/Business Partner/company/firm**) without attaching any risk and responsibility on our part in any respect whatsoever more particularly either as guarantor or otherwise.

For (Bank Name)

Sign & Stamp of Bank Manager

_____	_____	_____
Signature of Tenderer	Signature of Tender Inviting Authority	Signature of Tender Accepting Authority

Annexure-iv

PERFORMANCE BANK GUARANTEE

Bank Guarantee No. : _____

Date of Issue :_____

Date of Commencement:

Valid Until :**……/……/** or extended time as approved by the competent Authority

Amount : Rs._____/-

To
Superintending Engineer (Programming Circle)
W.S. Sector, K. M. D. A.

Sir:

Whereas the Superintending Engineer (Programming Circle.),W.S. Sector, Kolkata Metropolitan Development Authority a body corporate constituted under the West Bengal Town & Country (Planning & Development) Act, 1979, for and on behalf of the Kolkata Metropolitan Development Authority,(Since Superseded), constituted under Kolkata Metropolitan Development Authority Act 1966, having its Office at **2nd Floor, Block-C, Unnayan Bhavan Salt Lake City Kolkata-700091**

Hereinafter called **The Authority**", which expression shall unless excluded by or repugnant in the context be deemed to include their successors and assigns of the one part entered into contract No:

, to **Name of Work**:Areaunder International bidding norms with M/s. _____, a Company incorporated under the Companies Act, 1956_____ and having its Registered office at "Company name and address", (hereinafter called the "Contractor"). In accordance with the provisions of the Conditions of Contract No. …..the Contractor shall deposit with the Superintending Engineer (….Circle), Kolkata Metropolitan Development Authority, Office of the Superintending Engineer (…Circle), W.S. Sector, a Bank Guarantee to guarantee his proper and faithful performance under the said Clause of the Contract of an amount of Rs._____/- (Rupees …….. …….. only). The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract i.e. till the completion of the defects liability period as per the Contract.

We, the (Bank's name and Branch ……, a body incorporated in India under the Banking Companies (Acquisition and Transfer of Undertakings) Act, 1969 of (Bank's Address) ……., having our Registered Office at ……. (hereinafter called "the Bank") which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns, do hereby guarantee and undertake to pay an amount of **Rs……/-** (Rupees …… only) to the Employer immediately of a written demand if as per evaluation of the Employer, the Contractor does not satisfactorily fulfil his obligations under the contract, an or all monies payable by the Contractor to the extent of **Rs……/-** (Rupees …….. only) as aforesaid at any time until **……../ ……. /2024** or extended time as approved by the competent Authority without any demur, reservation, contest, recourse or protest and / or without any reference to the Contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor, any dispute pending before any Court, Tribunal, Arbitrator or any other authority. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Employer discharges this guarantee.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the bank as a principle debtor in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed there-under or of any of the contract documents which may be made between the Superintending Engineer (…Circle) , W.S. Sector, Kolkata Metropolitan Development Authority, Office of the Superintending Engineer (…Circle),W.S. Sector, and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be enforced for a maximum period until **……./……/**

or extended time as approved by the competent Authority on expiry of whichthe Superintending Engineer (E.B),W.S. Sector, Kolkata Metropolitan Development Authority, Office ofthe Superintending Engineer (E.B)Circle, shall discharge the Guarantee. In case the Defects Liability Period ends after the expiry date of this guarantee the Employer shall not discharge the guarantee and shall request for extension of validity period of this guarantee.

Notice of claim under this Guarantee, if any, must be given to the Bank by the Employer during the guarantee period as mentioned above.

Notwithstanding anything contained hereinabove, our liability under this guarantee is restricted to **Rs……/-** (Rupees …… ……. only) and this Guarantee shall be in force till **……../……./** or extended time as approved by the Authority from the date hereof.

Notwithstanding anything contained herein:

Our liability under this Bank Guarantee shall not exceed **Rs……../-** (Rupees …….. only).

The Bank Guarantee shall be valid until **……../……./** or extended time as approved by the competent Authority**.**

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if the Superintending Engineer (…Circle), Kolkata Metropolitan Development Authority, Office of The the Superintending Engineer (…Circle),W.S. Sector, serves upon us a written claim or demand on or before **…… / ……/**

or extended time as approved by the competent Authority**.**

And

All rights under this guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under whether or not this document shall have been returned to us after **……../…….**
or extended time as approved by the competent Authority**.**

For …… (Name of the Bank)

Authorized Signatory

Place:
Date :

SECTION - A

DESCRIPTION OF THE PROJECT

.

1.0 GENERAL/SCOPE OF WORKS

The work involves detail design, drawing, construction & erection including preparation of soil investigation reports (where necessary) of the following works-

(a) Civil Construction of fixed type jetty (84 MLD Capacity) for facilitating erection of suction assembly, accommodating pumping machinery, working bay and also act as marine protection to the pump and other assemblies etc in tidal river (Hooghly) supported on piles of appropriate size with tentative depth of 35m from HFL [Approx area 281.25 SqM]

(b) Civil Construction of pipe carriage way/ Gang way of RCC, approx 03.00 M width to carry suction delivery pipe up to the bank of the river with suitable RCC structure supported on column and adequate foundation/piles where necessary.[Approx area 192.50 SqM

(c) Civil Construction of Pump House for pumping machineries over intake jetty (excluding Electro-Mechanical work). [Approx area 80 SqM]

(d) Civil Construction of two storied Sub-Station building & administrative building for intake jetty(excluding Electro-Mechanical work) [Approx area 185.0 SqM]

Note- Depending upon the potential requirements of the site, the Electrical Sub-Station Building would be constructed over the gangway or individually to the river bank. In this regards necessary decision will be given by the E M sector, KMDA

(e) Supplying, Laying, Fitting and fixing minimum 800 mm Dia MS Raw water pipe line from Common Manifold up to River bank including Thrust Block.

(f) Construction of River Bank Protection with inclined boulder pitching.

(g) Construction of Paver Block Approach Road for Sub-station Building, Masonry Drains minimum 300 mm X 250 mm inner section as per required design & drawing, RCC boundary wall for Substation site, Dismantling of existing building at Intake location Etc..

2.0 LOCATION

The site of the proposed Intake Jetty mounted pump house is located at the side of River Hooghly near Kedarnath Hospital parking.
Latitude: 22 degree 38' 46.39"N, Longitude: 88 degree 21' 5.96" E

3.0 WORKS UNDER THIS TENDER

The basic scope of the work includes basic engineering design, construction and all complete as per scope. The basic engineering means-

(a) marine survey and river bed contour,
(b) soil/river bed exploration and soil investigation,
(c) land survey and contour plotting
(d) list of design codes and standards;
(e) master drawing schedule;
(f) structural design and drawing;
*Proof checking & vetting of all calculations, designs, drawings and structural stability Certificate should be submitted by the competent professional personnel as recommended by Tender inviting authority or Engineer in charge.
(g) Supply of all materials and equipment related to civil construction.
(h) Laying of raw water pumping main up to the river bank,
(i) Construction of River Bank Protection including upfront protection works. These works have to be done as per the drawing and design vetted by the Reputed Govt Engineering college like IIT, Kharagpur/Jadavpur University/IIEST, Shibpur, Howrah.
(j) Construction of Approach Road, Internal service Road, Drains, Land development Etc.

It is the responsibility of the contractor to make good or reconstruct the part or whole of a structure if gets damaged or demolished/ crushed/ settled down due to water hammer or similar external reasons or for faulty design at his own cost.

Faulty Design submitted by the contactor even if duly vetted and accepted by the competent authority in KMDA, will not relieve the contractor from above responsibility. Contractor will be considered total responsible for any accident caused due to negligence on his part/ poor workmanship/ faulty design.

Contractor has liberty to go for design mix for achieving Rich concrete having minimum cement content as stipulated inlatest I.S. code or go for variation if so required at site subject to the satisfaction & permission of E.I.C**.**

It is within the scope of the contractor to get Proof checking & vetting of all calculations, designs, drawings and structural stability Certificateby one or more teaching and professional expert from the Reputed Govt Engineering college like IIT,Kharagpur/Jadavpur University/IIEST, Shibpur, Howrah directed by Tender Inviting Authority or E.I.C, before getting approval from competent authority in KMDA.

The contractor is requested to go through all the sections of these tender documents containing description of works, specification of works, list of materials to be supplied etc. Not only the major works, all types of finishing works, such as, plastering, painting, landscaping, internal roads, sewerage systems etc., all has to be complied and performed by the contractor as per the clauses of the relevant sections and as per direction of the E.I.C.

It is obligatory to the contractor to execute all the works in such a way that aesthetic view of all the working premises shall be distinct and remarkable. To achieve this he may take advice of professional architects or artists in his own cost. In this regard, contractor is requested to consult with the E.I.C. before finalization of any aesthetic work.

The different water treatment processes which will in general be taken up for treating the raw water are:

3.1 INTAKE JETTY-CUM-RAW WATER PUMP HOUSE

i) The basic units of the jetty mounted pump house includes – **(a)** Civil construction for RCC Intake Jetty with jetty mounted pump house for housing 5 (Five) numbers vertical turbine pumps and Civil construction of Sub Station Building on the adjacent river bank. The pump house dimensions will be sufficient to accommodate 5 (Five) nos. (3W+2S) of vertical turbine pumps and other ancillary components and the dimensions of the jetty should be sufficient to accommodate the pump house including 1.50 m (minimum) wide walkwayaround the pump house but the minimum length shall be as per the suggested value by Hydraulic Department of KoPT (Dimension of pump house is to be finalized during detail engineering, in consultation with E/M wing of KMDA as per the requirement of the pump manufacturer).The motor floor or operating floor level and sub-station floor level shall be at least 0.10 m above the crown level of the adjacent road camber. **(b)** Elevated approach road (sloping level from the adjacent road to operating floor) cum gangway for Jetty of at least 10.00 meters width including supported space for 800 mm dia MS raw water suction pipe line, unloading bay, substation Building and required nos. of cable trenches and other necessary accessories. Sufficient space should be provided for maintenance of pipe, cable and other accessories. Space for loading and unloading of all machineries for pump house and sub-stations shall be provided. **(c)** Suitable R.C.C. cable trench/ alley on both side of the elevated approach road for transmission of power & control cables between the pump house on the intake jetty and sub-stations. **(d)** Suitable pipe supporting structures along with maintenance platform for supporting delivery main on the approach road to jetty. **(f)** Boundary wall/ 3 ply 12 gauge barbed wire Fencing wall of 2.4 m height from river bank to the existing boundary wall of adjacent premises surrounding the gangway, sub-station building etc., including ornamental gate. The boundary wall should be at least 1.00 m away from the gangway, sub-station building. The final length and alignment of the boundary shall be finalized as per site requirement and as per instruction of the E.I.C. **(g)** Glow sign board over the ornamental gate is to be provided. **(h)** Unloading bay, unloading platform and a stair case to go to the levels below the jetty deck are also the part and parcel of the pump house. **(i)** River bank protection at Intake Jetty site should be constructed as per recommendation and consultant with KoPT. In this purpose works have to be done on the basis of design and drawings prepared and vetted by any recognize educational Institution.

(ii) The works include total Civil works for the intake jetty, jetty mounted Raw Water Pump House, Gangway, Electrical Substation Building, River Bank Protection, Construction of elevated approach road at Raw Water Pump House to ensure smooth supply of Raw Water through 800mm diameter M.S pipe for existing48 MLDBally Water Treatment Plant as per recommendation and consultation with KoPT.

(iii) The entire design has to be made on the basis of the static and dynamic loading pattern as provided; taking into account the vibration level that will be generated due to operation of Raw Water pumps and also the laying of suction main underneath the Embankment without any hindrance to traffic movement.

(iv) The Tenderer, whose tender is accepted in the course will have to furnish details of the design of Intake jetty will be based on loading parameters provided, water current, and bore current to be encountered, weight of the pump and motors, machine/pipes to be housed. The Raw Water Pump house will be able to withstand the vibration generated due to operation of pumps, the weight of the pumps/motors and other electrical appliances. The Raw Water Pump house will be housing the pumping machinery including suitable size of common delivery manifold and B/F Valve, PDV etc with dismantling joint & full bore Flow meter after the common delivery manifold at suitable location. **The Tenderer is advised to undertake soil investigation studies of their own** and thereby the design criteria for structural work be formulated. The designs especially for the intake jetty have to be done based on relevant codes and sound engineering practice.

3.1.1 RCC. Intake Jetty

The R.C.C Intake Jetty will be located at the side of River Hooghly near Kedarghat. Considering the Berthing vessel if any of Inland water way vessel of 600 tons as per IS:4651 (Part-III). The Jetty will rest on R.C.C cast-in-situ bored pile foundation of minimum 900 mm diameter on river bed and of minimum M-25 concrete with minimum 8 mm

thick proper MS liner. Portion of jetty or gangway which will be on bank shall rest on minimum 900 mm dia. cast-in-situ bored piles of minimum M-25 design mix. A pump house is to be constructed on the jetty to support 5 nos. of 1200 M^3/Hr capacity each with a head range of 40 to 45 mtrs. (To be finalized during detailed engineering) vertical turbine pumps-motor (3W+2S) sets along with electromechanical control equipment /panels & accessories for operation of the pumping machinery for three number pump motors. The centre lines of the pumps-motor sets are to be finalized during detail engineering stage. Proper arrangement for fixing the caisson pipes (material- SS316L) of minimum 8mm thickness of adequate diameter (design to be fixed in consultation with E.M. wing of KMDA) are to be provided with the Jetty for the pump-motor sets. Rubber fenders are to be provided on the jetty T-head to guard against accidental hit of stray country boats/barges. R. C. C. hand railing fixed on R.C.C post around the edge of the jetty deck slab as applicable has to be provided for precautionary measure. The jetty head will be parallel to the flow line of river and perpendicular to the river shoreline and the end point of the jetty will be extended to River Hooghly to a suitable distance as suggested by KoPT/KMDA from the high bank so as to draw water from 4.5 meters contour region on river as per the contour drawing enclosed with the K.O.P.T. report. Applicable code for design shall be IRC : 78– 2000.

3.1.2 Raw Water Pump House

The pump house is located over the intake jetty. The Raw Water Pump House will be functional mainly at such floor level equal to the proposed jetty deck level & the suction bell mouth level shall be at least 2.50 mtr below the 50 years lowest water level to ensure minimum submergence & positive suctions at the time of low tide throughout the year. However, the depth of the suction bell mouth shall be guided by the recommendation of the pump manufacturer. The pump house will accommodate 6 nos. of vertical turbine pumps in vertical execution. Above the motor floor level, there will be valves (electrical actuator operated) and D.J on the delivery side. Suitable cat ways by M.S. gratings are to be constructed in the delivery side, above the pump individual delivery pipes, in the longitudinal direction for easy movement of the working personnel during maintenance. There are two localized drains (leading to a discharge to the river) whose invert level will be 0.10 M below the motor floor level. There will be two entry points to the pump house, one with rolling shutter and the other a normal door one for emergency exit. Suitable Bracket arrangement at desired height shall have to be provided for an E.O.T Crane of minimum 10 Ton capacity moving on rails. Substation room (on pile foundation) of suitable of size as prescribed by CESC adjacent to the substation as required by the CESC shall have to be constructed near the Jetty at the road flanks to accommodate Transformers, L.T/ H.T. panels, switch boards etc. at the sub-station rooms. Applicable code for design shall be IRC: 78 – 2000. **It should be noted that the position of the sub-station has been fixed according to the preliminary consultation with CESC. If the position of the Sub-Station shall have to be shifted from proposed position during the execution period as per the direction of the CESC engineers, the contractor shall have to construct the Sub-Station at the changed place, and no extra payment shall be paid for that change of sub-station site position. Substation has to be constructed above HFL. Also the top of jetty i.e. pump floor shall be above HFL.**

3.1.3 Elevated Platform & Approach Roads

An elevated platform over concrete pillars at least 0.10 meter above the crown of the adjacent existing road camber, whichever is higher, is to be constructed on the river bank to reach Jetty floor/ pump house floor. Approach road will start from the adjacent newly built road up to the gangway and in the scope of the contractor. The approach road and the gangway for Raw Water Pump House from a suitable location of the existing municipal road as per site condition shall be designed with a consideration of Single Class – A loading as per IRC with an allowable gradient. Suitable size of R.C.C. cable trench/ alley is to be constructed for transmission of power & control cables between the substation room on the road flank & the pump house on the intake jetty on both side of the elevated approach road. Suitable size of delivery pipe supporting structures shall have to be constructed on the approach road/gangway towards intake jetty. The pipe supporting structure shall be of sufficient width to accommodate the delivery manifold/ raw water rising main along with working space for maintenance on the both side. The width of both the approach roads shall be designed in such a manner that at least 5.0 meters clear road space is available for movement of heavy vehicle including fire engine in case of emergency. The intake jetty should be constructed at an off set with respect to the elevated approach road. This is to facilitate the heavy vehicles to enter inside the pump house building through the approach road without any turning. Applicable code for design shall be IRC : 78 – 2000. There shall be approach road for the substation building and CESC room for easy access of fire engine in case of emergency and maintenance.

LOAD ON VARIOUS SUPPORT

1) Static Load of Pump- Motor assembly:- To be finalized during detail engineering
(2) Static load on support provided with delivery side BFV & NRV= to be finalized during detail engineering
(3) Static load on support of delivery side sluice valve = to be finalized during detail engineering
(4) Resultant dynamic thrust due to change in the direction of flow = to be finalized during detail engineering

(5) Static load on foundation of each pump due in dead weight of the equipment + water= To be finalized during detail engineering
(6) Total dynamic load of pump = will be given during detail engineering
Dynamic load on each of foundation bolts= will be given during detail engineering Total static load of pump on each bolt = will be given during detail engineering Resultant load of pump = will be given during detail engineering
(The resultant force acts at centre of gravity in horizontal plane).
(7) Static load on foundation of each motor: To be finalized during detail engineering
(8) Dynamic load due to motor: To be finalized during detail engineering
(9) The tenderers are advised to go through the tender document carefully, visit the site with departmental representatives and make them will conversant about the requirements and site conditions. In case of any doubt on any item, data incorporated in the tender or otherwise it shall have to be clarified by applying in writing to the Superintending Engineer (Programming Circle), W&S Sector, KMDA in advance of the date of pre-bid conference of the tender.

Tenderers may consult with manufacturer/ expert at his own cost, if so felt, to reach more correct figure for Tendering purpose. The same is also advised for any other data supplied/missing. But in no case it will be treated as a Fault of Tendering Authority.

3.2 RAW WATER RISING MAIN

The raw water pumping main consists of a circular conduit of 800 mm internal diameter and with a thickness not less than 12 mm. The conduit can be of factory rolled pipe or fabricated from not less than 12 mm thick plate with shop welding. The pumping main shall carry raw water from the common manifold of the raw water pump house and will be connected to existing pipeline leading to Water Treatment Plant. The pumping main pipe is supposed to be laid along the newly built road adjacent to the bank of river Hooghly. The contractors are requested to inspect the site. The proposed pipe should be laid below road or flank in such a way that 1.20 meter of earth cushion could be provided. At various places, bends of different angles shall have to be provided according to the alignment of the pipe. Proper RCC thrust block shall have to be designed and provided as recommended in the CPHEEO Water Supply Manual. Also, utmost care shall have to be taken that after commissioning of that pipe, not even a slight displacement of the pipe shall occur due to various forces acting on the pipe causing any impairment to the newly built road and other existing structures or utilities.

A number of 200 mm diameter C.I./D.I./S.S. air release valve along with Sluice valve, MS cover and water drainage system shall have to be provided at all the concave curvature of the pipe. In absence of any such curvature, total two numbers of such air release systems shall have to be provided throughout the length of the pipe as per instruction of the E.I.C.

The mechanical, hydraulic tests of this MS pipe shall be according to the relevant clauses of Section - H.

4. Limit of Contract:

The limit of contract starts from the river Hooghly and covers the entire works and work sites as specified in the tender documents. Besides, the contractor shall have to lay pipeline started from the delivery manifold of 800 mm dia up to a minimum length of 3553 meters. The pipe shall be connected to the existing pipeline.

The sources of Electric Power would be from the proposed Electric Sub-station. A necessary arrangement of construction of Box Cable Trench of tentative Size 1000mm x 1500mm to connect the cables of appropriate size from substation to different units of RWPS is within the scope of this work. The excavation of cables trenches, covering the cable trenches, insert plates, cable trays etc. are also included under this contract. The cable trench shall be covered with removable RCC slabs of maximum 1m length and minimum 4 inch thickness to prevent easy removal, theft and breakage.

But supply and installation of transformer (in house) and laying the cables from substation to Water treatment plant units is out of scope of this work.

Bank protection work at Jetty site minimum 50 m long stretch is within the scope of this tender. Scouring depth in this region is to be taken as tentatively 20m until unless confirmed by the KoPT Hydraulic Survey Department or by the survey conducted by the Contractor.

SECTION - C

General Conditions of Contract

1. DEFINITIONS AND INTERPRETATION

(1) In the Contract, as hereinafter defined, the following words and expressions shall have to be meanings hereby assigned to them, except where the context otherwise requires:

(a) "**Approved**" means approved in writing, including subsequent written confirmation of previous verbal approval and "approval" means approval in writing, including as aforesaid.

(b) "**Authority**" means the Kolkata Metropolitan Development Authority.

(c) "**Bank**" means the "State Bank of India" or any other Scheduled Bank.

(d) "**Calendar day**" means a period of twenty four hours extending from midnight to midnight.

(e) "**Cash**" includes cheque, bank drafts and any other payment voucher authorising payment from any bank or treasury;

(f) "**Contractor**" means the person or persons, firm or corporation who have entered into the contract for the performance of the work;

(g) "**Contract price**" means the sum as stated in the tender submitted by the contractor subject to such additions thereto or deductions therefore as may be made under the provisions of the contract documents and accepted by the Employer.

(h) "**Constructional Plant**" means all appliances or a thing of whatsoever nature required in or about the execution or maintenance of the works but does not include materials or other things intended to form or forming part of the permanent works.

(i) "**District**" or "Kolkata Metropolitan District" means the area described as such in Schedule-I of The Act;

(j) "**Drawings**" means the drawings referred to in the tender documents and any modification of such drawings approved in writing by the Superintending Engineer and such other drawings as may from time to time be furnished or approved in writing by the Superintending Engineer.

(k) "**Employer**" means the Calcutta Metropolitan Development Authority (or KMDA in abbreviation) acting through the Superintending Engineer who enters into contract with the Contractor.

(l) "**Engineer**" or "Engineer Officer" means the Chief Engineer and includes a Superintending Engineer or an Executive Engineer or any other officer to whom the "Engineer" or the "Engineer Officer" may delegate his Authority in waiting.

(m) "**Engineer's Representatives**" means any resident Engineer or Assistant of the Engineer or any Clerk of works appointed from time to time by the Employer or the Engineer to perform the duties set forth in Clause 2 hereof, whose authority shall be notified in writing to the Contractor by the Engineer;

(n) "**Ground Level**" means the level of the referred point of the exposed surface of the ground, road or pavement free from extraneous materials;

(o) "**Holidays**" means a public holiday for the purpose of Section 25 of the Negotiable Instruments Act, 1881 or such other day on which the office of the Authority remains closed for the day;

(p) '**Local Authority**" not only means a Municipal Corporation or Municipality or other authority legally entitled to the control or manage local funds but also includes the Calcutta Port Trust and Calcutta Electric Supply Corporation;

(q) "**Month**" means English calendar month;

(r) "**Permanent Works**" means the permanent works including equipment to be supplied, executed, erected and maintained in accordance with the Contract;

(s) "**Road**" shall include a street, avenue, lane, by-lane or any other access routes over which a person authorised by a Local Authority has a right of way;

(t) "**Rupees**" (or Rs. in abbreviation) shall mean Rupees in Indian Currency.

(u) "**Site**" means the land and other placed on, under in or through which the permanent. Works or Temporary Works are to be executed and any other lands and places provided or arranged by the employer for working space or any other purpose as may be specifically designated in the Contract as forming part of the Site.

(v) "**Specification**" means the specification referred to in the Tender and any modification thereof or addition thereto as may from time to time be furnished or approved in writing by the Engineer.

(w) "**Store**" means such storage areas including depot, go-down, stockyard, dumping yard etc. maintained by the Authority or where supply of any material for the construction or any work has been undertaken by any authorised agent, by such agent within the District.

(x) "**Temporary Works**" means all temporary works of every kind required in or about the execution or maintenance of the Permanent Works.

(y) "**Tender Date**" means the closing date fixed for receipt of tenders as per Notice Inviting E-Tenders or as extended by subsequent notification(s).

(z) "**Tenderer**" means the person, or persons, firm or corporation submitting a tender for the work contemplated either directly or through a duly authorised representative;

(z-i) "**The Act**" means the Kolkata Metropolitan Development Authority Act.

(z-ii) "**Time**" expressed by hours of the clock shall be according to the Indian Standard Time.

(z-iii) "**Water main**" means any pipe or conduit of cast iron, steel or of any other material intended to convey or distribute water;

(z-iv) "**Works**" shall include both Permanent Works and Temporary Works.

(z-v)"**Work**" means all of the work of the project called for or shown in the tender documents including preparation, construction, improvement and clean up.

(2) **Singular and Plural** – Works importing the singular only also include the plural and vice versa where the context demands.

(3) **Headings or Notes** – The headings and marginal notes in these Conditions of Contract shall be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

(4) **Cost** – The work "cost" shall be deemed to include overhead costs whether on or off the Site.

(5) **Period of completion** – The period of completion shall be **18 (Eighteen) Month** from the date of work order.

2. ENGINEER AND ENGINEER'S REPRESENTATIVE

(1) **Duties and Powers of Engineer and Engineer's Representative** – The Engineer shall carry out such duties in issuing decisions, certificates and orders as are specified in the Contract. Fixation and acceptance of rates for altered or substituted items of work or for additional items of work or their deletion shall however always rest with the same authority (by designation) as had accepted the original Tender.

(2) **The Engineer's Representative** shall be responsible to the Engineer and his duties are to watch and supervise the Works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract, not, except as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Employer, nor to make any variation of or in the Works.

The Engineer may from time to time in writing delegate to the Engineer's Representative any of the power and authorities vested in the engineer and shall furnish to the Contractor and to the Employer a copy of all such written delegations of Power and authorities. Any Written instructions or approval given by Engineer's representative to the contractor within the terms of such delegation, but not otherwise, shall bind the Contractor and the Employer as though it had been given by the Engineer. Provided always as follows:

(a) Failure of the Engineer's Representative to disapprove any work of materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal of breaking up thereof.

(b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer, who shall thereupon confirm, reverse or vary such decision.

ASSIGNMENT AND SUB LETTING

3. ASSIGNMENT

The Contractor shall not assign the Contract or any part thereof, or any benefit or interest therein or there Sunder, otherwise than a change in the Contractor's bankers of any money due or to become due under this contract, without the prior written consent of the Employer.

4. SUB-LETTING

The Contractor shall not sub-let the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not sublet any part of the Works without the prior written consent of the Engineer, which shall not be unreasonably withhold and such consent, if given, shall not relieve the Contractor form any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of the said sub-contractor including his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen, provided always that the provision of labour on a piece-work basis shall not be deemed to be a subletting under this clause.

5. CONTRACT DOCUMENTS

(1) (a) **Language** – The Contract documents shall be drawn up in the English language. All correspondence, orders, notices etc. shall also be in English.

(b) **Law** – The law of India and of the State of West Bengal shall apply to the Contract and the Contract is to be construed accordingly.

(2) **Documents Mutually Explanatory** – The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Employer. The Contractor shall have to abide by the prevailing relevant official directives of this Authority (KMDA), UD&MA Dept.,GoWB, Finance Departments, GoWB, as circulated time to timeof the Conditions and Requirements for Tendering, who shall thereafter issue to the Contractor instructions thereon. Provided always that if, in the opinion of the Engineer, compliance with any such instructions shall involve the Contractor in any cost, which by reason of such ambiguity or discrepancy could not reasonably have been foreseen by the Contractor, the Engineer shall certify and the Employer shall pay such additional sum as may be reasonable to cover such costs.

6. (1) **Custody of drawing** – All the approved Drawings shall remain in the sole custody of the Engineer-in-Charge, but two copies thereof shall be furnished to the Contractor free of charge. The Contractor shall provide and make at his own expenses any further copies required by him. At the Completion of the Contract, the Contractor shall return to the Engineer-In-Charge all drawings as provided under the Contract.

(2) **One copy of drawings to be kept at site** – One copy of the Drawings furnished to the Contractor as aforesaid, shall be kept by the Contractor on the site and the same shall at all reasonable times be available for inspection and use by the Engineer-In-Charge and the Engineer's Representative and by any other persons authorised by the Engineer-In-Charge in writing.

(3) **Disruption of progress** – The Contractor shall give written notice to the Engineer-In-Charge whenever planning or progress of the works is likely to be delayed or disrupted unless any further approval of drawing or order, including a direction instruction or approval, is issued by the Engineer-In-Charge within a reasonable time. The notice shall include details of the drawing or order required, and of why and by whom it is required and of any delay or disruption likely to be suffered if it is further delayed.

7. FURTHER DRAWINGS

The Engineer-In-Charge shall have full power and authority to supply to or demand from the Contractor, from time to time, during the progress of the Works, such further drawings as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works. The Contractor shall carry out and be bound by the same. Adequacy as determined by the Employer shall be final and binding on the Contractor.

8. GENERAL OBLIGATION

(1) Contractor's General Responsibilities – The Contractor shall, subject to the provision of the Contract, and with due care and diligence, execute and maintain the Works and supply all labour, including the supervision thereof, materials, equipment, Constructional Plant and machinery, tools and all other things whether of a temporary or permanent nature, required for such execution and maintenance, so far as the necessary for providing the same is specified in or is reasonably to be inferred from the Contract.

The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, erection etc. provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the Permanent Works, or for the design or specification of any Temporary Works prepared by the Engineer.

9. CONTRACT AGREEMENT

The Contractor shall, when called upon to do so, enter into and execute a Contract Agreement, to be prepared and completed in the form annexed with such modification as may be necessary.

10. GUARANTEE

Formal acceptance of the work covered under the contract will not be made by the Engineer until all the work done by the contractor has satisfactorily passed all tests required and run for a reasonable period to his satisfaction.

11. INSPECTION OF SITE

The Employer shall have made available to the Contractor with the Tender documents, its location, and distance from fixed point including the layout drawing and location of the primary grid point and the Tender shall be deemed to have been based on such data. But the Tenderer shall be responsible for his own interpretation thereof. The Tenderer may also undertake investigations at his own cost on such levels or any other levels prior to submission of his offer.

The Tenderer shall also be deemed to have inspected and examined the site and its surroundings and information available in connection therewith and to have satisfied himself, so far as is practicable, before submitting his Tender, as to the form and nature thereof, including the sub-surface conditions, the hydrological and climatic conditions, the extent and nature of work and materials necessary for the completion of the Works, the means of access to the Site and the accommodation he may require and, in general shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Tender.

12. SUFFICIENCY OF TENDER AND ADVERSE PHYSICAL CONDITIONS, ARTIFICIAL OBSTRUCTIONS

The Tenderer shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the Works and of the rates and prices quoted in the Schedule of prices, which Tender rates and prices shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper execution and maintenance of the Works. If, however, during the execution of its Works the Contractor shall encounter physical conditions, other than Climatic conditions on the Site, or artificial obstructions, which conditions or obstructions could, in his opinion, not have been reasonably foreseen by an experienced contractor, the Contractor shall forthwith give written notice thereof to the Engineer and if, in the opinion of the Engineer-In-Charge, such conditions or artificial obstructions could not have been reasonably foreseen by an experienced contractor, then the Engineer-In-Charge shall certify and the Employer shall pay the additional cost to which the Contractor shall have been put by reason of such conditions, including the proper and reasonable cost.

a) Of complying with any instruction which the Engineer-In-Charge may issue to the Contractor in connection therewith, and

b) Of any proper and reasonable measures approved by the Engineer-In-Charge which the Contractor may take in the absence of specific instructions from the Engineer-In-Charge, as a result of such conditions or obstructions encountered.

13. WORK TO BE TO THE SATISFACTION OF ENGINEER-IN-CHARGE

Save insofar as it is not legally or physically impossible, the Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer-In-Charge and shall comply with and adhere strictly to the Engineer-In-Charge's instructions and directions on any matter whether mentioned in the Contract or not touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer-In-Charge or, subject to the limitations referred in Clause 2 hereof, from the Engineer-In-Charge's Representative.

14. (1) **Programme to be furnished** – Within ten(10) calendar days, the Contractor shall, after the acceptance of his Tender, submit to the Engineer-In-Charge for his approval a programme showing the order of procedure in which he proposes to carry out the Works. The Contractor shall, whenever required by the Engineer-In-Charge or Engineer-In-Charge's Representative, also provide in writing for his information; general description of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works.

(2) If at any time it should appear to the Engineer-In-Charge that the actual progress of the Works does not conform to the approved programme referred in sub-clause (1) of this Clause, the Contractor shall produce, at the request of the Engineer-In-Charge, a revised programme showing the modifications to the approved programme necessary to ensure completion of the Works within the time for completion as defined in Clause 42 hereof.

(3) The submission to and approval by the Engineer-In-Charge of such programmes or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

15. CONTRACTOR'S SUPERINTENDENCE

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer-In-Charge may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor or a competent and authorised agent or representative approved of in writing by the Engineer-In-Charge, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the Superintendence of the same. If such approval be withdrawn by the Engineer-In-Charge, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving written notice of such withdraw, remove the agent from the works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Engineer-In-Charge. Such authorised agent or representative shall receive, on behalf of the Contractor, direction and instruction from the Engineer-In-Charge or, subject to the limitations of Clause 2 hereof, the Engineer-In-Charge's Representative. The agent or representative of the Contractor must be able to speak and communicate in English/Bengali. In the absence of the Contractor's designated agent or representative for a particular operation on any site of the works the Contractor's supervisory staff or sub-agent or leading hands shall be instructed to receive and carry out any instruction or direction issued or given by the Engineer-In-Charge or the Engineer-In-Charge's Representative.

16. (1) **Contractor's Employees** – The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works.

a) Such technical assistants as are skilled and experienced in their respective calling and such sub-agents, foreman and leading hands as are competent to give proper supervision to the work they are required to supervise, and

b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

c) Employees covered under (a) and (b) may have to be provided with identity cards as specified by the engineer.

(2) The Engineer-In-Charge shall be at liberty to object to and require the Contractor to remove forthwith from the Work any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Engineer-In-Charge, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose employment is otherwise considered by the Engineer-In-Charge to be undesirable and such person shall not be again employed

upon the Works without the written permission of the Engineer-In-Charge. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer-In-Charge.

17. SETTING-OUT

The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer-In-Charge in writing and for the correctness, subject as above mentioned, of the position levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances/and labour in connection therewith. If, at any time during the progress of the Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required to do so by the Engineer-In-Charge or the Engineer-In-Charge's Representative, shall at his own cost, rectify such error to the satisfaction of the Engineer-In-Charge or the Engineer-In-Charge's Representative, unless such error is based on incorrect data supplied in writing by the Engineer-In-Charge, in which case the expense of rectifying the same shall be borne by the Employer. The checking of any setting-out or of any line or level by the Engineer-In-Charge or the Engineer-In-Charge's Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and reserve all bench-marks, sigh trails pegs and other things used in setting out the Works.

18. WATCHING AND LIGHTING

The contractor shall in connection with the works provide and maintain at his own cost all light, guards, fencing, as and when/where necessary or as required by the Engineer-In-Charge or the Engineer-In-Charge's Representative, for the protection of the works, or for the safety and convenience of the existing plant, contractor's employees, employees supervisor or for any other reason deemed fit by the Engineer-In-Charge. Contractor will arrange his own electrical supply and connection from respective power supply authority or will make his own arrangement at the time of construction period and up to the commissioning of the project.

19. (1) **Care of works** – From the commencement of the Works until the date stated in the Certificate of Completion for the whole of the Works, pursuant to Clause 47 hereof, the Contractor shall take full responsibility for the care thereof. Provided that if the Engineer-In-Charge shall issue a Certificate of Completion in respect of any part of the Permanent Works, the Contractor shall cease to be liable for the care of that part of the Permanent Works (O&M not counted) from the date stated in the Certificate of Completion in respect of that part and the responsibility for the care of that part shall pass to the Employer. The Contractor shall take full responsibility for the care of any outstanding work which he shall have undertaken to finish during the period to Maintenance. Certificate of completion will not be provided until such outstanding work is completed. In case any damage, loss or injury shall happen to the Works, or to any part thereof, from any cause whatsoever, save and except the excepted risks as defined in sub-clause (2) of this Clause, while the Contractor shall be responsible for the care thereof the Contractor shall, at his own cost, repair and make good the same, so that at completion the permanent Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer-In-Charge's instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall, if and to the extent required by the Engineer-In-Charge and subject always to the provisions of Clause 62 hereof, repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of completing any outstanding works or complying with his obligations under Clause 48 or 49 hereof.

(2) **Expected Risks** – The 'excepted risks" are war, hostilities, invasion, act of foreign enemies, rebellion, revolution insurrection or military or usurped power, civil war or unless solely restricted to employees of the Contractor or of his sub-contractors and arising from the conduct of his workers, riot commotion or ionising radiations or contamination by radio-activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous

properties of any explosive, nuclear assembly or nuclear component thereof, pressure waves cause by aircraft or other aerial devices travelling at sonic or supersonic speeds, or any such operation of the force of nature as an experienced contractor could not foresee, or reasonably make provision for or insure against all of which are herein collectively referred to as "the excepted risks."

20. INSURANCE OF WORKS, ETC.

Without limiting his obligations and responsibilities under Clause 19 hereof the Contractor shall insure in the names of the Employer and the Contractor against all loss or damage from whatever cause arising, other than the excepted risks, for which he is responsible under the terms of the Contract and in such manner that the Employer and Contractor are covered for the period stipulated in Clause 19(1) hereof and are also covered during the Period of Guarantee for loss or damage arising from a cause, occurring prior to the commencement of the Period of Guarantee, and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 48 or 49 hereof.

a) The Works for the time being executed to the estimated current contract value thereof together with the materials for incorporation in the Works at the replacement value.

b) The Constructional Plant and other things brought on the Site by the Contractor to the replacement value of such Constructional Plant and other things. These shall include materials belonging to the employer but issued to or intended to be issued to the Contractor for use in the Works. Such insurance shall be affected with an insurer and in terms approved by the Employer, which approval shall not be unreasonably withheld, and the Contractor shall, whenever required, produce to the Engineer-In-Charge or the Engineer-In-Charge's Representative the policy or policies of insurance and the receipts for payment of the current premiums.

21. (1) **Damage to persons and property** – The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of injuries or damage to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution, operation and maintenance of the Works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to :

a) The permanent use or occupation of land by the Works or any part thereof.

b) The right of the Employer to execute the Works or any part thereof on over under, in or through any land.

c) Injuries or damage to persons or property which are the unavoidable result of the execution, operation or maintenance of the Works in accordance with the Contract.

d) Injuries or damages to persons or property resulting from any act or neglect of the Employer, his agents, servants or other contractors, not being employed by the Contractor, or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the Employer, his servant or agents or other contractors for the damage or injury.

(2) **Indemnity or Employer** – The Contractor shall indemnify the Employer against all claims, proceedings, damages, costs charges and expenses in respect of the matters referred to in the provision to sub-clause (1) of this Clause.

22. (1) **Third Party Insurance** – Before commencing the execution of the Works the Contractor, but without limiting his obligations and responsibilities under Clause 21 hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the Employer, or to any person, including any employee of the Employer, by or arising out to the execution of

the Works or in the carrying out of the Contract, otherwise than due to the matters referred to in the provision to Clause 21 (1) hereof.

(2) **Minimum Amount of third party insurance** – Such insurance shall be affected with an insurer and in terms approved by the Employer, which approval shall not be unreasonably withheld, and for a least the amount stated in the Appendix to the Tender. The Contractor shall, whenever required, produce to the Engineer-In-Charge or the Engineer-In-Charge's Representative the policy or policies or insurance and the receipts for payment of the current premium. However, the Tenderer should insure for an amount commensurate with the risk involved subject to the minimum amount prescribed elsewhere in the Tender.

(3) **Provision to indemnify Employer** – The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the Employer, the insurer will indemnify the Employer against such claims and any costs, charges and expenses in respect thereof.

23. (1) **Accident or injury to Workmen** – The Employer shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-contractor, save and except an accident or injury resulting from any act or default of the Employer, his agents, or servants. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

(2) **Insurance Against Accident, etc. to workmen**– The Contractor shall insure against such liability with an insurer approved by the Employer, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any person is employed by him on the works and shall, when required, produce to the Engineer-In-Charge or the Engineer-In-Charge's Representative such policy of insurance and the receipts for payment of the current premium. Provided always that, in respect of any person employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such sub-contractor to produce to the Engineer-In-Charge when required, such policy of insurance and the receipt for the payment of the current premium.

(3) **Notification to insurer** – It shall be the duty of the Contractor to notify the insurers under any of the insurance referred to in Clause 20, 22 and 23 hereof any matter or count which by the terms of such insurance are required to be notified and the Contractor shall indemnify and keep indemnified the Employer against all losses, claims, demands, proceedings, costs, charges and expenses whatsoever arising out of or resulting from any default by the Contractor in complying with the requirements of this sub-clause whether as a result of the avoidance of such insurance or otherwise.

(4) **All Insurances at Contractor's cost** – The insurances referred to in Clause 21, 22 & 23 hereof shall be entirely at the cost and expenses of the Contractor and be included within his rates.

24. REMEDY ON CONTRACTOR'S FAILURE TO INSURE

Failure to fulfil this requirement shall attract penal provisions of the contract, arising out of theresultant non-implementation of such provisions.

In respect of all labours directly or indirectly employed in the work, materialsor physical damage, loss or injury which may occur to any property, including all labours directly or indirectly employed in the work, or to any person, including any employee of the Employer, by or arising out to the execution of the Works or in the carrying out of the Contract,if the contractor fails to make arrangement, and fail to provide necessary facilities as aforesaid, he/she shall be liable to pay a penalty of Rs. 2000/- for each default, and inaddition the Engineer-in-Charge shall be at liberty to make arrangement and providefacilities as aforesaid and recover the costs incurred in their behalf, from the contractor.

The decision of the Engineer-in-charge shall be final in deducting from any running bill or final bill or security deposit or otherwise due to the contractor, the amount levied as fine & cost to provide aforesaid facility and would be binding on the contractor.

25. (1) **Giving of Notices and Payment of Fees** – The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute, ordinance, or other law, or any rules regulation, or bye-law of any local or other duly constituted authority in relation to the execution of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

(2) **Compliance with Statutes, Regulations, etc.** – The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the Rules, regulations or bye-laws or any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Employer indemnified against all penalties, fines and liability of every kind for breach of any such Statute, ordinance of Law, regulation of bye law.

26. FOSSILS, ETC.

All fossils, coins articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall as between the Employer and the Contractor be deemed to be the absolute property of the Employer.

27. PATENT RIGHTS AND ROYALTIES

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent, rights, design Trade mark or name or other protected right in respect of any Constructional Plant, machine works, or material used for or in connection with the Works or any of them and from and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensations, if any, for getting stone, sand, gravel, clay or other materials or equipment required for the works or any of them.

28. INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES

All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the existing plant workers, member of the public, or the access to use and occupation of public or private roads, railways and footpaths to or of properties whether in the possession of the Employer or of any other person or local authority.

29. (1) **Extraordinary Traffic** – The Contractor shall use every reasonable means to prevent any of the highways, railways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of this sub-contractors and, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways, railways and bridges.

(2) **Special Loads** – Should it be found necessary for the Contractor to move one or more loads of Constructional plant, machinery or pre-constructed units or parts of units of work over part of a highway, railway or bridge, the moving whereof is likely to damage any highway, railway or bridge unless special protection or strengthening is carried out, then the Contractor shall before moving the load on to such highway, railway or bridge give notice to the Engineer-In-Charge or Engineer-In-Charge's Representative or the local authority of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway, railway or bridge. Such proposals, including any modifications thereto that the Engineer-In-Charge or the

local authority may require, shall be carried out by the Contractor at his own cost and expenses.

(3) **Settlement of Extraordinary Traffic Claims** – If during the Carrying out of the Works damage or injury to railways, railway or bridge occurs due to moving of one or more loads of Constructional Plant machinery or pre-constructed units or parts of units of work, the Employer shall conduct the necessary investigation for the purpose of determining the Contractor's liability. If the damage is due to failure on the part of the Contractor to observe and perform his obligations under sub-clause (1) and (2) of this Clause then the restoration/repair of the damaged portion of road or structure certified by the Engineer-In-Charge or local authority to be due to such failure shall be undertaken by or be chargeable against the Contractor.

(4) **Water-borne Traffic** – Where the nature of the Works is such as to require the use by the Contractor of water-borne transport the foregoing provisions of this Clause shall be construed as though "highway" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

30. (a) **Restriction of Movements** - The work shall have to be executed within the protected area of existing water works. The existing rules and regulation related to ingress and egress of labour and material shall have to be followed strictly in consultation with and as per direction of the Engineer-In-Charge or the local authority as the case may be. No labour, Supervisor or Engineer-In-Charge of the contractor shall enter in-side the treatment plant pump house or any other existing installations without prior permission of concerned officers.

(b) **Opportunities for other contractors -** The Contractor shall in accordance with the requirements of the Engineer-In-Charge, afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the employer and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works. If, however, the Contractor shall, on the written request of the Engineer-In-Charge or the Engineer-In-Charge's Representative, make available to any such other contractor, or to the Employer or any such authority, any roads or ways for the maintenance of which the Contractor is responsible, or permit the use by any such of the Contractor's scaffolding or other plant on the Site, or provide any other service of whatsoever nature, the Employer shall pay to the Contractor in respect of such use or service such sum or sums if at all as shall, in the opinion of the Engineer-In-Charge, be reasonable.

31. CONTRACTOR TO KEEP SITE CLEAR AND FREE OF WATER

During the progress of the Works the Contractor shall keep the site reasonable free from all necessary obstruction and shall store or dispose of any Constructional Plant and surplus materials and clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required. No extra payment is made for pumping out of water from any nature of source, heavy rains or leakage of any nearby water mains at site.

32. CLEARANCE OF SITE ON COMPLETION

On the completion of the Works the Contractor shall clear away and remove from the Site all Constructional Plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer-In-Charge.

33. LABOUR

(1) **Engagement of labour** – The Contractor shall make his own arrangements for the engagement of all labour, local or otherwise, and save in so far as the Contract otherwise provides, for the transport, housing, feeding and payment thereof.

(2) **Supply of Water** – The Contractor shall, so far as is reasonably practicable having regard to local conditions, provide on the site, to the satisfaction of the Engineer-In-Charge's Representative, an adequate supply of drinking and other water for the use of the Contractor's staff and work people.

(3) **Alcoholic Liquor or Drugs** – The Contractor or his workmen shall not consume or sale or gift or be under the influence of any drug/narcotics or Alcoholic liquor within the vicinity of the Construction site.

(4) **Arms and Ammunition** – The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

(5) **Festivals and Religious Customs** – The Contractor shall in all dealing with labour in his employment have due regard to all recognised festivals days of rest and religious or other customs.

(6) **Epidemic** – In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

(7) **Disorderly Conduct etc.** – The contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees or workers and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

(8) **Compliance with Laws, regulation etc. Relating to labour** – In respect of the engagement, employment, transport, payment, feeding, housing and working conditions of labour and all matters connected there with the Contractor shall at all times during the continuance of the Contract, comply in all respects with and carry out all obligations imposed on him by the provisions and requirements of the following statutes.

(a) The Apprentices Act 1961 (Act 52 of 1961) and Rules and Regulations issued thereunder from time to time.

(b) The Contract Labour (Regulation and abolition) And 1970 (Act 37 of 1970) and Rules made thereunder (West Bengal Contract Labour Regulation and Abolition Rules 1972) from time to time.

(c) The Payment of Wages Act 1936, the Minimum Wages Act 1948, the Employees Liability Act 1938, the Industrial Disputes Act 1947, the Maternity Benefits Act 1961, the Employees State Insurance Act 1948 including modifications thereto the Rules and Regulations framed thereunder from time to time.

(d) Other existing National or State Statute, Ordinance or other Law or any Regulation or Bye-law of any local or other duly constituted authority which may be applicable, including any such Law, Regulation or Order that may be passed or ordered from time to time and come into force during the tenure of the Contract.

(9) **Employees Provident Fund** – The Contractor shall comply with the provisions of the relevant Employees Provident Fund Act or Rules in force in the State along with the provisions of all rules and Regulations made thereunder from time to time, and shall in particular be responsible for the payment of all contributions as laid down under the Act/Rules.

(10) **Trade union rights** – The Contractor shall recognise the freedom of all workmen employed by him in and for performance of the Contract to be members of registered Trade Unions and shall not in any manner prevent or discourage any such workman from becoming a member of a registered Trade Union or discriminate against any workmen who is a member of a registered Trade Union.

(11) **Local Labour** – As far as possible local labour shall be engaged as unskilled labour.

(12) **Fair Wages** – The Contractor shall in respect of all workmen employed by him in and for the performance of the Contract pay rates of wages and observe the conditions of employment not less favourable than those provided under the relevant labour law as applicable to the State.

(13) **Medical Attendance** – The Contractor shall provide, to the satisfaction of the Government or Local Authorities Concerned, adequate medical attendance for his employees and labour.

(14) **Report or Accident** – The Contractor shall, within twenty four (24) hours of the occurrence of any accident at or about the site or in connection with the execution of the Work, report such an accident to the Engineer-In-Charge. The Contractor shall also report such accident to the competent authority whenever such a report is required by law.

(15) **Report required by Labour Commissioner** – The Contractor shall submit, at the request of the Labour Commissioner or of the Assistant Commissioner of the State such returns as may be called for from time to time in respect of labour employed by the Contractor and by his subcontractors in the execution of the Contract. If so required, the names and address of all subcontractors shall be furnished by the Contractor to the Labour Commissioner. Statutory provisions in this regards are to be also complied with.

(16) The Contractor shall be responsible for observance by his subcontractor of all the foregoing provision of sub-clause (1) to (15) of this Clause 33.

34. RETURNS OF LABOUR ETC.

The Contractor shall, if required by the Engineer-In-Charge, deliver to the Engineer-In-Charge's Representative, or at his office a return in detail in such form and at such intervals as the Engineer-In-Charge may prescribe showing the supervisory staff and the number of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Constructional Plant as the Engineer-In-Charge's Representative may require.

35. MATERIALS AND WORKMANSHIP

(1) All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the E.I.C instructions and shall be subjected from time to time to such tests as the Engineer-In-Charge may direct at the place of manufacture or fabrication, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples or materials before incorporation in the Works for testing as may be required and directed by the Engineer in charge, be it at site or at the manufacturer/Vendors premises or elsewhere.

(2) **Cost of samples** – All samples of materials as may be required for testing as per direction of the Engineer- in- charge shall be furnished by the Contractor at the cost and expense of the Contractor.

(3) **Cost of Tests** – The cost of making any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Contract and in the cases only of a test under load or of a test to ascertain whether the design of any furnished or partially finished work in appropriate for the purpose which it was intended to fulfil, is particularised in the Contract in sufficient detail to enable to Contractor to price or allow for the same in his Tender.

(4) **Cost of Tests not provided for, etc.** – If any test is ordered by the Engineer- in Charge which is either.

a) Not so intended by or provided for, or

b) In the cases above mentioned is not so particularised, or

c) though so intended or provided for is ordered by the EIC to be carried out by an independent person or organisation at any place other than the Site or the place of manufacture or fabrication of the materials tested, then the cost of such test shall be borne by the Contractor, if the tests shows the workmanship or materials not to be in accordance with the provisions of the Contract or the EIC's instructions.

36. INSPECTION OF OPERATIONS

The Engineer-In-Charge and any person authorised by him shall at all times have access to the Works and to all workshops stores and places where work is being prepared or from

where material, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

37. (1) **Examination of work before covering up** –

No work shall be covered up or put out of view without the approval of the EIC or his Representative and the Contractor shall afford full opportunity for the EIC orEIC's to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the EIC or EIC's Representative where any such work or foundations is or are ready or about to be ready for examinations and the Engineer-In-Charge's Representative shall, without unreasonable delay, unless be considers if unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examine such foundations.

(2) **Uncovering and making openings** – The Contractor shall uncover any part or parts of the Works or make opening in or through the same as the Engineer-In-Charge may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the EIC. If any such part or parts have been recovered up or put out of view after compliance with the requirement of sub-clause (1) of this Clause and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating and making good the same shall be borne by the Employer, but in any other case all costs shall be borne by the Contractor.

38. (1) **Removal of improper work and materials** – The Engineer-In-Charge shall during the progress of the works have power to order in writing from time to time.

a) the removal from the Site, within such time or time as may be specified in the order, of any materials, which in the opinion of the Engineer-In-Charge, are not in accordance with the Contract.

b) the substitution of improper, substandard and unsuitable materials, and

c) the removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefore, of any work which in respect of materials or workmanship is not, in the opinion of the Engineer-In-Charge, in accordance with the Contract.

(2) **Default of Contractor in Compliance** – In case of default on the part of the Contractor in carrying out such order, the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sum due or which may become due to the Contractor.

39. (1) **Suspension of work** – The Contractor shall, on the written order of the Engineer-In-Charge, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work, so far as is necessary in the opinion of the Engineer-In-Charge. Any extra cost incurred by the Contractor in giving effect to the Engineer-In-Charge's instruction under this Clause shall not be borne.

40. COMMENCEMENT TIME AND DELAYS

Commencement of works – The Contractor shall commence the Works after the receipt by him of a written order to this effect from the EIC and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer in charge or be wholly beyond the Contractors' Control.

No Mobilising Charges shall be paid under any circumstances.

The successful contractor shall within four weeks from the date of issue of Letter of Intent furnish one or more drawing stating and showing the following:

1. Dimensioned area requirement of the different Intake Jetty and raw Water Pumping Station& Raw Water Rising main showing the details of:

1.1 Cut-outs at the operating platform.

1.2 Layout of motors, pumps, valves and other electrical units like MCC, Capacitors, and Battery Room etc. at different flow level.

2. Vertical space requirement showing the levels of –

2.1 Plummer Block supporting systems

2.2 Centre line of Pump

2.3 Foundation level of pumps & valves

2.4 Centre line and sizes of pump delivery pipes, bends etc.

2.5 Top of the Pump casing

2.6 H.O.T./E.O.T Crane and rail as suitable.

3. Forces and Moments developed at different locations (to be submitted on regular basis depending on the progress of work and as per instruction of the EIC to avoid delay in construction).

3.1 Static and Dynamic loads of pumps, motors, valves, etc. (showing deed loads separately) & load of various electrical equipments and machinery will be finalised by the E/M Sector KMDA.

3.2 Moments and stresses developed at different locations.

3.3 Vibrations at different locations expected.

4. Foundation details showing bolt sizes and extent of embedding of the foundation bolts.

5. RSJ sizes, locations and fixing arrangements for motor support, RSJ/girder requirement for fixing HOT/EOT crane as clamp-on chain pulley blocks for attending of values etc. at the pump floor level stating the max. load that is required to be lifted.

6. Layout of cable trenches, cable trays showing the locations and levels together without position of hooks at the under site of the operating platform stating the max. load required to be withstood.

7. Any other reasonable data that may be asked for.

41. (1) **Possession of site** – Save in so far as the contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will, with the Engineer-In-Charge's written order to commence the Works, give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in Clause 14 hereof, if any, and otherwise in accordance with such reasonable proposals, of the Contractor as he shall, by written notice to the Engineer-In-Charge, make and will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due despatch in accordance with the said programme or proposals, as the case may be. If the Contractor suffers delays or incurs cost for failure on the part of the Employer to give possession in accordance with the terms of this Clause, the Employer shall grant an extension of time for the completion of the Works and certify such sum as, in his opinion, shall be fair to cover the cost incurred, which sum shall be paid by the Employer.

(2) **Way leaves etc.** – The Contractor shall bear all costs and charges for special or temporary way leaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purpose of the Works.

42. (1) **Time of Completion and progress of Works** – The progress of the work shall conform to the approved Work Programme in terms of Clauses 14 hereof, and subject to any

requirement in the contract as the completion of any section of the Works before completion of the whole, the whole of the Works shall be completed, in accordance with the provisions of Clause 47 hereof, within the time stated in the Contract calculated from last days of the period named in the Appendix to the Tender as that within which the Works are to be commenced, or such extended time as may be allowed under Clause 43 hereof.

(2) **Failure in keeping to stages of work programme** – if the Contractor does not keep to the approved programmed and continues at any stage to fail behind his schedule by as much as twenty percent (20%) of the said approved work programme, within thirty (30) days from receipt by him of a written notice from the Engineer-In-Charge, or if in the opinion of the Engineer-In-Charge the delay will substantially affect operation activities or execution of a major work item and it is ascertained by the Engineer-In-Charge that the Contractor cannot remedy the occasion within the stipulated time, the Engineer-In-Charge shall have full authority to undertake measures to recover from such adverse condition in terms of the provisions of Clause 62 thereof.

43. EXTENSION OF TIME FOR COMPLETION

Should the amount of extra or additional work of any kind or any cause of delay referred to in these Conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the works, the Engineer-In-Charge shall determine the period of such extension and shall notify the Employer and the Contractor accordingly. Provided that the Engineer is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has within twenty eight days after such work has been commenced, or such circumstances have arisen or as soon then after as is practicable, submitted to the Engineer-In-Charge's Representative full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time.

44. NO NIGHT OR SUNDAY WORK

Subject to any provision to the contrary contained in the Contract, none of the Permanent Works shall, save as hereinafter provided, be carried on during the night or on Sundays, if locally recognised as days of rest, or other locally recognised equivalent without the permission in writing of the Engineer-In-Charge's Representative, except when the works is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer-In-Charge's Representative, provided always that the provisions of the Clause shall not be applicable in the case of any work which it is customary to carry out by rotary of shifts.

45. RATE OF PROGRESS AND NIGHT WORK WHEN PERMITTED

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any section is at any time, in the opinion of the Engineer-In-Charge, too slow to ensure completion by the prescribed time or extended time for completion, the Engineer-In-Charger shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer-In-Charge may approve to expedite progress as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Engineer-In-Charge under this Clause, the Contractor shall seek the Engineer-In-Charge's permission to do any work at night or on Sundays, if locally recognised as days of rest, or their locally recognised equivalent, such permission shall not be unreasonable refused. When work at night has to be carried out, the Contractor shall, at his own cost and expense, make adequate arrangements for lighting and provide necessary facilities for safety etc. and comply with all stipulations as may have been imposed by the Engineer-In-Charge in granting permission for night work.

46. (1) **Liquidated Damages for Delay** – If the Contractor shall fail to achieve completion of the Works within the time prescribed by Clause 42 hereof, then the Contractor shall pay to the Employer the sum stated in the Contract as liquidated damages for such default and not as a penalty for every day of part of a day which shall elapse between the time prescribed by Clause 42 hereof and the date of certified completion of the Works. The Employer may without prejudice to any other method of recovery, deduct

the amount of such damages from any money in his hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor form his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

(2) **Reduction of liquidated Damages** – If, before the completion of the whole of the Works any part or section of the Works has been certified by the Engineer-In-Charge as completed, pursuant to Clause 47 hereof, and occupied or used by the Employer, the liquidated damages for delay shall, for any period of delay after such certificate and in the absence of alternative provision in the contract be reduced in the proportion which the value of the part or section so certified bears to the value of the whole of the Works.

(3) **Extent of Liquidated Damages** – The liquidated damages referred to in sub-clause (1) for delay of work: @ 2% (Two percent) of the tendered value of work arrived for each month of delay to be computed on per day basis subject tothe ceiling limit of security deposit already withheld or due to be withheld during imposition of the said clause and minimum payable compensation equivalent to the Earnest Money deposited (EMD).Provided always, that the total amount of compensation for delay, to be paid under this clause shall not exceed 10% of the tendered value of work or the tendered value of the item or group of items of the work, for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the contractor under this contract, if the contractor catches up with the progress of work subsequently, part or full of the desired progress as per the contract in accordance with the decision of the Tender Accepting Authority, under powers delegated by KMDA to be communicated by the Engineer-in-Charge, the withheld amount shall be released.

However, no interest, whatsoever, shall be payable on such withheld amount.

(4) **Liquidated Damage as Reasonable Compensation** – The 'Liquidated damage' referred to in sub-clause (1) to (3) above, shall be considered as reasonable compensation to the applied to the use of the Employer without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

(5) **Bonus for early completion** – The Contractor shall not be entitled to payment of any bonus for early completion of the Works.

47. CERTIFICATION OF COMPLETION OF WORK

(1) **Completion** – Completion is a stage when the structure as a whole is certified to be completed by the Employer. The decision on determination of major or minor works resting with the employer, shall not mollify the act of completion for the aforesaid purpose.

An item shall be considered as minor work where its non-completion may not in the opinion of the employer, stand in the way of commencement of plant operation.

48. (1) **Cost of Execution of work of repair, etc.** – The repair work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer-In-Charge, be due to the use of materials or workmanship not in accordance with the Contract, or to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Engineer-in-Charge, such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it was an additional work.

(2) **Remedy on contractor's failure to carry out work required** – If the Contractor shall fail to do any such work as aforesaid requirement by the Engineer-In-Charge, the Employer shall be entitled to employ and pay other persons to carry out the same, which in the opinion of the Employer, the Contractor was liable to do at his own expense under the Contract. In the said event, all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sum due or which may become due to the Contractor.

49. CONTRACTOR TO SEARCH

The Contractor shall, if required by the Engineer-In-Charge in writing, search under the directions of the Engineer-In-Charge, for the cause of any defect, imperfection or fault appearing during the progress of the Works or in the period of defect liability. Unless such defect, imperfection or fault shall be one for which the contractor is liable under the contract, the cost of the work carried out by the contractor in searching as aforesaid shall be borne by the Employer. If such defect, imperfection or fault shall be one for which the contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of Clause 48 hereof to the satisfaction of the Engineer.

50. ALTERATIONS, ADDITIONS AND OMISSIONS

(1) **Variations** – The Employer may make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be desirable, he shall have power to order the Contractor to do and the Contractor shall do any of the following:

a) Increase or decrease the quantity of any work included in the contract.

b) Omit any such work.

c) Change the character or quality or kind of any such work.

d) Change the levels, lines position and dimensions of any part of the Works and

e) Execute additional work of any kind necessary for the satisfactory completion of the works or for deriving satisfaction of the Employer. It is expressly provided that no such variation shall, in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

(2) **Orders for variations to be in writing** – No such variations shall be made by the Contractor without an order in writing from the Employer. Provided that no order in writing shall be required for insignificant increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Schedule of prices. Provided also that if for any reason the Employer shall consider it desirable to give any such order verbally, the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Employer whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of this Clause. Provided further that in the event of non-receipt of written confirmation from the Employer, the Contractor shall, within seven days, confirm the same from his end in writing to the Employer, and if such confirmation is not contradicted in writing within fourteen days by the employer, it shall be deemed to be an order in writing by the Employer.

51. (1) **Valuation of variations** – All extra or additional work done or work omitted or substituted by order of the Employer shall be valued at the rates and prices set out in the Contract if, in the opinion of the Employer, the same shall be applicable as it is or with addition to or subtraction from an accepted item. If the Contract does not contain any rates or prices applicable to the extra or additional work, then the rates or prices shall be obtained from the Presidency Circle, Public Works Department, KMDA, PHE, IRRIGATION of GOWB schedule of rates as was in vogue on the date of submission of the tender. The same being escalated to an extent determined by comparing the cost of a similar item appearing in the Schedule of Prices with those in PCPWD/KMDA/PHE/IRRIGATION Deptt of GoWB.. Where such rates are not available in above captioned schedule of rates, the market analysed rate as approved by the Employer shall be final and binding. In case of such analysed rates, 10% profit including over head consultant's fees, GST, ST, Turnover Tax etc. shall be allowed. No other overhead, or other expenses shall be taken into account shall be considered to be inclusive of contractors profit.

() **Claims** – The Contractor shall send to the Engineer-In-Charge's Representative once in every month an account giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Employer which he has executed during the preceding month. No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the Employer shall at his discretion be entitled to authorise payment to be made for any such working expense, notwithstanding the Contractor's failure to comply with this condition, that the Contractor has, at the earlier practicable opportunity, notified the Employer in writing that he intends to make a claim for such work, provided always that a release of payment shall be preceded by the claim and valuation of variation, in that order.

52. PLANT TEMPORARY WORKS AND MATERIALS

1. **Plant, etc. exclusive use for the works** – All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought on the Site be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent, in writing, of the Engineer which shall not be unreasonably withheld.

2. **Removal of plant, etc**. – Upon completion of the Works the Contractor shall remove from the Site all the said Constructional Plant and Temporary Works remaining thereon and any unused material provided by the Contractor to the satisfaction in the Engineer-In-Charge.

3. **Employer not liable for damage to plant, etc**. – The employer shall not at any time be liable for the loss of or damage to any of or damage to any of the said Constructional Plant, Temporary Works or materials same as mentioned in Clause 19 and 62 hereof.

4. **GST,Octroi, Cess and other imposts.** – The Contractor shall pay GST/Octroi/Sales Tax, Cess, Work Contract Tax and all other taxes, duties and charges as may be applicable from time to time in respect of materials purchased by him or plants and equipment brought to Site. No separate payment shall be made for all these and they shall be deemed to have been covered within the Contractor's rates for the finished items of work.

5. **Temporary Works** – At least fourteen (14) days in advance of taking up any temporary works, the contractor shall submit to the Engineer for approval complete drawings of all temporary works he may require for the execution of the Works. He shall, so required by the Engineer in charge, submit his calculations relating to the strength of the temporary works proposed. Modifications that the Engineer may require shall be made by the Contractor at the latter's cost and expenses. At the discretion of the Engineer, a higher stress up-to a maximum of twenty five percent (25%) in excess of the stress normally allowed for permanent structures may be permitted in the design of temporary works.

   Notwithstanding the approval by the Engineer-In-Charge of any of the temporary works, the contractor shall remain wholly responsible for their adequacy, safety, proper maintenance and of all obligations in regard to such works specified or implied in the Contract, until the removal of such works.

53. APPROVAL OF MATERIAL, ETC. NOT IMPLIED

The operation of Clause 52 hereof shall not be deemed to imply any approval by the Engineer-In-Charge of the materials or other matters referred to therein not shall in interfere with rejection of any such materials at any time by the Engineer-In-Charge.

54. MEASUREMENT

Quantities – The quantities set out in the Schedule of Prices are the estimated quantities of the work, but they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligation under the Contract.

55. WORKS TO BE MEASURED

The Engineer-In-Charge shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the Contract of work done in accordance with the Contract. He shall, when he requires any part or parts of the works to be measured, give notice to the Contractor's authorised agent or representative, who shall forthwith attend or send a qualified agent to assist the Engineer-In-Charge or the Engineer-In-Charge's Representative in making such measurement, and shall furnish all particulars required by either of them. Should the Contractor not attend, or neglect or omit to send his agent on two consecutive occasions, then in the third occasion the measurement shall be made unilaterally by the Engineer-In-Charge which shall be taken to be the correct measurement of the work. For the purpose of measurement such permanent work as is to be measured by records and drawings at suitable intervals of such work and the Contractor, as and when called upon to do so in writing shall, within fourteen days, attend to examine and agree upon such records and drawings, with the Engineer's Representative and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree upon such records and drawings on two consecutive occasions they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree with the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the Engineer-In-Charge's Representative, for decision by the Engineer-In-Charge, a notice in writing giving details of the respects in which such records and drawings are claimed by him to be incorrect together with reasons thereof.

56. METHOD OF MEASUREMENT

The Works shall be measured nut, notwithstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract.

57. 1) a) **Periodic Payment** – No running account bill payment shall be made for works less than 30(Thirty) percent of Tendered Value or up to Rs 25.00 lakh, whichever is less, till after the whole of the work shall have been completed and certificate of completion given. For works of tendered value above Rs 25.00 lakh, for running account bill payment, the contractor shall on submitting a bill of at least Rs 25.00 lakh there for, be entitled to receive a 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. But all such intermediate payments shall be regarded as payments by way of advance against the final m e a s u r e d b i l l payment only and not as payments for work actually done and completed, and shall not preclude the bad, unsound, and imperfect or unskilful work which is to be removed and taken away and reconstructed, or re-erected or to be considered as an admission of the due performance of the contract, or any part thereof, in any respect, or the accruing of any claim, nor shall it conclude, determine or affect in any way the powers of the Engineer-in-charge 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 fixed for completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

2) a) All payments to the Contractor shall be subject to deduction of GST, Work Contract Tax, Income Tax and any other Tax as may be prevalent at the time of payment. For each such deduction the Contractor will be furnished a Certificate to enable him to make requisite adjustment in his Returns related to GST/Income Tax/Sale Tax/Works Contract Tax or any other Tax as may be deducted. Contractors, while quoting, are to take into account all taxes, duties etc. prevalent on the date of opening. If any other taxes or duties of statutory nature are imposed during the post-tendering period, the said amount maybe reimbursed on production of documentary proof of payment according to notification published by finance wing, Govt. of West Bengal. Similarly for reduction or withdrawal, a corresponding deduction may be reimbursed on production of documentary proof of payment according to notification published by finance wing, Govt. of West Bengal. **In both cases, the decision of the Employer/Authority shall be final as to the extent thereof.**

b) All payments to the Contractor shall be subject to all accounting and auditing provisions, procedures, rules, regulation, decrees, law etc. legislated, enacted or in force in India and as applicable to the State of West Bengal during the period of the Contract.

c) No mobilization advance and price escalation shall be entertained under any circumstances.

5. **Final Claims** – The final bill along with supporting documents showing in details the value of the work done in accordance with the Contract together with all further sums which the Contractor considers to be due to him under the Contract, shall have to be submitted by the contractor within one month of the date of completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

6. **Certificate of final acceptance** – The Contractor's obligations and responsibilities under the contract will be considered satisfied and the completed permanent. Works accepted when the Engineer in Charge has issued the Certificate of Final Acceptance to the Contractor.

60. REMEDIES AND POWERS

1) **Default of contractor** – If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall made an arrangement with or assignment in favour of his creditors, or shall age to carry out the Contract under a committee of inspection of his creditors or, being a corporation, shall go into liquidation (other than a voluntary liquidation for the purpose of amalgamation or reconstruction), or if the Contractor shall assign the Contract, without the consent in writing of the Employer first obtained, or shall have an execution levied on his goods, or if the Engineer-In-Charge shall certify in goods, or if the Engineer-In-Charge shall certify in writing to the Employer at in his opinion the Contractor :

a) Has abandoned the Contract, or

b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for twenty eight days after receiving from the Engineer-In-Charge written notice to proceed, or

c) has failed to remove materials from the Site or to pull down and replace work for twenty eight days after receiving from the Engineer written notice that the said materials or work had been condemned and/or rejected by the Engineer-In-Charge under these conditions, or

d) despite previous warnings by the Engineer-In-Charge, in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligation under the Contract, or

e) has, to the detriment of good workmanship, or in defiance of the Engineer's instructions to the contrary, sublet any part of the Contract.

Then the Employer may, after giving fourteen day's notice in writing to the Contractor, enter upon the Site and the Works and expel the Contractor therefore without thereby avoiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the Employer or the Engineer-In-Charge by the Contract, and may himself complete the Works or may employ any other contractor or agency to complete the Works. The Employer or such other contractor may use for such completion so much of the Constructional Plant, Temporary Works and materials, which have been deemed to be reserved exclusively for the execution of the Works, under the provisions of the Contract, as he or they may think proper and the Employer may, at any time, sell any of the said Constructional Plant, Temporary Works used and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

2) **Valuation at date of forfeiture** – The Engineer-In-Charge shall, as soon as may be practicable after any such entry and expulsion by the Employer, fix and determine expert, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and the value of any of the said unused or partially used materials, and Constructional Plant and any Temporary Works.

3) **Payment after forfeiture** – If the Employer shall enter and expel the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer-In-Charge. The Contractor shall then be entitled to receive only such sums or sums, if any, as the Engineer-In-Charge may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

61. URGENT REPAIRS

If, by reason of any accident, or failure, or other event occurring to in or in connection with the Works, or any part thereof, either during the execution of the Works, or during the period of Maintenance, any remedial or other work or repair shall, in the opinion of the Engineer-In-Charge or the Engineer-In-Charge's Representative, be urgently necessary for the safety of the Works and the Contractor in unable or unwilling at once to do such work or repair, the Employer may employ and pay other persons to carry out such work or repair as the Engineer-In-Charge or the Engineer-In-Charge's Representative may consider necessary. If the work or repair so done by the Employer is work which in the opinion of the Engineer-In-Charge, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the Employer in so doing shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sums due or which may become due to the Contractor provided always that the Engineer-In-Charge or the Engineer-In-Charge's Representative, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

62. SPECIAL RISKS

Notwithstanding anything in the Contract contained:

1) **No liability for war, etc., Risks** – The Contractor shall be under no liability whatsoever whether by way of identity or otherwise for or in respect of destruction of or damage to the Works, same to work condemned under the provision of Clause 38 hereof prior to the occurrence of any special risk hereinafter mentioned, or to property whether of the Employer or third parties, or for or in respect of injury or loss of life which is the consequence of any special risk as hereinafter defined. The employer shall indemnify and save harmless to Contractor against and from the same and against and from the same and against and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising there out or in connection therewith.

2) **Damage to works, etc., by special risks** – If the Works or any materials on or near or in transit to the Site, or any other property of the Contractor used or intended to be used for the purposes of the Works, shall sustain destruction of damage by reason or any of the said special risks the Contractor shall be entitled to payment for :

   a) Any permanent work and for any materials so destroyed or damaged and so far as may be required by the Engineer-In-Charge, or as may be necessary for the completion of the Works, or the basis of cost plus such profit as the Engineer-In-Charge may certify to be reasonable;

   b) Replacing or making good any such destruction or damage to the Works;

c) Replacing or making good such materials or other property of the Contractor used or intended to be used for the purposes of the Works.

3) **Projectile missile etc.** – Destruction, damage, injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade, or other projectile, missile, ammunition, or explosive of war, shall be deemed to be a consequence of the said special risks.

4) **Increase cost arising from special risks** – The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall beat the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him/her to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation up to the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Engineer-in-Charge concerned. The contractor shall be paid for the damages/destruction suffered and for the restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

(5) Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations

(a) Unless the contractor had taken all such precautions against air raid as are deemed necessary by the Air Force Officers or the Engineer-in Charge.

(b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not Intended for the work.

In the event of the contractor having to carry out reconstruction as aforesaid, he/she shall be allowed such extension of time for its completion as is considered reasonable by the Engineer-in-charge.

6) **Outbreak of War** – If, during the currency of the Contract, there shall be an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the works, the Contractor shall, unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works. Provided always that the Employer shall be entitled at any time after such outbreak of war to terminate the Contract by giving written notice to the Contractor and upon such notice being given, this Contract shall, except as to the rights of the parties under this Clause and to the operation of Clause 64 hereof, terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof.

7) **Removal of plant of termination** – If the Contract shall be terminated under the provisions of the last proceeding sub-clause, the Contractor shall, with all reasonable despatch, remove format he Site all constructional Plant and shall give similar facilities to his Sub-Contractors to do so.

8) **Payment if Contract terminated** – If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the Employer, in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor,

for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

a) The amounts payable in respect of any preliminary items, so far as the work carried out or performed, and a proper proportion as certified by the Engineer-In-Charge of any such items, the work or service comprised in which has been partially carried out or performed.

b) The cost of materials or goods reasonably ordered for the Works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery such materials or goods becoming the property of the Employer upon such payments being made by him.

c) A sum to be certified by the Engineer-In-Charge, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works in so far as such expenditure shall not have been covered by the payments in this sub-clause before mentioned.

d) Any additional sum payable under the provisions of sub-clause (1), (2) and (4) of this Clause.

Provided always that against any payments due from the Employer under this sub-clause, the Employer shall be entitled to be credited with any outstanding balances due from the contractor for advances in respect of Constructional Plant and materials and any other sums which at the date of termination were recoverable by the Employer from the Contractor under the terms of the Contract and provided that if the termination be made in exercise of Clause C-60(1), no payment shall be released under Clause C-62(8) (a) to (d).

63. FRUSTRATION

Payment in event of Frustration – If, a war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevent from fulfilling his contractual obligations, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as would have been payable under Clause 62 hereof if the Contract had been terminated under the provisions of Clause 62 thereof.

64. SETTLEMENT OF DISPUTES

(1) **Settlement of Disputes** – If any dispute or difference of any kind whatsoever shall arise between the Employer and the Contractor or the Engineer-In-Charge and the Contractor in connection with, or arising out of the Contract, of the execution of the Works, whether during the progress of the Works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall be settled in the court of law having jurisdiction, provided that such a recourse shall not be resorted to without exhausting all other reasonable avenues of redressed.

65. NOTICES

(1) **Contractor's local office and service of notices to contractor** – The Contractor shall have a local office at or near the Site of Work. Full address thereof shall be intimated by the Contractor or his authorised Agent to the Employer as well as to the Engineer-In-Charge. All Certificates notice or written orders to be given by the Employer or by the Engineer to the Contractor under the terms of the Contract, shall be deemed to have been served by sending by post to or delivering the same to the Contractor's local office.

(2) **Service of notice to employer** – All Notice to be given to the employer under the terms of the Contract, shall be served by sending by Registered post or delivering the same to the address given below:

Superintending Engineer,
Programming Circle, Water & Sanitation Sector,
Kolkata Metropolitan Development Authority,
2nd Floor, Block-C, Unnayan Bhawan, Kolkata-700091.

(3) **Change in Address** – The Employer, the Engineer-In-Charge or the Contractor may change a nominated address to another address by prior written notice to the other two and in that event shall resume receiving of communication 28 days after delivery of such notice.

66. PRICE ADJUSTMENT& PRICE ESCALATION.

(1) *The prices to be paid to the contractor for the whole work shall remain firm during the stipulated contract period or extension thereof and no price adjustment shall be allowed.*

(2) *No price escalation will be considered during the stipulated contract period or extension.*

67. MISCELLANEOUS

Dangerous materials : Explosive, chemicals, combustible articles and items and similar materials intended for the Works shall be conveyed, stored and used by the Contractor and his sub-contractors in accordance with all laws, decrees, instruments, orders and regulations imposed by the Government or any of its instrumentalists. Observance of all safety provisions shall be the obligation of the Contractor and nothing herein shall release him from full responsibility for damage or injury to persons or properties resulting from his use of these dangerous materials.

68. CONTRACT CONFIDENTIAL

Except with the prior written approval of the Employer and to subject the such conditions as may be prescribed, the Contractor and/or any member of his organisation shall not in any case communicate to any person or entity and information connected with the performance of the Services or in carrying out the Works not make public any information for the purpose of publication or advertisement. All matters related to the Contract shall be treated by the Contractor as private and confidential.

69. CONTRACTOR TO PROVIDE FACILITIES

The Contractor shall provide such labour, materials and other facilities that the Engineer-In-Charge or his Representative may require to assist them in carrying out normal tests and checks on materials and workmanship and in measurement of works.

70. INTERFERENCE WITH EXISTING FACILITIES

The Contractor shall carry out the works in such a way as to the minimum extent of interference to the use of existing facilities of any kind.

71. ACTS OF INFLUENCE

Neither the Contractor nor any of his Agents, Representatives, Employees or members of his organisation shall commit any act which may influence the judgement or decision of the Employer or the Engineer or any their agents, representatives, employees or members of their respective organisation. Any breach of this provision shall constitute a breach of Contract on the part of the Contractor and apart from penal measures against the Contractor according to the law the land, the Employer shall have the Authority to take action for the Contractors' default in terms of the provisions of Clause 60 hereof.

72. INDIVIDUALS NOT PERSONALLY RESPONSIBLE

No personal liability shall be imposed on the members or the Employer or on the Engineer-In-Charge or their duly authorised representatives, agents or employees for acts performed or discharged in the exercise of their authorised duties or responsibilities or in carrying out their obligations by virtue of the provisions or scope of work contained in the Contract, if being understood that they are acting solely as agents and representatives of the Employer in good faith.

73. CONTRACT EMBODIES WHOLE ARRANGEMENT

The Contract becomes effective immediately on issue of the letter of acceptance to the successful Tenderer. The Contract (including annexure if any) as subsequently executed embodies the whole arrangement between the parties entering into the Contract. All previous correspondence, negotiations, representation, explanations statements, promises or guarantees (whether oral or written) as are not included in the Contract as executed, shall normally be excluded in the interpretation of the Contract.

74. COMPLETION DRAWING

Completion drawing including detailed construction drawing shall have to be submitted in original with 6 (six) copies of prints of each. The original drawings shall be drawn on thick polyester film approved by the Engineer-in-Charge. Scale and size of drawings shall also be as specified by the Engineer-in-Charge. Soft copy of drawing copied in CD/pen drive should be submitted in addition. No extra payment will be made for it.

The Completion drawings are to be got approved by the Employer and shall have to be submitted before the issue of certificate of final acceptance as in Clause C-57(6).

SECTION - D

SPECIAL PROVISIONS

1. GENERAL

1.1 Extended Scope of the Contract

The contract comprises the planning, designing, drawing supplying materials and equipment, construction of 84 MLD capacity Raw water intake Jetty cum Jetty Mounted Pump House and Sub-station building and Raw Water Rising main, and except in so for as the contract otherwise provides, the provision of all labour, materials, constructional plant, temporary works and everything (whether or a temporary or permanent nature) required and for such planning, design and constructionso far as the necessity forproviding the same in specified in or reasonably to be inferred from the contract.

1.2 Item wise details of the lump sum prices and interim payment schedule

The successful contractor will, against each of the job items quoted in the schedule of prices on lump sum basis, submit a detailed break up of lump sum prices for the approval of the Superintending Engineer for the purpose of preparing interim payment schedule and calculating the consumption of materials to be issued by the Authority. The breakups will be such as to fairly agree with the lump sum price quoted. **The Superintending Engineer shall have the authority to ask the contractor to submit the basis of breakup of payment schedule submitted by the contractor ormodify the breakup of payment schedule keeping, however, the total of the prices fairly equal to the lump sum amount quoted**. Lump sum prices quoted in the schedule of prices shall remain fixed irrespective of the variations (i) in items and quantities during actual execution compared with those provided in the break-ups.

A. Such break-ups for Civil Works shall include for each of the unit of the Raw Water Intake Jetty Mounted Pump House and Sub Station building the following broad items of works:

i) Preparation of detail design, drawing and structural stability certificate and duly checked and vetted by the recognized educational institution for getting approval from the department.

ii) Pilling works with liner and necessary arrangement for construction.

iii) Cement Concrete works.

iv) Reinforcement works.

v) Brick Works.

vi) Doors, Windows, Rolling Shutters, Gates etc.

vii) Roof Treatment works.

viii) Plumbing and Sanitary Works.

ix) Pipe Lines and appurtenant structures, fitting of Bell Mouth etc.

x) Finishing works and other miscellaneous works (to be specified by the Contractor).

B. Such break-ups for Civil Works shall include for each of the unit of the work of Laying Raw Water Rising main the following broad items of the works:

i) Supplying and laying of 800mmDiameter MS Pipe.

ii) Earth work in Excavation after survey

iii) Shoring work.

iv) Preparing base.

v) Laying of pipelines.

v) Construction of Thrust Block.

vi) Fitting Fixing of Valves, ball Valves, Air release Valves etc.

v) Temporary and permanent road restoration.

The abovementioned details should be submitted by the contractor as early as possible after receipt of the Letter of Intent in order to enable him to start any sub-items of work and to receive interim payments.

1.3 Store shed

The Contractor shall provide at his own cost a store shed of adequate capacity for storing materials. The shed should be of such construction that it must protect the materials against deterioration. A raised platform well above the highest flood level shall be made for stacking cement in such a way that the cement received earlier can be consumed first so as to avoid deterioration due to prolonged stacking. If, any modifications to the store shed in suggested by the Engineer for better storing of materials that should be carried out by the Contractor at his own cost.

1.4. Land for Contractor's Establishment

For the purpose of constructing Contractor's Store yard, go-downs, site office and ancillaries, he may utilise portion of the land belonging to the Employer or site handed over to him for the work, at such location as would not interfere to execute other works. For all these, the Contractor shall have to obtain the requisite permission of the Engineer. The Contractor shall for this purpose submit to the Engineer for his approval a plan of the proposed layouts for the site facilities. The Engineer reserves the right to alter and modify the Contractor’s proposals as the Engineer may deem fit.

1.5 Water and Electricity for Construction

1.5.1 The Contractor shall have to make his own arrangement for supply of water and for electrical power that may be required for or in connection with the works. No separate payment on this account will be entertained. However, KMDA may assist in getting power.

1.5.2 Arrangement for supply of piped water may not be possible. The Contractor will have to make arrangement for supply of drinking water and water required for constructions works by sinking tube wells or other suitable alternatives. The Tenderers shall investigate this matter during site inspection before submission of tenders. No payment will be entertained on this account.

1.5.3 Nevertheless electrical power from usual supply agencies may not be continuously available due to various reasons including loadshedding. In case of non-availability of electrical power the contractor will have to make his own arrangements for electrical power through Generator’s. This is during construction period only. Contractor should include such aspects while quote his rate. No payment will be entertained on this account.

1.6 First-Aid Facilities

The Contractor shall arrange for medical attentions to be promptly available when necessary. He shall for this purpose provide a number of First-Aid stations at suitable locations within easy reach of the workmen and other staff engaged in the Works. Each First-Aid station shall be properly equipped and will remain in charge of a suitably qualified person. The Contractor shall also provide for transport of serious cases to the nearest hospital. All these arrangements shall be to the approval of the Engineer.

1.7 Fire Fighting Arrangement

The Contractor shall provide suitable arrangement for firefighting. For this purpose he shall provide requisite number of Fire-Extinguishers and adequate number of buckets, some of which are to be always filled with sand and some with water. These equipments shall be provided at suitable prominent and easily accessible places and shall be properly maintained.

1.8 Safety Measures

The Contractor shall be responsible for the safety of all workmen and other persons entering or in the works and shall at his own expense and to the approval of the Engineer, take all measures necessary to ensure their safety.

Such measures shall include the provisions of helmets (Especially where work at a height is involved), provision of gum-boots to workers engaged in cement concrete or other works. Scaffolding or other measures required for working at a height shall be strong and rigid and have to be provided with suitable and convenient access. Shoring required for deep excavation must be adequate and rigidly braced and strutted. Other safety measure that the Engineer may direct, depending on the exigencies of the location and nature of work and other relevant factors, shall be provided by the Contractor.

1.9 Supervisory Staff

The Contractor shall engage an experienced and qualified Site Manager to be in day to day charge of the work and he should be authorised to receive instructions from the Engineer. He shall receive orders given by the Engineer from time to time and shall act on them promptly. The Contractor shall, during working hours, maintain engineer and supervisors of sufficient training and experience to supervise the various items and operations of the work. Orders and directions given to such engineers and supervisors or other staff of the Contractor shall be deemed to have been given to the Contractor. The Chief Engineer of the Contractor responsible for this work, by whatever designation he may be known, but who will be specified on award of the Contract shall at least once in a fortnight inspect the works and shall discuss with the Engineer the conduct and progress of the work.

1.10 Joint Survey

The Contractor shall satisfy himself regarding the correctness of the layouts, levels etc. as are shown in the drawings or given in the specifications. Before starting the work he shall also carry out at his own cost, survey of the whole work site jointly with the representative(s) of the Authority. Discrepancies noticed between drawings and the joint survey shall be informed in writing to the Engineer and got set right before execution of works. Such deviations as may arise out of the joint survey shall not variable the provisions of contract or entitle the Contractor to any extras in any way.

1.11 Layout and Checking

The contractor shall provide all labour, skilled and unskilled and all materials needed for carrying out, as directed, survey, laying out, setting out, checking of works, taking measurements, testing hydraulic and other structures, without any extra payment.

The Contractor shall also provide approach and access to all the works and stores without any extra cost.

1.12 Reference Points

After the joint survey has been plotted and approved by the Engineer, permanent base lines, cross line and bench marks shall be established by the Contractor so as to serve as reference points and "Dimensional Control Basis" of works. He shall prepare and submit a plan showing such reference points with their full description.

1.13 Co-operation with other Contractors

Some works in plant site have been already done/are being done/will be done through other contractors. In the event of any such work the contractor shall have to work in full co-operation and in close co-ordination with other contractor/contractors. Any difficulty that may arise in this connection will have to be amicably settled by the contractors amongst themselves. If that be not possible, the matter shall be referred to the Engineer whose decision shall be final and binding on all the parties.

However, the site allocated to the contractor may be fenced at the Contractor's cost provided any necessary access to others as it required is given. The contractor will be permitted to use only the access to the site as indicated on the site plan of Tender Drawing.

1.14 Approval of Materials and Equipment to be used

Samples in large enough quantity of materials and descriptive data there for requiring prior approval shall be furnished by the contractor to the engineer in good time before the collection of such materials and equipment so as to permit inspection and testing. The samples shall be properly marked to show the name of the materials, name of the manufacturer, and place of origin and item for which it is to be used. Only upon approval, the materials of approved quality shall be brought to site. Samples approved shall be on exhibition at all times, properly stores and prevented from deterioration for the purpose of comparison with the materials brought to site of work from time to time for use in work.

1.15 Testing, Testing Equipment and site laboratory

1.15.1 Testing of materials to be used in the permanent work or of the quality of finished items shall have to be done from approved NABL accredited laboratory or reputed universities/institute such as IIEST, J.U., IIT etc or KMDA's own laboratory as per instruction of E.I.C. at the expense of the contractor.

The contractor shall afford at his own cost necessary facilities in providing the requisite materials and other assistance that may be required by the Engineer including transport of the test specimens to the laboratory referred to above.

1.15.2 The Contractor shall provide site laboratory at his own cost necessary equipment for such testing which by the nature of work may have to be done at site or for taking samples for testing in laboratories. These include sufficient number of slump cones, standard 150 mm metal cube moulds, sets of I.S. sieves, weighing balances, graduated measuring cylinders, complete set of equipment for in-site density test, thermometers and any other miscellaneous equipment that may be required by the Engineer or his Representative. The Contractor shall also provide necessary arrangement for curing of concrete cube specimens, as instructed by the Engineer.

1.16 Construction Records

The Contractor shall keep and supply to the Engineer the up-to-date records of the dimensions and positions of all permanent works (showing therein any approved deviation between the drawing and the work as actually executed). The information available from the records must be adequate and complete to enable preparation of "as-made" drawing by the Contractor from these records.

1.17 Progress Photographs

The Contractor shall, at his own cost and expense arranges to take periodic GPS tagged photographs to show the progress of work or interesting features thereof. The time and the position where from a photograph is to be taken should be as per direction of the Engineer or his Representative. Three copies of each of these photographs to an enlarged size of about 25 cms x 20 cms together with soft copy of the same, shall have to be submitted to the Engineer-in-charge as an when directed by him and these shall become the property of the Employer. Each photograph shall be suitably captioned with the date of the photograph, location and other relevant particulars. Further prints and CD of the photograph, location and other relevant particulars shall not be kept by the Contractor or reproduced without written permission of the Employer. Digital Camera withatleast16.0 Mega pixel should be used for taking photos.

Restrictions to photography or security restrictions that may be applicable to any particular area must be carefully and rigidly observed.

1.18 Satisfactory completion of various items

The sub-works included in the Schedule of Prices are job works on lump sum basis. The various items of the sub-work are to fit in perfectly in the whole work in every respect so as to form effective working parts of the work as per satisfaction of the EIC. Each sub-work will be considered as complete when it is completed as per specifications as per standards, as a successful component part of the work.

1.19 Checking Quality of Work

Should the Engineer in Charge consider it necessary to satisfy himself as to the quality of the work, the Contractor shall, at any time during continuance of the contract, offer sample of work done or if necessary pull down a reasonable part of the work enough for such inspection and testing as the EIC may direct and the Contractor shall make good the same at his cost and to the satisfaction of the EIC without any extra cost.

1.20 Recording Measurements

Though the offer is on lump sum basis, the Contractor shall give not less than five days notice, in writing to the Engineer, about the work which is proposed to be covered or placed beyond the reach of measurements so that measurements may be taken before the work is covered, bar bending schedule is to be provided five days before the casting date. If any work is covered without such written notice, the same shall be uncovered at the cost of the Contractor and in default hereof no payment or allowances shall be made for such work. These requirements apply for all the component items executed for the sub-work for which lump sum price is quoted.

1.21 Reports and Returns

The Contractor shall maintain at Site daily records of progress with regard to the works carried out, labour engaged and construction equipment deployed. These will form the basis of preparing periodic reports and returns as may be required by the Engineer and in the manner as directed by him.

These daily records shall be made accessible to the Engineer or his Representative as and when desired by him.

1.22 Site Order Books

1.22.1 For the purpose of quick communication between the Engineer-in-Charge or his Representative and the Contractor or his Agent or Representative, Site order Books shall be maintained at site in the manner described below. Any communication relating to the works may be conveyed through records in the Site Books. Such a communication from one party to the other shall be deemed to have been adequately served specified elsewhere in the General Conditions of Contract. Each Site Book shall have machine-numbered pages in triplicate and shall be carefully maintained and preserved.

1.22.2 The Contractor shall keep Site order Books at various places Site work is being carried out so as to be readily available to the Engineer or his Representative. Any instruction or order which the Engineer or his Representative may like to issue to the Contractor may be recorded by him in the Site Book and two copies thereof taken by him for his record. The Contractor or his Agent or Representative may similarly maintain separate Site Book for any communication he may like to send to the Engineer or his Representative. Two copies thereof when sent to the Engineer's Representative and receipt obtained thereof, will constitute adequate service of the communication to the Engineer.

2. MATERIALS FOR THE WORK.

All the materials including cement and steel required for the work are to

be procured by the contractor at their own cost. TIA/EIC will check the materials quality as when required.

2.1 Cement:

C conforming to IS 269:1989 or PPC conforming to IS 1489:1991 or PSC conforming to IS 455:1989 (Grade 43 or above)is to be used and procured by the Contractor of his own cost**.** **Necessary test on cement sample to be done by the contractor at own cost.**

2.2 Reinforcement Steel: The contractor will have to use reinforcement steel (Grade Fe500 or above) procured from the following vendors:

a) For structure with Pile Foundation
such Jetty structure, Substation building, etc**:** TATA, SAIL or RINL.

b) For structures without pile foundation: Jindal, SRMB, Shyam steel, Elegant.

2.3 Mild Steel Plates: SAIL, TATA.

Necessary test on reinforcement & plate including collection of sample as per direction of E.I.C, have to be done by the contractor at his own cost.

Note: No material will be issued from KMDA departmental store. The Contractor shall have to arrange all the Constructional materials and equipments by himself. The contractor has to take approval of vendors from Engineer-in-Charge for cement, steel and all other material required for the work.

3. TERMS OF PAYMENT

a) Civil Works

100% value of civil works related to all civil structures shall be payable against Pro-rata running account Bill according to the satisfactory progress of the work.

4. SECURITY DEPOSIT:

(i) The Earnest money deposited by the lowest bidder (hereinafter shall be called the contractor) shall be converted into security deposit.

(ii) The authority making payment shall deduct such sum which together with the Earnest Money already deposited and converted into security deposit, shall amount to 3% of the value of works executed at the material point of time and paid during the progressive running accounts bills, so that total deduction against Security deposit together with Earnest Money constitute 3% of the tendered value of work actually done.

(iii) After completion of the work, the Contractor may opt for refund of the Security Deposit by replacing equal amount of Bank Guarantee of scheduled Bank valid up to 3 months beyond the defect liability period.

(iv) Security period/Defect Liability Period is fixed for 5 (five) years.

a) No security deposit shall be refunded to the contractor for 1st (first) 3 years from the actual date of completion of the work.

b) 30% of the security deposit shall be refunded to the contractor on expiry of four years from the actual date of completion of the work.

c) The balance 70% of the security deposit shall be refunded to the contractor on expiry of five years from the actual date of completion of the work.

5.INTEREST ON DUES

No interest will be payable by the Employer to the contractor on the account of any delay/pending/remaining bills lies at KMDA.

6. DEFECT LIABILITY:

The contract will have the Defect liability for a period of 5 (five) Years from the Date of successful completion of the work.

The contractor shall have to execute the work in such manner so that appropriate service level of the work under improvement is to be maintained during progress of the work and during Defect Liability Period from the date of successful completion of the work up to the entire satisfaction of the Engineer in Charge. If any defect / damage is detected during this period as mentioned above the contractor shall make the same good at his own expense to

the satisfaction of the of the Engineer in Charge or in default the Engineer in Charge may cause the same to be made good by other agency and deduct the cost (of which the certificate of the Engineer in Charge shall be final) from his security deposit or any sums that may be then, or at any time thereafter become due to the contractor. Security Deposit shall become payable only during Defect Liability Period as mentioned in clause for Security Deposit in NIT after making necessary deduction if applicable.

7. DISPOSAL OF THE EXCAVATED MATERIALS

All materials obtained from any excavation required to be carried out under this contract will be the property of the KMDA and the Contractor shall not have no claim on it. It will not be used for any purpose other than refilling the excavations as needed or levelling the compound or in construction of any embankment or in any manner as directed by the Engineer. After completion or work or earlier if so directed by the Employer the surplus excavated materials shall be disposed off by the contractor at any distance without any extra cost, but only after being so directed by the Employer.

7. POSSESSION PRICE TO COMPLETION

The Authority shall have the right to take possession for use of any completed or partly completed part of the work. Such possession or use shall not be deemed to be an acceptance of any work not completed in accordance with the agreement.

8. TENDER TO STRICTLY COMPLY WITH SPECIFIED CONDITIONS AND ALL OTHER SPECIFICATIONS

It should be clearly noted that the tenderers have to strictly comply with the specifications and other terms and conditions laid down in this document and no variations are permissible. This is necessary for the purposes of comparison of tenders received.

SECTION - E

GENERAL SPECIFICATIONS OF WORKMANSHIP AND MATERIALS FOR CIVIL WORK

1. GENERAL

1.1 General Materials

1.1.1 All materials used in the permanent works shall be of the best quality of the kind and to the approval of the Engineer-in-Charge. Any material not covered by these Specifications, shall comply with the relevant latest Indian Standard Specifications (Referred to as IS as revised or modified up-to the date one month prior to Tender date). British or American Standard Specifications shall be referred to in case any particular specification is not available in any of the aforesaid Specifications. For materials not specified in the aforesaid, direction of the Engineer-in-Charge shall be followed. All disputes shall be referred to the Employer, whose decision shall be final and binding.

1.1.2 Samples of materials to be supplied and used, by the Contractor in the works shall be to the prior approval of the Engineer-in-Charge. For this purpose the Contractor shall furnish in advance representative samples in quantities and in the manner as directed by the Engineer-in-Charge for his approval. Materials brought to the Site, which in the option of the Engineer-in-Charge do not conform to the approved sample, shall, if so directed by him, be removed by the Contractor from the Site and replaced by the materials of approved quality.

1.1.3 In spite of approval of the Engineer-in-Charge of any materials brought to the site, he may subsequently reject the same if in his opinion the materials has since deteriorated due to long or defective storage or for any reason whatsoever and is thereby considered unfit for use in the permanent works. Any material thus rejected shall be immediately removed from the Site at Contractor's cost and expense.

1.1.4 All materials brought to the Site shall be properly stored and guarded in the manner as directed by the Engineer-in-Charge and to his satisfaction.

1.1.5 The Engineer may carry out test of materials as he may decide. The Contractor shall, at his cost and expenses, for this purpose supply requisite materials and render such assistance to the Engineer-in-Charge as he may require.

1.2 Workmanship

All works are to be carried out in proper workman like manner. Items of works not covered by these Specifications or by other tender documents shall be carried out as per best practice according to the direction of the Engineer-in-Charge and to his satisfaction. The relevant IS Specifications and in case of necessity British or American Standard Specifications shall be taken as guide for the purpose.

1.3 Works Included

The rates for all items, unless specifically stated otherwise in the Contract, must cover the cost of all materials, labour, tools, machinery, plant, pumps, explosives, scaffolding, staging strong props, bamboos, ropes, templates, pegs and all appliances and operations whatsoever necessary for efficient execution of work.

1.4 Ground Conditions

The Contractor is to visit the site and ascertain local conditions, traffic restrictions, obstructions in the area and allow for extra expenses likely to be incurred due to any limitations whatsoever.

1.5 Setting Out and Levelling

The Contractor is to set and level the works, and will be responsible for the accuracy for the same. he is to provide all instruments and proper qualified staff required for checking the Contractor's work.

1.6 Safety

The Contractor shall take adequate precaution to provide complete safety for prevention of accidents on the site. The safety sign board to be installed at different strategic places of site as per civil, Electrical and others safety measures.

1.7 Keeping Works Free from Water

The Contractor shall provide and maintain at his own cost, electrically or other power driven pumps and other plant and equipment to keep site excavated foundation pits and trenches free from surface as well as subsoil / leakage water from any other source thereof and continue to do so to the complete satisfaction of the Engineer-in-Charge till the site is handed over. Method of dewatering shall need approval of the Engineer-in-Charge but no payment whatsoever is allowed on this count.

1.8 Rubbish

1.8.1 The Contractor shall clear all rubbish, vegetation, roots, soda etc., and dump then in the area indicated to the satisfaction of Engineer-in-Charge. No separate rate shall be allowed for the above work.

1.8.2 After the work is completed, the Contractor shall clear the area surrounding the buildings, of all hutments and excess stores and remnants of building materials such brick bats, metal, sand, timber, steel etc.

1.9 Bench Marks and Ground water Gauges

The Contractor shall protect surveyor's bench marks and ground watergauges, zero line marks and base line marks and base line marks from damage of movement during work.

1.10 Inspection

The Contractor shall inspect the Site of works and ascertain site condition and the nature of soil to be excavated.

1.11 Contractor's Staff

The Contractor must provide at all times efficient staff of trustworthy, skilful and experienced assistance capable of carrying out the work in accordance with the drawings and specification and to correct levels. The cost this establishment should be included in his rates.

1.12 Method of Measurement

Unless otherwise specified, the method of measurement for building works shall be as per IS:1200.

1.13 Specifications Referred to

1.13.1 The specification contained herein are not exhaustive and for such items of works which may arise and which are not covered by this specifications, the provisions in the relevant Indian Standard (Latest Edition) shall apply.

1.13.2 A list of some Indian Standards is given herein.

1.13.3 Wherever reference to the Indian Standard mentioned below or otherwise appears in the specification, it shall be taken as reference to the latest version of the Standard.

	IS Code No.	**Description**
General	IS:1200	Method of measurement of building And Civil Engineering works.
Cement	IS:269	Ordinary, Repair Hardening and Low Heat Portland Cement.
Sand	IS:1542	Sand for plaster.
Aggregates	IS:383	Aggregates-Coarse and fine, from Natural source for Concrete.
	IS:515	Aggregates for use in Mass Concrete, Natural and manufactured.
Concrete-Plain And Reinforced	IS:456	Code of Practice for Plain and Reinforced Concrete for General Building Construction.

	IS:3370	Code of Practice for Concrete Structures for the Storage of Liquids.
Bored Cast in Situ Piles	IS 2911	Code of practice for piling.
Brick Work	IS:1077	Common Burnt Clay Building Bricks.
Paving and Floor Finish	IS:1235	Flooring Tiles, Cement Concrete.
	IS:1443	Cement Concrete, Flooring Tiles Laying and finishing.
Plaster and Pointing	IS:1661	Cement and Cement Lime Plaster finishes on walls and Ceilings.
Steel and Iron Work	IS:226	Structural Steel (Revised)
	IS:800	Code of Practice for use of Structural Steel in General Building Construction.

Similarly others Indian standard Code of Practice to be followed for same and other kind of Civil , Mechanical , Electrical and Others Structural works.

2. EARTH WORK IN EXCAVATION & FILLINGS

2.1 General

Applicable provisions of Conditions of contract shall govern work under this section.

2.2 Excavation for Foundation, Trenches, Pit etc.

The excavation work shall be carried out in all kinds of Soil including Sand in workman link manner without endangering the safety of the nearby structures or works without causing any hindrance to other activities in the area. The existence of old buildings, boundary walls, hutment, sewer lines, water lines, if any very close to the area of excavation should be given careful consideration while designing carrying out the excavation work. The excavation shall be done in such method as would technically be appropriate and befitting the site conditions subject to the approval of the Engineer-in-Charge. All foundation trenches shall be excavated to the full width and depths shown on the approved drawing or to such ordered to the Contractor.

The Contractor shall not undertake any earth work without having obtained prior approval from the Engineer-in-Charge to the methods he proposes to employ in order to execute the work in the most efficient manner. He shall not modify such methods without the approval of the Engineer-in-Charge. This approval, however, shall not in any way make the Engineer-in-Charge responsible for any consequent loss or damage.

2.2.2 Should any excavation be taken down the specified levels, the Contractor shall fill in such excavation at his own cost with concrete as specified for foundations, well rammed in position until it is brought up to the specified level.

2.2.3 The Contractor shall notify when the excavation is completed and no concrete or masonry shall be laid until the soil for each individual footing, rafts etc. is approved.

2.2.4 The Contractor shall keep the site clear of water at all times. To this end he shall provide arrangements for bailing and pumping or any special arrangements as required within his quoted prices.

2.2.5 All foundation pits shall be refilled to the finished ground level (formation level) with approved materials, which shall be suitably consolidated in layers to the satisfaction of the Engineer-in-Charge.

2.2.6 **Nothing extra will be paid for pumping/bailing out water collecting in excavation due to rains, ordinary springs, leakage from any other sources etc., or any other reason**.

2.2.7 For the work of excavation the Tenderer shall included in his quotation the shoring, sheeting, bracing and sheet pilling (if required). The quotation shall also include the cost of compaction of foundation sub-base, removal and storage of excavated materials and back-filling.

2.3 Shoring

Timber shoring whenever required shall be closed boarded with minimum 50mm thick good and seasoned timber planks of sufficient length driven side-by-side to the required depth. The gaps between adjacent timber planks shall such would not allow any flow of soil particles, if necessary, the sides of the planks shall be planed smooth to ensure this. Sufficient number of bracing struts, walling etc. is to be provided to make the shoring rigid and non-yielding by earth pressure. Where necessary, sheet pilling shall be done to ensure safety to the adjoining structures, if it is found that it is not feasible to protect the structure by timber shoring only. The Tenderer is strongly advised to inspect the site before tendering and apprise himself of the requirement of any Sheet piling in addition to the timber shoring before submitting his Quotation accordingly.

2.4 Back Filling

The space around the foundations in trenches or sites shall be cleared of all trash and loose debris and filled with approved excavated earth, all clods being broken upto the finished G.I. Filling shall be done in 200mm layers, each layer to be property moistened and well rammed.Excavated materials which is surplus or which is consolidated unsuitable for back filling is to be disposed of in spoil dumps as directed by the Engineer-in-Charge.No extra payment will be made for this.

3. CONCRETE

3.1 General

3.1.1 Applicable provisions of Conditions of Concrete shall govern work under this section.

3.1.2 All concrete work, plain or reinforced shall be carried out strictly in accordance with this specification and any working drawing or instructions given from time to time to the Contractor.

3.1.3 The Contractor's states shall allow for wastages in all materials as well as for all tests of materials and concrete.

3.1.4 No concrete shall be cast in the absence of the Engineer-in-Charge or any other person duly authorised by him. The Contractor's Engineer shall personally check that both the form work and reinforcement have been correctly placed and fixed, and shall satisfy himself that all work preparatory to the casting is completely ready, before information the Engineer-in-Charge for final inspection and approval and for which purpose at least 24 hours notice shall be given by the Contractor.

3.1.5 The Indian Standards wherever referred to herein shall be the latest addition of such standards.

3.2 Cement

Cement shall conform for IS:269. Cement tests shall have to be carried out at Contractor's expense as and when directed. Cement which has practically set shall not be used under any circumstances. The important structures should be constructed with the grade of cement not below 43 (Grade-43). **No extra payment will be made for using Grade-43 cement or higher grade.**

3.3 Aggregates

The fine and coarse aggregates shall conform to all provisions and test methods of IS:383 and / or IS:515. Samples of aggregates, proposed to be used in the work shall be submitted free of charge in sufficient quantities to the Engineer-in-Charge with sieve analysis and other physical and chemical analysis data for his approval. Approved samples will be preserved by him for future reference. This approval will not in any way relieve the Contractor of his responsibility of producing of specified qualities.

3.3.1 Coarse Aggregates

Coarse aggregates for use all reinforced and other plain cement concrete works shall be crushed black granite trap stone obtained from approved source and shall consist of uncoated, hard, strong dense and durable pieces of crushed stone, and be free from undesirable matters, viz. Disintegrated stones soft, friable, thin, elongated or laminated pieces, dirt, salt, alkali, vegetable matter or other deleterious substances. The aggregates shall be thoroughly washed with water and cleaned before use to the satisfaction of the Engineer-in-Charge at no extra cost of the Employer.

The maximum size of coarse aggregates shall be as follows unless specified otherwise elsewhere.

Reinforced Concrete	:	20 mm
Plain Concrete	:	20 mm.
Thin R. C. C. Members		
With very narrow space	:	12 mm.
Mat/Lean Concrete	:	20/40 mm.

(The actual size to be agreed by the Engineer-in-Charge)

Grading of coarse aggregates for a particular size shall generally conform to relevant I. S. Codes and shall be such as to produce a dense concrete of the specified proportions and or strength and consistency that will work readily in position without segregation.

3.3.2 Fine Aggregates

Sand shall be clear River sand brought from approved source and consist of siliceous material, having hard, strong, durable uncoated particles, free from undesirable matters viz. dust lumps, soft or flaky particles or other deleterious substances. The amount of undesirable shall not exceed the percentage limits by weights as specified in relevant IS Codes. Washing of aggregates by approved means shall be carried out, if desired by the Engineer-in-Charge, at no extra cost to the Employer.

Coarse and fine sand shall be well graded within the limits by weight as specified in relevant IS Code. Fineness Modulus shall not vary by more than plus or minus 0.20 from that of the approved sample. Fineness Modulus for sand should not be less than 2.5.

3.4 Reinforcement

3.4.1 The Contractor shall prepare and furnish to the Engineer-in-Charge, Bar Bending Schedules in considerations of the approved drawings for all R. C. C. works for review and checking by the Engineer-in-Charge well before taking up the work.

3.4.2 The mild steel reinforcement shall conform to IS:432 & the TMT bars reinforcement shall conform to relevant IS: Codes.

All steel for reinforcement shall be free from loose, oil, grease, paint or other harmful matters immediately before placing the concrete.

3.4.3 The Reinforcement shall be bent to the shapes shown on the approved drawings prior to placing and all bars must be bent cold. The Steel shall be placed in such a way that it is rigidly held in position while concrete is being cast. The correct clearance from the form shall be maintained by either precast mortar blocks or by metal supporting chairs to be supplied by the Contractor free of charge.

The intersection of roads crossing one another shall be bound together with soft pliable with No. 16 to 18. S. W. G. at every intersection so that reinforcement will not be displaced in the process of depositing concrete. The loops of binding wire should be tightened by pliers and welding of reinforcements for lapping & binding should be done if desired by E.I.C. No extra payment will be made for this purpose.

3.4.4 The work of reinforcement shall also be inclusive of stirrups distribution bars, binders, initial straightening and removing of loose rust, if necessary, cutting to requisite length, hooking and bending to correct shape, placing in proper position including supplying and binding with block annealed wire as stated in clause 3.4.3 above.

3.5 Water

The Water shall be clean and free from Alkali oil or injurious amounts of deleterious materials. As far as possible, the water be of such quality that it is potable. If any chemical analysis of water is necessary and ordered, the same shall be carried out at an approved laboratory at the Contractor's cost and expenses.

3.6 Concrete Proportioning

3.6.1 The concrete proportions shall be as indicated on the approved drawings and shall conform to IS:456 & IS:3370. The quality and character of concrete shall be governed by IS:383. It should be sampled and analysed as per IS:1199. The concrete should stand the test specified in IS:516.

3.6.2 The minimum cover of main reinforcement shall be as per relevant IS: Codes. Cover to any reinforcement of R. C. C. piles shall be minimum 65 mm. In case in-situ and 50 mm. In case of precast piles. Suitable spacer blocks shall be provided at intervals not exceeding 1.2 m. throughout the length of the pile.

3.6.3 The workability shall be measured by slump. Preferably Slump for different grades of concrete shall follow clause 7.2 of IS: 456-2000.

3.6.4 All concrete works shall be thoroughly compacted and fully worked around the reinforcement, around embedded fixtures and into corners of the form work.

The Concrete shall be thoroughly and shall be efficiently vibrated during laying. The use of mechanical vibrators shall comply with IS: 2608, IS: 2506 and IS: 4656. Whenever vibration has to be applied externally, the design of form work and deposition of vibration shall receive special consideration to ensure efficient compaction and to avoid surface blemishes.

3.6.5 Test for Water Tightness of Structures / Pipes

For liquid retaining structures including inlet chambers etc. shall be deemed to be satisfactory water tight as per relevant clause of IS: 3370. Approved corrective measures, if necessary, shall be undertaken by the Contractor at his own expenses.

The contractor shall have to perform water-tightening test as per relevant IS Codes for all the water retaining structures immediately after construction and curing time. No mechanical or electrical equipments or instruments shall be allowed to install in any water retaining structure without proper water-tightening test.

As regards the pipe lines, the tests shall be performed for the Hydrostatic Pressure of 10 Kg./Sq. cm in case of S.W.M.S or Fabricated MS Pipe, D.I. Pipes and 2 Kg./Sq. cm. for P. S. C. respectively. The tests shall be carried out as per relevant IS Codes and pipes shall be considered satisfactory if the tests results satisfy the requirements of the relevant clauses of the Codes. The Contractor shall give all these Hydraulic Tests by making his own arrangements for water supply and filling and disposing the water after the tests. The Contractor shall rectify the defects noticed and carry out the tests again and repeat the testing operation till successful result is obtained and accepted by the Engineer. The rates Quoted for the work shall be considered as inclusive of cost of all Labour, materials and equipment required to give successful tests for Water tightness.

3.7 Workmanship

3.7.1 All Concreting work shall be carried out according to the IS:456, IS:3370, and other related IS codes.

3.7.2 Structural Concrete

Design mix Concrete shall be on all concrete works except in case of Mud-mat concrete lean concrete where nominal mix concrete will be allowed.

The concrete mix shall be designed to produced to produce the grade of concrete having required workability and a Characteristic Strength not less than appropriate values given in IS : 456 - 2000. For mix design, procedure given in Indian Standard.

Recommendation or any other standard procedure shall be adopted. As long as the quality of materials does not change a mix design done earlier may be considered adequate for later work. Batching mixing, sampling and Strength Test of concrete shall be carried out in compliance with the relevant clause of IS:456-2000 and all other relevant Indian Standards recommended therein.

The mix design by the Contractor shall be used for works only after obtaining written approval of the Engineer-in-Charge. Mix design shall be entirely the responsibility of the Contractor and any approval by the Engineer-in-Charge shall not relieve him of his responsibility in respect thereof.

The Contractor shall prepare all the Calculations. Tabulations, Graphs etc. pertaining to Mix design Test result and supply copies of such Calculations, tabulations, Graphs etc. required by the Engineer-in-Charge. The minimum Cement content in each grade of Concrete shall be as given below :

Grade of Cement Concrete-Maintained Minimum Cement Content perCu.m. of finished Concrete (Kg). This can be varied with Mix Design proportions.

Minimum Cement Content for Grade of Concrete for M 25 and M30 to be selected as per relevant IS Codes.

*Table -5 of IS: 456-2000-For cement of Grade-43 or higher, the minimum cement content will be fixed by E.I.C.in compliance with trial Mix Design test result.

On proportioning concrete, the quantity of both cement and aggregate shall be determined by weight, where the weight of cement is determined on the basis of weight per bag a reasonable number of bags be weighed periodically to check the net weight or should be either weighed or measured by volume in calibrated tanks. All measuring equipments shall be maintained in a clean serviceable condition and shall periodically checked for accuracy.

The grading of coarse and fine aggregates shall be checked frequently and frequency of testing shall be determined by the Engineer-in-Charge. Where weight batching is not possible or practicable, the quantities of coarse and fine aggregates may

be determined by volume but cement in any case shall be weighed by weight only. If fine aggregate and volume batching is adopted, allowance shall be made for bulking. The bulking shall be determined in accordance with IS: 2386 (Part-III).

The Water-Cement Ratio shall be maintained to its correct value. Surface moisture content of aggregate shall be determined as per IS:2386 (Part-III) and the amount of water to be added shall be adjusted accordingly to maintain the correct Water-cement Ratio.

During the progress of work in order to ensure correct strength of concrete proper control should be exercised by the Contractor as specified in Specifications mentioned in the Clause 3.7.1 above. Test strength of every sample shall be determined in accordance with the recommendations of IS:456-2000. If one out of ten consecutive test cubes shows a deficiency in strength up-to a maximum limit of 10%, the concrete will be deemed satisfactory. If two of the test cubes out of ten show a deficiency in strength up-to a limit of 10%, the concrete shall be deemed to be less satisfactory and a reduction of 1% will be made on the cost of such concrete. If three out of ten test cubes show deficiency in strength up-to a limit of 10%, a reduction of 5% will be made on the cost of such concrete. If more than three test cubes show a deficiency in strength up-to a limit of 10% a reduction of 10% will be made on the cost of such concrete. If more than five show a deficiency in strength up-to a limit of 10%, the concrete shall be rejected. Such rejected concrete work shall have to be dismantled and replaced to the satisfaction of the Engineer-in-Charge by the Contractor free of cost to the Employer. No payment for the dismantled concrete, the relevant form work and reinforcement, embedded fixtures etc. wasted in the dismantled portion, shall be made. In the course of dismantling, if any damage is done to the embedded items or adjacent structures, the same shall also be made good free of charge by the Contractor to the satisfaction of the Engineer-in-Charge.

If the deficiency in strength of one test cubes exceeds the 10% limit, a reduction of 5% will be made on the cost of such concrete. if the deficiency in strength to two out of ten test cubes exceeds the 10% limit, a reduction of 10% will be made on the cost of such concrete. If the deficiency in strength of three out of ten test cubes exceeds the 10% limit, a deduction of 20% on the cost of such concrete will be made.

With permission of the Engineer-in-Charge for any above mentioned grades of concrete, if the quantity of water has to be increased in special cases, cement shall also be increased proportionally to keep the ratio of water to cement same as adopted in trial mix design for each grade of concrete. No extra payment for additional cement will be made.

The contractor is requested to carry out the cube strength test to find out crushing strength of concrete at the laboratory of KMDA situated in UnnayanBhavan, Saltlake, paying appropriate charges. In case of inconvenience of the KMDA laboratory the cube strength test could be performed at site (60%)and at laboratories approved by EIC (rest 40%).

3.8 Precast Concrete

Precast Concrete items shall conform to relevant IS Specifications. Precast items shall be suitably marked with the date of casting identification marks and shall show the right way up as may be required. The arrangements to be made by the Contractor for Site manufacture and handling of precast items shall be done to the approval of the Engineer-In-Charge. Each precast unit shall be cast in one operation and no construction joints shall be permitted. No damaged or defective units shall be built into the works and units shall be so stored that they are not over stressed.

Precast units shall be provided in places as shown in the approved drawings. The precast units shall be cast at site strictly following the Specifications of Precast Concrete work. Proper care shall be taken to ensure that the units are obtained from

the moulds without any damage. Before erecting in position the position the units shall be cured adequately by keeping units immersed in water.

3.9 Form Work

3.9.1 The Form Work shall conform to IS:456. Whenever necessary, shuttering must be provided. The work shall also include providing all necessary staging, cantering, form work and moulds for placing concrete. Shuttering may be of approved dressed timber true to line, not less than 37 mm. thick. Surface to be in contact with concrete are to be planed smooth. Alternatively, sufficiently rigid plywood shuttering or steel shuttering may be used. In every case, joints of the shuttering are to be such as to prevent the loss of liquid from the concrete. In timber shuttering the joints shall, therefore, be either tongued or grooved or the joints must be perfectly close and lined with draft paper polyethylene films or other types of approved materials. In case of plywood or steel shuttering also the joints are to be similarly lined. All shuttering and framing must be adequately stayed and braced to the satisfaction of the Engineer-in-Charge for properly supporting the concrete, during concreting and the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete. No through bolts are allowed for holding the shuttering in water retaining structure.

3.9.2. Cleaning, Treatment and Removal of Forms

All forms shall be thoroughly cleaned of old concrete, wood shavings, saw dust, dirt and dust sticking to them before they are fixed in position. All rubbish loose concrete chippings, shavings, saw dust etc. shall be scrupulously removed from the interior of the forms before the concrete is poured. Form work shall not be used/reused, if declared unit or unserviceable by the Engineer-in-Charge.

If directed by the Engineer-in-Charge, compressed air jet/or water jet shall be kept handy along with wire brushes, brooms etc. for the purpose of cleaning.

Before shuttering is placed in position, the form surface in contact with the concrete shall be treated with approved non-staining oil or composition. Care shall be taken that the oil or composition. Care shall be taken that the oil or composition does not come in contact with reinforcing steel or existing concrete surface. They shall not be allowed to accumulate at the bottom of the shuttering.

Forms shall be struck in accordance with the relevant clause of IS:456 or as directed by the Engineer-in-Charge. The Contractor shall record on the drawings or in other approved manner, the date in which the concrete is placed in each part of the work and the date on which the form work is removed therefrom and have this recorded checked and countersigned by the Engineer-in-Charge.

The Contractor shall be responsible for the safe removal of the form work, but the Engineer-in-Charge may delay the time of removal if he considers it necessary. Any work showing signs of damage through premature removal of form work or loading shall be entirely reconstructed without any extra cost to the Employer.

3.10 Protection and Curing of Concrete

Newly placed concrete shall be protected by approved means; from rain, sun and wind and extreme temperature. Concrete placed below the ground level shall be protected from failing earth during and after placing. Concrete placed in ground containing deleterious substance shall be kept free from contact with such ground or, with water draining from such ground during placing of concrete and for a period of at least 3 (three) days or as otherwise directed by the Engineer-in-Charge. The ground water around newly poured concrete shall be kept to an approved level by pumping or other approved means of drainage at the cost of the Contractor. Adequate steps shall be taken to prevent flotation or flooding. Steps, as approved by the Engineer-in-Charge, shall be taken to project immature concrete from damage by debris, excessive loading,

vibration, abrasion, mixing with earth or other deleterious materials, etc. that may impair the strength and durability of the concrete.

As soon as the concrete has hardened sufficiently for the surfaced to be marked it should be covered with hessian, canvas, or similar materials and kept continuously wet for at least 7 (seven) days after final setting. This period may be extended at the direction of the Engineer-in-Charge, upto 14 (fourteen) days. Concrete slabs and floors shall be cured by flooding with water of minimum 25 mm. depth for the period mentioned above.

Approved curing compounds may be used in lieu of moist curing with the permission of the Engineer-in-Charge. Such compound shall be applied to all exposed surface of the concrete as soon as possible after the concrete has set. No extra payment is allowed on such count.

3.11 Concrete Finish

The Concrete surface on removal of form work shall be such that no finish in necessary, If, however, the surfaces is not satisfactory the Contractor shall, if so instructed, remove unwanted, projecting parts by chipping and smoothening the surface with cement rendering at his own expenses. The shutter marks shall invariably be removed by rubbing with carborundum stone. The Contractor shall therefore take all precaution for avoiding the shutter marks.

3.12 Construction Joints

These shall be in according with IS:337 or as directed.

3.13 Expansion Joints

Expansion joints shall be provided at position as directed and the spacing shall not exceed the limits specified in IS:456. These shall comply strictly with the details shown on approved construction drawings. Reinforcement shall not extend across any expansion joint and the break between the two section must be complete.

3.14 Details of typical expansion joints and construction joints should comply with the suggestive arrangements shown in IS:3370 (Part-I), Clause 8.1 (a)(2), Figure 2 (for expansion joints) and Clause 8.1(a) Figure 1, Clause 8.1 (b) Figure 4 (for construction joints).

3.15 P.V.C. Water Stops

The materials shall be durable and tough and as per approval of the Engineer-in-Charge. The minimum thickness of PVC sealing strips shall be 6 mm. and the minimum width 225 mm. actual shapes and size shall be as per drawings. The materials should be of good quality polyvinyl chloride highly resistant to abrasion and corrosion as well as to chemicals likely to come in contact with during use. The physical properties will generally be as follows:

Specific Gravity	1.3 to 1.35
Shore Hardness	60 A to 80 A
Tensile Strength	100 to 150 Kg./Cm2
Minimum Safe Continuous Temperature	75^0C
Ultimate Elongation	Not less than 275%
Water Absorption	Not more than 5% by weight in a 7 day test.

3.16 Rubber Water Stops

The materials must be very durable and tough and as per approval of the Engineer-in-Charge. The ribs shall be sufficient to ensure proper bonding with

concrete. The width shall be minimum 225 mm. and thickness minimum 6 mm. The rubber water stop must be used in long lengths to avoid splicing as far as practicable. Ends shall have at least 200 mm.overlaps and vulcanized. The materials shall be natural rubber and be resistant to corrosion tear and also to attacks from acid, alkalis and chemicals normally encountered in service. The physical properties will generally be as follows:

Specific Gravity	1.1 to 1.15
Shore hardness	65 A to 75 A
Tensile Strength	250 to 300 Kg/Cm^2
Maximum safe continuous temperature	75^0C
Ultimate elongation	Not less than 350%
Water Absorption	Not more than 350% by weight in a 7 day test.

3.17 Contractor's Supervision

The Contractor shall provide constant and strict supervision of all the items of construction during progress of work, including the proportioning and mixing of the concrete and bending and placing of reinforcement. Before any important operation such as concreting or stripping of form work adequate notice shall be given.

3.18 Laying Cement Concrete Foundations and Under Floors

Before laying the concrete, the bottom and sides of the trench up-to the proposed height of the concrete shall be moistened.

The concrete shall be laid and not thrown, in layers not exceeding 150 mm. in depth and shall be tamped / vibrated immediately after laying.

3.19 Chases, Holes, Recesses and Inserts

All chases, holes and recess for foundation or other bolts, various services and other requirements must be formed as shown on the approved drawings or as directed during the execution of the work, without any extra charge. The Contractor shall fix all necessary inserts or fixtures in the concrete for support of hangers etc., for pipes and cables, ceiling clamps for lights and fans or for duct etc. If any of the inserts are to be supplied by other agencies, no extra payment will be made to the Contractor for placing the inserts in position. The approximate nos. of MS inserts required for fixing of cable tray/hangers in 400. The load carrying capacity of inserts per sq. m. may be taken as 100 kg.

3.20 Load Testing of Structure

Load tests shall be carried out in accordance with relevant Indian Standard code of practice in civil engineering.

4.0 BRICK WORK

4.1 Applicable provisions of Conditions of Concrete shall govern work under this section.

4.2 The Contractor shall build the whole of brick work, shown on the approved drawings with first class bricks conforming to IS:1077 and IS:2212 in cement mortar as described.

4.3 Unless otherwise specified, the proportions of cement-sand mortar for various classes of brick work shall be as given below :

Type of Work	**Cement**	**:**	**Sand**
a) Ordinary brick work with Thickness 250 mm. above for building superstructure	1	:	6

b)	Brickwork in pillars and foundation	1	:	4
c)	Half brick or brick-on-edge portion wall with H.B. netting in every alternative 3rd layer	1	:	4
d)	Brickwork in water retaining structures	1	:	3

The cement and sand shall be thoroughly mixed dry in specified proportions. Water shall then be added just sufficient to make a stiff and workable paste. The mortar shall be used within half an hour of mixing.

4.4 The Contractor shall build all brickwork uniformly, no one portion being raised more than 1 meter above another at a time. The joints shall not exceed 12 mm. in thickness and should extend the full thickness of the brickwork. All joints shall be properly raked and the surface washed down.

4.5 All the bricks shall be kept fully immersed in water at least for a minimum period of six hours till they are completely soaked and only thoroughly soaked bricks shall be used in the work.

4.6 The Contractor shall keep wet all brickwork for at least 10 (ten) days after laying. The surface of unfinished work shall be cleaned and thoroughly wetted before joining new work to it.

5. PLASTERING, PAINTING AND SURFACE TREATMENT

5.1 Cement Plaster

5.1.1 The plastering work shall be governed by IS:1661. Unless otherwise specified cement plaster shall be composed of 1 part of cement and 6 parts of sand. For ceiling plaster, the composition shall be 1 part of cement and 4 parts of sand. The thickness of ceiling plaster shall be 6 mm. The thickness of plaster to the fair faces of brickwork shall be 19 mm. The thickness mentioned shall be minimum thickness. The Contractor shall allow in his rate for any rubbing out due to inequalities of brickwork.

5.1.2 The rate shall also include for forming of any moulding drip course etc., and for extra thickness due to corbelling of brick work in parapet or at any other place. If required, all internal angles shall be rounded off as per drawing or as directed by the Engineer-in-Charge without any extra charges.

5.1.3 Cement and sand shall be measured and mixed dry thoroughly to a uniform colour on a platform specially constructed for the purpose. Care should be taken to see that no foreign matters get mixed with the mixture. Only enough water shall be mixed to make the mixture workable. The mix shall then be turned over and again to a uniform colour and texture. No. more cement mortar shall be mixed at a time than cannot be used within thirty (30) minutes of mixing.

5.1.4 Surface to be plastered are to be brushed clean, wetted for 24 hours before the plaster is put in and the joints of the brick work raked out 12 mm. deep minimum. The concrete faces to be plastered shall be chipped, roughened and soaked with water for achieving required bond with the plaster without any extra cost.

5.1.5 The surface of the plaster shall be finished absolutely in one plane. Any unevenness shall be rubbed down by the Contractor with corborandum stones at his cost and expenses. Care shall be taken to see that no mark remains at the junction of plastering done at different times. If necessary, the junctions shall be rubbed with corborandum stones to eliminate such undesirable marks. The Contractor may be required to use normal sprinkling of thin cement slurry on the surface for satisfactory finishing of the plastering work for which no extra payment shallbe made.

5.1.6 Plaster shall be protected and cured by keeping it thoroughly wet with sprinkling of water for 10 (ten) days continuously.

5.1.7 The cost of plastering work shall also include the cost of necessary scaffolding, staging etc. as would be required for the work.

6. SURFACE FINISHING

6.1 General

The cost of all the items of work under this section should include the cost of necessary scaffolding, staging, preparing subbase, removing stains from the floor, skirting, wood work, glass etc. caused through execution of the work.

5.2 White Washing

5.2.1 White washing shall be done with 5(five) parts of stone lime and 1 (one) part of shell lime with necessary gum (about 2 Kg. per Cu.m. of lime)using a small quantity of blue as per direction of Engineer-in-Charge. The lime shall be brought to the site un-slaked and shall be slaked at site with an excess of water and allowed to remain under water for (two) days. To the mixture fresh water may be added to bring the consistency to that of a thin cream. When thoroughly mixed, the mix is to be strained through coarse cloth. The surface of the wall is to be brushed thoroughly cleaned before the white washing is applied. Each coat of white wash has to be laid on with brushes. Each coat of White Wash means one continuous strike of brush with the prepared wash from top downwards. Another similar strike bottom upward over first strike followed by another similar strike from right to left and another from left to right over the right application of brush before it dries. Each coat must be perfectly uniform when finished and free from brush mark etc.

5.2.2 Three coats of white wash will mean a minimum of 3 (three) coats to produce on opaque white surface to the entire satisfaction of the Engineer-in-Charge. If the surface is blotchy or otherwise unsatisfactory, more number of coats shall be applied till the desired effect is produced to the satisfaction of the Engineer-in-Charge without any additional cost.

6.3 Weather Coat or Similar Decorative Cement Finish

6.3.1 Where specified, external surface shall be finished with two coats of 'Weather Coat' or similar decorative cement finish of approved colour, shade and manufacture. The surface to be finished it to be previously cleaned down to remove loose dust or dirt by use of stiff wire brush. All inequalities to be rubbed down and defects rectified. The surface to be wetted well with water and the surface water is to be allowed to run off. The 'Weather Coat of approved quality' or equivalent to be mixed will be strictly as per manufacturer's specification. The mixed '"Weather Coat"' or equivalent to be applied to the surface with a brush of a good quality. The first coat should be well brushed into the surface to form a good bond. Second coat should be applied carefully to give a good finished appearance may be applied by brushing or spraying. Each 'Weather Coat of approved quality' or equivalent application shall be wetted at the end of the day with a fine water spray.

6.4 Painting to Steel Works

6.4.1 Any shop coat of paint shall not be considered as a coat of paint for the purpose of specification.

6.4.2 Ready mixed synthetic enamel paint of 'Jenson &Nicholson' 'Berger Paints', 'Asian Paints' or similar other approved make and approved colour and shade shall only be used. The primer shall be red oxide zinc chromate primer (IS:2074) or any other anticorrosive primer as approved and directed by the Engineer-in-Charge. The Contractor shall furnish the details of paints to the Engineer-in-Charge for approval of paints before commencement of painting work.

6.4.3 The surface to be painted shall be properly cleaned, derusted, all loose scales removed and smoothened with emery papers. Then a coat of anticorrosive priming shall be evenly applied. After this has dried up, two successive coats of best quality ready mixed synthetic enamel paint shall be given to the entire satisfaction of the Engineer-in-Charge. Brushes of approved size and make shall only be used for application of paint and use of cloth is definitely prohibited.

7. DAMP PROORING WORK

7.1 Unless otherwise specified, damp proof course shall be 25 mm. thick cement concrete (1:2:4) with stone chips graded 10 mm to 3 mm with 3% Chico or similar approved water proofing compound conforming to IS:2645 by weight of cement. The proportioning, laying etc., shall be done is conformity with specification for cement concrete work. The damp proof course shall be used for all brick walls of the building.

8. ROOF WATER PROOFING TREATMENT

8.1 Both flat and curved roofs, whether accessible or inaccessible, including top of clear water reservoir, shall be provided with polyurethane based water proofing paint.

Specification for Roof Water Proof Treatment with Polyurethane based Water Proof Paint:

8.2 Preparation of Surface

The top surface of the roof shall be chipped off where necessary and all loose particles, dust impurities, are to be removed by rubbing the entire roof surface with wire brush and by application of High Pressure Compressed Heated Air to have a complete dust free and moisture free surface.

The roof surface, receiving polyurethane based Water Proofing paint, shall be provided with cement punning having smooth finish. A cross slope of 1 in 300 shall be provided in the roof of Building to allow proper drainage of rain water.

8.3 Specification of Materials

The polyurethane based paint is essentially an elastic and water proof film having a good adhesion to concrete; water and abrasion resistant properties and shall have long term weather proof characteristics. The paint/film material shall be of two components which is to be mixed and processed as per manufacturer's specification. The mixture shall be homogeneous before applications, as it has tendency to settle.

The polyurethane based water proofing system shall be manufactured by reputed manufacturers of proven recorded and shall be approved by the Central Building Research Institute (CBRI)/National Chemical Laboratory (NCL)/The Council of Scientific and Industrial Research/New Delhi (CSRI)/National Test House, Kolkata or similar such Government/Public Sector Undertakings.

The materials are to be inspected/approved by the Engineer-in-Charge as per procedure to be mutually agreed upon the agency and in charge of the work.

8.4 Since the product has a very short self life, the materials are to be used in the work shall not be older than four (4) months from the date of manufacture (i.e. the date of bottling).

8.5 Application

The two components of polyurethane based water proofing system should be mixed as per manufacturer's specification before application. The tack coat should be applied by brushing or roller to the entire surface in normal temperature and 406 hours setting time should be allowed before application of the second coat. The record and final coat of polyurethanes based mixed water proofing sealing over the priming

coat to be applied at normal temperature and curing time between 36 to 48 hours should be allowed.

9. FLOORING

9.1 Patent Stone Floorings shall be 25mm. thick in M20 grade concrete with 10mm. to 6mm. stone ships laid in rectangular panel with diagonal length not exceeding 3.00M and finished smooth with neat cement punning 1.5mm. thick. After finishing, the surface shall be left undisturbed for two hours and then with wet bags and after 24 hours cured by flooding with water and kept wet for at least 7 (seven) days. Required Camber or Slope should be provided in floor draining wash water, if necessary. This treatment shall be applied to all minor machine room floor as per instruction of the E.I.C.

9.2 Cast-in-Situ Mosaic in floor shall be 25mm.thick (finished) laid in panels as directed with necessary underlay of cement concrete (1:2:4) with stone chips with 12mm. thick terrazzo topping finished to 9 mm. after final grinding with 0 to 10 mm. size Mosaic chips highly polished etc. - complete as per specification of IS;2114-1962. Cast-in-situ Mosaic in Skirting and Dado shall be 12mm. thick. The Mosaic work shall be of approved colour and to the entire satisfaction of the Engineer-in Charge. This treatment shall be given to all other floors other than 9.1 and 9.2 and as per instruction of the E.I.C.

9.3 'Ferro site' or 'Ironite' Flooring shall be 50mm. Thick to be laid in two layers. First a layer of 25mm. thick patent stone flooring shall be laid in M25 grade concrete and allowed to dry. Then the second layer of 25mm.thick flooring of M25 grade concrete with 10mm.to 6mm. stone chips using at least 1Kg./Sq.m. of floor hardening compound of approved quality and make shall be laid and cured. The flooring shall be laid in rectangular panel with diagonal length not exceeding 3.0 Meters. This treatment shall be applied to all machine (pump-motor and electrical panels) room floor and alum and chlorinegodown floors and to all the floors which are accessible to carrier vehicles as per instruction of the E.I.C.

10. IRON MONGERY

10.1 The rain Water pipe of the materials' and of size as specified shall be of approved manufacture end jointed as follow:

10.1.1 For heavy cast iron pipes with gasket and lead properly caulked.

10.1.2 Where required these are to be run in chase left out in walls,columns,slabs and to be encased in cement concrete 1:2:4 (1 Cement, 2Sand 4 washed Stone Chips 19mm. down) with metal wrapping or with M.S. loops placed at approximately 325mm. centres or as directed by the Engineer-in-Charge. All pipes encased in walls, columns or under floors must be heavy cast iron with lead caulked joints. For exposed lengths of pipes, these are to be neatly secured clear from the finished wall face with nails and bobbing in the case of cast iron pipes, nails or screwed to hard wood tapping pugs embedded in wall.

10.1.3 All cast iron rain water pipes shall be painted two coats inside with approved anticorrosive paint. The exposed cast iron pipes shall be painted outside with two coats of ready mixed Synthetic Enamel Paints of approved make, shade and colour over a coat of priming of approved make.

10.1.4 The mouth of rain water pipes shall be fixed with C.I grating and the pipe jammed in position in 1:2:4 cement concrete with stone chips and neat finish on the surface.

10.1.5 The work shall include all supply, fitting and fixture of materials cutting, making chases, encasing, painting, jointing etc.- complete in all respect. The work shall include

supplying, fitting, fixing, and jointing of all the specials required for the completed work.

10.1.6 Rain water Spouts shall be of C.I pipes cut to exact length as per approved drawing or direction of the Engineer-in-Charge and laid in position in 1:2:4 cement concrete with stone chips, adjoining roof being finished in neat cement. The interior faces shall be painted two coats with anticorrosive paint and the faces shall be painted with two coats of ready mixed Synthetic Enamel paint of approved make, shade and colour over a coat of priming of approved make.

10.2 Metal Casement

10.2.1 Unless specified otherwise, all doors, windows and ventilation in general should be of mild steel casement with sections as per IS:1038. They shall be of approved make. The Contractor will submit the name and address of the manufacturers whose mental casements he intends to use for approved of the Engineer-in-Charge. The workmanship shall be of high quality and shall be up-to the entire satisfaction of the Engineer-in-Charge.

10.2.2 All the steel doors and windows sashes shall be given a shop coat of Red Oxide Zinc Chromate Primer I.S:2070 after these are thoroughly cleaned off dust, dirt, scales etc., and passed after inspection by the Engineer-in-Charge.

10.2.3 Windows are to be prepared for puffy glazing from the outside and for opening outwards unless otherwise mentioned. All steel sashes shall have holes drilled at suitable places for inserting glazing clips which shall also be supplied by the Contractor. All glazing shall be fixed to the shutters or frames in addition to glazing clips with quality putty of Shalimar or equivalent make. Glass must not be placed directly against the metal. A thin layer of putty must be evenly spread over the glazing rebate and the glass pressed firmly against it.

10.2.4 Ventilators shall be constructed from solid rolled universal casement section being double weathered at all points to ensure water tightness and bedded in mastic and screwed to the sashes.

10.2.5 The fitting shall be of heavy pattern bronze oxidised brass and of approved quality, side hung casement will have two point locking handle and casement fasteners. The hung windows shall have 200mm. long adjustable casement stay, arrange to lock the windows from inside horizontally at the centre, hung windows shall have spring catch designed for hand cord or pole operation as approved by the Engineer-in-Charge. The fittings to be fitted either by screwing to the window sections or to steel bracket welded to the window section as approved by the Engineer-in-Charge.

10.2.6 Galvanised weather bars shall be provided to sills of all windows.

10.2.7 Metal casement is on no account to built in at the time the walls are constructed. Holes to accommodate the fixing lugs are to be left or cut and the casement fixed after all rough masonry plaster works have been finished. The lugs of the casement shall be jammed in 1:2:4 cement concrete with stone chips after holding the casement in proper position, line or level.

10.2.8 Glazing for windows and ventilators shall weight not less than 8.0 Kg./Sq.m.For doors, 6 mm. thick wires net reinforced glazing shall be used as approved by the Engineer-in-Charge. The glasses shall be cut to size accurately to suit all openings to glaze with slight margin of about 1.50mm. on all sides or as directed. These shall be securely fixed in position in the manner described earlier. On completion of the building, the Contractor shall clean all the glass and leave the same perfectly in a tidy condition.

10.2.9 The cost of marginal doors, windows and ventilations shall include supplying fixing, fitting, glazing cleaning, necessary scaffolding, staging etc. and shall be for the complete work in all respects to the satisfaction of the Engineer-in-Charge.

10.2.10 The Contractor shall without any extra charge, submit three sets of shop drawings from the manufacture showing full details of each type of doors, windows and ventilators including section, position of all fittings and fixtures for the approval of the Engineer-in-Charge before manufacture and finally six sets of approved final drawings with notes on the method of fixing.

10.2.11 Where specified, mosquito fly proof brass wire screen of approved gauge and mesh shall be used in combination with windows. The screen shall be fixed to the inside of the frames and the windows to be opened outside and be fitted with 'Folio operator' for opening to any position and closing. Additional intermediate members be fixed to the frames to receive the fly screen so that the clear span of the screen does not exceed 300 m, or as approved by the Engineer-in-Charge.

10.2.12 All windows shall be provided with grills of approved design made of 25 mm x 6 mm M.S. Flats and the other clean openings not exceeding 100 mm.

10.2.13 The work for metal casements shall also include the cost of painting with 2 coats of ready mixed synthetic enamel paint of approved made, quality colour and shade over a coal of approved anticorrosive primer.

10.3 Collapsible Gate

The M.S. collapsible gates will be obtained from manufacturer as approved by the Engineer-in-Charge. These shall be of mild bar type, out of 20 mm. channels and shall be top hung with roller bearing and shall have locking arrangement. Collapsible gates under 2.700 m. height shall be with 4 sets of lattices. Guide tracks shall be to the entire satisfaction of the Engineer-in-Charge. The gates shall be fixed in position, derustedand painted with 2 coats of approved ready mixed paint over a coat of approved anticorrosive primer.

10.4 Rolling Shutter

10.4.1 The M.S. roller shutter shall be obtained from manufacturer as approved by the Engineer-in-Charge. The roller shutter shall be of 18 G x 75 mm. galvanized mild steel laths of convex corrugation complete with one piece construction. These shall be fitted with pressed side guides and pressed bottom rail, brackets, door suspension shafts, top rolling springs (of strong English Continental Spring Steel Wire) with a four lever concealed lock as also separate locking arrangements for padlocks, pulling hooks, handles and top cover. The roller shutters shall be fixed in position with all accessories and the design and the workmanship shall be to the entire satisfaction of the Engineer-in-Charge. This shall be finished with two coats of approved ready mixed paint over a coat of approved anti corrosive primer.

11. STRUCTURAL STEEL WORK

11.1 All Structural Steel to be used for gantry beam etc. shall be of tested quality conforming to IS:226 and IS:2062 latest addition.

Finished steel shall be free from cracks, lamination and other visible defects. Section shall be adequately protected from rusting and scaling. Rivets and bolts, nuts and washers shall be of mild steel and comply with requirements of relevant IS Codes. Steel used for rails shall have tensile strength of about 50-60 Kg/Sq. mm. and yield point at 26 Kg/Sq. mm. The electrodes for welding shall conform to IS:814. All steel work shall be fabricated and erected as per IS:800 and IS:806. Welding shall be carried out as per IS:814, IS:815, IS:816 and IS:823, all of the latest editions.

11.2 All steel work, after preparation of surface, shall be given a coat of red oxide zinc chromate primer (IS:2074) and finished with two coats of Synthetic enamel paint. Surface to be painted shall be thoroughly cleaned of mill scale, oil grease, rust etc. over coating and finishing paints shall be of well known make (viz Jenson & Nicholson / British Paints (Berger Paints) / Shalimar Paints). The Contractor shall furnish details of Paints to the Engineer-in-Charge for approval of paints before commencement of painting work.

11.3 Steel work shall be hoisted and erected in position in a safe and proper manner. No. riveting or permanent bolting shall be down until proper alignment has been made. For grouting, cement and clean fine sand shall be used in a proportion of 1:2 and properly mixed with water. All trapped pockets shall be fully vented for full penetration of grout. All grouting shall be cured for a minimum period of seven days.

12. CABLE TRENCHES

12.1 The cable trenches should normally be of dimension 750mm x 600 mm (D x W) with insert plates made of M.S. of dimension100 mm x 750 mm x 12 mm (W x D x Thk.) are to be provided on the wall side of the cable trench 600 mm apart all along.

12.2 The Cable Trenches shall be covered with precast concrete slabs of dimension 650 x 600 x adequate thickness to withstand a load of 500 Kg/m^2 are to be provided as covers of trench all along. For easy access of cable from room to room, the design of the tie beam and level of the rooms may be adjusted to avoid bend in the cable.

12.3 The cable trenches shall be absolutely free from any obstructions as to allow the cables to be lowered in the trenches from top only during laying. The space inside the trenches throughout the entire lengths shall in no case be encroached by any beam or columns.

13. POCKETS & HOLDING DOWN BOLTS

Provision has also to be kept for pockets and holding down bolts as per requirement of the electrical and mechanical equipments at no extra cost. The extract details of such pockets and holding down bolts will be supplied to the Contractor as per specifications of the suppliers of the equipment after award of the contract. It is contemplated that M.S. hangers shall be provided from the underside of slab/beam of the operating floor, and is to be executed in a separate contract. However, for the above arrangement suitable pockets and holding down bolts are to be left.

14. CHEQUERED PLATES ETC.

These shall be manufactured from structural steel conforming to IS:226. They shall be of the specified size, thickness and pattern as per relevant drawings or as directed by the Engineer-in-Charge. Cover plates will generally be of chequered plates with or without stiffeners as detailed in the drawings. Floor convenience, the Contractor shall prepare detailed floor plans of the layout of cover plates for floors and platforms so as to include all openings, cuts etc. and so as to match the patterns of adjacent cover plates/gratings. Where necessary, the floor will have to be made leak proof by properly welding cover plates. If necessary, packing shall be welded to the bottom of cover plates to raise the cover plates on sides, so as to provide necessary slopes as shown in the drawings or as directed by the Engineer-in-Charge in the floors and platforms to drain away any liquid failing on the floors and platform. Necessary gutters at the ends of platforms shall be provided for sloping floors and platforms as shown in the approved drawings or as directed by the Engineer-in-Charge. Kerbs of flats shall be provided where necessary, around openings and cuts in order to prevent liquids falling to lower floors or platforms.

15. HAND RAILING

Double rows of 30 mm. dia. G.I. tubular hand railing fixed in G.I. stanchions shall be provided on the edge of walkways and platforms as specified. The stanchions shall be fixed with mild steel rag bolts with chromium plated cap nuts. The stanchions shall not be less than 1000 mm. high and placed at a distance not exceeding 2500 mm. The hand railing shall be fixed true to exact line and level. G.I. stanchions and hand railing layout shall be of architectural design with pleasing appearance.

16. SANITARY INSTALLATIONS

16.1 The Urinals shall be of flat back, front lipped having a size of 46.5 cm. x 36.5 x 26.5 cm. or nearest available size. The Indian type W.C. shall be of minimum 58 cm. Complete with foot rest in one piece.

16.2 All Sanitary works shallbe of "Parry, "Neycer", "Hindusthan" or any other equivalent make. They shall be of approved quality conforming to relevant IS Codes and shall bear ISI Certification marks. All G.I. pipes shall be of ITC or equivalent make heavy quality conforming to relevant IS Code. Wheel valves and stop cocks shall be of gun metal and of "leader" or "Annapurna" or equivalent make as approved by the Engineer-in-Charge and shall conform to relevant IS Codes.

16.3 Two urinals, one Indian W.C., one European W.C. (Commodde) along with bathing shower and other installations have to be provided in each of the toilet block.

17. MANHOLE COVERS

Heavy duty plastic fibre reinforced concrete manhole covers shallbe of heavy duty type conforming to IS:1726.

18. TIMBER DOOR

The timber door shall be of 1st. Class CP Teak Wood for both frame (100 mm x 100 mm) and shutters (49 mm thick). All such doors shall be fully panelled. All timber shallbe of best quality, well seasoned and/or well treated for prevention and protection against decay etc. It shall be uniform in substance, straight in fibres, free from large or dead knots, sap, flaws, sub cracks, shakes, or blemishes of any kind. Any insect damage or splits across the grain shall not be permissible. The colour of the timber shall be uniform throughout, firm and shining with a silky lustre when placed and shall not emit dull sound when struck. The doors shall be made as per approved drawings and as directed by the Engineer-in-Charge and the timber shall be sawn in direction of the grains and shall be straight and squat. The door fittings shall be highly polished as per direction of the Engineer-in-Charge.

19. M.S. PIPELINES

M.S. Pipe lines in required lengths and should be spirally welded from reputed manufacturers and M.S. specials will be fabricated from the said MSSW pipe or from M.S. Plates cut to exact size and shape, bent true to curvature and welded using standard electrodes after necessary edge preparations. Both the inside and outside surfaces of the MSSW pipes and specials shall thereafter bethoroughly cleaned after derusting and brushing. The outside surface shall then be wrapped and coated with a protective coal tor based insulating tape of 4 mm. average thickness as approved over one coat of approved primer leaving 150 mm. on either end of pipes unwrapped. The inside surfaces will be provided with 3 (three) coats of non-toxic paint over one coat of primer.

The pipes and specials will be lowered in trenches for laying only after testing the same with spark test by holiday detector so as to ensure that the pipes and special are free of holidays. The pipes thus lowered will then be interconnected by welding and the

portions of 150 mm. width left unwrapped on either side of pipes will then the wrapped with said insulating tape.

The thickness of SWMS pipes /fabricated MS pipe and specials of 900 mm. diameter shall be not less than 12 mm.

20. P.S.C. PIPLINES / N.P.-2 CLASS PIPELINE

P.S.C./N.P.-2 Class Pipes willbe laid on suitably designed 1:3:6 concrete bedding of 150 mm. thicknesses. The pipes will joined by rubber rings. Bends and specials will be of mild steel. The P.S.C./N.P.-2 Class pipes will be joined with M.S. special and machined ends will be wrapped and coated with an approved protective coal tar based insulting tape of 4 mm. average thickness over one coat of approved primer. The inside surface will be provided with 3 (three) coats of non-toxic paint over one coal of primer.

P.S.C./N.P.-2 Class pipes will be supplied free of cost the Tenderer, all other materials required for P.S.C/N.P.-2 Class pipes laying will be supplied by the Tenderer.

21. ELECTRICALLY OPERATED OVERHEAD CRANE

Provisions have to be made for a **20.0 M.T**. capacity Electrically Operated Travelling Crane (E.O.T.) suitable for inching operation with a lift upto motor floor level and cross travel over the suitable width of the pump house for handling pumps, motors, valves and other accessories, equipments, materials etc. Long travel shall be over the suitable length of the pump house for handling pumps, motors, valves and other accessories, equipments, materials etc. Suitable type of crane rails, girders and all other accessories, equipments, materials etc as necessary for installation and operation of the crane are to be designed and provided by the contractor within the lump sum price quoted. The two travels and two hoists i.e. longand cross travel& main Auxiliary etc. must be electrically operated, also with provision for mechanical operation. The buffers must be equipped with spring loaded operation. The speed and other criteria are as follows:

Speed for Hoisting	4-5 (normal) MPM
Speed for Cross Travel	1-12 (normal) MPM
Speed for Long Travel	15-20 (normal) MPM

Type of Brake - AC (Electromagnetic) shoe type for hoist and disc type for C.T.

Motor - Slip disc type.

Suitable vertical clearance is to be provided over the rail level to the bottom of the roof beam.

22. SLUICE GATE/PEN STOCK GATE

Most iron single faced Thimble mounted Sluice Gate/Pen Stock Gate will be designed as per IS:13349-1992.

23. C.I. CLUICE VALVE

C.I. Sluice Valve conforming to IS:2906-1869 suitable for water works purposes and as per requirements of the Clear Water Reservoir / Clear Water Pump Sump. The class of Sluice valves shall be class-I with maximum working pressure of 7 Kg/Sq. Cm. and 5 Kg./Sq. Cm. for 450 mm. dia. and 750 mm. dia C.I. Sluice Valves respectively.

24. C.I. COWL VENTILATOR

150 mm. dia Specially designed C.I. Cowl Ventilator shall be provided in the outer peripheral walls in between the underside of the reservoir roof and Top Water Level (T.W.L.) of the reservoir, in order to prevent breakage of the Cowl Ventilator, the same

shall be encased with cement concrete of grade M 15 with nominal reinforcement as typically shown in the tender scheme drawing.

25. ARRANGEMENTS OR PLASTIC FIBRE REINFORCED CONCRETE MANHOLE COVER M.S. LADDER ETC.

26.1 Manhole Cover

Heavy duty plastic fibre reinforced concrete manhole covers with frame should conform to relevant IS Code. The clear opening for access to the M.S. Ladder for going inside the reservoir shall be 600 mm. and the overall amentation of the heavy Duty Manhole Cover shall be specified by the Tenderer conforming to relevant IS Code. The manhole cover with frame shall be of 'Double Seal Type'. Location of manhole covers and frames are specified in the tender scheme drawing and the Tenderers are to include the cost thereof in their offer.

26.2 M.S. Ladder

M.S. Ladder for going inside of the reservoir has been typically shown in the tender scheme drawing. The width of the ladder shall be 750 mm. with G.L. hand railing with M.S. angle posts. The steps of the ladder shall be provided with M.S. chequered plates with minimum 6 mm. in thickness. The rise and treads of the steps work of the ladder shall be provided with suitable anti-corrosive paints over two coats of primer as per manufacturer's specifications to be approved by the Department. There shall be 6 (six) numbers M.S. ladder in the locations shown in the Tender drawings.

26.3 Rung Ladder

Where over specified, shall be formed out of 20 mm. dia M.S. Rods. The rods forming Rung Ladder shall be properly bonded inside the R.C.C. walls. The spacing of Rung Ladder shall not exceed 300 mm. and the size of the rung formed shall be 300 mm. wide x 150 mm. deep. The rods are to be painted with anti-corrosive paint with suitable primer as per manufacturer's specification to be approved by the Department.

26. LEVEL INDICATOR (Manual&Remote sensing)

One (1) Manual and one (1) Remote sensing Level indicator shall be provided at the Pump Sump so that they can be visible from inside the operator's room in Pump House Building. The level indicator shall be manual and remote sensing type with PVC floor, guide wire, level indicator board etc. as per requirements. The arrangement of remote indications with electrical / digital display from inside the operator's room shall also be made. The arrangement and details to be get approved by the department.

27. LIGHTENTING ARRESTOR

Required sets of Lightening Arrestor shall be provided by the tenderer at the highest point of the Pump House Building conforming to the I.E. Rules specifications as per standard practice.

The job includes supplying, fixing and commissioning of sufficient no. of lightening arrestors which includes air-terminals, separate earth electrodes, grid earthling and individual earthling with approved size of air-terminals, earth electrodes, earthling strips as per IE rules/IS codes. Detail Calculations to be vetted by the department in the final design.

28. MOTOR FLOOR AND CONTROL ROOM

There must not be any column in the motor floor for easy movement of the E.O.T. Crane. Similarly in the Control room cum office room, these must not be any column in the room. The motor floor should have suitable openings at appropriate location as per requirement of the pump manufacturer for lowering and taking up of pumps, motors,

valves, entry fo cable etc. The motor floor shall be suitably designed to take care of the vibration generated from the motor pump assembly while in operation.

29. Wrapping Coating

This work is to be completed in all S.W.M.S. pipe at ground level with 4 mm. thick coal tar based tape. Necessary 'Holiday Test' to be done to ensure perfection. This job is to be done before commencement of work of respective stretch.

30. TRIAL RUN

When in the opinion of the Engineer the initial performance tastes as specified in Section- I are satisfactory the Contractor shall arrange for trial run of the Units at its rated capacity and also their performance tests.

31. GUARANTEE PERIOD

The Contractor shall stand guarantee for the successful trial run and operation of the units for **63 (Sixty three) months** period from the date of the certified commissioning as stated in other section of relevant clause within which any defects and short coming due to faulty design of the plant, defective mechanical and electrical equipment or defective construction will have to be made good without any extra cost to the Authority. During the guarantee period the Contractor shall ensure thorough checking of the units at least once every month and arrange for immediate rectification of any defects detected during this special checking by his experts.

32. GUARANTEES

The Contractor shall give the following guarantees :

32.1 Civil and Structural Works

The Contractor shall guarantee the Intake structure and Substation with Raw water rising main against any structural failure due to faulty design, bad workmanship, substandard materials, etc. for a period of twelve months. Any defect found during the guarantee period shall be rectified by the Contractor to the satisfaction of the Engineer without any extra cost.

32.2 Equipments

Even when a equipment has been manufactured and / or marketed by a vendor, it would be deemed to have been supplied and installed under the contractor's supervision. The Contractor shall provide back to back guarantee along with the vendor but shall solely be responsible for its repair/replacement. He shall not cite the vendor and claim extra cost. In addition, all equipment shall be free from any defects due to faulty designs, materials and / or workmanship. The equipment shall operate satisfactorily and performances and efficiencies shall not be less than the values guaranteed by the manufacturer and endorsed by the Contractor.

Formal acceptance of the work or equipment covered under the Contract by the Engineer shall not be made until all the work done by the Contractor has satisfactorily passes all tests required by the specifications.

If, during testing of work and / or equipment prior to formal acceptance, any equipment or materials shall fail in any respect to meet the guarantees, the Contractor shall replace such equipment in a condition which will meet the guaranteed performance. Any such work shall be carried out by the Contractor at his own cost and expenses in necessity thereof, shall in the opinion of the Engineer be due to the use of materials or workmanship not in accordance with the Contract or to neglect or failure on the part of the Contractor to comply with any obligation expressed or implied on the

Contractor's part under the Contract. If in the opinion of the Engineer, such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it were additional work.

If the Contractor shall fail to do any such work as aforesaid, required by the Engineer, the Employer shall be entitled to carry out such work by its own workman or by others and if such work is supposed to be carried out by Contractor the cost thereof, or may deduct the same from any money due or that may become due to the Contractor.

33. IMPORTANT GUIDELINES AND SPECIFICATIONS

33.1 Unless otherwise specified elsewhere, the work shall be carried out as per the following specifications.

33.1.1 All civil works shall be carried out as per specifications contained in other section of these tender specifications.

33.1.2 All electrical works including supply of all electrical equipment shall be carried out as per specifications contained in other section of the tender specification.

33.1.3 All mechanical works including supply of equipment shall be carried out as per specifications contained in other section of these tender specifications.

33.1.4 The erection and commissioning works shall be carried out as per specifications contained in other section of these tender specifications.

33.2 A minimum free board of 500 mm shall be provided for all water containing structures viz., collecting well, flash mixer, stand wells, filter beds, channels, chambers, etc. unless otherwise specified elsewhere.

33.3 For the convenience and ready accessibility to the operating level, each unit of the treatment plant shall be so interconnected by walkways/gangways as will permit reaching one end of the treatment plant to the other by means of walkways/gangways without having any necessity to get down to the ground level.

33.4 Walkways and operating platforms shallbe provided with handrailings as specified in other section.

33.5 Roofs shall be provided with polyurethane paint.

33.6 All the exterior doors and windows shall be provided with R.C.C. chajja of approved design.

33.7 All windows and ventilators/skylights shall be provided with mild steel grills of approved design.

33.8 Construction of permanent roads within the treatment plant site are within the scope of the contract including at the porch of the filter house and annexe building where R.C.C. slab shall be provided. Tenderer shall, however, during construction, provide temporary access roads required for their own construction of different units of the treatment plant and for easy manoeuvre of their construction equipment, at their own cost. This would necessitate cutting of trees, clearing of bushes, filling of a pond (shown in the Tender drawing), levelling and dressing of. Every effect should be made to save as many trees as possible. The trees shall be cut by the Contractor as their own cost after finalization of the layout. The trees are the property of the Authority. The contractor after having cut the trees shall hand them over to the Engineer along with inventory of the trees.

The contractor shall have to construct bituminous water bound macadam road inside the water treatment plant premises connecting all units of the WTP and for easy thoroughfare of heavy trucks with Class-AA load of IRC code. All the major road shall of 5.0 meters width. The design of the roads shall be done accordingly.

The specification and workmanship of the permanent road restoration for the 750 mm diameter raw water main shall be as per the specification of that road itself. For general guidance of the permanent road restoration, a section of that road is provided with this

tender document. The contractor shall not deviate from the provided specification under any circumstances.

For other major & minor roads within the WTP premises and RWPH premises, the specifications and workmanships are as mentioned below.

34. Bituminous Work

Works involves preparation of Sub grade and base Course with 250 mm thick sand filling ,Graded Stone Base of 150 mm thick and WBM base course of 150 mm thick and Providing and laying bituminous macadam with Hot Mix Plant using approved crushed aggregate of specified grading as per Table 500 4 premixed With bituminous bind transferred to site laid overa previously prepared surface at specified laying temperature with paver finish to the required grade level and alignment an rolled with suitable power roller for break down, inter-mediate and finished rolling as per specification to achieve the desired compaction including cost and carriage of stone materials and bitumen, hire charges of machinery and equipment cost of fuel and lubricants and wages of operational staff, quality control complete as per clause 504 of Specifications for Road & Bridge Works of MoRT&H (5th revision) B.For Grading II (19 mm nominal size 50-75 mm thick) and Providing and applying primer coat with Cationic bitumen Emulsion of approved Grade conforming to IS 8887-1978 and requisite quantity on prepared surface and spraying primer using Mechanical mean including cost and carriage of bitumen emulsion an all other incidental cost of work complete a per clause 502 of specification for Road & Bridge works MoRT&H For WBM/WMM Surface (with primer @0.70-1.0 kg/sqm.).

34.1 Providing and applying tack coat with Cationic Bitumen Emulsion of approved Grade conforming to IS-8887-1978 on the Prepared surface cleaned with Hydraulic Broom , moistening the surface including Cost and carriage of emulsion, hire charges Of machinery and labour, cost of fuelAnd lubricants all complete as per clause 503 of Specification for Road & Bridge works of MoRT&H (5TH Revision)On Bituminous Surface (using Bitumen emulsion at the rate of 0.20 to 0.10 kg. Per sqm.).

34.2 Open-Graded Premix Surfacing using Bituminous(Viscosity grade paying Bitumen/Modified Bitumen) Binder and Mobile Hot Mix Plant (light duty) surface of 20 mm thickness composed of 13.2 mm @0.018 m3 and 11.2 @0.009 m3 per M2) size stone aggregates, including thoroughlyCleaning of the surface, screening, cleaning and Pre-heating stone hips and fully pre-coating theSame either using viscosity grade paving bitumen Or cutback or emulsion carrying the mixture by Any suitable arrangements, laying the mixture Uniformly mixing in Mobile Hot Mix Plant (lightDuty) and thoroughly rolling with a smooth Wheeled roller 8-10 tonne capacity finished toRequired level and grades including the cost and Carriage of stone chips and matrix, heating theMatrix, preheating the aggregates to required Temperature and including hire charges of Mobile Hot Mix Plant (Light duty) and other Machinery pay of operators cost of fuel and Lubricants etc. complete to be followed by Seal coat of either type A or type B as per Technical specification clause 508 for Rural Roads of MORD.

34.3 Providing and laying liquid seat coat (Type A) With approved quality stone chips and bitumenBinderon thoroughly cleaned black top surface Spreadingcleared and cleaned stone aggregate(100 % passing through 11.2 mmsleve and Retained on 2.36 mmsleve) uniformity @0.09 M3 of dry aggregate per 10M2 of area using Suitable means rushing the chips, if Necessary t ensure uniformity, rollowed by Rolling with power roller including the cost of and carriage of binder and stone chips, cost of hiting the

binder and all other incidentalCharges, cost of fuel and lubricants, including Hire charges of machineries, tools and plantsRequired for construction and quality control Complete as per clause 511 of SpecificationsFor Road & Bridge Works of MORT&H (5th revision).

35.Construction of river bank protection system (50m long approx.) with other accessories and pitching for bank protection work are to done according tothe report of any recognized Institute like IIEST BESU/IIT Khragpur/Jadavpur University.

SECTION – F
General Technical Specification

1.0 SITE CONDITION

The Tenderer shall verify the location of the same by inspection of the site and shall apprise himself of the local condition before submitting the Tender.

2.0 SUB-SOIL REPORT

The Tenderer should satisfy himself about the adequacy of the data for the design of pile foundation for different units of Jetty mounted RWPS, Substation and Raw water Rising Main. The tenderer should carry out soil investigation before submission of his tender by drilling bore hole at work site at his own cost for his own satisfaction. The successful Tenderer shall have to undertake fresh investigation of soil at the exact location of the structure at his own cost to design the foundation properly. Records of such sub-soil investigation such as bore-hole logs, soil samples, SPT values etc., shall be done by the contractor duly witnessed and authenticated by the Engineer in Charge or his competent authorized representative.

The latest soil examination data obtained from the Contractor shall be adopted for design without any extra claim over the quoted price as accepted by the Department. The soil report should be carried out by any university of repute or reputed organization as directed by the EIC.

3.0 TENDER DRAWINGS

3.1 The Site Layout Plan of the Jetty mounted RWPS, Substation and Raw water Rising Main with different units is shown in Tender Drawings. These drawings are meant for giving the Tenderer a general idea of the Jetty mounted RWPS, Substation.

There may be variations in details and sizes of pump bases and cable trenches depending on the Specification of the suppliers of Pump, Motor etc. **The final working drawings will be vetted by the E/M wing of KMDA in order to satisfy their requirements.**The RCC pile foundation has to be in such a manner that the same can withstand all dead loads, live loads, effect of earthquake and service loads and necessary tension for subsoil water it required. The pile foundation must satisfy the settlement criteria. All the major units of Jetty mounted RWPS, Substation. etc should be on pile foundations.

4.0 DESIGN CRITERIA

4.1 Design and construction of all R. C. C. Structures, brick masonry walls and Foundation shall conform to the latest edition of the following IS Codes.

a) Loading Standards	IS : 875
b) Earthquake Resistant Design	IS : 1893 & IS : 4326
c) Reinforced and Plain Concrete	IS : 456
d) Foundations	IS : 1080, IS : 2950 IS : 2911 & IS : 2974
e) Liquid Retaining Structures	IS : 3370
f) Structural Steel	IS : 800
g) Reinforcement	
Mild Steel	IS : 456 & IS : 432
Ribbed Tor Steel	IS : 1786 & IS : 1139
h) Masonry and Brickwork	IS : 1905 & ISS: 2212
i) National Building Code of India	
j) Design &Construction of Pile Foundation	IS : 2911

4.2 piles shall be bored Cast-in-situ R. C. C. Piles. The design, construction and workmanship for these piles shall fully conform to and satisfy the codal requirements of IS 2911 (Latest Edition). Concrete to be used in Piles shall be of minimum M-25 Grade having Cement content not less than 400 kg/m3 or as specified in latest code. Reinforcement in piles shall be in conformity with the requirements contained in IS:2911 (Latest Edition). The minimum area of Longitudinal Reinforcements shall be as perCodal requirements and such requirements shall be provided for the full length of piles. For

piles subject to Upward Tension, reinforcement shall be provided throughout the full length and such reinforcement shall be designed on the basis of upward load they are supposed to carry.
The safe working loads of the R. C. C. Cast-in-situ bored piles should be that as computed as per IS:2911 on the basis of Sub-soil Parameters of the Site with a minimum Factor of Safety 2.5 (Compression) and 3.00 (Up lift) applied there on or that indicated in the following table, whichever is less.
One no. test pile (Compressive load) are to be driven for initial load tests as shown the locations of driving test piles for initial load tests by the EIC. Routine load tests are to be carried out as per standard codal stipulations.
4.3. F.S. stands for Factor of Safety
Pile Termination levels shall be chosen carefully. The safe working load of the piles shall be substantiated by Routine Load Test. Sub-soil investigation after award of contract by the Tenderer shall be witnessed by the Engineer-in-Charge or his authorized Representative.
These Piles shall be designed for Seismic Condition also. The Important factor for Seismic Analysis of Structure shall be 1.50. The Tenderer shall include in his Lump Sum price the cost for at least one Load Test on working pile (Routine Test). The testing should be as per standard codal Stipulations. The Tenderer shall also include in his price the cost of installation of one R. C. C. cast-is-Situ, Bored Non working pile having same Structural Details as of Working Pile and lateral load Test of the same as per Codal Stipulations.
4.4 The successful Tenderer shall have to undertake fresh investigation of soil at 3 (Three) locations as approved by the Department at his own cost for design of the Foundation properly and for detailing the piles. In no case, extra claim over the Quoted price as accepted by the Department will be entertained.
5. **DESIGN DRAWING AND OTHER INFORMATIONS TO BE SUBMITTED BY THE CONTRACTOR (SUCCESSFUL TENDERER)**
5.1 On the award of the Contract Contractor shall submit to the Superintending Engineer (Programming Circle), KMDA, detailed design and drawings of different structures within fifteen (15) days from the date of issue of Letter of Acceptance and thereafter the balance drawings and design calculations will have to be submitted phase wise keeping pace with the work programme.
5.2 If called upon the Contractor shall also submit within reasonable time relevant books and other reference which have been referred to or used in the design. Such books and other relevance will be returned to the Contractor when done with. **Secrecy in regard to details of design materials and equipments etc. shall not be pleaded by the Contractor in the name of "Trade Secret" for not furnishing the requirement details asked for by the Superintending Engineer (Programming Circle), W&S Sector, KMDA.**The contractor shall never be allowed to use any formula, methodology, design data, design graph etc. which are not mentioned in relevant IS Codes, CPHEEO Water Supply Manual, AWWA monographs (relevant to Indian condition)or in any standard and approved text book in vogue on relevant subject. No such data, formula, graph from any journal, research paper etc. shall be allowed under any circumstances. The design and drawings shall be subjected to modifications at no extra cost, if found necessary and such modifications shall not vitiate the contract. Similarly, any additional new drawings as found shall be submitted by the Contractor and the drawings shall form part of the Contract Drawings.
5.3 Notwithstanding what has been stated above the Contractor shall be responsible for the correctness and soundness of the design and if any provisions are found inadequate or faulty necessary modification will have to be carried out at any stage up-to the expiry of the Guarantee period of 60 months.
5.4 The Contractor will not be permitted to commence the Actual Work at site unless detailed design and working drawings shall be proof checked& vetted by a professional and experienced teaching Engineer of Jadavpur University or IIEST (Shibpur) or IIT (Kharagpur) andshall be approved by the concerned Superintending Engineer

(Programming Circle),KMDA. The approval of design and drawing by the Authority does not relieve the contractor of the responsibility for the correctness of design, detail, manufacture and satisfactory performance of the units and equipment. **Five (05) copies of the approved design and six copies of the approved drawings are to be furnished by the Contractor free of cost for use by the Employer during execution of the work.** Any additional copies of same drawings, if required, should also be submitted by the Contractor free of cost at the request of the Employer. If the drawings are done with Auto Cad, then copy of the folders containing drawings in **Pen Drive/CD/DVD** may be submitted for records only.

5.5A tentative work programme in Network Diagram using CPM technique is required to be submitted by the successful tenderer within a fortnight from the date of issue of the letter of acceptance. The drawings from foundation onward will have to be submitted by the successful tenderer successively as per the work programme to be approved by the EIC. Adequate resources are to be mobilized during execution of the work, for which no extra payment shall be made.

5.6 Completion of Drawings and Other Documents to be submitted the Contractor

The Contractor shall submit within one month after the completion of all Construction works the followings drawings and documents free of cost.

a) Six copies of all approved Completion drawings and design calculations. These drawings shall be on black and white prints of thick paper and there shall be one transparency of each drawing. These drawings are to be submitted in a presentable form as directed by the Superintending Engineer. In addition to this **Pen Drive/CD/DVD** with folders of these drawings drawn in Auto CAD or scanned copies are to be submitted. The design calculations shall be in one or multiple printed and spiral-bound books.

b) Five copies of final designs in properly bound from as directed by the Superintending Engineer (Programming Circle).

c) Four copies of detailed specification and schedules of the completed Intake jetty.

d) The periodical maintenance schedule of all the civil up to their respective life period of the structures/components shall be submitted.

5.8 Release of final bill:

The final bill shall not be released until all the above mentioned Completion Drawings and Documents (as per relevant Clause) are submitted by the Contractor.

6.0. The bidders shall quote their rates as per the terms and conditions of the NIT, tender documents, BOQ and other documents submitted by the Notice Inviting Authority time to time before opening of the Tender. The rates should be realistic and reasonable. The bidders are requested not to quote any rate for any item of BOQ which is frivolously low or high. In that situation, the bidders shall have to justify his quoted rates and on request of the Authority, he shall have to rectify his quoted rates keeping the gross amount same.

The work will be awarded to the lowest bidder who will quote the lowest price in total which is mentioned in the BoQ (Sl.No-1.01 to 1.09).

7.0 STRUCTURAL STEEL WORK

7.1 All Structural Steel to be used for gantry beam etc. shall be of tested quality conforming to IS: 226 and IS: 2062 latest addition.

Finished steel shall be free from cracks, lamination and other visible defects.Section shall be adequately protected from rusting and scaling. Rivets and bolts,nuts and washers shall be of mild steel and comply with requirements of relevantIS Codes. Steel used for rails shall have tensile strength of about 50-60 Kg/Sq.mm. and yield point at 26 Kg/Sq. mm. The electrodes for welding shall conform to IS: 814. All steel work shall be fabricated and erected as per IS: 800 and IS: 806.Welding shall be carried out as per IS: 814, IS: 815, IS: 816 and IS: 823, all of the latest editions.

7.2 All steel work, after preparation of surface, shall be given a coat of red oxide zinc chromate primer (IS: 2074) and finished with two coats of Synthetic enamel paint.Surface to be painted shall be thoroughly cleaned of mill scale, oil grease, rust etc.over coating and finishing paints shall be of well-known make (vise Jenson & Nicholson/ Berger Paints/ Shalimar Paints). The Contractor shall furnish details ofPaints to the Engineer-in-Charge for approval of paints before commencement of painting work.

8. **CABLE TRENCHES**

8.1 The cable trenches should normally be of dimension 760mm x 460 mm (D x W) with insert plates made of M.S. of dimension 100 mm x 75 mm x 12 mm (W x D x Th) are to be provided on the wall side of the cable trench 600 mm apart all along with cable tray.

8.2 The Cable Trenches shall be covered with pre-cast concrete slabs of dimension 650 x 600 adequate thickness to withstand a load of 500 Kg/m2 are to be provided as covers of trench all along. For easy access of cable from room to room, the design of the tie beam and level of the rooms may be adjusted to avoid bend in the cable.

8.3 The cable trenches shall be absolutely free from any obstructions as to allow the cables to be lowered in the trenches from top only during laying. The space inside the trenches throughout the entire lengths shall in no case be encroached by any beam or columns.

9. **HAND RAILING**

Double rows of 30 mm diameter G.I. tubular hand railing fixed in G.I. stanchions shall be provided on the edge of walkways and platforms as specified. The stanchions shall be fixed with mild steel rag bolts with chromium plated cap nuts. The stanchions shall not be less than 1000 mm. high and placed at a distance not exceeding 2500 mm. The hand railing shall be fixed true to exact line and level. G.I. stanchions and hand railing layout shall be of architectural design with pleasing appearance.

10. **SANITARY INSTALLATIONS**

The Urinals shall be of flat back, front lipped having a size of 46.5 cm. x 36.5 x 26.5 cm. or nearest available size. The Indian type W.C. shall be of minimum 58 cm.Complete with footrest in one piece.

All Sanitary works shall be of "Parry, "Neycer", or any other equivalent make. They shall be of approved quality conforming to relevant IS Codes and shall bear ISI Certification marks. All G.I. pipes shall be of ITC or equivalent make heavy quality conforming to relevant IS Code. Wheel valves and stop cocks shall be of gun metal and of "Leader" or "Annapurna" or equivalent make as approved by the Engineer-in-Charge and shall conform to relevant IS Codes.

Two urinals, one Indian W.C., one European W.C. (Commode) have to be provided in the toilet block.

SECTION – G

DETAILED TECHNICAL SPECIFICATIONS OF THE PROJECT

PART – I

DETAILED TECHNICAL SPECIFICATION FOR

INTAKE JETTY, SUB-STATION & SUCTION MAINS

1.0 GENERAL

The pump house will be constructed over the raw water intake jettysituated nearKedarnath Hospital parking on the river Hooghly Ward No-5 of Bally Municipality. The jetty shall have a general deck level of minimum (+) 0.10 m above from the nearest road camber crown.

The tenderers shall be responsible for their own interpretation of the same. The tenderer is also advised to inspect the site and its surroundings and collect information accordingly as he may consider necessary. They shall have to carry out marine survey, river bed survey, soil exploration etc. to get the exact design parameters after awarding the tender.

The depth of water table varies but while designing, the tenderer should take into account the probability of floatation and local flooding due to rains. The tenderers may assume higher values of water table since he would be responsible for establishing and ensuring safety against possible floatation. The tenderers are required to take adequate precautionary measure for the safety of the adjacent existing structures (which, though dilapidated, is functionally important) during the entire period of execution, and as such vibration in any form are to be kept to the minimum level. Therefore, driving of driving sheet piles, Z piles etc., are ruled out.

The tenderers shall make all provisions for the safety of the structures. The Raw Water Pump House will be functional mainly at floor level as mentioned earlier (operating platform level). The pumps are Vertical Turbine Type (V.T) in vertical execution& thus motors will be installed at an elevated level on the motor stool which shall be mounted on the operating floor. Suitable walkways have to be provided as per requirement of site/ detail design so as to reach every valve/ actuator on the pump delivery side. This will also help for inspection and maintenance of the valve/ actuator and its accessories. The specific levels will be finalized at per site requirement at detail engineering stage. The bases for the same, intermediate walkways and vertical support for suction main are within the scope of the contract including hanging support. Pedestal foundations/ cut outs for all pumps / motors & relevant items are within the scope of contract. All relevant Dimensions will be provided during detail engineering stage in consultation with theE/M Sector and site suitability.

Delivery line, i.e., the common delivery manifold of 12mm thick 800mm dia MS pipe of suitable length to Raw water Rising main of 800 mm diameter (12 mm thickness) emerging from R.W.P.S. to 100 meters limit with interconnection with existing main are within the scope of this tender.

Cable trays/ Cable trenches insert plates, dowels chequered plates, M.S. gratings, and pre cast slabs for cable trenches as required for the electrical / mechanical equipments at both Raw Water Pump House & Electrical Substations are within the purview of this contract. The motor floor will also accommodate cable trench, cut out at different locations for the pump motor sets. Capacitor and reactor, control and instrumentation panels and L.T/H.T. switchgears whose weight need not be considered within the live load as per relevant IRC Code. The same is applicable for the elevated platform also. Unloading bay, unloading platform and a stair case to go to the levels below the jetty deck are also the part and parcel of the pump house.

On entry, the vehicle will negotiable a mild upward slope in the form of a range in the passage. Trucks transporting materials and equipment should reach the unloading bay of the pump house through the approach road and shall be in a position to load and unload with the help of an overhead E.O.T. crane. The other end of the unloading bay will be closed, only to be interrupted by a door for emergency exit. The normal entry door would be from at the covenant orientation.

The Electrically operated double girder overhead Travelling crane (Minimum 10MT capacity) will move on rails (LRIC) based on a RCC gantry girder spanning between brackets from columns at intervals located within the superstructure external walls running between two furthest sides. The bracket if made continuous may also serve as the crane girder if so designed. In any event a clearance of approximately 6.4 meters (to be declared during detailed engineering , so that a truck loaded with vertical motor can enter the pump house) for the rolling shutter shall have to be provided free of all obstructions at vehicle entry point. The rest located on crane girder shall have a minimum distance of 300 mm from the wall to the centre line of the rail. The loading pattern may be designed on the basis of four-wheels at required distance apart (In each side there shall be two wheels) with equal load being transmitted through each side wheels. This will also be subjected to horizontal thrust as per practice. A minimum vertical clearance of 2500 mm (approx.) is to be provided over the rail level to the bottom of the beam supporting roof., Contract includes supplying fitting & fixing Crane Girder And supporting arrangements.

In broader classification Jetty mounted Raw water Pumping Station will Include the pump house which shall accommodate 5 Nos (V.T) motors (3W+2S) with suitable length with a discharge of 1000KL/Hr @ 28 M head of each pump having provision

for operation of two pumps in parallel. The proposed size will such that all the motors, valves & other electro-mechanical accessories for smooth operation of 5 nos V.T. pumps and motors can be housed comfortably with an cantilever walkway of clear width 1.2 m.(with hand rails @ 1.2 m c/c.) to house all the pumps and the unloading bay.

The Substation building over the Intake Jetty OR on the bank of the river shall house the CESC HT Supply Room, KMDA HT room, LT panel room, toilet as given in the enclosed drawing including necessary foundation for LT panel, HT panel as per direction of EIC.

There shall be two outdoor types Transformer whose capacity shall be finalized by E/M Sector, KMDA. Proper foundation & fencing roof shed (if required) shall have to be executed.

R.C. Beams above cable trench should be at such level so as to easily operate in cable trench.

In the pump house and Sub-Station will include -

a) The Jetty mounted pump house zone will accommodate three (5) nos. V.T. Pump Motor sets, enlarger,metal dismantling joint, NRV , short piece, BFV , short piece , Specials, , common manifold, flow stabilizing pipe, Flow Meter, BFV on the delivery line , expander and finally its connection to the 800mm dia delivery line.

b) The Substation building on the bank of the river shall house CESC HT Supply Room, KMDA HT room, LT panel room, toilet, 2 nos outdoor Transformer as given in the enclosed drawing. **The drawing attached is a tentative one so the final Location may vary as per site condition and availability.**

The approach road towards jetty & the elevated platform towards jetty will also be provided with a permanent staircase connecting the approach road with the existing road towards river at a suitable location with the satisfaction to EIC. Handrails shall be provided at -

a)Staircase i) flights

ii) Landings

b) Railing around the walkways.

The Contractor is free to use water-proofing compound of his choice during concreting and otherwise and should include the cost of the same within the quoted rate. The Authority will not entertain any extra claim at a later date of such provisions. The design must indicate that provisions are being made in this regard.

The contract shall include complete design together with construction of all civil works as per specification and directions of the Engineer-in-Charge. The tenderers shall fill up rates in the price schedule.

Before proceeding with any detailing and designing of various components of work under this contract, the contractor shall first prepare a layout plan to a sufficiently large scale and elevations of the pumping station and parts thereof. The entire work has to have a suitable architectural treatment in conformity with the surroundings. For this purpose the services of a reputed architect may be enlisted by the contractor at his cost. Economy in construction, without sacrificing architectural and aesthetic get up of the work can only be considered.

For guidance of the tenderers, the tentative Limit of Contract of the tenderers shall be at a distance of 100m from the outer flange of the BFV placed after the flowmeter. Tenderers have to strictly comply with the internal dimensions of the pumping station as given in the enclosed drawing.

(i) The work shall be carried out in general according to IS specifications applicable for the respective items of the work.

ii) The RCC design shall be based on IS: 456 for plane and reinforced concrete for general building construction.

(iii) Tenderers/ contractor will be given full liberty to opt for design mix as per satisfaction of E.I.C. with minimum cement content as stipulated in I.S. code. It is the responsibility of the contractor to make good or reconstruct the part or whole of a structure if gets damaged or demolished/ crushed/ settled down due to water hammer or similar external reasons or for faulty design at his own cost. Faulty Design submitted by the contactor even if accepted by the department will not relieve the contractor from above responsibility. Contractor will be considered total responsible for any accident caused due to negligence on his part/ poor workmanship/ faulty design. Contractor has liberty to go for design mix for achieving Rich concrete having minimum cement content as stipulated in I.S. code or go for variation if so required at site subject to the satisfaction & permission of E.I.C.

As regards the pipe lines, the test shall be performed for pressure of water head equivalent to double the working pressure in case of MS pipes. The test pressure shall remain constant in the pipe section under test of 15 minutes without any reduction in pressure. The contractor will have to demonstrate all the hydraulic tests by making his own arrangements for water supply and filling and disposing water after the test. The Contractor shall rectify the defects noticed and carry out the test again and repeat the testing operation till successful result is obtained and accepted by the Executive Engineer. The rates quoted for the work shall be

considered as inclusive of cost of all labour and materials and plant required to give successful test for water tightness.

The Contractor's quoted price shall include the design, supply, erection, commissioning & construction of one numbers of elevated approach roads (gangway) (including the area covered by the common delivery manifold & the cable trenches/ alley) towards jetty and towards sub-station along with the Jetty mounted pump house & the Sub-station, cable and pipe trenches covered with chequered plate or removable pre cast slabs to complete the work of Intake Jetty and Raw Water Pump House in all respect (Civil Work only). The details and sizes of the pump/motor bases/foundation / Cut out will be supplied by E/M sector during detail engineering. The foundation of pump/ motor bases and operation platform slab shall take into account the dead load of pumps & motors as well the effects of their moments and vibrations. The live load of pump Houses floor (or operating platform) shall be assumed as per IS Code. This is in addition to Motor load, Pump load, water load etc. data for which have to be furnished. For Quoting in price bid Tenderers are free to assume standard sizes of all base plates, motor stool / pedestals considering the pump house at present will run 5 Nos vertical turbine type (V.T) pumps with delivery head of 40 to 45 mtr. head @ 1200 m3/hr discharge of each pump.

Mass concrete of the 1:4:8 mixes where applicable shall be used in places for mat concrete under foundation and lean concrete fill between foundations and in fill for excess excavation using 37 mm size stone chips.

First class brick work in cement mortar of 1:6 shall be used for 250 mm thick supper structure panel walls. Super structure panel walls of the building shall have 20 mm thick cement plaster (1:6) inside and 15 cement plaster (1:6) faced outside. All the inside wall of the building will have two coats of Oil Bound Distemper(synthetic) paint of approved quality and shade over a coat of primer. Unless otherwise specified all External faces of walls shall be provided with two coats of premium 'Acrylic Exterior Emulsion' paint of approved colour. 10 mm thick ceiling (1:4) shall be rendered smooth and shall have two coats of white oil bound distemper wash. Adequate number of 150 mm diameter rainwater down pipes shall be provided of heavy duty type with fittings, as necessary.

The Control room of the pump house shall be of Acrylic Emulsion Paint of approved shade over wall putty and one coat of primer.

Double chequered damp proof course of 25 mm thickness of 1:2:4 with stone chips will have to be provided at plinth level of all brick walls. A 1.0 M wide apron of 100 mm thick 1:2:4.The apron shall be finished with 35 mm thick IPS.

PCC over BFS all around the Pump House over sand fill of 150 mm. Minimum thickness shall be provided by the contractor. The tenderers shall include in his quotation a provision of surface drain 150 mm wide x 200 mm(min) deep with 250 mm brick side wall 1:4 cm, 100 mm thick concrete base slab of PCC 1:2:4 over 75 mm flat brick soling complete with plaster 1:4 and neat cement punning along with entire edge of the brick apron for disposal of the rain water.

The roof slab of the pump house shall be of flat roof.

The roof shall be of RCC construction of mix not leaner than Grade M-25 with minimum cement content as specified in relevant I.S. Code.

The super structure of the pump house buildings may be of RCC frame with brick panel walls. The brick walls shall be of minimum 250mm thickness.

The flooring of the entire pump house of entire operating floor except otherwise specified shall be insitu mosaic shall also be provided in the dado upto and including the sill of windows as well.

The flooring of the sub-station rooms would be of 57 mm thickness with ironies or Ferro site flooring. Mosaic tiles shall be provided in all other places including stairs etc.

Adequate skylights and windows shall be and as approved provided to admit sufficient natural light. The total shutter area of doors, windows & ventilators shall be not less than 20% of the total carpet area of the buildings. All doors, windows and ventilators shall be of steel except otherwise indicated in our documents and their pattern shall be upto-date and fitted with floss of not less than 13 Kg/M2. The external doors shall have a width of 1200 mm except that of the unloading bay. All internal doors shall be not less than 1050 mm wide where the application is only a pathway for persons and not less than 2500 mm where Panels, Transformers etc are to be installed. All exterior doors and windows shall have RCC Chajja in a box type or any other approved architectural pattern so as to be useful to the building in general. The main door shall be 1500 mm. wide.

All fastenings and fixtures of doors, windows and ventilators shall be of heavy duty type as per direction of EIC. The position of windows shall be such that these will open outside and close easily when necessary. One rolling shutters of width as directed by the E.I.C. with a provision of ramp shall be provided. The windows shall be provided with M.S grills of approved Design.

The Pumping Station would have one emergency exit from the Vehicle Passage& two main exit points from the pump house to the cantilever walk way around the pump house.

All load data are tentative & will be given during detail engineering. All data/ design information being tentative may be verified with stipulated standards / site information's etc. Tenderers/contractor therefore is advised to consult with manufacturer/experts at their own cost, if so felt, to reach more correct figure for Tendering purpose. The same is also advised for any other data supplied/missing. But in no case It will be Treated as a Fault of Tendering Authorities S.E.(East Circle).If any data is found in Variance in same chapter/ section or anywhere of tender document, is to be brought to the notice of the tendering Authority & His interpretation/ decision will be considered as final and binding to the contractor.

2. DESCRIPTION AND SCOPE OF WORK

2.1 The work involves planning, designing and construction on turnkey basis of a R. C. C. Intake Jetty as per Tender contained in Section-A of the Tender Document including jetty mounted pump house with supporting 5 nos. 1000 KL/ Hr capacity vertical turbine pump and motor, valves, pipes, control desk, 10 MT EOT crane, etc. as required.

2.1.1 Designing, drawing and construction of the intake jetty and jetty mounted pump house will be based on R. C. C. bore pile of minimum 900 mm diameter having pile foundation with permanent steel casing with R. C. C structure for the Jetty and jetty mounted pump house itself and for supporting the 5 nos vertical turbine pumps. The deck will be reinforced concrete along with all the structural work.

2.1.2 Suitable tubular rubber fenders in front of the first row of the piles of the T-head have to be provided to guard against accidental hit of stray country boats/barges.

2.1.3 The jetty width should be sufficient for accommodating six nos. Vertical Turbine Pumps & for which necessary load consideration has to be taken into account.

2.1.4 Providing and fixing R. C. C. hand railing of R. C. C. post of adequate size to serve as precaution on both sides of jetty approach and Sub Station elevated platform approach roads & around the edges of the deck slab.

2.2 The offer of the tenders shall be inclusive of all works necessary for completing the jetty, Jetty mounted pump house and vertical Suction column pipes with Caisson pipes so that the Raw Water Pumps can be made operative.

2.3 Drainage arrangement shall be provided to drain out all leakages water and all wastewater including rainwater etc. into the river and to keep the pump house and roof and jetty deck complete dry.

2.4 One MS pipeline shall be provided from the delivery manifold which will discharge raw water at the river. The diameter and thickness of the pipe shall be same as the delivery pipeline of the pumps or as per instruction of the EIC. This pipeline shall also include one sluice valve.

3. LOCATION

3.1 The Intake Jetty and Jetty mounted pump house will be located approximately within length of existing Jetty from the bank (length may vary as per local echo sounding report, which is to be done by the agency before finalization). The actual location shall be finalized only after

detailed survey carried out by the contractor. The individual delivery pipes will be connected with 12 mm thick 800 mm dia M. S. Common Delivery Manifold to be installed in the Jetty.

4. SUBSOIL REPORT

4.1 Subsoil investigation shall be arranged by the contractor to be carried out fromany recognized Institution like IIEST (BESU)/Jadavpur University&should be vetted from any recognized Institution like IIEST (BESU)/Jadavpur University / IIT Kharagpur, and a summary report will be placed by the Contractor after getting LOI/Work Order since the location will also be fixed by the Contractor in consultation with EIC.

5. TENDER DRAWINGS

5.1 Nevertheless it is essential that the minimum centre-to-centre distance between two adjacent pumps is given in the attached drawing. It will be the responsibility of the Tenderer to verify the bed level. The bench mark will however be provided by the KMDA.

6. DESIGN CONSIDERATION

6.1 The Intake Jetty structure and its members shall be reinforced cement concrete and shall be design for suction safely with the effect of the combination of various loads, forces and stress that can possibly coexist. All calculations shall distinctly tabulate the various combinations of the loads and stresses covered by the design. The loads, forces and stresses to be considered in designing the structure should included the following :-

i) Dead Load – Dead weight of all structural elements, weight of intake pipes including its supporting arrangements and probable silt deposits on the upper surface.

ii) Live Load - Super imposed load of 1.0 tonne/m2 on the deck slab for jetty head and 0.75 t/m2 on the deck slab for shore gangway. In addition to the above the deck slab for jetty head shall be designed to take localised load of 6 tonnes over 10 m2 of surface area. The impact or dynamic effect, if any, of live load is to be considered.

iii) Effect of bore and water current – The Maximum flood and ebb velocity when the sagar range may be assumed as 4.14 M is 2.19 m/s &1.58m/s at the bank where jetty is located. the piles are to be designed to withstand the maximum of surge of bore current.

iv) Berthing forces from Vessels - For this 600 tonnes (gross tonnage) Barge with a velocity of 1.5 m/s should be considered if applicable. The approach angle should be taken as 20 degree

v) Mooring forces.

vi) Forces due to wind.

vii) Temperature stress due to variation in temperature of 300 C.

viii) Seismic forces.

ix) Erection stresses.

x) Water hammer in Suction Mains.

xi) Any other forces that the Tenderers may consider.

6.2 Maximum anticipated scour depth at the jetty height may be considered as 13 meters below the existing river bed which is to be calculated and finalised by the contractor. Scour depth may be reduced for the piles towards shore according to the existing bank slope. The design of jetty shall be such that the entire structure is to be totally safe with this scour depth.

6.3 Unless specified otherwise elsewhere, a factor of safety of 2.50 shall be applied to the ultimate load to arrive at the safe load of the piles.

6.4 Spacing of piles (centre-to-centre) in a pile group or between any two piles of adjacent group shall not be less than 3-3.5 times the diameter of the pile or the diameter of the circumscribing circle in the structural area in case of non-circular sections.

6.5 Vertical load bearing capacity of pile under any combination of loads shall not be allowed to exceed normal load bearing capacity under static condition.

6.6 In the jetty, piles are subjected to high horizontal and due to large projection above bed level, the members shall be designed by Working Stress method for the load and forces acting on the structure.

6.7 In the case of R. C. C. bored piles, the main reinforced shall not in any case be less than 0.80% of the gross sectional area and shall extended for the full length in all piles made into

cages and well wired lines/stirrups (8 mm dia at 150 mm c/c or equivalent) and spot welded to make them stiff enough to withstand handling without damage.

6.8 Minimum 8 mm thick mild steel liner shall be provided for bored cast-in-situ piles covering each pile, and the liner shall be embedded upto a depth of six times diameter of the pile below the bed level.

7. R. C. C. SCREENING AROUND BELLMOUTH OF SUCTION MAIN

Suitably designed screens shall have to be provided around the bell mouth of the Vertical Turbine Pumps. The screens shall be suspended from a suitable level of the jetty and aligned accurately with the help of steel wires at different depth of the screen. The screen may be made of suitable size to prevent entry of large floating matters and shall be provided with all arrangements and facilities for proper cleaning.

The Tenderers shall submit detailed drawing and design of the screening arrangement for approval.

8. Bank protection work (approximate 40 to 50 meters long along Boundary line or the shore as recommended by the KoPT is within the scope of this tender. Scouring depth in this region is to be taken as 13 m until unless confirmed by the KoPT Hydraulic Survey Department.

9. SPECIFICATION FOR WORK

The work shall be carried out in general, according to the IS specifications applicable for the respective items of works. During execution at any stage if any variation is required to be made to suit the site condition; E.I.C to be technically satisfied and his decision will be regarded as final.

ALL load data are tentative & if not found reasonable (this will also applicable for data of Design Parameters) will be given during detail engineering. Tenderers therefore are advised to consult with manufacturer/ experts at their own cost, if so felt, to reach more correct figure for Tendering purpose. The same is also advised for any other data supplied/missing. **But in no case It will be Treated as a Fault of Tendering Authorities S.E. (Programming circle), KMDA. If any data is found in Variance in same charter/ section or** anywhere of tender document is to be brought to the notice of the tendering Authority & His interpretation/ decision will be considered as final and binding to the contractor.

11. OPERATION AND MAINTENANCE

The contractor shall have to operate and maintain for five years after the trial run period of the Intake Jetty, Raw Water Pump House, Raw Water Pumping Main including sub-station and other units/components all complete in 24x7 basis. It is expected that the entire unit shall be operated in full capacity (84 MLD in 22 hours) throughout the entire period and with full overloading condition as and when the situation will demand within the entire period. The contractor shall have to pay for all material and labour components regarding the O&M. The liability of the Authority is only payment of the energy charges to CESC/WBSEB during the maintenance period over and above the contractual payment to the contractor as quoted in the tender BOQ and no any other payment shall be made under any circumstances.

The broad scopes of work are as follows,

(i) Employment of sufficient number of Person-In-Charge, technical personnel and other skilled, semi-skilled, un-skilled personnel and sufficient number of guards to operate and maintain the establishments satisfactorily in three shifts. It should be noted that payment to the contractor may not be made, if wages, PF, ESI would not paid or prevailing labour laws and other relevant laws of

GoI/GoWB shall not be complied. The Contractor shall issue separate Identity Card (with picture) to all personnel working under his contract. The contractor shall also have to take full responsibility of any casual labour working under this contract.

(ii) Minimum wages, PF, ESI as per GoI /Go WB laws, notices shall be paid to all hired personnel.

(iii) The Contractor shall have to operate and to maintain the entire establishment as a factory and he should obey the rules and regulations as per prevailing Factory Act.

(iv) Supply of all consumables, chemicals, instruments, spare parts, tools & tackles etc. related to proper O&M. Contractor should supply extra amount/quantity of all those, so that those could be used for another three months after the O&M contract period.

(v) Repairing, replacing of any defective or faulty Civil/Mechanical/Electrical/Electronic components and instruments during the O&M period and at the completion of the O&M period, no components and instruments should be found defective, un-attended or faulty. Final bill will not be paid to the contractor unless all the defective, broken, misplaced, lost components shall be repaired or replaced.

(vi) It is expected that due to convenience of operation and maintenance, the contractor shall have to perform some extra capital works (Civil/mechanical/ electrical/electronic) which are not mentioned in the present NIT. If the contractor shall feel it necessary, he shall carry out those extra works at his own cost and no payment shall be done by the Authority in this regards.

(vii) Round the clock proper security arrangement for safety of civil, electrical and mechanical equipment.

(viii) The contractor is insisted to take necessary insurance cover for any damage or compensation payable by law, in respect of or in consequence of any accident causing injury to any of their workman or other persons in the employment of the contractor. The premium shall be paid by the contractor and not reimbursed by the Authority.

(ix) For any damage of civil, mechanical, electrical, electronic or chemical compound of this plant, due to ignorance or mishandling of the contractor's staffs or representatives, the contractor is liable to replace the components with a new and approved one, whatever cost it shall be required.

(x) The contractor shall have to keep a close contact with Department from time to time. Regular close interaction between the units, such as, Jetty Mounted Pump House, Substation, Raw Water Rising main up to battery limit etc. is

absolutely essential for their scheduled operation and shall be strictly maintained. The contractor shall have to arrange for sufficient number of mobile phones and other communication devices for the Shift-in-Charges, operators and other responsible personnel to maintain regular close interaction between the units.

(xi) The contractor shall engage experienced and qualified technical supervisor (Electrical) having a valid certificate of competency authorized by W.B. License Board (Electrical) (H.T & L.T) and operating personnel for operation of electrical pumps, motors, EOT cranes and all electrical hoists.

(xii) Contractor shall have to arrange all labors materials, tools and plants, oil and grease for smooth O&M of the unit. He should provide at least one 5 H.P diesel/Kerosene pump with requisite length of suction and delivery pipes, welding machines with ESAB/TATA electrodes, electric and hand drilling machine, electric grinders, gas cutter, and mechanical cutters, cement grouting machines, blower, vacuum cleaners etc.

(xiii) The contractor should supply required amount of oils and lubricants of approved grade and make required for smooth O&M of the units. He shall also ensure that adequate quantities of the appropriate fuels, lubricant oil and grease available at stock. Oil levels are to be checked and level is to be maintained by using the recommended grade of oil where required.

(xiv) General cleanliness of the Intake jetty and RWPH shall be maintain regularly by the contractor by sweeping and washing at his own cost. Cleaning of all electro-mechanical equipments including the units/components of the Jetty and RWPH including their privy and toilets etc. in a regular manner and keep all the premises in a neat and clean manner & maintain the healthy & hygienic atmosphere in all the premises. The soot and dust inside all the buildings are to be cleaned very early.

(xv) The contractor shall have to arrange to provide proper accommodation of his workers and other personnel at his own cost. The contractor may construct any temporary building structure at his own cost if and only if this Authority provide space within the Jetty and RWPS premises.

(xvi) The contractor will maintain a register to record all spare parts which will be installed. The unserviceable/scraps materials are to be returned to the Department and the same to be recorded in the register except which are consumables. A separate register to be maintained for consumables items where the uses of the consumables items are to be maintained along with quantity and date. Both registers should be certified by the EIC or his authorized representatives.

(xvii) The Contractor shall have to supply sufficient number of printed log-books, duty charts, report sheets for each operation of the Intake Jetty and RWPH as per instruction of the E.I.C. There shall be separate such printed log books for separate operations of the various units to be recorded in a printed register as per the instruction of the E.I.C.

Section – H
Detailed Specification for Fabrication of Steel Pipes And Specials and Other Allied Works

1.GENERAL

1.1 The work shall comprise of supplying all labour and materials cost and providing all tools and plants, machineries, equipment and instruments necessary for proper fabrication of pipes and specials including necessary testing thereof at the Contractor's stack yard/workshop and also providing necessary stack yard if required for stacking and storing of the steel plates and pipes properly till despatch to the work sites. Any materials net covered by that specification should comply with the Indian Standard Specification and in the absence thereof with the British Standard Specification or any other approved standard.

1.2 10, 12, 16 &20 mm thick steel plates of nominal size 4000 mm (L) x 2500 mm (B) will have to be procured by the Contractor from TATA, SAIL or from a steel plant already approved by KMDA.

1.3 The work shall include:

(a) Cutting, where necessary, and shaping steel plates and rolling the same to proper diameter and / shape and welding of longitudinal seams for fabrication of the pipe barrels as per specifications and direction of the Engineer-in-Charge.

(b) Jointing the individual pipe barrels by circumferential arc welding as per specification and direction of the Engineer-in-Charge to form pipes of required length to suit the site conditions.

(c) Cutting, shaping and rolling of steel plates for fabrication of specials as per specification and direction of the Engineer-in-Charge by longitudinal and circumferential arc welding, as would be necessary.

(d) Fabrication of flanged plates (25 mm thick) with drilling or required diameter bolt holes and joining the flange plates with pipe barrels by welding.

2. WORKSHP AND STOREYARD

2.1 The Contractor shall have to set up a workshop, if he does not already possess a suitable workshop for fabricating the pipes at a convenient plate to be approved by the Engineer-in-Charge. The workshop shall be fully equipped with necessary machinery and equipment for cutting, shaping and bending of plates to proper size and shape and for jointing by automatic are welding to form required pipes and specials. The workshop shall also have proper facilities and equipment/instruments for carrying out the necessary shop-tests.

2.2 An independent enclosure properly fenced at Contractor's cost shall be maintained within or near about the Contractor's workshop or near the worksite where the fabricated bare pipes and /or the coated pipes may be stacked.

2.3 Also a separate store and/or stack yard shall be provided by the Contractor at his own cost for storing valves, steel materials, flanged adaptors and cement, etc. (as may be supplied to the Contractor by the Authority), safety and securely.

2.4 The Engineer-in-Charge and other staff authorised by him or by the KMDA for supervision for the work shall have access to the Contractor's workshop, stack yard or store as mentioned above at any time. "Identity Card" or "Gate Pass" system may be introduced for the purpose.

2.5 Not only the fabrication but also the coating and wrapping operation shall be carried out under a properly constructed shed. The storing of the coated pipes shall also be under shed.

3. CUTTING

3.1 The plates shall be cut to proper dimensions by oxyacetylene cutting and machine finishing or by shearing and guillotine machines, but in the latter cases the Contractor shall supply specifications and particulars to the Engineer-in-Charge and obtain his approval, before the method is adopted.

3.2 In case of specials the Contractor shall have to use templates and guided cutting torches for cutting plates.

3.3. All plates shall be kept perfectly in a horizontal plane at the time of cutting. Any plate found to be wrapped or to have permanent corrugations should not be used.

3.4 The plates shall be given the necessary chamfering at the edges. The ends of all the pipes shall also have the necessary chamfering (for hand welding at site from outside and inside).

3.5 The edges shall be made even by suitable grinders.

3.6 The tolerance on dimensions of plates cut by flame shall be guided by IS 6431.

4. BENDING

4.1 The plates cut to the exact sizes shall be put into the plate-bending machine to form barrel shells of the required diameter, by cold rolling.

4.2 Proper size and number of rollers shall be used to give the plate uniform curvature from end to end.

4.3 It shall be the responsibility of the Contractor to check and demonstrate the proper curvature of the bent plates. Any finished barrel found defective in shape shall have to be rectified by the Contractor to the entire satisfaction of the Engineer-in-Charge.

5. SPECIALS

5.1 The working drawings of the specials shall have be prepared by the Contractor well in advance and approved by the Engineer-in-Charge. The specials shall be fabricated by cutting plates to the required shape obtained by developing the form of the specials on a plastered bed. The cut shall be made by templates on guide cutting torches so as to obtain a proper cut. No hand cut shall be permitted.

5.2 The bends shall be either single piece ones or composite ones, and require prior approval of the Engineer-in-Charge before fabrication. The composite bends (made of more than one of pieces having an angle of more than 6^0 shall be made of cut pieces as per approved drawings.

5.3 The tapers shall be of one or more streaks. Each streak of and timer shall have a stiffening ring in the center fixed circumferentially. This shall be of the pipe thickness as the same and shall be 75 mm wide. The dimensions of tapers shall be as per approved drawings. No taper shall be sharper than 15^0 (angle enclosed at the apex of the cane of which the taper is in strum). All the tapers shall be tested hydraulically same way as the bare pipes and specials.

5.4 Loose flange rings shall be prepared to correct inner and outer dial. And bolt holes shall be correctly drilled.

5.5 The blank flange shall be prepared to the correct dimensions and with necessary stiffeners etc.

5.6 The manhole covers, saddle pieces, plug plates and tee pieces shall have to be prepared, as per approved drawings, made for providing 600 mm dial manholes in the pipe line. These manhole covers, made from 12 mm thick M.S. Plates, are to be fixed at the top of the pipe with necessary saddle piece of approx. 225-mm. heights complete with flange welded properly.

6. ASSEMBLY

6.1 The rolled barrel shells shall be placed on a platform for tack welding. Before tacking is resorted to, those shall be properly examined to ascertain the correctness of the shape and also the gap between the ends shall be properly maintained. Spiders and tightening rings shall be used for the purpose.

6.2 The rolled barrel shells, adequately tacked, shall then be subjected to automatic arc welding (for welding of the longitudinal seams) to form barrels.

6.3 A lot of such barrels, comprising a maximum of thirty consecutively formed barrels is subjected to normal lists for testing as derailed in clause 8 herein below of this specification. Only on successful completion of the tests for welding a lot is passed for further fabrication.

6.4 The barrels from only a passed lot shall be taken to the assembly platform and the requisite number of barrels shall be joined together to form each piece of pipe may be of lengths up to 7.5 meters as the Contractor may decide keeping in view the convenience of handling and transport. The lengths of pipes have to be decided after due survey of the site condition and manoeuvrability.

6.5 The barrels shall be so arranged that the longitudinal joints will be staggered at 90^0. The barrels tacked together shall have uniform roots and gaps for full penetration of the weld.

6.6 The tacked barrels shall then be subjected to automatic arc welding, to form pipes.

6.7 The assembled pipes shall be correctly cylindrical at and the faces shall be true to shape. A suitable arrangement for testing the correctness of the faces shall be provided by the Contractor at his own cost at the assembly stage.

6.8 The numbering of barrels and pipes shall be done by suitable punches, as directed by the Engineer-in-Charge. The cost thereof shall be included in the fabrication item given in the schedule. No extra payment can be made in this respect.

7. WELDING

7.1 The circumferential as well as longitudinal joints shall be welded properly so as to obtain strength of at least equal to that of the parent metal.

7.2 Before commencement of work, the Contractor shall submit complete design(s) of the welding procedure(s) to the Engineer-in-Charge for approval. Prior to the start of production Welding a detailed procedural specification shall be established and qualified to demonstrate that welds having suitable mechanical properties and soundness can be made by this procedure. The quality of welds shall be determined by destructive and non-destructive testing. For any field when minimum 4 (four) runs of welding shall be provided three (3) runs from inside and one (1) run from outside. All necessary arrangements viz. wooden or steel boxes, etc., are to be made by the Contractor at his own cost for welding from outside at the bottom side of the pipes when laid in each with proper facility for inspection by the Engineer-in-Charge or his authorised representative. The Contractor shall consider this important point while quoting their overall rate for the work. Any local sand filling necessary for this purpose will however, be paid separately as per scheduled item in the Bill of Quantities.

7.3 The details of each qualified procedure shall be recorded. This record shall show complete results of the procedure qualification test. These procedures shall be adhered to during construction except, where a change is specifically authorised by the Engineer-in-Charge as provided for in 7.4.

7.4 The Procedure Specification Shall Include The Following:

(a) Process: (the specific arc welding process using automatic, semi-automatic or manual where applicable) process or a combination of these processes).

(b) Joint Design (shape or gorses or angle of bevel, size of root face and root opening, shape and size of fillet welds type of back up if used).

(c) Electrodes and fluxes (size and classification numbers of electrodes as per ISS Minimum number and sequences of beads).

(d) Electrical characteristics (current and polarity, voltage and amperage for each size electrodes.

(e) Position (Roil of position welding).

(f) Direction of welding vertical up or down.

(g) Number of welders (minimum number of root bead welders; minimum number of subsequent bead welders).

(h) Time lapse between passes (Maximum time between completion of root head and start of second bead, maximum time between completion of second head and start of other beads).

(i) Type of line up clamp, if used (Internal, External or none required).

(j) Removal of line up clamp (after root bead welding is 50% complete after root head welding is 100% completed).

(k) Cleaning (power tools, hand tools).

(l) Preheat, stress relief methods, temperature, temperature soon control methods, ambient temperature range.

(m) Shielding Flix (Type and size).

(n) Speed to travel (cm. per minute).

(o) Sketches and tabulations (sketches on separate sheets showing the joint design and held bead sequence together with tabulations of the date required under items b, c, & d).

7.5 A welding procedure must be re-established as a new procedure specification and must be completely re-qualified when any of the changes listed below are made in the procedure. The changes other then these given below may be made in the procedure without the necessity for re-qualification provided the specification is revised to show these changes.

(a) Change in welding process.

(b) Change in joint design.

(c) Change in pipe material.

(d) Change in position (for butt welds only): a change from vertical to horizontal on vice versa.

(e) Change in pipe size wall thickness (for groove) welds a change from one diameter and wall thickness group combination to, another and for fillet welds, a change from one wall thickness group to another group).

(f) Change in electrodes (type and/or size).

(g) Decrease in number of root head welders.

(h) Change in time lapse between passes.

(i) Change in direction (vertical down to vertical up or vice versa).

(j) Change in shielding gas (from one gas/mixture to another gas/mixture).

(k) Change in flow rate (decrease or increase).

(l) Change in shielding, flux (Change in type on size flux particles).

(m) Major change in speed of travel.

7.6 Subject to an approved weld design with the pattern of procedures established by qualifying tests:

(a) The longitudinal seams of the rolled barrel shells shall be welded by submerged arc welding conforming to IS 4353.

(b) The circumferential joints between the barrels should be welded by semi-automatic arc welding machines. Manual arc welding in specific cases may be allowed by special permission of the Engineer-in-Charge.

(c) The circumferential joints between pipes and between pipes and specials, at field, shall be done by manual arc welding and shall conform to IS 823.

7.7 All electrodes shall conform to relevant Indian Standards Published by Indian Standards Institution. Particular mention is made of IS 814 and IS 815, and IS 3613 and IS 7200 in this respect.

7.8 For shop welding as well as for welding at site the Contractor shall have to carry out the work taking every precaution for safety. The safety and health requirement, equipment for protection and fire precautions to be adopted shall conform to IS 818, IS 1179 and IS 3016 respectively.

7.9 All the production welding at shop and welding at site shall be carried out only by certified welders, who have passed the requisite welder qualification tests by using a previously qualified welding procedure.

7.10 The welder qualification tests shall be arranged, under the direction of the Engineer-in-Charge, at the Contractor's factory workshop. The costs of all

labour and materials, equipments, tools and plants shall be borne by the Contractor.

7.11 The training and testing of metal arc welders shall conform to IS 817.

7.12 Notwithstanding whatever has been mentioned above if any of the following essential variables are changed the welder using the new procedure shall be requalified, through qualifying tests.

(a) A charge from one welding process to another welding process.

(b) A change in the direction of welding from vertical up to vertical down.

(c) A change in the electrode from one classification group to another classification group.

(d) A change in position other than that already qualified.

(e) A change in the joint design.

7.13 All qualifying tests shall be carried out under the supervision of the Engineer-in-Charge or his authorized representative.

7.14 For manual welding, the circumferential welding of the joints should preferably carry out by pair of welders so that by observing proper sequence distortion cab be avoided.

7.15 For manual welding, a joint entrusted to a particular welder or to a pair of welders shall be completed by that particular individual on by the pair (as the case may be) in all respects including the back sealing run.

7.16 For manual welding in specific cases as permitted by the Engineer-in-Charge, all the circumferential joints of all lots of pipe fabricated at shop, shall be carried out and completed by not more than a pair of welders. If however, the pipes welded by an individual or a pair (as the case may be) falls short of the normal length of a lot (i.e. 75 meters approximately), such pipes shall form a separate lot for the purpose of testing for welded joints.

7.17 No helper or other unauthorized person shall be permitted to do any welding work whatsoever.

8. TESTING

8.1 As per instruction of the E.I.C., random samples of piece of pipes and specials etc. shall be taken by the E.I.C. or by his representatives and those shall be subjected to tests for material tests, tests for welded joints and hydraulic pressure test at the contractor's cost as specified in the following sub-paragraphs. The number of random samples and number of tests shall be as per instruction of the E.I.C. unless specified.

The shop tests for welded joints, whenever necessary shall be done at the Contractor's own cost. The Contractor shall quote his overall rate for the work accordingly. The joints shall be tested in accordance with IS 3600.

8.2 Test pieces at the rate of the one for each specified tests shall be taken from a lot composed normally of thirty barrels (each having a nominal length of 2.5 meters), and similar test pieces shall be taken from a lot normally comprising ten pieces (each pipe having nominal length up to 7.5 meters) and fabricated drum only passed barrels.

8.3 If however, both the longitudinal and the circumferential joints are welded by the same procedure specification (duly established) test pieces at the rate of one for each specified tests shall be taken from each lot of ten pipes (each having a nominal length up to 7.5 meters) fabricated. In this case, clause 8.2 shall be inoperative.

8.4 Field welded joints shall also be subjected to the normal tests for welded joints. However, the Contractor shall be paid for such tests of field joints as per relevant item in the Bill of Quantities. For this purpose each set shall comprise one tensile test, one bend test and one nick break test.

8.5 In addition to above, ten (10) number of "RADIOGRAPHY" tests (non-destructive test) are to be carried out for field welded joints at the Contractor's own cost. The Contractor shall quote overall rate for the work accordingly.

8.6 The test pieces shall be taken out from the position as may be indicated by the Engineer-in-Charge, and shall be immediately machined and tested. Similarly the Engineer-in-Charge shall select the positions of Radiography tests.

8.7 The shape of the test pieces, removed from the pipes, shall be such that it would yield test specimens of the required dimensions and at the same time leave the hole in the pipe with rounded corners. All such holes shall be patched up by inserting plates of suitable size & shape & welding manually. Care shall be taken in preparing these replacements plates so as to get a good weld in proper position.

8.8 If a test specimen shows defective machining or develops of laws a not due to welding, it may be discarded and another specimen substituted with the approval of the Engineer-in-Charge.

8.9 The tensile test shall be done as follows:

a) From the test piece, collected from the pipe as may be indicated by the Engineer-in-Charge the test specimen shall be taken perpendicularly across the weld. The welded seam shall be at the middle of the test piece.

b) The test specimen shall then be shaped, in accordance with IS 223 of 1950. The dimensions shall be as specified in IS 3600, with the test specimen/being made of flat and its sides machined.

c) The protruding welded portion from inside the and outside shall be removed by machining or grinding before the specimen is tested in accordance with IS 1608-1972.

d) The welded joint shall have tensile strength not less then the tensile strength of the parent metal.

8.10 The bend test shall be done as follows:

a) The test specimens for the bend shall be prepared from the test pieces collected from the same lot of barrels and/or pipes.

b) The test specimen shall be shaped and machined in the same way, as done for the tensile test specimens. The dimensions shall be as specified in IS 3600.

c) The test specimen shall be tested at the factory of the Contractors in presence of the Engineer-in-Charge or his authorised representative. The specimen shall stand cold-bend through 180^0C around a pin, the diameter of which is equal to $4\ ^1/_2$times the thickness of the plate. The side of the specimen representing the inside of the pipe shall be placed next to the pin, with the welded joint approximately at the center of the bend.

d) The bend test shall be considered acceptable if no crack or defect of a dimension greater than 1.3 mm measured along the weld and greater than 1.6 mm measured across the weld is present in the weld or between the weld and the fusion zone after bending.

8.11 The nick break tests shall be done as follows:

a) The preparation of test specimen, the testing and recording of test results shall conform to IS 3600.

b) The exposed surface of each specimen shall show complete preparation and fusion.

c) The fracture shall have a clean appearance and the weld metal is free from voids, slag inclusions to an acceptable limit.

d) The nick break test shall be considered acceptable if: -

i) There shall be no more than six gas pockets per 625 m^2 of surface area with the greatest dimensions not exceeding 5 mm.

ii) Slag inclusions shall not be more than 0.8 mm in depth nor 3 mm or one half ($1^1/_2$) nominal wall thickness (whichever is smaller) in length and there shall be at least 12 mm of sound weld between two adjacent slag inclusions.

8.12 For failure of a test specimen, the operator or the welder (as the case may be) shall be warned for the first failure. If a second failure takes place the operator or the welder (as the case may be) shall not be permitted to continue welding work any further. A suitable substitute shall be given immediately by the Contractor.

8.13 If there be other reasons for the failure of the test specimen, rather than from any lapse on the part of an operator/welder, in the opinion of the Engineer-in-Charge, then such reason(s) shall be removed forthwith by the Contractor.

8.14 Records showing the names of welder's operator working on individual joints shall be recorded, along with other data.

8.15 For failure of test specimens in tensile and/or bend tests the following procedures for retest shall be adopted.

a) In case of longitudinal welds, two more test pieces shall be taken from the same lot, for each failure (i.e. 2 nos. for tensile failure, 2 nos. for failure in bend and 4 nos. for failure in both tensile and bend). If anyone of the test specimens prepared for retest fails subsequently, the lost shall be rejected and extensive gauging and repairing shall be carried out by the Contractor at his own cost in accordance with direction of the Engineer-in-Charge. The gauged and repaired lot can only be accepted after successful tensile and/or bend test (as the case may be).

b) In case of circumferential welds a similar procedure shall be followed.

c) In case of circumferential welds at fields, two more test pieces (for each failure) shall be taken (from the specified length for of approximately 50 meters of pipes laid in trench) for retest. If any of the test specimens prepared three-room for retest fails subsequently (in that particular type or types of tests in which failure occurred previously) then all the joints in the strength shall be provided with additional strips externally with requisite filled welds, as may be directed by the Engineer-in-Charge. If all the additional test specimens show successful test results in retest, then only the joint from where the test piece was initially taken (and failed) shall be provided with the additional strips externally. Northing shall be

paid for any additional strips mentioned here and the Contractor shall bear the entire cost.

8.16 All charges in connection with taking out test pieces, preparation of test specimens, machining and shop tests, including refill works shall be borne by the Contractor. No extra payment will be made on this account. The Contractor shall quote his overall rate for the work accordingly.

8.17 The tensile test of the test specimen, if not possible in the Contractor's shop, shall be carried out at a laboratory as may be directed by the Engineer-in-Charge at the Contractor's own cost and he shall quote his overall rate for the work accordingly.

8.18 Each pipe, after fabrication, shall be subjected to hydraulic test. The pipes shall withstand a hydraulic pressure of 14.5 kg/cm^2 (200 psi) without showing any sign of weakness leakage, posing or sweating.

8.19 The pressure of 14.5 kg/cm^2 shall be steadily applied by an approved ram pump and shall be maintained for at least ten (10) minutes in each case.

8.20 The pipe conveying the pressure shall be fitted with an accurate pressure gauge, approved by the Engineer-in-Charge.

8.21 Each pipe shall be hammered with sharp slow along its full length with a hand hammer/weighing about 1 kg (2 lbs) when it is under hydraulic test.

8.22 Defects in welds such as sweats or leaks shall be replaced after obtaining necessary permission from eh Engineer-in-Charge in writing otherwise the pipe shall be rejected. The repaired pipe shall be retested successfully before acceptance.

8.23 The demonstration of hydraulic test shall be given in presence of the Engineer-in-Charge or his authorised representative. All charges for hydraulic testing in the shop shall be borne by the Contractor and no extra payment will be made on this account. The Contractor shall quote his overall rate for the work accordingly.

8.24 The contractor shall have to perform the hydraulic test after laying of the pipe at site. He may carry out the hydraulic test for entire length of the 750 mm diameter MS raw water rising main or by part at his own convenience.

Hydraulic test of all pipelines after laying are to be given by the contractor on the pipe lines along with valves and specials are to be tested in full length or part length under a working water pressure of 6 kg/cm2 and 7 kg/cm^{2}for raw water pumping main and clear water pumping main respectively and the surge

pressure and shall withstand the total pressure for a continuous period of 1 hour without any leakage or fall of pressure in the pressure gauge. All internal pipelines within water treatment plant shall also be tested as per instruction of the E.I.C. No payment will be allowed without satisfactory hydraulic test.

For the purpose of hydraulic testing, the contractor shall have all necessary appliances tools & plants, pumps, pipes & specials (blank flanges) and also labour. The contractor shall have to arrange for procurement of clear water required for hydraulic testing and KMDA will not have any responsibility in this regard. This point shall be taken into consideration and the contractor shall find at his own way of supplying clear water for testing before quoting for this work. No extra claim whatsoever shall be entertained in this regard.

The contractor shall also make arrangements at his own cost for draining out the water in pipeline after satisfactory hydraulic testing. No extra claim whatsoever shall be entertained in this regard.

If at the time of testing any pipe, special and valve are found defective or any joint have been found leaking or sweating or having any other defect the contractor will have to replace the pipe, special or valve by a good one and/or he will have the defective joints freshly done after which the line will be tested again under the same pressure till found satisfactory by the EIC. No extra payment will be made for such rectification work and the cost for this would be included in overall value quoted for the work by the contractor.

9. FINISHING

9.1 Before subjecting the fabricated pipes to coating and wrapping it shall be checked that:

- **a)** All the pipes are correctly finished and are free of cracks, surface flaws, laminations and all other defects.
- **b)** All the pipes are cylindrical concentric and straight axially.
- **c)** All guests, temporary tasks, and other protrusions (if any) have been removed or chipped off carefully from the pipes without damaging the parent metal.

9.2 If, however it is found that any metal from the plate (i.e., parent metal has been removed, the Contractor shall repair the surface by depositing mental welding to the satisfaction of the Engineer-in-Charge).

9.3 For chiseling and grinding, either electrical or pneumatic chisel sand grinders shall be used.

9.4 The repairs of minor defects by welding or otherwise shall be permitted but such repairs shall be done only after being permitted by the Engineer-in-Charge in writing.

9.5 Any pipe or part thereof that develops injurious defects due to shop working or other operations there shall be rejected. The rejected pipe or part thereof shall be taken over by the KMDA but a penalty will be levied (as mentioned elsewhere) upon, the Contractor for so causing the damage.

9.6 The external circumference of the pipe, particularly at the ends, shall not deviate from the theoretical circumferential lengths by more than 5 mm.

10. STACKING

10.1 The stacking of the pipes and specials in the factory yard shall be done in a planned way so that those could be removed conveniently for subsequent operations.

10.2 Props shall be provided near end of the pipes to maintain in the correct diameter of the pipes during stacking and subsequent transport for other operations. The props shall be placed near the ends of the pipes and specials, where coating will not be applied at the shop.

10.3 The stacking ground in the yard shall be such as will not get water logged with any possibility of water logging, the pipes and specials shall be supported on sleepers sand shall be well above the high flood level.

11.0 The item of works of the for fabrication of steel pipes are as follows:-

(a) Mild steel plates should be conforming to IS 2062:1992.

(b) Gas cutting of MS pipes and / or MS plates of different thickness. All complete as per spec. and the direction of EIC.

(c) Fabricating MS pipe of different dia. In shop out of 8mm to 12mm thick MS plate supplied dept, cutting the plate to exact size and shape by gas cutting device and / or by adopting by any other approved type of mechanical means, bending the same in true curvature by template and rolling machine of approved design incl. proper marking, levelling joint followed by electric arc welding as per relevant IS spec.- longitudinal and circumferential as necessary using standard electrode incl. edge preparation , electricity charges and hydraulic testing of the fabricated pieces all complete as per spec. and direction of the EIC

(d) Fabrication of MS specials of different dia. In shop out of 8mm to 12mm thick MS plate supplied dept, cutting the plate to exact size and shape by gas cutting device and / or by adopting by any other approved type of mechanical means,

bending the same in true curvature by template and rolling machine of approved design incl. proper marking, levelling joint followed by electric arc welding longitudinal and circumferential as necessary using standard electrode as per standard IS spec incl. edge preparation, electricity charges and hydraulic testing of the fabricated pieces all complete as per spec. and direction of the EIC.

(e) Field welding of machine ends of pieces of MS pipes and specials for laying the same inside trench over ground by means of electric arc welding as per relevant IS spec. using standard electrodes incl. / edge preparation and charges for deployment of Electric generator set with fuel, lubricants and all other tools & plants all complete as per spec. and the direction of EIC for 10/12/16 mm thickness.

(f) Derusting, Scraping, brushing and cleaning the outer surface of manufactured MS pipes and specials applying first coat of synthetic primer Type B as per IS 15337 2003 of approved make over it and wrapping the same with coal tar based insulating tape 2mm thick as per IS 15337 of approved make and applying the second coat of synthetic primer Type - B over the first layer of insulating tape and wrappings the same second layer of 2mm thick coal tar based insulating tap in staggered pattern by torching etc as per manufacture specification and as per direction of EIC.

(g) **Derusting , brushing and cleaning the inside surface of the manufactured MS pipes and specials Applying one coat of approved primer over it and providing 3 coats of anticorrosive and non-toxic paint (two coats in the factory over primer and the third coat at site before laying) to all pipes & specials as per IS specification & direction of EIC. The specifications and make of such paints shall have to be approved by the E.I.C. prior to purchase of such paints. All exposed external surfaces shall get three coats of Epoxy paint over two coats of Epoxy primer. Specifications and the make of the Epoxy paint and primer shall have to be approved by the E.I.C. prior to the purchase of such paints. Workmanship and other technical specifications and testing procedures shall be as per Clause-18 and sub-clauses of other relevant sections.**

(h) Lowering MS pipes & specials in trench upto a depth of 3m below GL laying and jointing the same inside the trench / over the ground by means of electric arc welding using standard electrode as per IS specification all complete as per direction of the EIC..

(i) Supplying, wearing and laying of Polythene sleeving conforming to IS:8329:2000 is used for making the film is polythene or an mixture of polythelenes and for ethelene olefimcoplyme , density of which shall be between 910 930 Kg/cu.m. The material shall be stabilized inprediction by the addition carbon black in the range of 2 to 3 percent by mass for protection against ultraviolet rays , nominal thickness of the sleeving shall be not less than 200u and not more than 250u and negative tolerance on the nominal thickness shall not exceed 10% as per clause 16.2.1 , Tensile strength and elongation of the film in the longitudinal and transverse direction respectively . The rate includes the cost of wearing and laying in proper line and maintaining the overlapping of the said material to ensure complete cover for the different diameter of pipe

(j) Supplying, fitting and fixing of MS machine end fabricated with 30mm to 40mm thick MS plate properly machining and joint with socket end of CI/DI pipe with supply of SBR gasket and welding with MS pipe in the other end as per direction of E.I.C.

(k) Supplying, fitting and fixing of MS machine end fabricated with 30mm to 40mm thick MS plate properly machining and joint with spigot end of CI/DI pipe with supply of SBR gasket and welding with MS pipe in the other end as per direction of E.I.C.

11. DETAILED SPECIFICATION FOR COATING AND WRAPPING

11.1. General

1.1 All MS pipes laid below ground shall get anti-corrosive wrapping and coating treatment as specified. The work shall consist of cleaning both the inner and outer surface of pipes and specials followed by the application of a priming coat to these surfaces. The outer surfaces of the portion of the pipe line which will be buried underground shall then be provided with a coat of coal tar enamel over the primer coat followed by wrapping of the pipes and specials with a fiber glass mat externally and then finished with another coat of coal tar enamel over the glass-glass wrapping. The inside surface of the entire pipeline including specials and outer surfaces of all exposed portion of pipes and specials (i.e. the portion of pipe line which is not buried underground) shall be provided with three coats of a special anticorrosive and non-toxic paint as approved by the department.

1.2 The Contractor shall supply all labour and materials along with the necessary tools and plants, machinery, equipment and instruments as needed to complete the job and for performing the tests as specified herein below.

1.3 All materials to be used and also their applications shall conform to American Water Works Association (AWWA) Specifications C-203-57/66/73/78 unless specified otherwise herein under. The physical and functional characteristics of such materials shall conform to the requirements indicated in American Society for Testing Materials (ASTM) Standard Designations or in AWWA. C-203-57/66/73/78.

12. Cleaning the pipe and special surfaces

12.1 All oil and grease from the inside and outside surfaces of the pipes and specials shall be removed thoroughly by flushing and washing, using suitable chemical solvent and clean ranges.

12.2 Both the inside and the outside surface of the pipes and specials shall there after be thoroughly cleaned of all mill scale, rust, dirt, weld scales, weld burns, dust, moisture etc. by sand blasting in general or by scraping and cleaning with pneumatically/electrically actuated stiff wire brush as may be approved by the Engineer-in-Charge. Air supply to sand blasting equipment must be free from oil and moisture. The cleaning shall expose the bare metal surface. Manual hand cleaning will not be allowed.

12.3 Notwithstanding that a length of 150 mm of the pipe/special at both the ends is excluded from coating and wrapping initially, the cleaning operation, to be done at the Contractor's workshop shall cover the entire length of the pipes/specials in respect of their inner and outer surfaces. Nothing shall be paid extra for cleaning the bare ends of the pipes/specials again at site prior to application of field coating and wrapping.

12.4 The cleaning operations in respect of both the inner and outer surface of the pipes and specials shall be carried out simultaneously and completed to the entire satisfaction of the Engineer-in-Charge.

13. Materials

13.1 Materials manufactured by reputed firms (Shalimar Tar Products/Lloyd Tar Products) and conforming to the specification, mentioned in the relevant clauses herein below shall be used. Details of such materials to be used shall be recorded properly as directed by the Engineer-in-Charge.

13.2 The primer shall consist of processed coal tar pitch and refined coal tar oils only suitably blended to produce or effective bond between the metal and the

coal tar enamel at the external surfaces and also between the metal and non-toxic paint at the internal surfaces. Primer shall not contain benzyl or any other toxic and /or highly volatile added pigments, or interfiles or other substances and shall show no tendency to settle out in containers. It should be free from bubbles, voids or other imperfections. The primer shall be applied in a smooth and even film. The main characteristics of the primer shall be as follows:

i) Drying time touch of 30^0C and normal humidity (70%)	Less than one hour
ii) Maximum Boiling Point	215^0C
iii) Penetration of residue, ASTM D5-597 100 gm. wt., 5 sec.,	25^0C Under 7
iv) Softening Point of residue, ASTM D36-26	104^0C (Min.)
v) Specific Gravity at 25^0C	1.1 to 1.14
vi) Viscosity at 30^0C through 4 mm Cu (Standard Tar Viscometer)	25 to 30 secs.
vii) Distillates up to 160^0C	2% to 4% V/V
viii) Tar Acid	12%

13.3 The coal tar enamel shall be composed of a specially processed coat tar pitch combined with inert material filler. No asphalt for either petroleum or natural base shall be acceptable as part of the ingredients. The enamel shall have the following:

	MIN.	**MAX.**
i) Softening Point	105^0C	125^0C
(Ring & Ball) ASTM D-36-26	220^0F	257^0F
ii) Filler (Ash) - ASTM D271-48	25%	35%
iii) Specific Gravity at 25^0C - ASTM D5-52	1.40	1.60
iv) Penetration - ASTM D5-52		
a) 100 gm. wt., 5 sec at 25^0C	10	20
b) 50 gm. wt., 5 sec at 45^0C	15	55
v) High Temperature Test		
AWWA C-203 at 70^0C Maximum		
Sag 24 hours -	1.50 mm	
vi) Low Temperature Test		
AWWA C-203 at 25^0C Maximum		
6 hours Cracking	None	-
vii) Electrical Resistance		

10,000 Volts/6M. Amp	No Breakdown	
viii) Viscosity - ZAHN No.4 at 230^0C	10	15
ix) Impact Test at 5^0C/650 gm. wt.	-	10 Sq. inch
/2.44 m direct, impact, disbonded area		(64.5 cm^2)
x) Normal Application Temperature	230^0C	250^0C

13.4 Before use, the Contractor will be required to furnish test certificates of the specified manufacturers in respect of the physical and functional characteristics of each batch of primer and enamel to be procured for the intended use.

13.5 The glass-glass mat for wrapping shall be flexible, insert, inorganic non-wicking, non-hygroscopic and uniform mat composed of chemically resistant borosilicate fiber glass tissue moni-filaments distributed in a random open porous structures bonded together with a thermosetting (phenol type) resin shall be compatible with the hot coal tar enamel. The fiber glass tissue shall be longitudinally reinforced by continuous filament glass yarn embedded in the mat at 10 mm (3/8") nominal contress.

13.6 The fiber glass shall have the following physical characteristics:

a) No disbonding of individual glass fibers shall occur during or following the embedding process;

b) The fiber glass shall not cause buddling under the conditions of application;

c) The mat shall be sufficiently porous, so that it can be embedded in the hot coal tar enamel as it is applied to the exterior of the pipe;

d) The mat shall be free from thin spot, pimples, formations, uncured binder spots, wrinkles, torn edges, dust oil and grease.

13.7 The fiber glass mat shall also conform to the following characteristics:

i)	Weight	45.50 gms/M^2
ii)	Nominal thickness	0.4 mm to 0.5 mm
iii)	Longitudinal tensile strength 500 mm x 150 mm (20" x 6")	45.36 Kgms (100 lbs) minimum
iv)	Tear strength in the transverse direcitons	3.6 Kgms (8 lbs)
vi)	Porosity	the glass mat shall have a porosity of not more than 1.54 mm (0.06") water gauge measured as pressure difference across the sample at an air velocity of 1.02 M/Sec.

vi) Temperature resistancy shall be unaffected under load in hot bitumen at 230^0C (530^0F) for one minute.

vii) Moisture absorption % by wt. relative humidity of 95% and 1200^0F for 24 hours.

Fibreglass mat sold by reputed manufacturers may be used provided at satisfied the above specification and is also approved by the Engineer-in-Charge. However, before use the Contractor shall provide manufacturer's test certificate for each batch of fibre-glass mats procured.

14. Operational Procedures

14.1 The priming operations shall not be conducted during rain or fog, unless protected from the weather by suitable housing.

14.2 The primer shall be applied on pipe surface cleaned as per clause 2 herein above and must be dry at the time of applying, the specified primer.

14.3 The application of the primer in the Contractor's shop shall be by mechanical means and shall be in accordance with instructions for application as supplied by the manufacturers of the primer. The apparatus to be used for application of primer shall be approved by the Engineer-in-Charge.

14.4 The entire surface of the pipe, except for a length of 150 mm at each end should be primed without any patch left out. The use of coal tar primer that becomes fouled with foreign substances or has thickened through evaporation of solvent oils will not be permitted. After application, the coal tar priming coat shall be uniform and free from floods, runs, sags, drips, holidays or bare spots. All bare sports or holidays shall bear recoated with an additional application of primer. All runs, sags, floods or drips shall be removed by scraping and cleaning and the cleaned area shall be retouched.

14.5 Suitable measures shall be taken to protect wet primer from contact with rain, fog, mist, spray, and dust or, other foreign matter until completely hardened. The coal tar enamel or non-toxic paint shall there after be applied to the outer and inner surface.

14.6 Prosily primed pipe shall be placed on clean, square cut skids and shall not be allowed to come in contact with the ground or with any other foreign matter. It shall remain on skids until lifted or cradled for the coating and wrapping operation.

14.7 All primed-pipes, which have an excessive coat or dust accumulated over them before the primer is dry or which have been exposed to weather for more than

twenty four (24) hours after priming shall be reprimed free of cost as per instructions of the Engineer-in-Charge.

14.8 The minimum and maximum allowable drying time of the coal tar primer between application of primer and application of coal tar enamel shall been accordance with instructions issued by the manufacturer of the primer unless otherwise directed by the Engineer-in-Charge. If the enamel is not applied within the maximum time after priming, as required by the manufacturer or as directed by the Engineer-in-Charge, the pipe shall be reprimed with an additional light coat of primer or at the discretion of the Engineer-in-Charge the entire prime coat shall be removed and the pipe reprimed for which no claim will be entertained.

The primer shall be kept in tightly sealed container when not in use to prevent evaporation.

14.9 The enamel shall be broken into pieces suitable for the heating equipment used, on a platform or suitable place free from dirt, weeds and other forms of contamination. The broke enamel shall be placed in a melting kettle and shall be melted and brought up to application temperature as rapidly as without injury to the enamel.

The enamel heated in supply kettles shall not exceed the temperature and melting periods recommended by the coating manufacturers and, if done so, will be rejected. Operating kettles shall not be used as a continuous source of supply adding unmelted enamel during the time they are in use but shall completely be empted of one charge and cleaned, if necessary, before the next charge of unmelted enamel is except when mechanically agitated kettles are used.

14.10 The enamel being prepared for use by automatic coating machines shall be agitated in melting kettles having continuous mechanical agitators. If shall melting mettles without mechanical agitators are used, with the approval of the Engineer, the melted enamel in the kettles shall be stirred at an interval not more than 15 (fifteen) minutes during heating with metal agitator. Wooden puddles or stick shall not be used for stick. Accurate thermometers shall be mounted on heating kettle in such a way as to be red clearly. The thermometer bulb shall within 100 mm from the bottom of the kettle and shall have temperature range from 200^0F to 600^0F. The automatic coating machine shall be such as will allow coating to be applied by pouring over the pipe, which is revolving at a specified low speed and spreading to the specified thickness of coating, which is normally between 1.5 mm and 2.5 mm.

14.11 The enamel heated in the kittled shall be strained through 1/16" (1.5 mm) mesh strainer located in such a way that it can be readily cleaned and applied at a temperature specified by the manufacturer to give best results under conditions of weather. The primed surface shall be cleaned to remove dust or other foreign materials before applying the enamel. The coating and wrapping of fiber glass shall be applied with a machine.

14.12 First coat of hot coal tar enamel shall be applied over the primed surface to a minimum thickness of approximately 1.5 mm. The Engineer-in-Charge shall cut samples/test the thickness of coating and further work of outer coating shall have to be taken up only, after the inner coating has been approved by the Engineer-in-Charge.

14.13 Simultaneously with the first coat of coal tar enamel fibreglass mat shall be mechanically applied in a continuous and free machine or in a lathe type machine. Sufficient tensile shall be applied to the rolls of fibreglass mat to embed it in the enamel before the enamel sets or cools. The fibreglass mat shall be of suitable uniform width for smooth spiral application. The overlap of the fibre mat shall not be less than 1/2 inch (12 mm). The cover will be in single layer except at the overlapped edges.

14.14 Immediately after application of the glass mat, the final coat of coal tar enamel shall be applied.

The thickness of final coat of enamel shall be so adjusted that the total dry thickness of coating and wrapping is maintained between 3.6 mm and 4.5 mm. The coating must be free of pinholes, bubbles or holidays. The Engineer-in-Charge shall cut samples from the coating from time to time to determine the thickness and bond of coating.

After final coating the insulation of the pipes and specials shall be wrapped properly as per direction of the Engineer-in-Charge with Kraft paper of approved quality and conforming to relevant IS specification before transporting the insulated pipes and specials to work site.

14.15 The enamel which drops down during application and which is free from dust or sand may be collected and embed with chunks of solid fresh enamel in the proportion of 1:9 (101d: 9) if approved by the Engineer-in-Charge. However no dripped enamel to be reused shall be heated directly without mixing with good quality enamel into the above mentioned proportion.

14.16 For field application of coating & wrapping the following procedures shall be adopted:

a) The pipe ends should be thoroughly cleaned by sand blasting or by scraping with pneumatically/electrically actuated stiff wire brush. Surface shall be free from any grease, oil, moisture, dirt or any other materials that may impair the proper bonding of the coating.

b) Primer shall be applied with brushes to obtain a smooth uniform coating free of runner drips when the primer has dried, one coat of dry enamel shall be applied and glass fibre wrap shall be applied and glass

5. ALL/ any of data given if not found reasonable (this will also include data of Design Parameters) will be given during detail engineering. Tenderer/contractor therefore is advised to consult with manufacturer/ experts at their own cost, if so felt, to reach more correct figure for Tendering purpose. The same is also advised for any other data supplied/missing. But in no case it will be treated as a Fault of Tendering Authorities S.E. (Programming Circle). If any data is found in Variance in same chapter/ section or anywhere of tender document, is to be brought to the notice of the tendering Authority & His interpretation/ decision will be considered as final and binding to the Contractor.

6. All work will mainly be guided by provision as stipulated in IS Codes and IRC codes of practice. However in case of any deviation due to site suitability or any other unforeseen reason Alternative design/proposal to be attempted subject to the approval and satisfaction of E.I.C.

SECTION – I

GENERAL TECHNICAL SPECIFICATION FOR
R. C. C. PILE FOUNDATION

GENERAL:

The Design of the tenderer should be based mainly on cast-in situ Bored reinforced concrete piles on driver piles ifsite situation so arises subject to the approval of EIC.
Sub-soil investigation was carried out by the bidder. This information is given as guidance and is indicative only, and for any variation in strata at any location at site during actual execution of work, the employer shall not be held responsible nor shall the contract be null and voidon this count. In case of any variation in cut off level, necessary adjustment of safe working load will be made asper IS stipulation.The specialist firm may quote any proprietary system of piling subject to approval of the Engineer-in-

Chargeconsistent with the load, moment and forces to be encountered by each pile.The successful bidder shall submit with his tender drawings, calculations explaining his scheme draw upspecification and submit the schedules of prices following the format of the schedules of prices accompanyingthese tender documents.

DESIGN AND CONCRETE QUALITY

The safe working loads of the RCC cart in site bored piles should be that as computed as per IS: 2911 on thebasis of sub soil parameter of site with a minimum factor of safety 2.5 (compression) and 3.00 (up lift) appliedthere on. For boring/driving pile under water are stipulation as well as irrigation department & M.E.D suggestionswill be strictly honored. The grade of concrete of all types of R. C. C. pile shall be minimum M-25/IS stipulationunless otherwise specified elsewhere. The cement content in concrete to piling work shall be minimum 400 kg/M3with ordinary Portland cement. Water cement ratio and slump shall be as per I. S. Specification for relevant pilingwork. Maximum size of coarse aggregate shall not exceed 20 mm.

Grading and other requirement of coarse and fine aggregates, water and concrete shall be as specified forreinforced cement concrete work under this Contract.

1.3.2 The average basis length of the piles is to be assumed from cut off level to the tip of the pile (howeverfor piles with muff the basic length shall be from tip of the pile up to underside of muff). The final lengthwith be decided by the Contractor with approval of the Engineer on the basis of driving/boring resistanceactually observed at site. It will be the responsibility of the Contractor to prove by subsequent loadtest/pullout tests that the adopted length of pile shall carry the specified safe load, tension and theresulting deflections being within the permissible limits. In no case extra claim over the originally quotedprice will be entertained for any increase in number/length/cross sectional area/reinforcement of pilesand in the site of other foundation structures if requires if required at the time of execution after the loadtests of piles. Similarly no deduction in payment will be made from the lump sum price quoted fordecrease in number/length/cross-section of area/reinforcement and in the size of other foundation structures at the time of execution or after the load tests of piles provided that the complete safety of theStructures is fully assured.

1.3.3 For Intake Jetty pile foundation should have permanent steel casing/approved alternative methodology.

Scour depth below bed level will be a major guiding factor. All relevant provision of I.S. code for R.C.C.Structure on river bed (under water) will have to be strictly followed. However Tenderers may suggestother methodology without deviating from major objectives & cost keeping the working well within I.S.standards. In any case he has to be ensured the stability of the structure.

1.3.4 Tenderers/ contractor will be given full liberty to opt for design mix as per satisfaction of E.I.C. withminimum cement content as mentioned.

1.4 SPECIFICATION FOR BOREDCAST-IN-CITU PILES:

Unless specified otherwise in the following paragraphs, stipulations of relevant section of I. S. 2911 (latest edition)shall be followed. However in case of any conflict of stipulations laid here in and IS code of practice occurs, ISstipulations will stand as final subject to satisfaction of EIC.

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The tenderer shall submit within his tender the layout and number of piles based on allowable load carryingcapacity, tension on the pile section design by him.

1.4.2 Boring equipment and accessories shall generally conform to IS: 2911 relevant section. Boring may bedone by either rotary or percussion equipment or grassing equipment using reverse or direct noncirculation method. In case of unstable soils the boring tools used shall be such that suction effects areminimized.

Stabilization of the sides of bore hole shall be done by the use of betonies slurry or casing. The size ofcutting tool shall not be less than the diameter of the pile by more than 75 mm.In case of boring with casing, the casting shall be used from the ground level. The casing shall be keptahead of boring in cases where there is danger of carrying in due to subsoil entering into the borehole orwhere soil is loose.While boring below sub-soil water, precaution shall be taken so that no boiling of the bottom of the holeoccurs due to difference in hydrostatic head.

1.4.6Concreting of bore holes shall start soon as possible after its completion. Should a borehole, be leftwithout concreting for more than two hours it shall be cleaned thoroughly as directed by the Engineer-in-Charge before placing concrete. Concrete under water shall be placed by means of a tremie pipe. It shall,however, be ensured that concrete entering the tremie pipe does not get mixed up with the slurry and ¼kg of granulated vermiculite shall be poured in the tremie pipe before pouring concrete as directed by theEngineer.

1.4.7 The tremie pipes and funnel shall be filled and lifted just 15 cm above bottom before releasing theconcrete column to facilitate flushing out of the bottom. The concrete levels in the tremie shall be checkedevery meter in order to judge the difference, if any, between the theoretical quantity that should have beenplaced and the actual quantity that has gone in. This is to locate the position of cut off during boring.In addition to the normal precautions to be taken in tremie concreting as per relevant Section of IS : 2911 thefollowing specifications shall be particularly applicable for the use of tremie concrete in pipes

i) The concrete shall be coherent, such in cement (not less than 400 kg/m3) and of slump not less than 150mm IS stipulations.

ii) The hopper and tremie shall be closed system.

iii) The tremie shall be large enough with due regard to the size of the aggregate. For 20 mm aggregate thetremie pipe shall be of diameter not less than 200 mm.

iv) The first charge of concrete shall be placed with a sliding plug pushed down the tube of it or with a steelplate of adequate charge to prevent mixing of concrete and water. However, the plug shall not be left inthe concrete as a lump.

v) The tremie pipe shall always penetrate into the concrete with an adequate margin of safety againstwithdraw of the pipe surged to discharge the concrete.

vi) The pile shall be concreted wholly by tremie and the method of deposition shall not be charged way upthe pile to prevent into laitance from being trapped within the pile.

vii) All tremie tubes shall be scrupulously cleaned after use.

Normally concreting of the piles shall be carried out without any interruption. In the exceptional case of interruptionin concreting, but which can be resumed within 1 or 2 hours, the tremie shall not be taken out of the concrete.Instead, it shall be raised and lowered slowly, from time to time to prevent the concrete around the tremie from setting. Concreting shall be resumed by introducing a little richer (5% additional amount) concrete with a higherslump for easy displacement of the partly set concrete.

If the concreting cannot be resumed before final set of concrete already placed, the pile so cast may be rejected oraccepted with modifications at the sole discretion of the *ii:* Engineer-in-Charge or his representative.In case of withdrawing of tremie out of the concrete, either accidentally or to removed a blockage in the tremie, thetremie may be reintroduced in the following manner to prevent impregnation of laitance or sewer laying on top ofthe concrete already deposited in the bore.The tremie shall be gently lowered on the old concrete with very little penetration initially. A vermiculite plug shallbe introduced in the tremie. Fresh concrete of slump between 150 mm. And 180 mm. shall be filled in the tremiewhich will push the plug forward and will emerge out of the tremie displacing laitance/sewer. The tremie will bepushed further in steps, watering fresh concrete sweeping away laitance/scum in its way. When tremie is buried byabout 60 to 100 cm. concreting may be resumed.

1.4.8 The top of concrete in a pile shall be brought above the cut off level to permit removal of all laitance andweak concrete before capping to ensure good concrete at the cut off level for proper embedment into thepile cap. Where cut off level is less than 1.5 M. below the working level concrete shall be cast to aminimum of 500 mm. Above cut off level. For each additional 0.3 m. increase in cut-off level below theworking level additional coverage of 50 mm. minimum shall be allowed. Higher allowance may be necessary depending on the length of the pile as directed by the Engineer-in-charge. When concrete isplaced by using tremie material, concrete shall be cast to the piling platform level to permit overflow ofconcrete for visual inspection or to a minimum of one meter above cut-off level. In the circumstanceswhere cut off level is below ground water level the need to maintain pressure on the freshly laid concreteequal to or greater than water pressure shall be formed out and accordingly the length of extra concreteabove cut-off level shall be determined and provided in works.

1.4.9 During piling, the sequence of construction and installation of piles shall as per direction of theEngineering-in-Charge.

1.4.10 In case defective piles are formed during construction, they shall be removed or left in place whichever isfound convenient without adversely affecting the performance of the adjacent piles or the pile cap as awhole. Additional piles shall be provided at Contractor's cost to replace them as per direction of theEngineer-in-Charge and in this respect the Engineer-in-Charges' decision shall be final and binding uponthe contractor. Any deviation from the designed location, alignment or local capacity of any pile shall benoted and adequate measures shall be taken well before concreting of the pile cap, etc. if the deviationsare beyond the permissible limit. All such alternations shall be done at Contractors' own cost andexpenses and to the entire satisfaction of the Engineer-in-Charge.

1.4.11 Piles shall be installed accurately as per approved design and drawings. For vertical piles a deviation of1.5 percent from vertical line shall not be exceeded. Piles shall not deviate more than 75 mm. or onetenth of diameter whichever is more (in case of piles having diameter more than 600 mm) from theirdesigned positions at working level of the piling rig.In case of piles deviating beyond the above mentioned limits and such an extent that the resultingeccentricity cannot be taken care of by a redesign of the pile cap & pile trees, the piles shall be replacedor supplemented by one or more additional piles by the contractor at his own cost and expenses alongwith any additional cost for pile cap, etc. being borne by him.
1.4.12While manual chipping may be permitted after casting of pile, pneumatic chipping, if permitted by theEngineer-in-Charge, shall not be started before 7 days under any circumstances.

1.4.13 Main longitudinal reinforcement in the length of the piles and links or spirals shall be provided as per theapproved drawing. Longitudinal bars where possible shall preferably be in one length. Every care shall betaken in handling of the reinforcing cage so that its shape is not damaged.

1.4.14When working adjacent to existing structure every care shall be taken to avoid any damage to suchstructures, in the case of bored piles care shall be taken to avoid effect due to loss of ground. In the caseof deep excavations adjacent to piles proper protection shall be provided to safeguard against the lateralmovement of soil stratum or releasing the confirming soil stress.

1.5 During piling work the following data shall be recorded along with any other data as may be directed bythe Engineer-in-Charge. These data shall be submitted to the Engineer-in-Charge in triplicate copies oncompletion of installation of each pile.

i) Sequence of installation of piles in a group.
ii) Dimensions of the pile including reinforcement details and mark of the pile
iii) Details of mild steel liners where provided along with the details of stiffeners
iv) Depth bored and founding level along with a bore log depicting the nature of strata encountered duringboring.
v) Time taken for penetration of every 15 cm during last 2 m depth before founding level.
vi) Method of cleaning bottom of hole at founding level before concreting.
vii) Time taken for concreting.
viii) Cement consumption and slump of concrete.
ix) Cut off level/working level/R. L. of top concrete.

1.6 During execution at any stage if any variation is required to be made to suit the site on E.I.C to betechnically satisfied and His decision will be regarded as final. 1.6.2 Any of data /information given if notfound reasonable (this will also include data of parameters) will be given during detail engineering.
Tenderers/contractor therefore revised to consult with manufacturer/ experts at his own cost, if so felt, toreach more in figure for Tendering purpose. The same is also advised for any other data supplied. **But inno case It will be Treated as a Fault of Tendering Authorities Superintending Engineer, Programming Circle.** lfany found in Variance in same chapter/ section or anywhere of tender document, is to be into the notice ofthe tendering Authority & His interpretation/ decision will be consider as final.

1.7 LOAD TEST ON PILES
1.7.1 The load tests shall be carried out as per IS : 2911 unless specified otherwise in the followingparagraphs. The tests shall be carried out on test pile and a selected representative pile as approved bythe Engineer-in-Charge. Sufficient time shall be allowed before tests to permit adjustment on the soilconditions following disturbance from the method of installation. The period between installations of the testpile or any other pile in the vicinity and the test loading of the pile shall be least 28 days.

1.7.2 The test load shall be applied by jacking against Kent ledge or any other structure approved by theEngineer-in-Charge. No working pile shall be permitted to be used for any loading for load test on pile.The design of the Kent ledge shall be such as to prevent instability, particularly in the event of a suddenchange in the load reaction from the pile. The reaction from Kent ledge to be made available for the testshall be at least 25 percent more than the final test load to be applied. The test shall be carried out at cut
off level or at maximum 1.5 m below G. L. as directed by the Engineer-in-Charge. Anchors, if provided, forload test shall be at specified distance away from test pile as per relevant I. S. Code of Practice and thereshall be minimum two anchors at two ends of the pile.Details regarding the testing arrangement shall be submitted well in advance to the Engineer-in-Chargefor his approval. Load tests shall only be undertaken after obtaining the approval.

1.7.3 The jack is to be hydraulically operated. The load applied to the pile shall be recorded either by a gaugein the hydraulic system or a proving ring duly calibrated from an approved laboratory before load tests.The sensitivity of the full load and in any event, the accuracy and sensitivity of the system is to bechecked against an approved instrument.A test certificate and fresh calibration chart as obtained from an approved laboratory for jack as well aspump supplying hydraulic power shall be produced before the Engineer-in-Charge well in advance beforeuse for any load testing pile.

1.7.4 The settlement of the pile shall be recorded by three dial gauges recording to **0.02 mm** and placed atequal distance around the test pile. The dial gauges shall be fixed on datum bars whose ends rest uponnon-movable supports. The supports for datum bars with reference to which the settlement of the pilewould be measured shall be at least **5d**

(d being the diameter of the circular pile of the side of the squarepile) away and clear from the test piles, subject to a minimum of 1 .5 meters.

1.7.5 The testing equipment employed shall be capable of loading a pile to failure or to three times the designloading.

1.7.6 Before testing the top of the pile shall be clipped off carefully till sound concrete is encountered. Theprojecting reinforcement shall be cut or bent suitably and the top finished smooth and level with plaster ofparis, when required or as directed by the Engineer-in-Charge. A series 25 mm thick bearing plates shallbe placed on the head of the pile for jack to rest as directed by the Engineer-in-Charge.

1.7.7 The Contractor shall have to perform rotating load test on working piles on load as decided and selected by the Engineer-in-Charge and the results must satisfy the requirements of the test.At least one working pile of each diameter shall be tested. The test shall be carried out at cut-off level orat such level as per direction of the Engineer-in-Charge. The Contractor shall also have to carry out initialtest on a non-working test pile as described below:

A. Initial Test on a Non-working pile:

i) The test load shall be applied in equal increments of amount one-fifth of the estimated safe load asdirected by the Engineer-in-Charge. Each state of loading or unloading shall be maintained till the rate ofmovement of the pile top is not more than 0.02 cm per hour in the case of clayey soils and 0.1 mm perhour in 2 hours whichever is greater.

ii) The estimated safe load shall be maintained for 24 hours and settlements shall be observed andrecorded every hour during the period.

iii) Time-settlement observation shall be made at the commencement and completion of each increment.The rebound observation shall be made with suitable unloading as per direction of the Engineer-in-Charge.

iv) The loading shall be continued till the settlement of the pile top equals one tenth of the diameter of thepile stem (one tenth of the side in case of square piles) or the load is two times the estimated safe load onthe pile, whichever is earlier.

v) The safe load on pile shall be the minimum of the following:

a) **Two thirds of the final load at which the total settlement attains value of 12 mm unless it isspecified that a total settlement different from 12 mm is permissible or required in given caseon the basis of nature and type of structure in which case the safe load shall correspond toactual total settlement permissible or required.**

b) Fifty (50) percent of the final load at which the total settlement equal one tenth of the pilediameter of the size of the pile.

B. Routine Test on working pile:

Load on the pile in routine test shall be applied upto and a half times the estimated safe load carrying capacity ofthe pile. The loading procedure and settlement observations shall be the same in initial test describedhereinabove. The safe load on the pile shall be the minimum of the following:

a) Two third of the final load at which the total settlement attains a value of 12 mm unless it is specified that

a total settlement different from 12 mm is permissible in a given case on the basis of nature and type ofstructure.

b) Fifty percent of the final load at which the total settlement equals one tenth of the pile diameter of size ofthe pile.

C. Lateral Load on working pile:

i) The Contractor shall have to carry out lateral load test on one vertical working pile. Reaction may beobtained from suitable set up as approved by the Engineer-in-Charge and hydraulic jack shall be insertedin between the loading set up and pile in order to

apply the lateral load. Thrust pieces need be inserted oneither end of the jack to fill up the gap. Lateral deflections shall be measured at cut-off level or atmaximum 1.5 M below G. L. as directed by the Engineer-in-Charge by means of dial gauges fixed toimmovable supports.

ii) Loading shall be applied in increments of about 20% of the estimated safe load till the rate of deflectionreduces to 0.02 mm per hour in the case of clayey soil and 0.05 mm per hour in the case of sandy soils or2 hours whichever is earlier.

iii) Displacements shall be measured by issuing at least two dial gauges spaced at 30 cm and kepthorizontally one above the other on test pile. Where it may not be possible to place one of the dial gaugeson the line of jack axis, then the two dial gauges shall be kept at a distance of 30 cm at a suitable heightand the displacement interpolated at load point from similar triangles To fix dial gauges on the pilesurface, uneven surfaces shall be chipped of and 25 to 30 mm square glass piece shall be fixed toprovide a smooth surface. The dial gauge tips shall rest on the central portion of the glass plate.

iv) The safe lateral load shall be the least of the following:

a) Fifty (50) percent of the final load at which the total displacement increases to 12 mm.

b) Final load at which total displacement corresponds to 5 mm.

c) Load corresponding to any other specified displacement due to performance requirements.

1.7.8 All pile test data i.e., load, displacement and time shall be recorded in a suitable chart along with otherinformation about the pile in a manner as directed by the Engineer-in-Charge.

2.0PAYMENT BREAK UP SCHEDULE (CIVIL WORK)

a) Upon satisfactory completion of Surveying, Geo-Technical investigation, Planning, Designing & Drawing of all civil structure, sub structure, foundation for intake jetty, Pump house, pipe carrying bridge & Electrical Substation including necessary design calculation , preparation of level sheet , drawing sheet etc and submission for approval.

.=2.00% on BOQ Basic Rate.

b) Construction of fixed type jetty head for facilitating erection of suction assembly, accommodating pumping machinery, working bay and act as marine protection of the pump and other assembles etc in tidal rivers supported on piles of appropriate size including construction of Pump house.

=46.00% on BOQ Basic Rate.

c)Construction of Pipe carriageway of RCC minimum 3 m width to carry suction /delivery pipe up to the bank of the river.

=29.00% on BOQ Basic Rate

d) ConstructionofSub-stationbuilding& administrativebuilding for Intake.

=9.00% on BOQ Basic Rate

e) ConstructionofMasonrydrain300mmX250mm innersectionasperdepartmental design&drawing.(Unit per Mtr.)

=0.50% on BOQ Basic Rate

f) Construction of Boundary wall &Paver Block Approach Road

for Substation site.

=3.50% on BOQ Basic Rate

g) Construction of River Bank Protection Wall of 50M.& Dismantling of Existing Building at Intake Location.

=10.00% on BOQ Basic Rate

N.B:- Any item of works as mentioned in the Tender Document if not executed for any envious reasons, proportionate payment as derived with drawings and specification for the same work shall be deducted as per S.O.R (PHED W.B)-2019 with its latest Addendum & Corrigendum and Market analysis rate (those items rate are not in the relevant schedule.