MUNICIPAL COUNCIL VIZIANAGARAM
Andhra Pradesh Municipal Development Project (APMDP)

NATIONAL COMPETITIVE BIDDING
(CIVIL WORKS)

NAME OF WORK : Comprehensive Water Supply Service Improvements in Vizianagaram Municipality-Construction of 500 KL ELSR at Phoolbaugh

PERIOD OF AVAILABILITY OF BIDDING DOCUMENT ON WEB SITE : FROM 09-09-2015, 11.00 AM TO 09-10-2015, 05.00 PM

TIME AND DATE OF PRE-BID CONFERENCE : DATE 18-09-2015 TIME 11.00 AM.

LAST DATE AND TIME FOR ONLINE RECEIPT OF BIDS : DATE 09-10-2015 TIME 05.00 PM

TIME AND DATE OF OPENING BIDS : DATE 14-10-2015 TIME 11.00 AM

PLACE OF OPENING OF BIDS : Office of Commissioner, Vizianagaram Municipality, Vizianagaram, Andhra Pradesh

OFFICER INVITING BIDS : Commissioner, VizianagaramMunicipality, Vizianagaram, Andhra Pradesh.

September-2015
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INVITATION FOR BID

(IFB)
e-PROCUREMENT NOTICE / INVITATIONS FOR BIDS (IFB)

NATIONAL COMPETITIVE BIDDING

Date: 03-09-2015

IFB No: 3/APMDP/VZM/E/TO/2015-16

1. The Government of Andhra Pradesh through Government of India has received a loan from the International Bank for Reconstruction & Development towards the cost of Andhra Pradesh Municipal Development Project (APMDP) and intends to apply a part of the funds to cover eligible payments under the contracts for construction of works as detailed below. Bidding is open to all bidders from eligible source countries as defined in the IBRD Guidelines for Procurement. Bidders are advised to note the minimum qualification criteria specified in Clause 5 of the Instructions to Bidders to qualify for the award of the contract.

2. The Commissioner, Vizianagaram Municipality, invites item rates bids in electronic tendering system for the construction of works detailed in the table. Date of release of Invitation for Bids through e-procurement 09-09-2015.

3. The bid document is available online and bids are to be submitted online through the e-tendering portal http://eprocure.gov.in only. Bids submitted manually will not be accepted. The bidders would be required to register in the web-site which is free of cost. For submission of the bids, the bidders are required to have Digital Signature Certificate (DSC) from one of the authorized Certifying Authorities.

Aspiring bidders who have not obtained the User ID and Password for participating in e-tendering may obtain the same by registering in the website: http://eprocure.gov.in

The bidders are required to submit

   a. original bid security in approved form and
   b. original affidavit regarding correctness of information furnished with
       the bid document as per provisions of Clause 4.5 B.(d) of ITB

   to the Office of the Commissioner, Vizianagaram Municipality, Vizianagaram, Pin code – 535001, Andhra Pradesh, on or before the date and time of opening of Bids, either by registered post or by hand, failing which the bids shall be declared non-responsive.

   (i) The above documents may be submitted in one envelope. The bidders shall not write their names or addresses on this envelope.
   (ii) The number mentioned on acknowledgement of online submission of the bid by the bidder shall be mentioned on envelope containing the documents as detailed above.
(iii) Bid Security: Rs.1,10,700/-. Bid security will have to be in any one of the forms as specified in the bidding document and shall have to be valid for 45 days beyond the validity of the bid.

4. A pre-bid meeting will be held on 18-09-2015 at 11:00hrs. at the office of **Commissioner, Vizianagaram Municipality** to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in Clause 9.2 of ‘Instructions to Bidders’ of the bidding document.

5. The last Date and time for receipt of bids through the e-tendering portal [http://eprocure.gov.in](http://eprocure.gov.in) is 09-10-2015 upto 5:00 PM and will be opened on 14-10-2015 at 11:00 AM. If the office happens to be closed on the date of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.

6. Other details can be seen in the bidding documents. The Employer shall not be held liable for any delays due to system failure beyond its control. Even though the system will attempt to notify the bidders of any bid updates, The Employer shall not be liable for any information not received by the bidder. It is the bidders’ responsibility to verify the website for the latest information related to the tender.

7. The address for communication is as under:

(a) Name & Designation of Officer **Commissioner, Vizianagaram Municipality**

Official Address **Commissioner,**

Vizianagaram Municipality,
Vizianagaram -535001, Andhra Pradesh
Phone &Fax No. 08922-224793.
E-mail commvzm@yahoo.com

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33. Employer’s Right to Accept any Bid and to Reject any or all Bids
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35. Performance Security
36. Advance Payment and Security
37. Adjudicator / Disputes Review Expert
**Instructions to Bidders (ITB)**

**A. General**

| 1. Scope of Bid | 1.1. The Commissioner, Vizianagaram Municipality invites bids for the construction of Works, as described in the BDS and Section VI, “Special Conditions of Contract” (SCC). The name and identification number of the Contract are provided in the BDS and the SCC.  

1.2. The successful Bidder shall be expected to complete the Works by the Intended Completion Date specified in the BDS and SCC 1.1 (r).  

1.3. Throughout these Bidding Documents:  

(a) the term “in writing” means communicated in written form (e.g. by mail, e-mail, fax, telex, ) with proof of receipt;  

(b) if the context so requires, “singular” means “plural” and vice versa; and  

(c) “day” means calendar day. |
| 2. Source of Funds | 2.1 The Government of India, intends to apply part of the funds of a loan from the International Bank for Reconstruction and Development (IBRD) (Hearing after interchange ably called “the Bank” or “the World Bank”) towards the cost of the Project, Andhra Pradesh Municipal development Project (APMDP) to cover eligible payments under the Contract for the Works. Payments by the World Bank shall be made only at the request of the Borrower and upon approval by the World Bank in accordance with the Loan Agreement, and shall be subject in all respects to the terms and conditions of that Agreement. Except as the World Bank may specifically otherwise agree, no party other than the Borrower shall derive any rights from the Loan Agreement or have any rights to the loan proceeds.  

2.2. The loan agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council, taken under Chapter VII of the Charter of the United Nations. |
| 3. Fraud and Corruption | 3.1. It is the Bank’s policy to require that Borrowers (including beneficiaries of Bank loans), as well as bidders, suppliers, and contractors and their subcontractors under Bank-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Bank: |

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1International Bank for Reconstruction and Development (IBRD) (Hearing after interchange ably called “The Bank or the World Bank”)

2Andhra Pradesh Municipal development Project (APMDP)

3In this context, any action taken by a bidder, supplier, contractor, or a sub-contractor to influence the procurement process or contract execution for undue advantage is improper.
(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) “corrupt practice”\(^2\) is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

(ii) “fraudulent practice”\(^3\) is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) “collusive practice”\(^4\) is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) “coercive practice”\(^5\) is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) “obstructive practice” is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under sub-clause 3.1 (e) below.

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of the loan engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur;

(d) will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a Bank-financed contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

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\(^2\) “another party” refers to a public official acting in relation to the procurement process or contract execution. In this context, “public official” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

\(^3\) A “party” refers to a public official; the terms “benefit” and “obligation” relate to the procurement process or contract execution; and the “act or omission” is intended to influence the procurement process or contract execution.

\(^4\) “Parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non-competitive levels.

\(^5\) A “party” refers to a participant in the procurement process or contract execution.
fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a Bank-financed contract; and

(e) will have the right to require that a provision be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers, and contractors and their sub-contractors to permit the Bank to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by the Bank.

3.2. Furthermore, bidders shall be aware of the provision stated in GCC Sub-Clause 60.

<table>
<thead>
<tr>
<th>4. Eligible Bidders</th>
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<tr>
<td>4.1. A Bidder, and all parties constituting the Bidder, may have the nationality of any country, subject to the provisions of Section III, Eligible Countries. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors.</td>
</tr>
<tr>
<td>4.2. A Bidder shall not have a conflict of interest. All Bidders found to have conflict of interest shall be disqualified. Bidders may be considered to have a conflict of interest with one or more parties in this bidding process, if they are associated, or has been associated in the past, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Borrower to provide consulting services for the preparation or supervision of the Works, and any of its affiliates shall not be eligible to bid.</td>
</tr>
<tr>
<td>4.3. A Bidder that is under a declaration of ineligibility by the Bank in accordance with ITB Clause 3, at the date of contract award, shall be disqualified. The list of such debarred firms is available at the electronic address specified in the BDS.</td>
</tr>
<tr>
<td>4.4. A firm that has been determined to be ineligible by the Bank in relation to the Bank Guidelines On Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants shall not be eligible to be awarded a contract.</td>
</tr>
<tr>
<td>4.5. Government-owned enterprises in the Employer’s country may be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) that they are not a dependent agency of the Borrower or Sub-Borrower or Employer.</td>
</tr>
<tr>
<td>4.6. Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.</td>
</tr>
</tbody>
</table>
5. Qualifications of the Bidder

5.1. All bidders shall provide in Section IV, “Form of Bid, Qualification Information, Letter of Acceptance, and Agreement,” a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary, as further elaborated in ITB Clause 5.3(k).

5.2. In the event that prequalification of potential bidders has been undertaken, only bids from prequalified bidders shall be considered for award of Contract. These qualified bidders should submit with their bids any information updating their original prequalification applications. The update or confirmation should be provided in Section IV.

With the updated information the bidder must continue to be qualified in accordance with the criteria laid down in the prequalification document. All bidder shall also furnish the information for the following in Section IV irrespective of the bidders being pre-qualified:

(i) Power of Attorney.
(ii) Evidence of access to or availability of credit facilities certified by bankers.
(iii) Details as stipulated in clause 5.3 (g) to (k)

5.3. If the Employer has not undertaken prequalification of potential bidders, all bidders shall include the following information and documents with their bids in Section IV, unless otherwise stated in the BDS:

(a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business of the Bidder; written power of attorney of the signatory of the Bid to commit the Bidder;
(b) total monetary value of construction works performed for each of the last five years;
(c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and clients who may be contacted for further information on those contracts;
(d) major items of construction equipment proposed to carry out the Contract;
(e) qualifications and experience of key site management and technical personnel proposed for the Contract;
(f) reports on the financial standing of the Bidder, such as profit and loss statements and auditor’s reports for the past five years;
(g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);
(h) authority to seek references from the Bidder’s bankers;
(i) information regarding any litigation, current or during the last five years, in which the Bidder was/is involved, the parties concerned, and the disputed amounts; and awards;
(j) proposals for subcontracting components of the Works amounting to more than 10
percent of the Contract Price. The ceiling for sub contractor's participation is **stated in the BDS** [for each the qualification and experience of the identified sub-contractor in the relevant field should be annexed. No vertical splitting of work for subcontracting is acceptable]

(k) the proposed methodology and program of construction including Environment Management Plan, backed with equipment, materials and manpower planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

5.4. Bids from Joint Ventures are not acceptable.

5.5. To qualify for award of the Contract, the bidder in its nameshould have, in the last five years, i.e from 2010-11, 2011-12,2012-13, 2013- 14 and 2014- 15 the following experience and licenses:

A (a) achieved in at least two financial years, a minimum annual financial turnover (in all cases of civil engineering construction works only )of Rs.22.14Millions.

(b) satisfactorily completed as prime Contractor (or as a sub-contractor duly certified by the employer / main contractor) at least one similar work of value not less than the Rs.8.86Millions

(c) executed in any one year, the minimum quantities of work specified below.

| 1. Construction of ELSR to minimum capacity of 400KL ELSR and above. | 1 No |

B :Each bidder should further demonstrate & confirm:

(a) Availability for construction work, either owned, or on lease or on hire, of the key and critical equipment stated in the BDS including equipment required for establishing field laboratory to perform mandatory tests, as stated in the BDS;

(b) Availability for construction work a Contractor's Representative and following key technical personnel with adequate experience as stated in the BDS.
The bidder must not have in his employment\(^6\).

(i) the near relations (defined as first blood relations, and their spouses, of the bidder or the bidder’s spouse) of persons listed in the BDS\(^7\);

(ii) without Government permission, any person who retired as gazetted officer within the last two years;

(c) Availability of liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of not less than Rs.2.76 Million in the format given in section IV.(Credit lines/letter of credit/certificates from Banks for meeting the funds requirement etc.).

(d) Each Bidder must produce:

(i) A copy of PAN issued by income Tax Authorities; and

(ii) An affidavit that the information furnished with the bid document is correct in all respect;

5.6 Sub-contractor’s experience and resources will not be taken into account in determining the Bidder’s compliance with the qualifying criteria, except to the extent stated in Clause[A] above.

5.7 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity for construction work is equal to or more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available bid capacity = \((A \times N \times 1.5 - B)\)

Where,

\(A\) = Maximum value of civil engineering works executed in any one year during the last five years (updated to the price level of the financial year 2015-16 as per the

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\(^6\) Applicable as per guidelines of the government. Delete if not applicable

\(^7\) Indicate the persons of controlling departments inviting bids
percentage escalation as stated in the BDS, taking into account the completed as well as works in progress).

\[ N = \text{Number of years prescribed for completion of the works for which bids are invited} \]

\[ (\text{period up to 6 months to be taken as half-year and more than 6 months as one year}). \]

\[ B = \text{Value, at 2015-16 price level, of existing commitments and on-going works to be completed during the period of completion of the works for which bids are invited}. \]

**Note:** The statements in Section IV showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer or equivalent.

5.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements, affidavits and attachments submitted in proof of the qualification requirement;
- record of poor performance such as abandoning the works, not properly completion or financial failures etc.;
- consistent history of litigation or arbitration awards against the bidder.
- participated in the previous bidding *(if this is a re-bidding)* for the same work and had quoted unreasonably high bid price and could not furnish rational justification to the employer.

### 6. One Bid per Bidder

6.1. Each Bidder shall submit only one Bid for one contract. A bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) shall cause all the proposals with the Bidder’s participation to be disqualified.

### 7. Cost of Bidding

7.1. The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer shall in no case be responsible or liable for those costs.

### 8. Site Visit

8.1. The Bidder, at the Bidder’s own responsibility and risk, is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder’s own expense.

### B. Bidding Documents

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<th>9.1. The set of Bidding Documents comprises the documents listed in the table below and addenda issued in accordance with ITB Clause 11:</th>
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<td>Section X</td>
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### 10. Clarification of Bidding Documents

10.1. The electronic bidding system provides for online clarification. A prospective bidder requiring any clarification may notify online the authority inviting the bid. The authority inviting bid will respond to any request(s) for clarification received earlier than 10 days prior to the deadline for submission of bids. Description of clarification sought and the response of the authority inviting the bid will be uploaded for information of the public or other bidders without identifying the source of request for clarification.

10.2. Pre-bid Meeting

10.2.1. The bidder or his official representative is invited to attend a pre-bid meeting, which will take place at the place and time stated in BDS.

10.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

10.2.3. The bidder is requested to submit any questions online through the portal not later than one week before the meeting.

10.2.4. Minutes of the meeting, including the text of the questions raised (without identifying the source of inquiry) and the responses given will be uploaded on the website. Any modification of the bidding documents listed in Sub-Clause 9.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 11 and not through the minutes of the pre-bid meeting.

10.2.5. Non-attendance of the pre-bid meeting will not be a cause for disqualification of a bidder.

### 11. Amendment of Bidding Documents

11.1. Before the deadline for submission of bids, the Employer may modify the Bidding Documents by issuing online corrigendum. The corrigendum will appear on the webpage of the website [http://eprocure.gov.in](http://eprocure.gov.in) under “Latest Corrigendum” and email notification is also automatically sent to those bidders who have moved this tender to their “My tenders” area.

11.2. Any addendum thus issued shall be part of the Bidding Documents and deemed to have been communicated to all the bidders who have moved this tender to their “My Tenders”
area. In case of any addendum/corrigendum, the system will automatically send e-mails to all bidders who have downloaded the bidding document.

11.3. To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend, as necessary, the deadline for submission of bids, in accordance with ITB Sub-Clause 21.2 below.

C. Preparation of Bids

<table>
<thead>
<tr>
<th>12. Language of Bid</th>
<th>12.1. All documents relating to the Bid shall be in the English language.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Documents Comprising the Bid</td>
<td>13.1. The Bid submitted by the Bidder shall comprise the following:</td>
</tr>
<tr>
<td></td>
<td>(a) The Bid (in the format indicated in Section IV);</td>
</tr>
<tr>
<td></td>
<td>(b) Bid Security, in accordance with ITB Clause 17.</td>
</tr>
<tr>
<td></td>
<td>(c) Priced Bill of Quantities;</td>
</tr>
<tr>
<td></td>
<td>(d) Qualification Information Form and Documents;</td>
</tr>
<tr>
<td></td>
<td>(e) Alternative offers where invited;</td>
</tr>
<tr>
<td></td>
<td>and any other materials required to be completed and submitted by bidders, as specified in the BDS.</td>
</tr>
<tr>
<td></td>
<td>The documents listed in Section IV, VI, and IX of sub-clause 9.1 shall be filled in without exception.</td>
</tr>
<tr>
<td></td>
<td>13.2. The documents and details mentioned in clause 13.1 above shall be submitted online on website <a href="http://eprocure.gov.in">http://eprocure.gov.in</a>. Details and process of online submission of the tender and relevant documents are given in the website mentioned above. The above are to be submitted in the manner as prescribed below:</td>
</tr>
<tr>
<td></td>
<td>(a) The following details shall be entered on line in the prescribed formats:</td>
</tr>
<tr>
<td></td>
<td>i) The entry of rates for individual items of work shall be made by the bidder on line.</td>
</tr>
<tr>
<td></td>
<td>(b) Scanned copies of the following documents shall be uploaded on the website <a href="http://eprocure.gov.in">http://eprocure.gov.in</a> at the appropriate place.</td>
</tr>
<tr>
<td></td>
<td>i) Bid Form, as per format given in Section.4</td>
</tr>
<tr>
<td></td>
<td>ii) Bid Security in any of the forms specified in ITB (Clause 17 of ITB)</td>
</tr>
<tr>
<td></td>
<td>iii) Copy of PAN Card issued by Income Tax Authorities (Clause 5.5 B. (d) of ITB)</td>
</tr>
<tr>
<td></td>
<td>iv) Evidence of access to line of credit (Clause 5.5 B. (c) of ITB)</td>
</tr>
<tr>
<td></td>
<td>v) Annual Turnover Certificate from Charted Accountant for last five financial years forms with breakup of civil works and total works each</td>
</tr>
</tbody>
</table>
financial years. (Clause 5.5 A. (a) of ITB)

vi) Affidavit regarding correctness of certificates (Clause 5.5 B. (d) of ITB)

(c) Scanned copies of the Certificates showing details of similar nature of works, work in hand and machineries owned or possessed on hire should be uploaded after converting the same to PDF.

i) Similar nature of works executed (Clause 5.5 A. (b) of ITB)
ii) Works in hand (Clause 5.7 of ITB)
iii) Machineries owned/brought on hire (Clause 5.5 B. (a) of ITB)
iv) Project Manager and other key staff (Clause 5.5 B (b) of ITB)

(d) Submission of Original Documents: The bidders are required to submit (a) original bid security in approved form and (b) original affidavit regarding correctness of information furnished with bid document as per provisions of Clause 5.3 & 5.4 of ITB to the Office of the Commissioner, Vizianagaram Municipality, Vizianagaram, Pin code – 535001, Andhra Pradesh, on or before the date and time of opening of Bids, either by registered post or by hand, failing which the bids shall be declared non-responsive.

14. Bid Prices

14.1. The Contract shall be for the whole Works as described in ITB Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

14.2. The bidders shall make online entries to fill in rates in bill of quantities. Upon numerical entry, the amount in words would automatically appear and upon entry of rates in all the items of work, total bid price would automatically be calculated by the system and would be displayed. The items for which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

14.3. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, shall be included in the rates, prices, and total Bid price submitted by the Bidder.

14.4. Bidders may like to ascertain availability of excise/custom duty exemption benefits available in India to the contracts financed under World Bank loan/credits. They are solely responsible for obtaining such benefits which they have considered in their bid and in case of failure to receive such benefits for reasons whatsoever, the employer will not compensate the bidder (contractor). Where the bidder has quoted taking into account such benefits, he must give all information required for issue of certificates in terms of such notifications as per form attached to the Qualification Information in the bid. To the extent the employer determines the quantity indicated therein are reasonable keeping in view the bill of quantities, construction programme and methodology, the certificates will be issued within 60 [sixty] days of signing of contract and no subsequent changes will be permitted. No certificate will be issued for items where no quantity/capacity of equipment is indicated in the statement. The bids which do not conform to the above provisions will be treated as non responsive and rejected. Any delay in procurement of the construction equipment /machinery/goods as a result of the above shall not be a cause for granting any extension of time.
14.5 The rates and prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract if provided for in the BDS and SCC and the provisions of Clause 47 of the General Conditions of Contract.

15. Currencies of Bid and Payment

15.1 The unit rates and prices shall be quoted by the Bidder entirely in Indian Rupees.

16. Bid Validity

16.1 Bids shall remain valid for a period not less than ninety days after the deadline date for bid submission specified in Clause 21. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

16.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid except as provided in 16.3 hereinafter, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 17 in all respects.

16.3 In the case of contracts in which the Contract Price is fixed (not subject to price adjustment), in the event that the Employer requests and the bidder agrees to the extension of the validity period, the contract price, if the bidder is selected for award shall be the bid price corrected as follows: The price shall be increased by the factor (value of factor F specified in BDS) for each week or part of a week that has elapsed between the expiration of the initial bid validity and the date of issue of letter of acceptance to the successful bidder.

16.4 Bid evaluation shall be based on the Bid Prices without taking the above correction into consideration.

17. Bid Security

17. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This bid security shall be in favour of the Commissioner Vizianagaram Municipality, Vizianagaram, Andhra Pradesh. and may be in one of the following forms:

- a bank guarantee issued by a nationalized / scheduled bank located in India or a reputable bank located abroad in the form given in Section X; or

- Certified cheque, Bank Draft or Letter of Credit in favour of the Commissioner Vizianagaram Municipality, Vizianagaram, Andhra Pradesh.

- If the institution issuing the guarantee is located outside India, it shall be counter signed by a Nationalized/Scheduled bank located in India, to make it enforceable.

17.1 Bank guarantee issued as Bid security for the bid shall be valid for 45 days beyond the validity of the bid.
<table>
<thead>
<tr>
<th>17.2 Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clause 17.1 and 17.2 above shall be rejected by the Employer as non-responsive.</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.3 The Bid security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 16.1. The Bid Security of successful bidders will be discharged and returned when the bidder has signed the Agreement and furnished the required Performance Security.</td>
</tr>
<tr>
<td>17.4 The Bid Security may be forfeited:</td>
</tr>
<tr>
<td>(a) if a Bidder withdraws/modifies/substitutes its bid during the period of bid validity specified by the Bidder on the Bid Submission Sheet, except as provided in ITB Sub-Clause 16.2; or</td>
</tr>
<tr>
<td>(b) if the Bidder does not accept the correction of its Bid Price pursuant to ITB Sub-Clause 28.</td>
</tr>
<tr>
<td>(c) if the successful Bidder fails within the specified time to:</td>
</tr>
<tr>
<td>(i) sign the Contract Agreement; or</td>
</tr>
<tr>
<td>(ii) furnish the required performance security.</td>
</tr>
<tr>
<td>18. Alternative Proposals by Bidders</td>
</tr>
<tr>
<td>18.1. Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.</td>
</tr>
<tr>
<td>19.1. The bidding under this contract is electronic bid submission through website <a href="http://eprocure.gov.in">http://eprocure.gov.in</a>. Detailed guidelines for viewing bids and submission of online bids are given on the website. The Invitation for Bids under APMDP is published on this website. Any citizen or prospective bidder can logon to this website and view the Invitation for Bids and can view the details of works for which bids are invited. The prospective bidder can submit bids on line; however, the bidder is required to have enrolment/registration in the website and should have valid Digital Signature Certificate (DSC) in the form of smart card/e-token. The DSC can be obtained from any authorized certifying agencies. The bidder should register in the web site <a href="http://eprocure.gov.in">http://eprocure.gov.in</a> using the relevant option available. Then the Digital Signature registration has to be done with the e-token, after logging into the site. After this, the bidder can login the site through the secured login by entering the password of the e-token &amp; the user id/password chosen during registration.</td>
</tr>
<tr>
<td>The Bidder should go through the bid document carefully and then submit the documents as asked, otherwise, the bid will be rejected.</td>
</tr>
<tr>
<td>19.2. The completed bid comprising of documents indicated in ITB clause 13, should be uploaded on the website given above through e-tendering along with scanned copies of requisite certificates as are mentioned in different sections in the bidding document and scanned copy of bid security in case it is provided in the form of BG.</td>
</tr>
<tr>
<td>19.3. The bidder shall furnish information as described in the Form of Bid on commissions or</td>
</tr>
</tbody>
</table>
gratuities, if any, paid or to be paid to agents relating to the Bid, and to contract execution if the bidder is awarded the contract.

<table>
<thead>
<tr>
<th>20. Electronic Submission of Bids</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.1 The bidder shall submit online the requirements under qualification criteria and Technical and Financial parts. The contents of the Post Qualification and Technical and Financial bid shall be as specified in clause 13 of the ITB. All the documents are required to be signed digitally by the bidder. After electronic online bid submission, the system generates a unique bid identification number which is time stamped. This shall be treated as acknowledgement of bid submission.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>21. Deadline for Submission of Bids</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.1. Bids must be received by the Employer online no later than specified deadline for receipt of bids shall be is 09-10-2015 5 P.M.</td>
</tr>
<tr>
<td>21.2. The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with ITB Clause 11, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline shall then be subject to the new deadline.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>22. Late Bids</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.1. The electronic bidding system would not allow any late submission of bids after due date and time as per server time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>23. Modification and Withdrawal of bids</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.1. Bidders may modify their bids online before the deadline prescribed in Clause 21.</td>
</tr>
<tr>
<td>23.2. For bid modification and consequential re-submission, the bidder is not required to withdraw his bid submitted earlier. The last modified bid submitted by the bidder within the bid submission time shall be considered as the bid. For this purpose, modification/withdrawal by other means will not be accepted. In on line system of bid submission, the modification and consequential re-submission of bids is allowed any number of times. The bidders may withdraw his bid by uploading their request before the deadline for submission of bids, however, if the bid is withdrawn, the re-submission of the bid is not allowed.</td>
</tr>
<tr>
<td>23.3. No bid may be modified after the deadline for submission of Bids.</td>
</tr>
<tr>
<td>23.4. Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 16.1 above or as extended pursuant to Clause 16.2 is not allowed in the e-procurement system. If a bidder does the same through any other medium, then it may result in the forfeiture of the Bid security pursuant to Clause 17.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Bid Opening and Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Bid Opening</td>
</tr>
<tr>
<td>24.1. The Employer will open all the Bids received online including modifications made pursuant to Clause 23, at the time and date and place specified in BDS, and this could be viewed by bidders online. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.</td>
</tr>
<tr>
<td>24.2. In all cases, the amount of bid security and validity of the bid shall be scrutinized.</td>
</tr>
</tbody>
</table>
Thereafter, the bidders’ name and such other details as the Employer may consider appropriate, will be notified as Technical bid opening summary by the authority inviting bids at the online opening. A separate electronic summary of the opening is generated and kept online.

24.3. The Bidders’ names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be recorded as bid opening summary and uploaded by the Employer on the portal. No bid shall be rejected at bid opening. Any Bid price, which is not declared and recorded, will not be taken into account in Bid Evaluation.

24.4. The Employer will also prepare minutes of the Bid opening, including the information disclosed in accordance with Clause 23.3 of ITB and upload the same for viewing online.

25. Confidentiality

Information relating to the Examination, Clarification, Evaluation, and Comparison of Bids and Recommendations for the Award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

26. Clarification of Bids

26.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification on his bid, including breakdown of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with ITB Clause 28.

26.2. Subject to sub-clause 26.1, no Bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, he should do so in writing.

26.3. Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders’ bid.

27. Examination of Bids and Determination of Responsiveness

27.1. Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in ITB Clause 4; (b) has been properly signed; (c) is accompanied by the required Security; and (d) is substantially responsive to the requirements of the Bidding Documents.

27.2. A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the Bidder’s obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

27.3. If a Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming
### 28. Correction of Errors

| 28.1 | In the electronic bidding system, there is no scope for errors. Upon numerical entry of item rate, the amount in words would automatically appear and upon entry of rates in all the items of work, total bid price would automatically be calculated by the system and would be displayed. |

### 30. Evaluation and Comparison of Bids

| 30.1 | The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with ITB Clause 27. |
| 30.2 | In evaluating the bids, the Employer will determine for each Bid the evaluated Bid price by adjusting the Bid price as follows: |
|       | (a) making any correction for errors pursuant to ITB Clause 28; |
|       | (b) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with ITB Clause 18; and |
|       | (c) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with ITB Sub-Clause 23.5. |
| 30.3 | The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Bidding Documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation. |
| 30.4 | The estimated effect of any price adjustment conditions under GCC Clause 47, during the period of implementation of the Contract, will not be taken into account in Bid evaluation. |
| 30.5 | If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer’s estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 35 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract. |

### 32. Award Criteria

<p>| 32.1 | Subject to ITB Clause 33, the Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of |</p>
<table>
<thead>
<tr>
<th><strong>33. Employer’s Right to Accept any Bid and to Reject any or all Bids</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>33.1. Notwithstanding ITB Clause 32, the Employer reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer’s action.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>34. Notification of Award and Signing of Agreement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>34.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the <em>Conditions of Contract</em> called the &quot;Letter of Acceptance&quot;) will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the &quot;Contract Price&quot;).</td>
</tr>
<tr>
<td>34.2. The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 35.</td>
</tr>
<tr>
<td>34.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and kept ready for signature of the successful bidder in the office of employer within 28 days following the notification of award along with the Letter of Acceptance.</td>
</tr>
<tr>
<td>34.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>35. Performance Security</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>35.1. Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced Bids in accordance with Clause 30.5 of ITB and Clause 52 of Conditions of Contract:</td>
</tr>
<tr>
<td>- a bank guarantee in the form given in Section X; or</td>
</tr>
<tr>
<td>- Certified cheque, Bank Draft or Letter of Credit in favour of the CommissionerVizianagaramMunicipality, Vizianagaram, Andhrapradesh payable at Vizianagaram</td>
</tr>
<tr>
<td>35.2. If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer or (c) by a foreign bank through a correspondent Bank in India [scheduled or nationalized].</td>
</tr>
<tr>
<td>35.3. Failure of the successful bidder to comply with the requirements of sub-clause 35.1 shall constitute a breach of contract, cause for annulment of the award, forfeiture of the bid security, and any such other remedy the Employer may take under the contract, and the Employer may resort to awarding the contract to the next ranked bidder.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>36. Advance Payment and Security</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>36.1. The Employer will provide an Advance Payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in</td>
</tr>
<tr>
<td>37. Adjudicator /Disputes Review Expert</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>37.1. The Employer proposes that Mr. G.R.T. Omprakash, CE(HUDA) Rtd., be appointed as Adjudicator under the Contract, at a daily fee of Rs5000/- plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in the Bid. If in the Letter of Acceptance, the Employer has not agreed on the appointment of the Adjudicator, the Adjudicator shall be appointed by Chairman, Institute of Engineers, Hyderabad at the request of either party.</td>
</tr>
</tbody>
</table>
## A. General

### ITB 1.1

The Employer is **Commissioner, Vizianagaram Municipality, Vizianagaram**  
Pin code – 535001  
Andhra Pradesh  
INDIA

*The Works are:*  
**Comprehensive water supply service improvements in Vizianagaram Municipality – Construction of 500 KL ELSR at Phoolbaugh**

*Main components of the work:*  
- Construction of 500KL ELSR at Phoolbagh – Est. Rs. 11.50 Millions

*The name and identification of the contract are*  
**Comprehensive water supply service improvements in Vizianagaram Municipality – Construction of 500 KL ELSR at Phoolbaugh**  
**IFB No:** 3/APMDP/VZM/E/TO/2015-16

### ITB 1.2

The Intended implementation period is 365 days

### ITB 2.1

The Borrower is Government of India

Employer: **Commissioner, Vizianagaram Municipality**

### ITB 2.1

The “World Bank” means: **International Bank for Reconstruction and Development (IBRD)**

and loan refers to a **IBRD loan** which, as of the date of issue of the bidding documents, has been approved by the World Bank.

### ITB 2.1

The Project is **Andhra Pradesh Municipal Development Project (APMDP), India.**

The Government of Andhra Pradesh through Government of India has received a loan from the International Bank for Reconstruction & Development towards the cost of Andhra Pradesh Municipal Development Project (APMDP) for taking up developmental works in identified ULBs.

*Loan no. Ln(7816-IN)*

### ITB 4.3

The list of firms debarred from participating in World Bank projects available at:

---

8 This section should be filled out by the Employer before issuance of the Bidding Documents.
The information required from bidders in ITB Sub-Clause 5.3 is modified as follows: “none”

The ceiling for sub contractor's participation is: **25%**

The qualification data required from bidders in ITB Sub-Clause 5.4 are modified as follows: “none”.

The previous financial years are:


The qualification criteria in ITB Sub-Clause 5.5 are modified as follows:-

“none

(a) Financial turnover: not less than Rs22.14Millions (@2015-16 price level financial turnover and cost of completed works of previous years shall be given weightage@ 5% per year based on rupees value to bring them to base year price level of the financial year in which bids are received.)

(b) Completion of similar work of value of Rs8.86 Millions. The following work will be considered as similar

“Water supply works comprising of Construction with a minimum capacity of 400KL ELSR will be considered as similar type of works.”

(c) Execution of minimum quantities of major components of work in any one year.

| 1. Construction of ELSR minimum capacity of 400KL ELSR and above | 1 No |

---

* Delete if prequalification has been conducted.
(a) The essential equipment to be made available for the Contract by the successful Bidder shall be as under:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Equipment</th>
<th>Minimum Capacity</th>
<th>Max. age of Equipment</th>
<th>Minimum Number Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concrete mini batching plant</td>
<td>As per requirement</td>
<td>Not more than 5 years</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Water Tanker</td>
<td>5000 lts</td>
<td>Not more the 10 years</td>
<td>1 no</td>
</tr>
</tbody>
</table>

[Based on the studies carried out by the Employer, the minimum suggested major key and critical equipment required to attain the completion of work in accordance with the prescribed construction schedule are shown in the above list. The bidders should, however undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and detailed calculations as stated in clause 5.3 (k) above to allow the Employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.]
(b) The Key Personnel required for the project implementation are:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Position</th>
<th>No.</th>
<th>Total Work Similar Experience (Years)</th>
<th>Experience in similar position (Years)</th>
<th>Qualification and specific Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Manager</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>Graduation in civil engineering</td>
</tr>
<tr>
<td>2</td>
<td>Assistant project Manager/site Engineer (mechanical)</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>Graduation/Diploma in Mechanical engineering</td>
</tr>
</tbody>
</table>

The persons of the following department(s) are not permitted to be in the employment of the Bidder.

(i) Public Health Engineering Department, Govt.of. Andhra Pradesh.

(c) The minimum amount of liquid assets and/or credit facilities net of other contractual commitments of the successful Bidder [availability to be certified by a Scheduled Bank in the specified format] shall be: Rs. 2.76Millions
### B. Bidding Documents

**ITB 10.1** The Employer’s address for clarification is: Municipal Engineer / Commissioner, Vizianagaram Municipality, Vizianagaram Pin code – 535001 Andhra Pradesh INDIA Ph. 0091-8922-224793

**ITB 10.2** Pre-bid Meeting shall be held on 18-09-2015 at 11:00 AM at the address given below. Office of the Commissioner, Vizianagaram Municipality, Vizianagaram Pin code – 535001 Andhra Pradesh INDIA

### C. Preparation of Bids

**ITB 13.1** Any additional materials required to be completed and submitted by the Bidders are “none”.

**ITB 13.2** The original documents mentioned in Clause 13.2(d) shall be submitted on or before 13-10-2015 at 3:00 PM

**ITB 14.3** All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, including Works Contract Tax (VAT), Labour cess etc., shall be included in the rates, prices, and total Bid price submitted by the Bidder.

**ITB 14.5** The Contract “is not” subject to price adjustment in accordance with GCC Clause 47.

**ITB 16.1** The Bid shall be valid for 90 days.

**ITB 16.2** The factor ‘F’ is 0.12% per week

**ITB 17.1** This Bid security shall be in favour of the Commissioner Vizianagaram Municipality, Vizianagaram, Andhra Pradesh, and may be in one of the following forms:

- a bank guarantee issued by a nationalized / scheduled bank located in India or a reputable bank located abroad in the form given in Section X; or

- Certified cheque, Bank Draft or Letter of Credit in favour of the Commissioner Vizianagaram Municipality, Vizianagaram, Andhra Pradesh.

- If the institution issuing the guarantee is located outside India, it shall be counter signed by a Nationalized/Scheduled bank located in India, to make it enforceable.
The Bid Security amount is - Rs0.1107 Million

Alternatives will not be considered.

D. Submission of Bids

Bidders shall submit their bids only electronically.

The Employer’s address for the purpose of online submission of bids is:
http://eprocure.gov.in
Address for submission of original documents as per Clause 13.2
Commissioner,
Vizianagaram Municipality,
Vizianagaram
Pin code – 535001
Andhra Pradesh
INDIA

Comprehensive water supply service improvements in Vizianagaram Municipality – Construction of 500 KL ELSR at Phoolbaugh
IFB No: 3/ APMDP/VZM/E/TO/2015-16

Not Applicable

The deadline for submission of bids shall be 09-10-2015, 5:00 PM

E. Bid Opening and Evaluation

The bid opening shall take place at: Office of Commissioner, Vizianagaram Municipality.
Date: 14-10-2015 Time: 11:00 AM

In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

F. Award of Contract

The Standard Form of Performance Security acceptable to the Employer shall be a bank guarantee in the form given in Section X; or
- Certified cheque, Bank Draft or Letter of Credit in favour of the Commissioner, Vizianagaram Municipality, Vizianagaram, Andhra Pradesh payable at Vizianagaram

If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer or (c) by a foreign bank through a correspondent Bank in India [scheduled or nationalized].

The Advance Payment shall be limited to 10 percent of the Contract Price.

The Adjudicator proposed by the Employer is Sri. G.R.T. Omprakash, CE(HUDA) Rtd.,
The daily fee for this proposed Adjudicator shall be Rs.5000/- per visit.
| Reimbursable Expenses: Actual boarding, lodging, travel and other incidental expenses. The Appointing Authority is Chairman, Institute of Engineers, Hyderabad. |
Section III. Eligible Countries

Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement

1. In accordance with Para 1.8 of the Guidelines: Procurement under IBRD Loans and IDA Credits, dated May 2004, the Bank permits firms and individuals from all countries to offer goods, works and services for Bank-financed projects. As an exception, firms of a Country or goods manufactured in a Country may be excluded if:

Para 1.8 (a) (i): as a matter of law or official regulation, the Borrower’s Country prohibits commercial relations with that Country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of the Goods or Works required, or

Para 1.8 (a) (ii): by an Act of Compliance with a Decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower’s Country prohibits any import of goods from that Country or any payments to persons or entities in that Country.

2. For the information of borrowers and bidders, at the present time firms, goods and services from the following countries are excluded from this bidding:

(a) With reference to paragraph 1.8 (a) (i) of the Guidelines:
None

(b) With reference to paragraph 1.8 (a) (ii) of the Guidelines:
As per the list of countries which are barred under UN Security Council Chapter VII]
Section IV.

Forms of Bid, Qualification Information, Letter of Acceptance, and Agreement
1. Contractor’s Bid

The Bidder shall fill in and submit this Bid form with the Bid. If the Bidder objects to the Adjudicator proposed by the Employer in the Bidding Documents, it should so state in its Bid, and present an alternative candidate, together with the candidate’s daily fees and biographical data, in accordance with ITB Clause 37.

[date]

Identification No and Title of Contract: [insert identification number and title of the Contract]
Comprehensive water supply service Improvements in Vizianagaram Municipality - Construction of 500 KL ELSR at Phoolbaugh

To: Commissioner,
VizianagaramMunicipality,
Vizianagaram
Pin code – 535001
Andhra Pradesh
INDIA

Having examined the Bidding Documents, including addenda [insert list], we offer to execute the [name and identification number of Contract] in accordance with the GCC accompanying this Bid for the Contract Price of [insert amount in numbers], [insert amount in words] [insert name of currency].

The advance payment required is:

We accept the appointment of [insert name proposed in Bid Data Sheet] as the Adjudicator.

[or]

We do not accept the appointment of [insert name proposed in Bid Data Sheet] as the Adjudicator, and propose instead that [insert name] be appointed as Adjudicator, whose daily fees and biographical data are attached.

This Bid and your written acceptance of it shall constitute a binding Contract between us. We understand that you are not bound to accept the lowest or any Bid you receive.

We hereby confirm that this Bid complies with the Bid validity and, if required, Bid Security as required by the Bidding Documents and specified in the BDS.
We, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB Sub-Clause 4.1;

We have no conflict of interest in accordance with ITB Sub-Clause 4.2;

Our firm, its affiliates or subsidiaries—including any subcontractors or suppliers for any part of the contract—has not been declared ineligible by the Bank, or under the Employer’s country laws or official regulations, in accordance with ITB Sub-Clauses 4.3 and 4.4.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery or any collusive arrangements with competitors.

We also undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

<table>
<thead>
<tr>
<th>Name and address of agent</th>
<th>Amount and Currency</th>
<th>Purpose of Commission or gratuity</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

(if none, state “none”)

Authorized Signature: _______________________________________________________

Name and Title of Signatory: ________________________________________________

Name of Bidder: __________________________________________________________

Address: ________________________________________________________________
2. Qualification Information

**Notes on Form of Qualification Information**

The information is to be filled in by individual bidders. The following pages will be used for purposes of post-qualification as provided for in Clause 4 of the Instructions to Bidders. This information will not be incorporated in the Contract. Attach additional pages as necessary.

### Individual Bidders Qualification

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(i) Constitution or <strong>legal status</strong> of Bidder</td>
<td>[attach copy]</td>
</tr>
<tr>
<td></td>
<td>(ii) Place of registration:</td>
<td>..........</td>
</tr>
<tr>
<td></td>
<td>(iii) Principal place of business:</td>
<td>..........</td>
</tr>
<tr>
<td></td>
<td>(iv) Power of attorney of signatory of Bid</td>
<td>[attach]</td>
</tr>
</tbody>
</table>

**Total annual volume of civil engineering construction work** executed and payments received in the last five years preceding the year in which bids are invited. *(Attach certificate from Chartered Accountant)*

<table>
<thead>
<tr>
<th>Year</th>
<th>(Rs. In millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 -2011</td>
<td></td>
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<tr>
<td>2011 -2012</td>
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<tr>
<td>2012 -2013</td>
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<td>2013 -2014</td>
<td></td>
</tr>
<tr>
<td>2014 -2015</td>
<td></td>
</tr>
</tbody>
</table>

**(A) Work performed as prime Contractor** *(in the same name and style)* on construction works of a similar nature and volume over the last five years. *(Attach certificate from the Engineer-in-charge.)*

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Name of Employer</th>
<th>Description of work</th>
<th>Contract No.</th>
<th>Value of contract</th>
<th>Date of Issue of Work Order</th>
<th>Stipulated Date of Completion</th>
<th>Actual Date of Completion</th>
<th>Remarks explaining reasons for Delay, if any</th>
</tr>
</thead>
</table>

**(B) Quantities of work executed as prime contractor** *(in the same name and style)* in the last five years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Name of the Work</th>
<th>Name of Employer*</th>
<th>Quantity of work performed</th>
<th>Remarks* (indicate contract Ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
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<td>2011-2012</td>
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<td>2013-2014</td>
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<tr>
<td>2014-2015</td>
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</tr>
</tbody>
</table>

[@ The items or work for which date is requested should tally with that specified in ITB 5.5A(c)]

* Attach certificates from Engineer in-charge

---

10 Immediately preceding the financial year in which bids are received.

11 Immediately preceding the financial year in which bids are received.
(c) Value of Electrical & Sanitary/ Water supply works executed (ITB Clause 5.5 (A) (d) & (e))

<table>
<thead>
<tr>
<th>Name of Contractor</th>
<th>Year</th>
<th>Contract No.</th>
<th>Name of Work</th>
<th>Name of Employer &amp; Address</th>
<th>Value of Electrical works executed</th>
<th>Value of Sanitary water supply works executed</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
2.1. **Information on Bid Capacity** (works for which bids have been submitted and works which are yet to be completed) as on the date of bid submission.

(A) **Existing commitments and on-going construction works:**

<table>
<thead>
<tr>
<th>Description of Works</th>
<th>Place &amp; State</th>
<th>Contract No &amp; Date</th>
<th>Name &amp; Address of Employer</th>
<th>Value of Contract (Rs. in million)</th>
<th>Stipulated period of completion</th>
<th>Value of works remaining to be completed (Rs. millions)*</th>
<th>Anticipated Date of completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
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<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
</tbody>
</table>

* Enclose certificate(s) from Engineers(s)-in-charge for value of work remaining to be completed.

(B) **Works for which bids already submitted & likely to be awarded – expected additional commitment.**

<table>
<thead>
<tr>
<th>Description of Work</th>
<th>Place &amp; State</th>
<th>Name &amp; Address of Employer</th>
<th>Estimated Value of Works (Rs. millions)</th>
<th>Stipulated period of completion</th>
<th>Date when decision is expected</th>
<th>Remarks, if any</th>
</tr>
</thead>
<tbody>
<tr>
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<td>(2)</td>
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<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>Item of Equipment</td>
<td>Description</td>
<td>Make</td>
<td>Capacity</td>
<td>Age (Years)</td>
<td>Condition</td>
<td>Number Available</td>
</tr>
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</tbody>
</table>
### 2.2 Availability of Major items of Contractor’s Equipment:

List all information requested below. Refer also to Clause 5.3 (d) and Clause 5.5B (a) of the Instructions to Bidders.

<table>
<thead>
<tr>
<th>Item of Equipment</th>
<th>Description</th>
<th>make</th>
<th>capacity</th>
<th>age (Years)</th>
<th>Condition</th>
<th>Number available</th>
<th>Owned</th>
<th>Leased</th>
<th>Purchased</th>
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</tbody>
</table>

### 2.3 Qualifications of technical personnel proposed:

Refer also to Clause 5.3 (e) and Clause 5.5 B (b) of the Instructions to Bidders and Clause 9.1 of Part-1 General Conditions of Contract.

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Qualification</th>
<th>Years of Experience</th>
<th>Years of experience in proposed position</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Others Total
2.4 Proposed sub-contractors and firms: Refer to ITB Clause 5.3(j) and GCC Clause 7.

<table>
<thead>
<tr>
<th>Sections of the Works</th>
<th>Value of subcontract</th>
<th>% of Bid price</th>
<th>Sub-contractor (name and address)</th>
<th>Experience in similar work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

Note: *The capability of the sub-Contractor will also be assessed (on the same lines as for the main Contractor) before according approval to him*

2.5 Financial reports of the last five years: Balance sheets, profit and loss statements, auditors’ reports, etc. List below and attach copies.

2.6 Financial Resources: Evidence of access to financial resources to meet the qualification requirements [
*cash in hand, lines of credit, etc.*] List below and attach copies of support documents. [Attach a certificate from Bank in the format at the end of this section. Other Certificate will not be accepted]

2.7 **Banker’s References:** Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Employer.

2.8 **Information on current litigation in which the Bidder is involved.**

<table>
<thead>
<tr>
<th>Name of Other party(s)</th>
<th>Cause of dispute</th>
<th>Litigation where (Court or Arbitration)</th>
<th>Amount involved</th>
<th>Remarks regarding present status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2.9 **Proposed work method and schedule:** The bidder should attach descriptions, drawings, and charts as necessary, to comply with the requirements of the bidding documents. [*Refer Clause 5.1 and 5.3(k)*]
2.10 Statement of Compliance under the requirements of Sub-Clause 4.2 of ITB.

2.11 Financial Statements Summary: To be submitted by each bidder including each members of JV.

### SUMMARY OF FINANCIAL STATEMENTS

#### Name of bidder/JV Member: (Equivalent Rs. Million)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Financial Information in Rupee equivalent with exchange rate at the end of concerned year</th>
<th>Actuals for Previous five years excluding the current financial year</th>
<th>Ref. of Page Nos. of Balance Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3) (4) (5) (6) (7) (8)</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Total Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Total Turnover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Current Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Current Assets + Loan &amp; Advances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Total Liabilities</td>
<td></td>
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<tr>
<td>6.</td>
<td>Current Liabilities</td>
<td></td>
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<tr>
<td>7.</td>
<td>Current liabilities &amp; provision</td>
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<td></td>
</tr>
<tr>
<td>8.</td>
<td>Profit before Interest and Tax</td>
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<tr>
<td>9.</td>
<td>Profit before Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Profit after Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Shareholder’s Funds (Net Worth) = (Paid up equity +Reserves)-(revaluation reserves + Miscellaneous expenditure not written off)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Depreciation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Current Ration (2)/(5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Net cash accruals = Profit after Tax + depreciation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This information should be extracted from the Annual Financial Statements/ Balance sheets, which should be enclosed. Year 1 will be the latest year for which audited financial statements are available. Year 2 shall be the year immediately preceding year 1 and year 3 shall be the year immediately preceding Year 2.

2.12 Additional Requirements: Bidders should provide any additional information required to fulfill the requirement of Clause 5 of ITB.
2.13 SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES-
CLAUSE 5.5 [B] [c] OF ITB

BANK CERTIFICATE

This is to certify that M/s……………………………is a reputed company with a good financial standing.

If the contract for the work, namely……………………………………[/funded by the World Bank] is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. ………… to meet their working capital requirements for executing the above contract.

---Sd.---

Name of Bank

Senior Bank Manager

Address of the Bank

* Change the text as follows for Joint Venture:  Not Applicable
Dear Sir:

Re: [Name of Work]………………
Certificate for Import/Procurement of Goods/Construction Equipment

1. We confirm that we are solely responsible for obtaining customs/excise duty waivers which we have considered in our bid and in case of failure to receive such waivers for reasons whatsoever, the employer will not compensate us.

2. We are furnishing below the information required by the Employer for issue of the necessary certificates in terms of the Government of India Central Excise Notification No.108/95 and Customs Notification No. 85/99.

3. The goods/construction equipment for which certificates are required are as under:

<table>
<thead>
<tr>
<th>Items</th>
<th>Make/Brand Name</th>
<th>Capacity [where applicable]</th>
<th>Quantity</th>
<th>Value</th>
<th>State whether it will be procured locally or imported [if so from which country]</th>
<th>Remarks regarding justification for the quantity and their usage in works.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Construction Equipment</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
4. We agree that no modification to the above list is permitted after bids are opened.

5. We agree that the certificate will be issued only to the extent considered reasonable by the Employer for the work, based on the Bill of Quantities and the construction programme and methodology as furnished by us alongwith the bid.

6. We confirm that the above goods and construction equipment will be exclusively used for the construction of the above work and the construction equipment will not be sold or otherwise disposed of in any manner for a period of five years from the date of acquisition.

Date: ___________________    (Signature)______________________
Place:___________________    (Printed Name)__________________
(Designation)________________________
(Common Seal) ___________________

[This certificate will be issued within 60 days of signing of contract and no subsequent changes will be permitted.]
3. Letter of Acceptance

[letterhead paper of the Employer]

[The Letter of Acceptance shall be the basis for formation of the Contract as described in ITB Clauses 34 and 35. This Standard Form of Letter of Acceptance shall be filled in and sent to the successful Bidder only after evaluation of bids has been completed, subject to any review by the World Bank required under the Loan Agreement.]

[insert date]

Identification No and Title of Contract: [insert identification number and title of the Contract]

To: [insert name and address of the Contractor]

This is to notify you that your Bid dated [insert date] for execution of the [insert name of the Contract and identification number, as given in the SCC] for the Contract Price ……………….. [insert amount in numbers and words] as corrected and modified\(^\text{12}\) in accordance with the Instructions to Bidders is hereby accepted by our Agency.

[insert one of the following (a) or (b) options]

(a) We accept that [insert name proposed by bidder] be appointed as the Adjudicator.\(^\text{13}\)

(b) We do not accept that [insert name proposed by bidder] be appointed as Adjudicator, and by sending a copy of this Letter of Acceptance to [insert name of the Appointing Authority], we are hereby requesting [insert name], the Appointing Authority, to appoint the Adjudicator in accordance with ITB Clause 37.1.\(^\text{14}\)

We note that as per your bid, you do not intend to subcontract any component of work.

[OR]

We note that as per your bid, you propose to employ M/s. ………………… as sub-contractor for executing ……………………

[Delete whatever is inapplicable]

You are hereby requested to furnish Performance Security, plus additional security for unbalanced bids in terms of ITB clause 30.6, in the form detailed in ITB Clause 35.1 for an amount of Rs. ____ within 21 days of the receipt of this letter of acceptance, valid up to 28 days from the date of

\(^{12}\) Delete “corrected and” or “and modified” if not applicable. See Notes on Standard Form of Agreement, next page.

\(^{13}\) To be used only if the Contractor disagrees in the Bid with the Adjudicator proposed by the Employer in the Instructions to Bidders, and has accordingly offered another candidate.

\(^{14}\) To be used only if the Contractor disagrees in the Bid with the Adjudicator proposed by the Employer in the ITB, has accordingly offered another candidate, and the Employer does not accept the counterproposal.
expiry of Defects Liability Period i.e. upto ……………… and sign the contract, failing which action as stated in ITB Clause 35.3 will be taken.

We have reviewed the construction methodology submitted by you alongwith the bid in response to ITB Clause 5.3[k] and our comments are given in the attachment. You are requested to submit a revised Program including environmental management plan as per Clause 27 of General Conditions of Contract within 14 days of receipt of this letter of acceptance.

Yours faithfully,

Authorized Signature………………………..

Name and Title of Signatory…………………

Name of Agency……………………………..
Issue of Notice to proceed with the work
(letterhead of the Employer)

_______ (date)

To

______________________________ (name and address of the Contractor)

______________________________

______________________________

Dear Sirs:

Pursuant to your furnishing the requisite security as stipulated in ITB clause 35.1, construction methodology as stated in letter of acceptance and signing of the contract agreement for the construction of ___________@ a Bid Price of Rs. ____________, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)
4. Agreement

[The Agreement shall incorporate any corrections or modifications to the Bid resulting from corrections of errors (ITB Clause 28), price adjustment during the evaluation process (ITB Sub-Clause 16.3, selection of an alternative offer (ITB Clause 18), acceptable deviations (ITB Clause 27), or any other mutually-agreeable changes allowed for in the Conditions of Contract, such as changes in key personnel, subcontractors, scheduling, and the like.]

This Agreement, made the [insert day] day of [insert month], [insert year] between Commissioner, Vizianagaram Municipalities (hereinafter called “the Employer”) and [insert name and address of Contractor] (hereinafter called “the Contractor”) of the other part.

Whereas the Employer is desirous that the Contractor execute [insert name and identification number of Contract] (hereinafter called “the Works”) and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rs. ……………

Now this Agreement witnesseth as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

In Witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of [Witness entity] was hereunto affixed in the presence of: ________________________________

Signed, Sealed, and Delivered by the said ________________________________ in the presence of: ________________________________

Binding Signature of Employer [signature of an authorized representative of the Employer]

Binding Signature of Contractor [signature of an authorized representative of the Contractor]
Section V: Conditions of Contract
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General Conditions of Contract

A. General

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<th>1. Definitions</th>
<th>2.1. Boldface type is used to identify defined terms.</th>
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<tr>
<td>(a) <strong>Adjudicator</strong> is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC Clauses 24 and 25 hereunder.</td>
<td></td>
</tr>
<tr>
<td>(b) <strong>Bill of Quantities</strong> means the priced and completed Bill of Quantities forming part of the Bid.</td>
<td></td>
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<tr>
<td>(c) <strong>Compensation Events</strong> are those defined in GCC Clause 44 hereunder.</td>
<td></td>
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<tr>
<td>(d) The <strong>Completion Date</strong> is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 55.1.</td>
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</tr>
<tr>
<td>(e) The <strong>Contract</strong> is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Clause 2.3 below.</td>
<td></td>
</tr>
<tr>
<td>(f) The <strong>Contractor</strong> is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.</td>
<td></td>
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<tr>
<td>(g) The <strong>Contractor’s Bid</strong> is the completed bidding document submitted by the Contractor to the Employer.</td>
<td></td>
</tr>
<tr>
<td>(h) The <strong>Contract Price</strong> is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.</td>
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</tr>
<tr>
<td>(i) <strong>Days</strong> are calendar days; months are calendar months.</td>
<td></td>
</tr>
<tr>
<td>(j) <strong>Dayworks</strong> are varied work inputs subject to payment on a time basis for the Contractor’s employees and Equipment, in addition to payments for associated Materials and Plant.</td>
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<tr>
<td>(k) A <strong>Defect</strong> is any part of the Works not completed in accordance with the Contract.</td>
<td></td>
</tr>
<tr>
<td>(l) The <strong>Defects Liability Certificate</strong> is the certificate issued by Project Manager upon correction of defects by the Contractor.</td>
<td></td>
</tr>
<tr>
<td>(m) The <strong>Defects Liability Period</strong> is the period named in the SCC Sub-Clause 35.1 and calculated from the Completion Date.</td>
<td></td>
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<tr>
<td>(n) <strong>Drawings</strong> include calculations and other information provided or approved by the Project Manager for the execution of the Contract.</td>
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<tr>
<td>(o) The <strong>Employer</strong> is the party who employs the Contractor to carry out the</td>
<td></td>
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</tbody>
</table>
Works, as specified in the SCC.

(p) **Equipment** is the Contractor’s machinery and vehicles brought temporarily to the Site to construct the Works.

(q) The **Initial Contract Price** is the Contract Price listed in the Employer’s Letter of Acceptance.

(r) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the SCC. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.

(s) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

(t) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

(u) The **Project Manager** is the person named in the SCC (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

(v) **SCC** means Special Conditions of Contract

(w) The **Site** is the area defined as such in the SCC.

(x) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

(y) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

(z) The **Start Date** is given in the SCC. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

(aa) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

(bb) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

(cc) A **Variation** is an instruction given by the Project Manager which varies the Works.
The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, **as defined in the SCC.**

| 2. Interpretation | 2.1. In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.  

2.2. If sectional completion is specified in the SCC, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).  

2.3. The documents forming the Contract shall be interpreted in the following order of priority:  

(a) Agreement,  
(b) Letter of Acceptance,  
(c) Contractor’s Bid,  
(d) Special Conditions of Contract,  
(e) General Conditions of Contract,  
(f) Specifications,  
(g) Drawings,  
(h) Priced bill of Quantities, and  
(i) any other document **listed in the SCC** as forming part of the Contract. |

| 3. Language and Law | 3.1. The language of the Contract and the law governing the Contract are **stated in the SCC.**  

3.2. Salient features of major labour and other laws that are applicable to construction industry in India are given as Appendix 1 to these General Conditions of Contract. |

| 4. Project Manager’s Decisions | 4.1. Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.  

However, if the Project Manager is required, under the rules and regulations and orders of the Employer, to obtain approval of some other authorities for specific actions, he will so obtain the approval. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Project Manager. |
<table>
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<tr>
<th>5. Delegation</th>
<th>5.1. The Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Communications</td>
<td>6.1. Communications between parties that are referred to in the Conditions shall be effective only when given in writing. A notice shall be effective only when it is delivered. All oral instructions shall be confirmed in writing in seven working days.</td>
</tr>
</tbody>
</table>
| 7. Subcontracting | 7.1. The Contractor may subcontract with the approval of the Project Manager up to the ceiling specified in Contract Data, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor’s obligations. 

7.2. The Project Manager should satisfy himself before recommending to the Employer whether:

a) the circumstances warrant such sub-contracting; and,

b) the sub-Contractor so proposed for the Work possesses the experience, qualifications and equipment necessary for the job proposed to be entrusted to him in proportion to the quantum of Works to be sub-contracted.

7.3. If payments are proposed to be made directly to that sub-contractor, this should be subject to specific authorization by the prime contractor so that his arrangement does not alter the contractor’s liability or obligations under the contract.

7.4. The Contractor shall not be required to obtain any consent from the Employer for:

(a) the sub-contracting of any part of the Works for which the Sub-Contractor is already named in the contract;

(b) the provision for labour, or labour component, and,

(c) the purchase of materials which are in accordance with the standards specified in the contract. |
| 8. Other Contractors | 8.1. The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of other Contractors, as referred to in the SCC. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification. |
| 9. Personnel | 9.1. The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the SCC, to carry out the functions stated in the Schedule or other personnel approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or |
Compliance with Labour Regulations

better than those of the personnel listed in the Schedule.

9.2. The Project Manager may require the Contractor to remove from the Site of Works, a member of the Contractor’s staff or his work force, who:

(a) persists in any misconduct or lack of care,

(b) carries out duties incompetently or negligently,

(c) fails to conform with any provisions of the Contract, or

(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

The contractor shall ensure that the person leaves the site within seven days and has no further connection with the work in the contract. The Contractor shall appoint a suitable replacement within 28 days or earlier as may be agreed to between the Project manager and the Contractor.

9.3. The Contractor shall not employ any retired Gazetted officer who has either not completed two years after the date of retirement or has not obtained permission from the Government authorities for employment with the Contractor.

9.4. The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport. The Contractor shall, if required by the Project Manager, deliver to the Project Manager a return in detail, in such form and at such intervals as the Project Manager may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Project Manager may require.

9.5. During continuance of the Contract, the Contractor and his Sub-Contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour laws (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law prevailing on the Base Date either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contraventions including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Project Manager/ Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Project Manager shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or

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15 Based on Government Directives.
damage suffered by the Employer.

9.6. The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

9.7. The Contractor shall duly comply with the provisions of the Apprentices Act 1961 (III of 1961) and the rules made there under, and comply, failure or neglect to shall be subject to all liabilities and penalties provided in the said Act and Rules.

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<th>10. Employer’s and Contractor’s Risks</th>
<th>10.1. The Employer carries the risks which this Contract states are Employer’s risks, and the Contractor carries the risks which this Contract states are Contractor’s risks.</th>
</tr>
</thead>
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<tr>
<td>10.2. Irrespective of the Employer’s or Contractor’s Risk the Contractor shall continue with the works as are appropriate and as directed by the Project Manager.</td>
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<table>
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<tr>
<th>11. Employer’s Risks</th>
<th>11.1. From the Start Date until the Defects Liability Certificate has been issued, the following are Employer’s risks:</th>
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<td>(a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to</td>
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</tr>
<tr>
<td>(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or</td>
<td></td>
</tr>
<tr>
<td>(ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.</td>
<td></td>
</tr>
<tr>
<td>(b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer’s design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.</td>
<td></td>
</tr>
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</table>

| 12. Contractor’s Risks | 12.1. From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer’s risks are Contractor’s risks. |

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<th>13. Insurance</th>
<th>13.1. The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the SCC for the following events which are due to the Contractor’s risks:</th>
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<td>(a) loss of or damage to the Works, Plant, and Materials;</td>
<td></td>
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<tr>
<td>(b) loss of or damage to Equipment;</td>
<td></td>
</tr>
<tr>
<td>(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and</td>
<td></td>
</tr>
<tr>
<td>(d) personal injury or death.</td>
<td></td>
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<tr>
<td>13.2. Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager’s approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.</td>
<td></td>
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<td>---</td>
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</tr>
<tr>
<td>13.3. If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.</td>
<td></td>
</tr>
<tr>
<td>13.4. Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.</td>
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<td>13.5. Both parties shall comply with any conditions of the insurance policies.</td>
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<thead>
<tr>
<th>14. Site Investigation Reports</th>
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<tbody>
<tr>
<td>14.1. The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the SCC, supplemented by any information available to the Bidder.</td>
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<thead>
<tr>
<th>15. Queries about the Special Conditions of Contract</th>
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<tbody>
<tr>
<td>15.1. The Project Manager shall clarify queries on the SCC.</td>
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<tr>
<th>16. Contractor to Construct the Works</th>
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<tbody>
<tr>
<td>16.1. The Contractor shall construct and install the Works in accordance with the Specifications and Drawings and as per instructions of Project Manager.</td>
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<tr>
<th>Protection of Environment</th>
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<tbody>
<tr>
<td>16.2.1 The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or property of the public or others resulting from pollution, noise or other causes arising as a consequence of his method of operation.</td>
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<tr>
<td>(a) The contractor has to follow all environmental mitigation measures as defined in the Technical specification read along with the Environmental Management Plan (EMP) provided in the specifications section VII-F. A damage shall be levied at the rate as stated in the SCC for non-conformity of Environmental Management Plan measures as per the decision of the Engineer-in-Charge.</td>
</tr>
<tr>
<td>(b) The contractor has to ensure that sufficient numbers and good quality Personnel Protective Equipments, should be provide to staff and labour all time as defined in the labour codes read along with the Environmental Management Plan (EMP). A damage shall be levied at the rate as stated in the SCC for non conformity as per the decision of the Engineer-in-Charge.</td>
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<tr>
<td>16.2.2 During continuance of the contract, the contractor and his sub-contractor shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and byelaws of the State or Central Government, or local authorities and any other law, byelaw, regulation that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.</td>
</tr>
<tr>
<td><strong>17. The Works to Be Completed by the Intended Completion Date</strong></td>
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</tbody>
</table>
| **18. Approval by the Project Manager** | 18.1. The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings.  
18.2. The Contractor shall be responsible for design of Temporary Works.  
18.3. The Project Manager’s approval shall not alter the Contractor’s responsibility for design of the Temporary Works.  
18.4. The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.  
18.5. All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use. |
| **19. Safety** | 19.1. The Contractor shall be responsible for the safety of all activities on the Site. |
| **20. Discoveries** | 20.1. Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager’s instructions for dealing with them. |
| **21. Possession of the Site** | 21.1. The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the SCC, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event. |
| **22. Access to the Site** | 22.1. The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out. |
| **23. Instructions, Inspections and Audits** | 23.1. The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.  
23.2. The Contractor shall permit the Bank and/or persons appointed by the Bank to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank. The Contractor’s attention is drawn to Sub-Clause 60.1 [Corrupt or Fraudulent Practices] which provides, inter alia, that acts |
intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Sub-Clause 23.2 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility under the Procurement Guidelines).

<table>
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<tr>
<th>24. Disputes</th>
<th>24.1. If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager’s decision.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. Procedure for Disputes</td>
<td>25.1. The Adjudicator should be in position before “notice to proceed with work” is issued to the contractor and an agreement should be signed with the Adjudicator jointly by Employer/Contractor in the form attached – Appendix 3</td>
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<tr>
<td></td>
<td>25.2. The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.</td>
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<td></td>
<td>25.3. The Adjudicator shall be paid daily at the rate specified in the BDS and SCC, together with reimbursable expenses of the types specified in the Contract Data, and the cost shall be divided equally between the Employer and the Contractor. Whatever decision is reached by the Adjudicator, either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator’s written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator’s decision shall be final and binding.</td>
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<td>25.4. The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place specified in the SCC.</td>
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<td></td>
<td>25.5. The Arbitrators shall give a decision in writing within 120 days of start of the proceedings except otherwise agreed to by the Parties. The Arbitrators shall entertain only those issues which have been earlier referred to the Adjudicator and either party is dissatisfied with the decision given by the Adjudicator.</td>
</tr>
<tr>
<td>26. Replacement of Adjudicator</td>
<td>26.1 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the SCC at the request of either party, within 14 days of receipt of such request.</td>
</tr>
</tbody>
</table>

**B. Time Control**

| 27. Program | 27.1 Within the time stated in the SCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval, a revised Program (revising the program given along with bid |

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27.1 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

27.2 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period stated in the SCC. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

27.3 The Project Manager’s approval of the Program shall not alter the Contractor’s obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

27.4 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

27.5 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

28.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

28.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

29.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.

29.2 If the Contractor’s priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
| **30. Delays Ordered by the Project Manager** | 30.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works. |
| **31. Management Meetings** | 31.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure. |

31.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting. |

| **32. Early Warning** | 32.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible. |

32.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager. |

| **C. Quality Control** |
| **33. Quality Assurance** | 33.1 The Contractor shall institute Quality Assurance (QA) and Quality Control (QC) systems in accordance with Quality Assurance Plan to demonstrate compliance with the requirements of the Contract as approved by the Project Manager. |

33.2 Compliance with the QA/QC systems shall not relieve the Contractor of any of his duties obligations or responsibilities under the Contract. |

| **34. Tests** | 34.1 The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. |

34.2 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event. |
### 35. Identifying and Correction of Defects

| 35.1 | The Project Manager shall check the Contractor’s work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor’s responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect. |
| 35.2 | The contractor shall permit the Employer’s Technical auditor to check the contractor’s work and notify the Project Manager and Contractor of any defects that are found. Such a check shall not affect the Contractor’s or the Project Manager’s responsibility as defined in the Contract Agreement. |
| 35.3 | The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the SCC. The Defects Liability Period shall be extended for as long as Defects remain to be corrected. |
| 35.4 | Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager’s notice. |

### 36. Uncorrected Defects

| 36.1 | If the Contractor has not corrected a Defect within the time specified in the Project Manager’s notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount. |

*Note: Where in certain cases, the technical specifications provide for acceptance of works within specified tolerance limits at reduced rates, Engineer will certify payments to Contractor accordingly.*

### D. Cost Control

### 37. Bill of Quantities

| 37.1 | The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor. |
| 37.2 | The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate specified in the Bill of Quantities for each item. |

### 38. Changes in the Quantities

| 38.1 | If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. |

(a) If the quantity of work executed exceeds the quantity of the item in BOQ beyond the higher specified limit the Project Manager shall fix the rate to be applied for the additional quantity of the work executed. |

(b) If the quantity of work executed less than the quantity of the item in BOQ lesser than the lower specified limit, the Project Manager shall fix the rate to be applied for whole of the quantity of the work so executed. |
<table>
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<tr>
<th><strong>38.2</strong></th>
<th>The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>38.3</strong></td>
<td>If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.</td>
</tr>
<tr>
<td><strong>39. Variations</strong></td>
<td><strong>39.1</strong> All Variations shall be included in updated Programs produced by the Contractor.</td>
</tr>
<tr>
<td><strong>40. Payments for Variations</strong></td>
<td><strong>40.1</strong> The Contractor shall provide the Project Manager with a quotation [with breakdown of unit rates] for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.</td>
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<td><strong>40.2</strong> If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in Sub-Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.</td>
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<td><strong>40.3</strong> If the Contractor’s quotation is unreasonable, [or if contractor fails to provide the Project Manager with a quotation within a reasonable time specified by Project Manager in accordance with GCC40.1] the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager’s own forecast of the effects of the Variation on the Contractor’s costs.</td>
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<td><strong>40.4</strong> If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.</td>
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<td><strong>40.5</strong> The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.</td>
</tr>
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<td><strong>41. Cash Flow Forecasts</strong></td>
<td><strong>41.1</strong> When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall be in Indian Rupees.</td>
</tr>
<tr>
<td><strong>42. Payment Certificates</strong></td>
<td><strong>42.1</strong> The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously along with details of measurement of the quantity of works executed in a tabular form approved by the Project Manager.</td>
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<tr>
<td>42.2</td>
<td>The Project Manager shall check the details given in the Contractor’s monthly statement and within 14 days certify the amounts to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amount and under conditions set forth in GCC Sub-Clause 51.4 [Secured Advance]</td>
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<tr>
<td>42.3</td>
<td>The value of work executed shall be determined by the Project Manager after due check measurement of the quantities claimed as executed by the contractor.</td>
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<tr>
<td>42.4</td>
<td>The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.</td>
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<tr>
<td>42.5</td>
<td>The value of work executed shall include the valuation of Variations and Compensation Events.</td>
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<tr>
<td>42.6</td>
<td>The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.</td>
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<tr>
<td>43. Payments</td>
<td>43.1 Payments shall be adjusted for deductions for advance payments, retention other recoveries in terms of contract &amp; taxes to be deducted at source [TDS] as per applicable law. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at 6% per annum.</td>
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<td>43.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.</td>
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<td>43.3 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.</td>
</tr>
<tr>
<td>44. Compensation Events</td>
<td>44.1 The following shall be Compensation Events:</td>
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<td>(a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 21.1.</td>
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<td>(b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.</td>
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<td>(c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.</td>
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<td>(d) The Project Manager instructs the Contractor to uncover or to carry out...</td>
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</table>
additional tests upon work, which is then found to have no Defects.

(e) The Project Manager unreasonably does not approve a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effects on the Contractor of any of the Employer’s Risks.

(k) The Project Manager unreasonably delays issuing a Certificate of Completion.

(l) Other compensation events, listed in SCC or mentioned in contract.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor’s forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor’s forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager’s own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

44.4 The Contractor shall not be entitled to compensation to the extent that the Employer’s interests are adversely affected by the Contractor’s not having given early warning or not having cooperated with the Project Manager.

45. Tax

45.1 The rates quoted by the Contractor shall be deemed to be inclusive of the VAT, sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source [TDS] as per applicable law.
| 46. Currencies | 46.1 All payments shall be made in Indian Rupees. |
| 47. Price Adjustment (NOT APPLICABLE) | 47.1 // NOT APPLICABLE//
Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants and other inputs to the works in accordance with the principles and procedures outlined below. A table of adjustment data is included in the SCC which indicates the coefficients of various inputs and the sources of indices for various schedules of BOQ. If the SCC does not include a table of adjustment data this sub clause shall not apply and there shall be no price adjustment.

(a) The price adjustment according to sub para (d) below, shall apply for the work done from the start date given in the SCC up to the end of the Intended Completion Date. If there is delay in completion beyond such date for reasons attributable to the contractor, the Price Adjustment for the work carried out during such period, for reasons attributable to the Contractor, shall be regulated by sub-para (g) below.

(b) The Contract Price shall be adjusted to take account of any increase or decrease in cost after the base date, which affect the Contractor in performance of obligations under the Contract.

(c) The total value (R) of the work done during the specified period[GCC 42.1]shall be as under:

\[ R = \sum (R_{S1} + R_{S2} + R_{S3} + \ldots \ldots R_{Sn}) \]

Where,

\( R_{sn} \) is the value of work done to which the price adjustment shall be applied for the relevant schedule of Bill of Quantities (BOQ) specified in S.C.C during the specified period, and represented as under:

\[ R_{sn} = (V_{sn} + S_{sn}) \text{ minus (amount of secured advance recovered in the same period + value of works executed under variations for which price adjustments will be worked separately based on terms mutually agreed between the Project Engineer and the Contractor)} \]

where,

\( V_{sn} \)is the total value of work done during the specified period for the respective schedule of BOQ, and

\( S_{sn} \) is the secured advance paid during the specified period for the respective schedule of BOQ,

(d) The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate schedule of BOQ and certified in Payment Certificates, shall be determined from formulae which shall be of the following general type:

\[ P_n = a + b \frac{L_n}{L_o} + c \frac{E_n}{E_o} + d \frac{M_n}{M_o} + \ldots \ldots \]
where,

“\( P_n \)” is the adjustment multiplier to be applied to the estimated contract value of the work carried out in period “n”, this period being a month unless otherwise stated in the SCC.

“a” is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

“b”, “c”, “d”, … are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

“\( L_n \)”[Labour], “\( E_n \)”[Equipment], “\( M_n \)”[Material], …. are the current cost indices or reference prices for period “n”, each of which is applicable to the relevant tabulated cost element [Labour, Equipment, Steel, Cement, Fuel/Lubricants, Bitumen, others] on the date, specified in the Table-2 of Adjustment Data, prior to the last day of the period (to which the particular Payment Certificate relates); and

“\( L_o \)”, “\( E_o \)”, “\( M_o \)”, ….are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.

(e) The cost indices or reference prices stated in the tables of adjustment data given in SCC shall be used. The base date shall be date of opening of bids.

(f) If the Contractor fails to complete the Works within the Intended Completion date, adjustment of prices thereafter shall be made using either:

(i) index or price applicable for each cost element tabulated in the tables of adjustment data on the specified date prior to the expiry of the Intended Completion Date, or

(ii) the current index or price applicable for the period in question whichever is more favourable to the Employer.

(g) The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be varied by the Project Manager if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.

(h) Unless otherwise stated in the S.C.C., the Price adjustment shall be done in each monthly IPC. The coefficients and indices are given in the Tables of Adjustment Data in Contract data.

To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.
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<th>Section</th>
<th>Description</th>
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| **48. Retention** | The Employer shall retain from each payment due to the Contractor the proportion stated in the SCC until Completion of the whole of the Works.  
48.2 On completion of the whole of the Works, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected.  
48.3 On completion of the whole Works, the Contractor may substitute retention money (balance half) with an “on demand” Bank guarantee. |
| **49. Liquidated Damages** | The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the SCC for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the SCC. The Employer may deduct liquidated damages from payments due to the Contractor.  
49.1.1 Time is the essence of the contract and payment or deduction of liquidated damages shall not relieve the contractor from his obligation to complete the work as per agreed construction program and milestones, or from any of the other contractor’s obligations and liabilities under the contract.  
49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 43.1. |
| **50. Bonus** | Not used. |
| **51. Advance Payment** | The Employer shall make advance payment to the Contractor of the amounts stated in the SCC by the date stated in the SCC, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee can be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.  
51.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.  
51.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall |
| **Secured Advance** | be taken of the advance (mobilization & equipment) payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, or Liquidated Damages.  
51.4 The Engineer shall make advance payment in respect of materials intended for but not yet incorporated in the Works in accordance with conditions stipulated in the SCC. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>52. Securities</strong></td>
<td>52.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount specified in the SCC, by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.</td>
</tr>
<tr>
<td><strong>53. Dayworks</strong></td>
<td>Not used</td>
</tr>
<tr>
<td><strong>54. Cost of Repairs</strong></td>
<td>54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor’s cost if the loss or damage arises from the Contractor’s acts or omissions.</td>
</tr>
</tbody>
</table>

### E. Finishing the Contract

| **55. Completion** | 54.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed. |
| **56. Taking Over** | 56.1 The Employer shall take over the Site and the Works within seven days of the Project Manager’s issuing a certificate of Completion. |
| **57. Final Account** | 57.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor’s account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the contracts revised account. |
| **58. Operating and Maintenance Manuals** | 58.1 If “as built” Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the SCC.  
58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the SCC, or they do not receive the Project Manager’s approval, the Project Manager shall withhold the amount stated in the SCC from |
payments due to the Contractor.

<table>
<thead>
<tr>
<th>59. Termination</th>
<th>59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:</td>
<td></td>
</tr>
<tr>
<td>(a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;</td>
<td></td>
</tr>
<tr>
<td>(b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;</td>
<td></td>
</tr>
<tr>
<td>(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;</td>
<td></td>
</tr>
<tr>
<td>(d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager’s certificate;</td>
<td></td>
</tr>
<tr>
<td>(e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;</td>
<td></td>
</tr>
<tr>
<td>(f) the Contractor does not maintain a Security, which is required; and</td>
<td></td>
</tr>
<tr>
<td>(g) The Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the SCC.</td>
<td></td>
</tr>
<tr>
<td>(h) The contractor has contravened Sub-clause 7 of GCC read with SCC and Clause 9.0 of GCC.</td>
<td></td>
</tr>
<tr>
<td>(i) The contractor does not adhere to the agreed construction program and agreed environmental management plan (Clause 27 of GCC) and also fails to take satisfactory remedial action as per agreements reached in the management meetings (Clause 31) for a period of 60 days.</td>
<td></td>
</tr>
<tr>
<td>(j) The contractor fails to carry out of the instructions of Engineer within a reasonable time determined by the Engineer in accordance with GCC Clause 16.1 and 23.1.</td>
<td></td>
</tr>
<tr>
<td>59.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC Sub-Clause 59.2 above, the Project Manager shall decide whether the breach is fundamental or not.</td>
<td></td>
</tr>
<tr>
<td>59.4 Notwithstanding the above, the Employer may terminate the Contract for</td>
<td></td>
</tr>
</tbody>
</table>
59.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

### 60. Corrupt or Fraudulent Practices

60.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 59.5 shall apply.

60.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with Clause 9.1 [Personnel].

60.3 For the purposes of this Sub-Clause:

(i) “corrupt practice”\(^{16}\) is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

(ii) “fraudulent practice”\(^{17}\) is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) “collusive practice”\(^{18}\) is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) “coercive practice”\(^{19}\) is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) “obstructive practice” is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation.

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\(^{16}\) “another party” refers to a public official acting in relation to the procurement process or contract execution. In this context, “public official” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

\(^{17}\) a “party” refers to a public official; the terms “benefit” and “obligation” relate to the procurement process or contract execution; and the “act or omission” is intended to influence the procurement process or contract execution.

\(^{18}\) “parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non-competitive levels.

\(^{19}\) a “party” refers to a participant in the procurement process or contract execution.
into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Clause 23 [Instructions, Inspections and Audits].

| 61. Payment upon Termination | 61.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of contract less taxed to be deducted at source [TDS] as per applicable law and less the percentage to apply to the value of the work not completed, as indicated in the SCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

61.2 If the Contract is terminated for the Employer’s convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor’s personnel employed solely on the Works, and the Contractor’s costs of protecting and securing the Works, and less advance payments received up to the date of the certificate less other recoveries due in terms of the contract, and less taxes due to be deducted at source [TDS] as per applicable law.

| 62. Property | 62.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor’s default.

| 63. Release from Performance | 63.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

| 64. Suspension of World Bank Loan or Credit | 64.1 In the event that the World Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the World Bank’s suspension notice.

(b) If the Contractor has not received sums due it within the 28 days for payment provided for in Sub-Clause 43.1, the Contractor may immediately issue a 14-day termination notice.
Section VI.

Special Conditions of Contract
### A. General

<table>
<thead>
<tr>
<th>GCC 1.1 (o)</th>
<th>The Employer is <strong>Commissioner</strong>, Vizianagaram Municipality, Vizianagaram Pin code – 535001 Andhra Pradesh INDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCC 1.1 (r)</td>
<td>The Intended Completion Date for the whole of the Works shall be 365th day from the start date.</td>
</tr>
<tr>
<td>GCC 1.1 (u)</td>
<td>The Project Manager is <strong>Municipal Engineer</strong>, Vizianagaram Municipality, Vizianagaram Pin code – 535001 Andhra Pradesh INDIA</td>
</tr>
<tr>
<td>GCC 1.1 (w)</td>
<td>The Site is located at Vizianagaram and is defined in drawings specified in Section VIII</td>
</tr>
<tr>
<td>GCC 1.1 (z)</td>
<td>The Start Date shall be within seven days from issue of notice to proceed with the work.</td>
</tr>
</tbody>
</table>
| GCC 1.1 (dd)         | The Works consist of  
  - Construction of 500KL ELSR.                                                                                   |
GCC 2.2 | Sectional Completions are: NA

GCC 2.3(i) | The following documents also form part of the Contract: [list documents]

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Document</th>
<th>Description of the document</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Construction Methodology</td>
<td>Construction methodology given in bid amended as per comments of employer given in letter of acceptance.</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GCC 3.1 | The language of the contract is English.

The law that applies to the Contract is the laws of Union of India.

GCC 8.1 | Schedule of other contractors: Nil
GCC 9.1

Key Personnel:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Position</th>
<th>No.</th>
<th>Total Work Similar Experience (Years)</th>
<th>Experience in similar position (Years)</th>
<th>Qualification and specific Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Manager</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>Graduation civil engineering</td>
</tr>
<tr>
<td>2</td>
<td>Assistant project manager/ site Engineer (Mechanical)</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>Graduation/Diploma Mechanical engineering</td>
</tr>
</tbody>
</table>

GCC 13.1

Insurance: The contractor should maintain contractor All Risk Insurance policy for the project period along with the defect liability period with the coverage mentioned below:

- a) Third party liability upto 10% of the contract value
- b) Removal of debris upto Rs.5.00 Lakhs
- c) Owners surrounding property 10% of the contract value
- d) Earthquake cover – contract value
- e) Storm, tempest, flood and inundation – contract value
- f) Escalation – up to 10% of the contract value
- g) Contractor plant and machinery – up to 10% of the contract value

The contractor All risk policy should be taken with the lowest deductibles as per the tariff guidelines.

The contractor should maintain insurance policy for their employees and labour engaged for the contract work under Workmen compensation Act.

GCC 14.1

Site Investigation Reports are: Nil

GCC 15.1

Queries. Nil

GCC 16.1.2(a)

Rs.500.00 per day per location
| GCC 16.1.2(b) | Rs.500.00 per day |
| GCC 21.1 | The Site Possession Dates shall be:  
The Site Possession Date(s) shall be: *Date of issue of Notice to proceed with the work.* |
| GCC 25.3 | Fees and types of reimbursable expenses to be paid to the Adjudicator:  
Rs.5000/- per visit.  
Reimbursable Expenses: Actual boarding, lodging, travel and other incidental expenses. |
| GCC 25.4 | The procedure for arbitration will be as follows:  
(a) In case of Dispute or difference arising between the Employer and a domestic contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of 3 Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding Arbitrator. In case of failure of the two Arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the Arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Disputes Resolution (India).  
(b) In the case of dispute with a Foreign contractor the dispute shall be settled in accordance with provisions of UNCITRAL Arbitration Rules. The Arbitral Tribunal shall consist of three Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties, and shall act as presiding Arbitrator. In case of failure of the two Arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the Arbitrator appointed, the Presiding Arbitrator shall be appointed by the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Disputes Resolution (India).  
(c) If one of the parties fails to appoint its Arbitrator in pursuance of sub-clause (a) and (b) above within 30 days after receipt of the notice of the appointment of its Arbitrator by the other party, then the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Disputes Resolution (India), both in cases of Foreign Contractor as well as Indian Contractor, shall appoint the Arbitrator. A certified copy of the order of the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Disputes Resolution (India), making such an appointment shall be furnished to
each of the parties.

(d) Arbitration proceedings shall be held at Hyderabad, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(e) The decision of the majority of Arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the Arbitrator appointed by such party or on its behalf shall be borne by each party itself.

(f) Where the value of the contract is Rs.50 millions and below, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority, namely the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Disputes Resolution (India).*

(g) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the owners shall not be withheld, unless they are the subject matter of the arbitration proceedings.

| GCC 26.1 | Appointing Authority for the Adjudicator: Engineer-in-Chief, Public Health Engineering Department, Government of Andhra Pradesh. |

### B. Time Control

| GCC 27.1 | The Contractor shall submit a revised Program including Environmental Management Plan for the Works (in such form and detail as the engineer shall reasonably prescribe) within 14 days of delivery of the Letter of Acceptance.  

*This program should be in adequate detail and generally conform to the program submitted along with bid in response to ITB Clause 5.3(k). Deviations if any from that should be clearly explained and should be satisfactory to the Engineer.* |

| GCC 27.3 | The period between Program updates is 45 days.  
The amount to be withheld for late submission of an updated Program is Rs.50000. |

### C. Quality Control

| GCC 35.1 | The Defects Liability Period is: 365 days. |
### D. Cost Control

| GCC 47.1 | Price Adjustment:  
The contract "is not" subject to price adjustment in accordance with G.C.C. Clause 47 and information regarding coefficients "does not" apply. |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>GCC 48.1</td>
<td>The proportion of payments retained (Retention Money) shall be 6% from each bill subject to the maximum of 5% of final contract price.</td>
</tr>
</tbody>
</table>
| GCC 49.1 | The liquidated damages for the whole of the Works are 0.05% per day. The maximum amount of liquidated damages for the whole of the Works is 10% of the final Contract Price.  
For milestone 1  Rs.50 / Rs 100000 of uncompleted work per day or 0.05% / day  
For milestone 2  Rs. 50 / Rs 100000 of uncompleted work per day  
For milestone 3  Rs. 50 / Rs 100000 of uncompleted work per day  
For milestone 4  Rs. 50 / Rs 100000 of uncompleted work per day  
For milestone 5  Rs. 50 / Rs 100000 of uncompleted work per day  

All works  Rs. 50 / Rs 100000 of uncompleted work per day i.e., 0.05 % per day. |
The amount of the advance payment are:

<table>
<thead>
<tr>
<th>Nature of Advance</th>
<th>Amount (Rs.)</th>
<th>Conditions to be fulfilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mobilization</td>
<td>5% of the Contract price</td>
<td>On submission of unconditional Bank Guarantee. <em>(to be drawn before end of 20% of Contract period)</em></td>
</tr>
<tr>
<td>2. Equipment</td>
<td>90% for new and 50% of depreciated value for old equipment. Total amount will be subject to a maximum of 5% of the Contract price.</td>
<td>After equipment is brought to site as per agreed construction program <em>(provided the Project Manager is satisfied that the equipment is required for performance of the contract)</em> and on submission of unconditional Bank Guarantee for amount of advance.</td>
</tr>
</tbody>
</table>
| 3. Secured advance for non-perishable materials brought to site - Pipes | 75% of Invoice value or 75% of Department Estimate value –lower of the two. | a) The materials are in-accordance with the specification for Works;  
b) Such materials have been delivered to site, and are properly stored and protected against damage or deterioration to the satisfaction of the Project Manager;  
c) the Contractor’s records of the requirements, orders, receipt and use of materials are kept in a form approved by the Project Manager and such records shall be available for inspection by the Project Manager;  
d) The contractor has submitted with his |
monthly statement the estimated value of the materials on site together with such documents as may be required by the Project Manager for the purpose of valuation for material and providing evidence of ownership and payment thereof;

e) Ownership of such materials shall be deemed to vest in the Employer for which the Contractor has submitted an Indemnity Bond in an acceptable format; and

f) The quantity of materials are not excessive and shall be used within a reasonable time as determined by the Project Manager.

The advance payment shall be limited to material required for next three months only.

(The advance payment will be paid to the Contractor no later than 15 days after fulfillment of the above conditions).

Repayment of advance payment for mobilization and equipment:

The advance shall be repaid with percentage deductions from the interim payments certified by the Engineer under the Contract. Deductions shall commence in the next Interim Payment Certificate following that in which the total of all such payments to the contractor has reached not less than 15 percent of the Contract Price or 4 months form the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 4 percent of the amounts of all Interim Payment Certificates until such time as the advance has been repaid, always provided that the advance shall be completely repaid prior to the expiry of the original time for completion.

Repayment of secured advance:

The advance shall be repaid from each succeeding monthly payments to the extent materials [for which advance was previously paid pursuant to Clause 51.4 of G.C.C. and 51(3) of S.C.C.] have been incorporated into the Works.
The Performance Security for 5 percent of contract price plus additional security for unbalanced bids [in terms of ITB Clause 30.6]

The standard form of Performance Security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section X of the Bidding Documents.

E. Finishing the Contract

GCC 58.1

* The date by which operating and maintenance manuals are required is within 28 days of issue of certificate of completion of work.

* The date by which “as-built” drawings in 2 sets are required is within 28 days of issue of certificate of completion of work.

GCC 58.2

The amount to be withheld for failing to produce “as built” drawings and/or operating and maintenance manuals *by the date required in G.C.C. 58.1 is Rs.20000/-

GCC 59.2 (g)

The maximum number of days is: 200

GCC 61.1

The percentage to apply to the value of the work not completed, representing the Employer’s additional cost for completing the Works, is 20%.

F. Payment Breakup for Electro-Mechanical Equipment

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>On Supply</td>
<td>80%</td>
</tr>
<tr>
<td>On Erection</td>
<td>10%</td>
</tr>
<tr>
<td>On Commissioning</td>
<td>10%</td>
</tr>
</tbody>
</table>
Appendices
### Salient Features of Labour Laws

**SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK**  
(The law as current on the date of bid opening will apply)

| Labour Laws | (a) **Workman Compensation Act 1923**: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.  
(b) **Payment of Gratuity Act 1972**: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.  
(c) **Employees P.F. and Miscellaneous Provision Act 1952 (since amended)**: The act provides for monthly contribution by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:  
(i) Pension or family pension on retirement or death, as the case may be.  
(ii) Deposit linked insurance on the death in harness of the worker.  
(iii) Payment of P.F. accumulation on retirement/death etc.  
(d) **Maternity Benefit Act 1951**: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.  
(e) **Contract Labour (Regulation & Abolition) Act 1970**: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.  
(f) **Minimum Wage Act 1948**: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a schedule employment. Construction of Buildings, Roads, Runways are schedule employments.  
(g) **Payment of Wages Act 1936**: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.  
(h) **Equal Remuneration Act 1979**: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not |
making discrimination against Female employees in the matters of transfers, training and promotions etc.

(i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

(j) Industrial Disputes Act 1947: the Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations, a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(k) Industrial Employment (Standing Order) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

(l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.


(n) Inter-State Migrant Workmen’s (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and bank etc.
The Building and Other Construction works (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employ 10 or more workers and covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

Factories Act 1948: the Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

**SALIENT FEATURES OF SOME OF THE MAJOR LAWS THAT ARE APPLICABLE FOR PROTECTION OF ENVIRONMENT**

### Laws on protection of Environment

Add the following as GCC Clause 16.2:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or the causes arising as a consequence of his method of operation.

During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, byelaw, regulation that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

1. **The Water (Prevention and Control of Pollution) Act, 1974,** This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. ‘Pollution’ means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or
other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

2. The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. ‘Air Pollution’ means the presence in the atmosphere of any ‘air pollutant’, which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

3. The Environment(Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. ‘Environment’ includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

4. The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.


Cutting of trees in non-forest land, irrespective of land ownership, also requires permission from the State Forest Department. Afforestation to the extent of two trees per each tree felled is mandatory.

6. Andhra Pradesh Water, Land And Trees Act, 2002

The Act came into force on July 1, 2002 with an objective of promoting waste conservation and tree cover and regulating the
exploitation and use of ground and surface water for protection and conservation of water sources, land and environment and matters connected therewith. 'Preservation of trees' includes planting of new trees and transplanting trees to other sites including protection measures such as fence tree guards etc. 'To fell a tree' includes burning, cutting, debarking, girdling and release of harmful chemical and such other potations, which may damage any part of the tree guards etc.


Under the Act,

“Polluter Charges” means levy of Prescribed charges by the Infrastructure Authority on any Developer, if any Developer pollutes the environment or does not adhere to the specifications and measures for environment preservation & conservation agreed under the contract with the Government or the Government Agency or the Local Authority or fails to stop polluting the environment within 30 days of receipt of notice inwriting from the Infrastructure Authority or the Government Agency or the Local Authority.
Appendix 2

Tables of Adjustment Data (Cl. 47 of GCC)  (NOT APPLICABLE)

Table 1: Coefficients governing the adjustment for changes in cost.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Coefficients Name</th>
<th>Symbol</th>
<th>Schedules (Reference Number)</th>
<th>[Description of each schedule is given below]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fixed</td>
<td>a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Labour [L]</td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Steel [S]</td>
<td>c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Cement [C]</td>
<td>d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Plant &amp; Equipment spares [E]</td>
<td>e</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Diesel and Petroleum products [D]</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Bitumen [B]</td>
<td>g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Others [O]</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Total % 100 100 100 100 100 100 100 100 100]

[Fixed element is 15%]

BOQ SCHEDULES

[The following Schedules are for example only. The schedules may be modified and specified as appropriate for each work]

Schedule 1: Earth Work In Formation
Schedule 2: Civil Engineering Work (Bridge)
Schedule 3: Civil Engineering Work Building,
Schedule 4: Steel Fabrication Works
Schedule 5: Road Works – WBM
Schedule 6: Road BTM
Schedule 7:

Table 2: Reference to Cost Indices or Costs (applicable for specific items) For Adjustment For Changes In Cost.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Cost Element</th>
<th>Symbol</th>
<th>Indices or Cost on the Base Date</th>
<th>Index for adjustment</th>
<th>Sources of Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fixed</td>
<td>F</td>
<td>L₀ - all India average Consumer Price Index (CPI) Number for L₀-CPI for the month for which the IPC is related</td>
<td>Labour Bureau, Ministry of Labour, Government of India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industrial Workers for centre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>-------------------------------</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Steel</td>
<td>c  $S_n$ – Whole-sale Price Index (WPI) for Steel [Bars &amp; Rods]</td>
<td>$S_n$-WPI for the month which is two months prior to the month to which IPC is related</td>
<td>Economic Advisor, Ministry of Industry, Government of India.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Cement</td>
<td>d  $C_n$-WPI for Cement</td>
<td>$C_n$-WPI for the month which the cement is brought to site(^{20}) or one month prior to the month to which IPC is related, whichever is less</td>
<td>Economic Advisor, Ministry of Industry, Government of India</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Plant &amp; Equipment spares</td>
<td>e  $E_n$-WPI (1993-94)=100 for “Heavy machinery parts”</td>
<td>$E_n$ – WPI for the month which IPC is related</td>
<td>Economic Advisor, Ministry of Industry, Government of India</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Diesel(^{21})</td>
<td>f  Do-Unit Cost from the identified depot on the base date</td>
<td>Dn-Unit Cost for on the first day of the month to which the IPC relates</td>
<td>From the Visakhapatnam Depot</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Bitumen(^{22})</td>
<td>g  Bo-Unit Cost from the identified refinery on the base date</td>
<td>Bn- Cost per unit quantity on the first day of the month in which the material is brought to site or two months prior to the date to which IPC is related</td>
<td>From Visakhapatnam Refinery</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Others</td>
<td>h  Oo-Wholesale Price Index(WPI) for all commodities</td>
<td>On- For WPI for the month to which IPC is related</td>
<td>Economic Advisor, Ministry of Industry, Government of India</td>
<td></td>
</tr>
</tbody>
</table>

IPC – Interim Payment Certificate

---

\(^{20}\) May be related to the secured advance in the respective month.

\(^{21}\) The SCC specifies the identified depot for the rate of diesel for the base date and the applicable date for price adjustment.

\(^{22}\) The SCC specifies the identified refinery for the rate of Bitumen for the base date and the applicable date price adjustment.
Appendix -3

Appointment of Adjudicator

Suggested Draft of Letter of Appointment of Adjudicators in civil works contracts

Sub:_______________________________________________(Name of the Contract)

To

Name and address of the Adjudicator

We hereby confirm your appointment as adjudicator for the above contract to carry out the assignment specified in this Letter of Appointment.

For administrative purpose____________________(name of the officer representing the employer) has been assigned to administer the assignment and to provide the Adjudicator with all relevant information needed to carry out the assignment on behalf of both the employer and the contractor. The services will be required during the period of contract for the work of (Name of the Contract)_______________________.

The Adjudicator shall visit the worksite once in 3 (three) months till the completion of the work indicated above or as specifically requested by employer/contractor for the period upto the end of defects liability period with prior intimation to both the employer and the contractor. The duration of each visit shall ordinarily be for one day only. These durations are approximate and (Name of the employer and Name of the Contractor) may find it necessary to postpone or cancel the assignment and/or shorten or extend the duration.

The appointment will become effective upon confirmation of letter by you. The appointment of Adjudicator shall be liable for termination under a 30 (thirty) days written notice from the date of issue of the notice, if both Employer and Contractor so desire. Also the appointment shall automatically stand terminated 14 days after the defect notice/correction period as stated in Clauses 35 and 36 of the Conditions of Contract is over.

The Adjudicator will be paid a fee of Rs.5000./_(Rupees FIVE THOUSAND only) per each day of visit at the worksite. The actual expenses for boarding and traveling in connection with the assignment will be reimbursed to the Adjudicator. The Adjudicator will submit a pre-receipted bill in triplicate to the employer indicating the date of the visit, fees for the visit and a proof in support of the actual expenditure incurred by him against boarding, lodging and traveling expenses after performing the visit on each occasion. The Employer will make the admissible payment(both the Employer’s and the Contractor’s share) to the Adjudicator within 30 days of the receipt of the bill. The Contractor’s share on this account(half the paid amount) will be recovered by the Employer from the Contractor’s bills against the work.

In accepting this assignment, the Adjudicator should understand and agree that he is responsible for any liabilities and costs arising out of risks associated with travel to an from the place of emergency repatriation, loss or damage to personal/professional effects and property. The Adjudicator is advised to effect personal insurance cover in respect of such risks if he does not already have such cover in place. In this regard, the Adjudicator shall maintain appropriate medical, travel, accident and third-party liability insurance. The obligation under this paragraph will survive till termination of this appointment.
Procedures for resolution of disputes by the Adjudicator is described in the contract of (name of the contract) between the employer and the contractor vide clauses no.24, 25 and 26 of the Conditions of Contract. Your recommendation should be given in the format attached, within 28 days of receipt of a notification of dispute.

The Adjudicator will carry out the assignment in accordance with the highest standard of professional and ethical competence and integrity, having due regard to the nature and purpose of the assignment, and will conduct himself in a manner consistent herewith. After visiting the worksite, the Adjudicator will discuss the matter with the Employer and if necessary with the Contractor before arriving at any decision.

The Adjudicator will agree that all knowledge and information not within the public domain, which may be acquired while carrying out this service shall be all time and for all purpose, regarded as strictly confidential and held in confidence, and shall not be directly or indirectly disclosed to any party whatsoever, except with the permission of the employer and the contractor. The Adjudicator’s decision should be communicated in the form of a speaking order specifying the reasons.

The Adjudicator will agree that any manufacturing or construction firm with which he might be associated with, will not be eligible to participate in bidding for any goods or works resulting from or associated with the project of which this consulting assignment forms a part.

Read and Agreed Name of Adjudicator

Signature

Place:

Date:

Name of Employer
Signature of authorized representative of Employer

Name of the Contractor
Signature of authorized representative of Contractor

Attachment: Copy of contract document between the employer and contractor and format for recommendation.
SUMMARY OF AJUDICATOR’S RESPONSIBILITIES

The Adjudicator has the following principal responsibilities:

1. Visit the site periodically.

2. Keep abreast of job activities and developments.

3. Encourage the resolution of disputes by the parties.

4. When a dispute is referred to it, conduct a hearing (no legal presentation), complete its deliberations, and prepare a recommendations in a professional and timely manner (as per sample format).
Sample Format of Adjudicator’s Recommendation

[Project Name]
Recommendation of Adjudicator

Dispute No. XX [NAME OF DISPUTE]  Hearing Date:____________

Dispute

Description of dispute. A one or two sentence summation of the dispute.

Contractor’s Position

A short summation of the contractor’s position as understood by the Adjudicator.

Employer’s Position

A short summation of the Employer’s position as understood by the Adjudicator.

Recommendation

The Adjudicator’s specific recommendation for settlement of the dispute. (The recommended course is consistent with the explanation).

Explanation

(This section could also be called Considerations, Rationale, Findings, Discussion, and so on.)

The Adjudicator’s description of how each recommendation was reached.

Respectfully submitted,

Date : _______________________ ____________________

Date : _______________________ ____________________

Date : _______________________ ____________________

Date : _______________________ ____________________
SECTION-VII

Works Requirements & Specifications
Scope of Work:

Providing comprehensive Water Supply Scheme to Vijayanagaram Municipality - Construction of 500 KL ELSR at Phoolbaugh covering Construction of ELSR etc.

The works consists of:

- Construction of 500KL ELSR.

MILESTONES:

<table>
<thead>
<tr>
<th>Milestone No:</th>
<th>Physical works to be completed</th>
<th>Period from the date of issue of Work order / notice to proceed with the work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milestone 1</td>
<td>Mobilisation of men, material, equipment, Detailed Designs, drawings for all units under Package II(a)(i).</td>
<td>2 months</td>
</tr>
<tr>
<td>Milestone 2</td>
<td>Construction of 500KL ELSR. - 50%</td>
<td>6 months</td>
</tr>
<tr>
<td>Milestone 3</td>
<td>Construction of 500KL ELSR. - 80%</td>
<td>9 months</td>
</tr>
<tr>
<td>Milestone 4</td>
<td>Construction of 500KL ELSR. - 100%</td>
<td>12 months</td>
</tr>
</tbody>
</table>
**Proposed sites**

All the sites are within the Municipal Boundary.

**Other requirements:**

The bidders shall arrange approval from the Chief Electrical Inspector for the operation of the electrical installation.

**Testing of Pipes and Equipment:**

All the pipes and equipment’s have to be tested both at factory and at site as per relevant Indian Standards.

The testing shall be witnessed by the Departmental Engineers.

**Site conditions for Execution of works:**

The bidder has to check all survey data including levels, designs and carryout soil investigation works before execution. No additional payment for carrying out these works and modifications therein even at the time of execution will be made.
SPECIFICATIONS
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Section</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VII A</td>
<td>General Specification of Workmanship and Materials for Civil Work</td>
</tr>
<tr>
<td></td>
<td>Division 1</td>
<td>General Specifications</td>
</tr>
<tr>
<td></td>
<td>Division 2</td>
<td>Site Work</td>
</tr>
<tr>
<td></td>
<td>Division 3</td>
<td>Earth Work</td>
</tr>
<tr>
<td></td>
<td>Division 4</td>
<td>Masonry</td>
</tr>
<tr>
<td></td>
<td>Division 5</td>
<td>Plastering &amp; Pointing</td>
</tr>
<tr>
<td></td>
<td>Division 6</td>
<td>Concrete</td>
</tr>
<tr>
<td>2</td>
<td>VII B</td>
<td>Technical Specification for Civil Works</td>
</tr>
<tr>
<td>3</td>
<td>VII C</td>
<td>Technical Specification for equipment</td>
</tr>
<tr>
<td>4</td>
<td>VII D</td>
<td>Pumping Machinery</td>
</tr>
<tr>
<td>5</td>
<td>VII E</td>
<td>General conditions for Erection &amp; Commissioning</td>
</tr>
<tr>
<td>6</td>
<td>VII F</td>
<td>Environmental Management Plan.</td>
</tr>
</tbody>
</table>
SECTION- VII A

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.

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 opinion 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 shall 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 Leveling

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.

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 Primary Grid of any other source
thereof and continue to do so during construction and afterwards 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. The pumped water should be drained out in such a manner so that it doesn't create any inconvenience to others.

1.8 Rubbish

1.8.1 The Contractor shall clear all rubbish, vegetation, roots, soda etc., and dump them 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 water gauges, zero 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, skillful 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.

<table>
<thead>
<tr>
<th>General IS</th>
<th>Code No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>IS:1200</td>
<td>Method of measurement of Civil Engineering works.</td>
</tr>
<tr>
<td>Sand</td>
<td>IS:1242</td>
<td>Sand for Plaster</td>
</tr>
<tr>
<td>Aggregates</td>
<td>IS:383</td>
<td>Aggregates-Coarse and fine, from Natural source for Concrete.</td>
</tr>
<tr>
<td></td>
<td>IS:515</td>
<td>Aggregates for use in mass concrete, natural and manufactured.</td>
</tr>
<tr>
<td>Concrete-Plain</td>
<td>IS:456</td>
<td>Code of Practice for Plain and Reinforced Concrete for General Building</td>
</tr>
</tbody>
</table>
2. Earth Work in Excavation & Fillings

2.1 General

Applicable provisions of Earth work in excavation & fillings 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 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 bailing out water collecting in excavation due to rains, ordinary springs, leakage from existing primary grid etc., or any other reason.

2.2.7 For the work of excavation the Tenderer shall include in his quotation the shoring, sheeting, bracing and sheet piling (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. are to be provided to make the shoring rigid and non-yielding by earth pressure. Where necessary, sheet piling 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 up to the finished G.I. Filling shall be done in 200mm layers, each layer to be properly 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.

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 authorized 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 informing 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 or practically set shall not be used under any circumstances.

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 in 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.

With very narrow space : 12 mm.

Elsewhere:

Reinforced Concrete : 20 mm
Plain concrete : 20 mm.
Thin RCC Members 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 before taking up the work.

3.4.2 The mild steel reinforcement shall conform to IS: 432 & the tor-steel reinforcement shall conform to IS: 1788.

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 rods 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.

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.

3.4.5 Welding of reinforcement shall be done according to the IS specifications where binding wire will not be sufficient without any extra payment to the Contractor.

3.5 Water

The Water shall be clean and free from acid, 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 analyzed 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 25 mm or the diameter of the bar whichever is greater. 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 work ability shall be measured by slump. Slump for different grades of concrete shall not exceed following unless specifically permitted by the Engineer-in-Charge.
   i) For M 15 concrete – 3.75 cm.
   ii) For M 20 concrete – 2.50 cm.
   ii) For M 30 concrete – 2.50 cm.

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

All liquid retaining structures including underground reservoir, and different units of water treatment plant like inlet chambers, flocculator, clarifier, filter etc. shall be deemed to be satisfactory water tightness test as per relevant clause of IS:3370. Approved corrective measures, if necessary, shall be undertaken by the Contractor at his own expenses. This water tightness test is mandatory for all type of water retaining structure and no security deposit shall be released without satisfactory water tightness test results.

As regards the pipe lines, the tests shall be performed for the Hydrostatic Pressure of 10 Kg./Sq. cm in case of Mild Steel and 2 Kg./Sq. cm. for P.S.C./R.C.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 and IS:3370. It should, however, be noted that for every 15 Cum of concrete placed or for every one day’s volume of concrete whichever is lower, a minimum of 3 (three) Cubes shall be cast for test purpose, and tested at the Contractor’s cost and expenses at a Laboratory as approved by the Authority. The number of test cubes may, however, be altered at discretion of the Engineer-in-Charge. It is compulsory to test 3 (three) cubes in each case.

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.

Design mix Concrete shall be used in Reinforced Concrete Structures and shall be in Grade M20 or
richer.

The mix shall be designed 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:

<table>
<thead>
<tr>
<th>Grade of Concrete</th>
<th>Cement Content per cum of finished concrete (Kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 15</td>
<td>310</td>
</tr>
<tr>
<td>M 20</td>
<td>330</td>
</tr>
<tr>
<td>M 25</td>
<td>400</td>
</tr>
<tr>
<td>M30</td>
<td>600</td>
</tr>
</tbody>
</table>

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 equipment 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 rest 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 from 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 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.

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, centering, 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 long and grooved or the joints must be perfectly close and lined with draft paper polythene 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 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 truck 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 there from 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 carborandum 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 sections 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 shape 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°C 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: 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.

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>1.1 to 1.15</td>
</tr>
<tr>
<td>Shore hardness</td>
<td>65 A to 75 A</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>250 to 300 Kg/Cm²</td>
</tr>
<tr>
<td>Maximum safe continuous temperature</td>
<td>75°C</td>
</tr>
<tr>
<td>Ultimate elongation</td>
<td>Not less than 350%</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>Not more than 350% by weight in a 7 day test.</td>
</tr>
</tbody>
</table>

3.17 (omitted)

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.

4. 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. All brickworks, unless otherwise specifically mentioned, should be of 1st Class brick of approved quality.

4.3 Unless otherwise specified, the proportions of cement-sand mortar for various classes of load tests shall be carried out in accordance with IS:456, if required brick work shall be as given below:

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Cement : Sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Ordinary brick work with Thickness 250 mm.</td>
<td>1 : 6</td>
</tr>
<tr>
<td>above for building superstructure</td>
<td></td>
</tr>
<tr>
<td>b) Brickwork in pillars and foundation</td>
<td>1 : 4</td>
</tr>
<tr>
<td>c) Half brick or brick-on-edge portion wall</td>
<td>1 : 4</td>
</tr>
<tr>
<td>with H.B. netting in every alternative 3rd layer</td>
<td></td>
</tr>
<tr>
<td>d) Brickwork in water retaining structures</td>
<td>1 : 3</td>
</tr>
</tbody>
</table>

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.

4.7 Before supplying the bricks, quality and grade of the bricks must be approved by the Engineer on the representative sample.

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. Except underground reservoir and unless otherwise specified by the Engineer, cement plaster shall be applied on all inner and outer surfaces except floors of all structures.

5.1.2 The rate shall also include for forming of any moulding drip course etc., and for extra thickness due to corbelling of brickwork 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 brickwork 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. All 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 shall be 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 sub base, 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 Cum 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 WhiteWash means one continues 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 Snowcem or Similar Decorative Cement Finish

6.3.1 Whether specified or unspecified, all external surface shall be finished with two coats of 'Snowcem' or similar decorative weather-proof "Weather coat" 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 'Snowcem' or equivalent to be mixed will be strictly as per manufacturer's specification. The mixed 'Snowcem' 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 'Snowcem' or equivalent application shall be wetted at the end of the day with a fine water spray. For the external surfaces of the Pump House, Chemical House, Annexe Building, the quality and colour scheme shall be as per direction of the E.I.C.

6.3.2 Plastic (Acrylic) Emulsion Paint: All internal surfaces of the Control Rooms of the Pump House, Control Rooms of the Filter House and Annexe Building, Laboratory shall get plastic (acrylic) emulsion paint. On the plastered surfaces a cement priming coat is required before application of plastic emulsion. Plastic emulsion paint of approved brand and manufacturer and of the required shade shall be used. The paint will be applied in the usual manner with brush and roller. The paint dries by evaporation of the water content and as soon as the water has evaporated the films gets hard and the next coat be applied. The time for drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces. The thinning of emulsion is to be done with water and not with turpentine. Thinning with water will be particularly required for the undercoat which is applied on the absorbent surface. The quantity of thinner to be added shall be as per manufacturer's instruction. The surface on finishing shall present a flat, velvety, smooth finish. If necessary more coats shall be applied till the surface present a uniform appearance.

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 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, de-rusted, 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.
6.5 Painting to Internal Walls

Whether or not specified, entire internal surfaces of Pump House, Filter House, Chemical House (except alum godown) and Annexe Building (except mentioned in Clause 6.3.2, ) shall be given two coats of washable synthetic ready-mix wall paint of approved make, colour and shade on a coat of approved primer. The surfaces are to be prepared and both primer and paint are to be applied as per manufacturer's specification. Painting works shall be carried out only by trained hands in order to achieve a high grade finish to the entire satisfaction of the Engineer.

7. Damp Proofing 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% approved waterproofing 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 roods, whether accessible or inaccessible, shall provide with polyurethane based water proofing paint. Specification for Roof Water Proof Treatment with Polyurethane based Water Proof Paint:

8.2 Preparations 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). Necessary Test Certificate of CBRI/NCL/CSIR/National House etc. are to be furnished by the contractor to the Department, for the materials procured for the water proofing work.

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. The application to be made by technically trained and approved applicators duly certified by the manufacturers.

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.

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.

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 M15 grade concrete and allowed to dry. Then the second layer of 25mm. thick flooring of M15 grade concrete with 10mm. to 6mm. stone chips using at least 1Kg/Sqm of floor hardening compound of approved quality and make shall be laid and cured. The flooring shall be laid in rectangular panel sit diagonal length not exceeding 3.0 Meters. All floors with pump and motors, chlorinator and chlorine drums, pipeline higher than 300 mm diameter, electrical panel board, blowers, alum/coagulant storage room, unloading bay, stack yards for pump and motors shall be of this type of flooring.

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, 2 Sand, 4 washed Stone Chips 19mm. down) with metal lath wrapping or with M.S. loops placed at approximately 325mm. centers 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 metal casements he intends to use for approved of the Engineer-in-Charge. The workmanship shall be of high quality and shall be upto 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 IS: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 filled universal casement section being double weathered at all points to ensure water tightness and budded in mastic and screwed to the sashes.

10.2.5 The fitting shall be of heavy pattern bronze oxidized 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 center, hung windows shall have spring catch designed for hand cord or pole operation as approved by the Engineer-in-Charge. The fitting 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 Galvanized weather bars shall be provided to sills of all windows.
10.2.7 Mental casement are on no account to build 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, 6mm. thick wire 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 glazed with slight margin of about 1.50 mm. 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 'Folo 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 rung 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, degusted, de-scaled and 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 dimension 100 mm x 750 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.

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/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.

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 have also to be kept for pockets and holding down bolts as per requirement of the electrical and mechanical equipment 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 shall be of standard 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 standard make heavy quality conforming to relevant IS Code. Wheel valves and stop cocks shall be of gun metal and of standard 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. (Commode) have to be provided in the toilet block.

17. Manhole Covers

Heavy duty plastic fiber reinforced concrete manhole covers shall be of heavy duty type conforming to IS:1726.

18. Mechanical Overhead Crane

Suitable type of rails, girders and all other accessories as necessary for installation and operation of the chain pulley block are to be designed and provided by the contractor within the price quoted.
Suitable vertical clearance is to be provided over the rail level to the bottom of the roof beam.

There shall be 3.0 MT capacity Mechanical chain pulley block covering maximum horizontal and vertical length including operating/maintenance platform and unloading bay.

19. C.I. Sluice Valve

C.I. Sluice Valve conforming to IS:14846-2000 suitable for water works purposes and as per requirements of the works.

20. Manhole Cover

Heavy duty plastic fiber 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 dimension 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.

21. M.S. Ladder

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.

22. Rung Ladder

Wherever 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.

23. Lightning Arrestor

Required sets of Lightning Arrestor shall be provided by the tenderer at the highest point of the Pump House Building, Annex building, Filter house, Chemical house 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 earthing and individual earthing with approved size of air-terminals, earth electrodes, earthing strips as per IE rules/IS codes. Detail Calculations to be vetted by the department in the final design.

24. Motor Floor and Control Room

There must not be any column in the motor floor for easy movement of the 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 for cable etc. The motor floor shall be suitably designed to take care of the vibration generated from the motor pump assembly while in operation.

25. 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.

26. Guarantee Period

The Contractor shall stand guarantee for the successful operation of all the civil, mechanical, electrical, electronic components and structures including all types of pipelines and road works during defect liability period 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 plant at least once every month and arrange for immediate rectification of any defects detected during this special checking by his experts.

27. Guarantees

The Contractor shall give the following guarantees:

27.1 Civil and Structural Works The Contractor shall guarantee the plant against any structural failure due to faulty design, bad workmanship, substandard materials, etc. for defect liability period. Any defect found during the guarantee period shall be rectified by the Contractor to the satisfaction of the Engineer without any extra cost.
27.2 Plant and Equipment

Even when a plant or equipment has been manufactured and / or marketed by a vendor, it would be deemed to have been supplied and installed under the contractors 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 absolvent. 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.

28. Important Guidelines and Specifications

28.1 Unless otherwise specified elsewhere, the work shall be carried out as per the following specifications. Wherever any particular work is not covered in this entire document, the decision of the Engineer regarding the specification of the same shall be deemed final and binding on the Contractor.

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

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

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

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

28.6 All Roofs shall be provided with water proof polyurethane paint,

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

28.8 All windows and ventilators/skylights shall be provided with mild steel grills of approved design.
DIVISION – 1

GENERAL SPECIFICATIONS

A. CIVIL WORKS

The I.S. Codes shall be those indicated or subsequent amendments thereon

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<td>7</td>
<td>Cast iron fittings for pressure pipes for water,</td>
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<td>1976</td>
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<td>8</td>
<td>Cast iron detachable joints for use with Asbestos</td>
<td>8794</td>
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<td>9</td>
<td>Rubber rings for jointing C.I. Pipes, RCC Pipes</td>
<td>5382</td>
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<td>1969</td>
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<td>10</td>
<td>Bolts &amp; Nuts to be used in jointing C.I.D.F. Pipes</td>
<td>1363</td>
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<td></td>
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<td>1967</td>
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<td></td>
<td><strong>VIII. WATER SUPPLY FITTINGS</strong></td>
<td></td>
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</tbody>
</table>

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140
Sl. No. Description I.S. No

1. Sluice valves for water works purposes (50 to 300 mm dia size) 14846-2000

2. D.I. D/F Gate Valve 3896 (pt.2) - 1985

3. Surface boxes for sluice valves. 3950 – 1966


IX. LAYING OF PIPES

1. Laying of Asbestos Cement Pressures Pipes 6530 – 1972

2. Laying of MDPE Pipes 7634 (Pt. II) – 1975

3. Laying of Cast-Iron Pipes. 3114 – 1965

4. Laying of D.I. Pipes 3114 – 1965

(i) X. MACHINERY

1. Batch type concrete mixer. 1791 – 1968

2. Sheep foot roller 4616 – 1968

XI. SAFETY

1. Safety code for excavation works. 3764 – 1966

2. Safety Code for scaffolds and ladders

Part – I – Scaffolds. 3696 – 1966

(Part – I)
Part – II – Ladders. 3696 – 1966

(Part – I)
DIVISION-2

SITE WORK

2.1 Intimation about commencement of work

Before commencing the works and also during progress the bidder shall give due notice to the concerned authorities, the Municipality, the Roads and Buildings and Electricity Board, Telephone Department, the Traffic Department attached to the Police, other Departments and companies as may be required to the effect that the work is being taken up in a particular locality and that necessary diversion of traffic may be arranged for. The bidder shall cooperate with the Departments concerned and provide for necessary barricading of roads, protections to existing underground mains, cables etc.

2.2 Cross Drainage

The bidder shall handle all flows from natural drainage channels intercepted by the work under these specifications, perform any additional excavation and grading for drainage as directed and maintain any temporary construction required to bypass or otherwise cause the flows to be harmless to the work and property. When the temporary construction is no longer needed and prior to acceptance of the work, the bidder shall remove the temporary construction and restore the site to its original condition as approved by the Engineer-in-Charge. The cost of all work and materials required by this paragraph shall be included by the bidder in the unit prices quoted in the section 6 of Vol. III (bill of quantities) and no separate payment will be made for the same.

2.3 Stacking of Excavated Material

Where the location of the work is such and does not permit the deposition of excavated earth while digging trenches for laying pipes, the excavated earth should be conveyed to a convenient place and deposited there temporarily, as directed by the Engineer-in-Charge. Such deposited earth shall be reconvened to the site of work for the purpose of refilling of trenches, if such deposited soil is suitable for refilling. The unit rate for trench work of excavation and refilling shall include the cost of such operations.
2.4 Disposal of Surplus Earth

The rate for excavation of trench work, shall include charges of shoring, strutting, any of these contingent works. While bailing out water care should be taken to see that the bailed out water is properly channelized to flow away without stagnation or inundating the adjoining road surfaces and properties.

2.5 Shoring, Strutting and Bailing out Water

The rate for excavation of trench work shall include charges of shoring, strutting, bailing out water wherever necessary and no extra payment will be made for any of these contingent works. While bailing out water care should be taken to see that the bailed out water is properly channelized to flow away without stagnation or inundating the adjoining road surfaces and properties.
3.1 Earth Work - General

3.1.1 Earth work diagrams and Data

To the extent that they exist plans and earth work data prepared for the Government’s (that is Government of Andhra Pradesh) studies of earth work for construction of the related works will be available for Inspection by the bidders in the Office of the concerned Engineer-in-Charge.

Such information is made available solely for the convenience of bidders. The Government does not represent that this information is accurate or complete. Bidders are cautioned that this information is subject to revision and that the Government disclaims responsibility for any interpretations, deductions or conclusions which may be made there from. It is not intended that this earth work information will limit or prescribe the excavation and handling procedure of the contractor, and the Government reserves the right to utilize and distribute earth work materials during the progress of work as best serves the interest of the Government.

3.1.2 Compacting Earth Materials

Where compacting of earth materials is required, the materials shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing, moistening and compacting operations shall be such that the materials will be uniformly compacted throughout the required section and will be homogeneous, free from lenses, pockets, streaks, voids, lamination or other imperfections. The compaction shall be carried out in accordance with the relevant clauses of I.S 4701 – 1982.

Excavation

(a) Classification of Excavation

Except as other-wise provided in these specifications, material excavated will be measured in excavation to the lines shown on the drawings or as provided in these specification, and all materials so required to be excavated will be paid for at the applicable prices bid in the schedule for excavation. No additional allowance above the price bid in the schedule will be made on account of any of the material being wet. Bidders and the contractors must assume
all responsibility for deducting and concluding as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavation. The Government does not represent that the excavation can be performed or maintained at the paylines described in these specifications or shown on the drawings.

Excavation for removal of debris and deposited earth on berms while forming roads is to be carried out as specified in relevant clauses of 154701-1982 as compared before lying of berms with the same setting of roads.

(b) **Excavation for Structures**

**General**

Excavation for the foundation of structures shall be to the elevation shown on the drawings or as directed by the Engineer-in-Charge. In so far as practicable, the material removed in excavation for structures shall be used for back fill and embankments. Otherwise it shall be disposed off as specified in paragraph 2.4.

**Foundations for Structures**

The Contractor shall prepare the foundations at structure/sites by methods which will provide firm foundation for the structures. The bottom and side slopes of common excavation upon or against which the structure is to be placed shall be finished to the prescribed dimensions and the surfaces so prepared shall be moistened and tamped with suitable tools to form firm foundation upon or against which to place the structure. The Contractor shall prepare the foundation for the structures as shown on respective drawings. The natural foundation material beneath, the required excavation shall be moistened if required and compacted in place.

Separate payment will not be made to the contractor for moistening and compacting the foundation of structures. The contractor shall include cost thereof in the price bid per cubic meter of the item of the Bill of quantities for preparation of foundations.

Whenever unsuitable material is encountered in the foundation for a structure the Engineer-in-Charge will direct additional excavation to remove the unsuitable material. The cost of such additional excavation shall be paid at the unit price bid in the Bill of quantities for earth. The additional excavation shall be refilled by selected bedding material and compacted.
(c) **Over Excavation**

If at any point in common excavation the foundation material is excavated beyond the lines required to receive the structure, or if at any point in common excavation the natural foundation material is disturbed or loosened during the excavation process, it shall be compacted in place or where directed, it shall be removed and replaced as follows. In excavation soils, the over excavation shall be filled in by selected bedding material and compacted. In excavation in rock it shall be filled with M5 grade cement concrete. Any and all excess excavation or over excavation performed by the Contractor for any purpose or reason except for additional excavation as may be prescribed by the Engineer-in-Charge and whether or not due to the fault of the contractor shall be at the expense of the contractor. Filling for such excess excavation or over excavation shall be at the expense of the contractor.

(d) **Measurement for payment**

Excavation for structures will be measured for payment, for box cutting with vertical sides of foundation dimensions. The contractor will have to make his own arrangement for shoring, strutting, provision of adequate slopes for the sides to prevent slips etc., and no separate charge will be paid for any incidental charges arising either during excavation of foundation or construction of the structure.

(e) **Payment**

*Payment for excavation for structures will be made at the unit price per cubic metre bid therefore in the Bill of quantities for excavation for structures. The unit price bid in the bill of quantities for excavation for structures shall include the cost of all labour and materials for coffer dam and other temporary construction, of all pumping and dewatering, of all other work necessary to maintain the excavation in good order during construction, of removing such temporary construction where required and shall include the cost of disposal of the excavated material.*

3.3 **Backfill**

3.3.1 **Back Fill Around Structures:**
(a) **General**

The item of the schedule for backfill around structures including pipe portions of structures includes all backfill required to be placed under these specifications.

(b) **Materials**

The type of material used for backfill, the amount thereof, and the manner of depositing the material shall be subject to approval of Engineer-in-Charge. In so far as practicable backfill material shall be obtained from material removed in required excavations for structures. But when sufficient suitable material is not available from this source, additional material shall be obtained from approved borrow-areas. The borrow pit excavation shall be in accordance with clause-9.1 to 9.3 of I.S 4701-1982.

Backfill material shall contain no stones larger than 80 millimeters in diameter. If the excavation for the foundation of the structure is in swelling soils, a layer of cohesive non-swelling soil conforming to I.S..9451-1980 should be interposed between the swelling soil of the structure and compacted to atleast 95% standard proctors density.

(c) **Placing Backfill**

Backfill shall be placed to the lines and grades shown on the drawings as prescribed in this paragraph or as directed by the Engineer-in-Charge. All backfill shall be placed carefully and spread in uniform layers not exceeding 150 mm, so that all spaces about rocks and clods will be filled. Each layer shall be watered and well compacted before the succeeding layer is laid, care being taken not to disturb the constructed structure. Backfill shall be brought up as uniformly as practicable on both sides of walls and all sides of structure to prevent unequal loading. Backfill shall be placed to about the same elevation on both sides of the pipe positions of the structures to prevent unequal loading and displacement of the pipe.

(d) **Measurement and Payment**

Excavation refill required to be placed about structures that is within the pay line limits for excavation for the structures, will be measured in place for payment as backfill about structure provided that where the contractor elects not to excavate material which is outside the limits of the actual structure or pipe, but within the pay line limits of excavation, all such material will be included in the measurement for payment of backfill.
The unit price bid there for in the Bill of quantities for excavation of foundation of structure shall include cost of backfilling about the structure upto ground level. No separate payment will be made for backfill of foundation.

Refill of excavation performed outside the established paylines for excavation for structures shall be placed in the same manner as specified for the adjacent backfill and such refill shall be placed at the expense of the contractor.
DIVISION-4
MASONRY

4.1 Materials

4.1.1 Brick for Masonry

General

Bricks used for brick masonry shall conform to the relevant specifications of I.S. 1077-1986 common burnt clay building bricks shall be hand or machine moulded. They shall be sound, hard, homogeneous in texture well burnt and shall give a clear ringing sound when struck. They shall be clean, free from warping, distortion, cracks, chips, flaws, stones and nodules of free lime. Unless otherwise specified the sizes of the bricks shall be 190 x 90 x 90 mm. The compressive strength shall not be less than 40 Kg/Cm$^2$. The percentage of water absorption shall not be more than 20 per cent by weight after 24 hours immersion in cold water.

(b) Cost:

The cost of collecting the bricks for masonry will not be paid for separately and their cost including the cost of transporting, stacking, royalty seigniorage charges shall be included in the unit price per cubic metre bid therefore in the relevant item in the bill of quantities.

4.1.2 Sand for Masonry

General

Sand shall generally conform to specifications given in paragraph 6.2.5 except that the sand for mortar shall conform to the grading of sand given in clause 4 of I.S.2116-1189 as detailed below in Table 4(b).

Table 4(b): Grading of Sand for use in Masonry Mortars:

<table>
<thead>
<tr>
<th>I.S. Sieve Designation</th>
<th>Percentage passing by Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75 mm</td>
<td>100</td>
</tr>
<tr>
<td>2.36 mm</td>
<td>90 to 100</td>
</tr>
<tr>
<td>1.18 mm</td>
<td>70 to 100</td>
</tr>
<tr>
<td>600 Micron</td>
<td>40 to 100</td>
</tr>
<tr>
<td>300 Micron</td>
<td>5 to 70</td>
</tr>
<tr>
<td>150 Micron</td>
<td>0 to 15</td>
</tr>
</tbody>
</table>
A sand whose grading falls out-side the specified limits due to excess or deficiency of coarse or fine particles may be processed to comply with the standard by screening through a suitably sized sieve and/or blending with required quantities of suitable size and particles. The procurement of sand for masonry shall confirm to the specifications given in paragraph 6.2.5.

**Cost**

The cost of sand for masonry will not be measured and paid separately and the cost of sand including the cost of stripping, transporting and storing and royalty charges shall be included in the unit price per cubic metre bid therefore in the relevant item of work in the bill of quantities for which this and is required.

### 4.1.3 Cement

**General**

As per clause 4 of I.S. 456-1978 for the purposes of these specifications, cement used shall be any of the following with the prior approval of the Engineer-in-Charge Ordinary Portland (OPC) –

- GRADES 43 & 53 Conforming to BIS : 811 : 12269 respectively (or)
- Portland pozzolana cement conforming to I.S. 1489 relevant amendments up to date.

The provisions of this paragraph apply to cement for use in cast-in-place concrete required under these specifications. Portland cement required for items such as concrete pipes, precast concrete structural members and other precast concrete products, for grout and mortar and for other item is provided for in the applicable paragraphs of these specifications covering the items for which such Portland cement is required.

The water used in making and curing of concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter, injurious amounts of oils, acids, salts, and other impurities etc., as per I.S. specification No.456-1978.

The Engineer-in-Charge will determine whether or not such quantities of impurities are objectionable. Such determination will usually be made by comparison of compressive strength, water requirement, time of set and other properties of concrete made with distilled or very clean water and concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with I.S. 3025-1964 shall be as tabulated below.
Permissible limit for Solids

Maximum permissible limit

1. Organic                  200 mg/litre
2. Inorganic   3000 mg/litre
3. Sulphates (as SO$_4$)  500 mg/litre
4. Chlorides (as CL)  2000 mg/litre for plain concrete work and
       1000 mg/litre for R.C.C. work
5. Suspended matter  2000 mg/litre

If any water to be used in concrete, mortar or grout is suspected by the
Engineer-in-Charge of exceeding the permissible limits of solids, samples of water will be
obtained and tested by the Engineer-in-Charge in accordance with I.S. 3025-1964.

a. Mortar

Preparation of Mortar

Unless otherwise specified, the cement mortar used in Masonry works shall be cement mortar mix
MM5 (1:5) grade using minimum 288 Kg. of cement per cubic metre of mortar.
Mixing shall be done thoroughly preferably in a mechanical mixer. In such cases, the cement and
sand in the specified proportions shall be mixed dry thoroughly in the mixer operated manually or by
power.
Water shall be added gradually and wet mixing continued atleast for 3 minutes. Water should not be
more than that required for bringing the mortar to the required working consistency of 90 to 130
millimetres as required in clause 9.11 of I.S. 2250-1981. The mix shall be clean and free from
injurious kind of soil, acid, alkali, organic matter or deleterious substance

Time of use of Cement Mortar

Cement mortar shall be used as soon as possible after mixing and before it has begun to set, within 30
minutes after the water is added to the dry mixture.
Mortar unused for more than 30 minutes should not be used and shall be removed from the site of
work. The cost of such wasted mortar shall be borne by the bidder. The use of re-tempered mortar
will not be permitted to be used for the masonry.
Tests of Mortar

Mortar Test cubes shall be cast for the mortar used on the work and shall be tested in accordance with Appendix-A of I.S.2250-1965 code of practice for preparation and use of Masonry Mortars. Such cubes shall develop a compressive strength of at least 50 Kg/square centimetre for MM5 (1:5) Grade cement mortar mix, 75 Kg/square centimetre for MM 7.5 (1:4) grade cement mortar mix and 30 Kg/square centimetre for MM-3 grade cement mortar mix.

Mortar not conforming to the specifications will be rejected, and the cost of such wasted mortar shall be borne by the bidder.

Measurement and Payment

Cement Mortar will not be measured and paid separately and its cost, including cost of materials, transporting and placing shall be included in the unit price per cubic metre bid therefore in the bill of quantities of the contractor for the relevant finished item of work or which cement mortar mix mentioned in the above paragraph is required.

4.2.5. Dismantling of Structures

During course of excavation of drainage works certain dismantling of brick masonry / R.R. masonry retaining walls in CM C.C M10 grade leveling course are to be carried out. These have to be carried out as specified under section 202 of A.P.S.S, and as per directions of Engineer-in-Charge and site cleared before facing up actual execution.
DIVISION-5

PLASTERING & POINTING

5.1 Section – Materials

5.1.1 Sand for Mortar for Plastering and Pointing:

(a) General:

The sand for preparation of Mortar for plastering and pointing shall confirm to the following gradation, shown in Table 5(A).

TABLE 5 (A)

Requirements of Grading For Sands for External Plastering and Rendering

<table>
<thead>
<tr>
<th>I.S. SIEVE</th>
<th>Percentage by weight passing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I.S., Sieve</td>
</tr>
<tr>
<td>Designation</td>
<td>Class – A</td>
</tr>
<tr>
<td>4.75 MM</td>
<td>100</td>
</tr>
<tr>
<td>2.36 MM</td>
<td>90 to 100</td>
</tr>
<tr>
<td>1.18 mm</td>
<td>70 to 100</td>
</tr>
<tr>
<td>600 Microns</td>
<td>40 to 85</td>
</tr>
<tr>
<td>300 Microns</td>
<td>5 to 50</td>
</tr>
<tr>
<td>150 Microns</td>
<td>0 to 10</td>
</tr>
</tbody>
</table>

For the purpose of indicating the suitability for use, the sand is classified as Class A and Class B in accordance with the limits of grading. Class ‘A’ sands shall be used generally for plastering and pointing, and when they are not available, Class ‘B’ sands may be used with the approval of Engineer-in-Charge.

The procurement of sand for Mortar for plastering and pointing shall conform to the specifications given in paragraph 6.2.5.
(b) **Cost:**

The cost of sand for mortar for plastering and pointing will not be measured and paid separately, and the cost of sand including the cost of stripping, transporting and storing and royalty charges shall be included in the unit price per Cubic metre bid therefore in the relevant item of work in the Schedule ‘A’ for which this sand is required.

5.1.3 **Cement:**

The specifications and conditions specified for supply for cement in paragraph 4.1.4 shall be applicable here also.

Portlandpozzolana cement conforming to I.S. 1489-1976 shall be used for preparation of mortar for plastering and pointing work. Ordinary portland cement – Grades 43 & 53 may also be used in the event of non-availability of P.P.C.

5.1.4 **Water**

The specifications and conditions specified for procurement of water in paragraph 4.1.5 shall be applicable here also.

5.2 **Section – Mortar**

5.2.1 **Preparation of Mortar for Plastering work:**

Unless otherwise specified, the cement mortar used in plastering work shall be in cement mortar mix of MM. 7.5 (1:4) grade, using minimum 360 Kg. of cement per cubic metre of mortar.

The other specifications and conditions enunciated in paragraph 4.2.1 shall apply for this mortar for plastering work also.

5.2.2 **Preparation of Mortar for Pointing**

The cement mortar used in pointing work shall be cement mortar mix of M.M 7.5 grade, using 480 Kg. of cement per cubic metre of mortar.

The other specifications and conditions enunciated in paragraph 4.2.1 shall apply for this mortar for pointing work also.

5.3 **Section – Plastering With Cement Mortar Mix. Mm 7.5 Grade 20 Mm Thick**
5.3.1 **Preparation of Surface**

The roughening of the background improves the bond of plaster. All joints shall be thoroughly raked. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering as otherwise rashly exposed surface may tend to absorb considerable amount of water from the plaster. The surface shall be wetted evenly before applying the plaster. Care shall be taken to see that the surface is not too dry as this may cause lack of adhesion or excessive suction of water from the plaster. A fog spray may be used for this work. As far as possible, the plaster work shall be done under shade.

5.3.2 **Laying of Plastering with Cement Mortar Mix MM.7.5 grade 20 mm thick**

The mortar used for plastering shall be stiff enough to cling and hold when laid. To ensure even thickness and true surface, plaster shall be applied in patches of 150 mm x 150 mm of the required 20 mm thickness at nor more than 2 metres intervals horizontally and vertically over the entire surface to serve as guides. The surface of these guides shall be truly in the plane of the furnished plaster surface and truly plumb. The mortar shall then be applied to the surface to be plastered between the guides with a trowel. Each trowel full of mortar shall overlap and sufficient pressure shall be used to force it into thorough contact with the surface. On relatively smooth surfaces, the mortar shall be dashed on with the trowel to ensure adequate bond. The mortar shall be applied to a thickness slightly more than that specified, using a string, stretched out between the guides. This shall then be brought to a true surface by working with a long wooden float with small sawing motion. The surface shall be periodically checked with a string stretched across it. Finally the surface shall be rendered smooth with a small wooden float, over working shall be avoided. All corners, arises, and junctions shall be brought truly to a line with any necessary rounding or chamfering.

If it is necessary to suspend the work at the end of the day, it shall be left in a clean horizontal or vertical line not nearer than 150 millimetres for any corner or arises or on parapet tops or on copings etc. When recommending the work, the edges of the old work shall be scraped clean and treated with cement slurry before the new plaster is laid adjacent to it. After the first coat is done, it shall be kept undisturbed for the next 24 hours and thereafter kept moist and not permitted to dry until the final rendering is applied.

After the plaster has sufficiently hardened cement slurry with cream like consistency shall be applied as thinly and evenly and rubbed to a fine condition.
The finished surface shall be cured with water for a period of 10 days.

5.4 Section – Pointing To Stone Masonry with Cement Mortar Mix Mm.75 Grade

The joints in the masonry shall be raked out to a depth not less than the width of the joint or as directed when the mortar is green. Joints are to be brushed clean of dust and loose particles with a stiff brush. The area shall then be washed and the joints thoroughly wetted before pointing is commenced.

5.4.2 Flush Pointing with Cement Mortar Mix MM. 7.5 Grade for Rubble Masonry

The pointing to be done shall be flush pointing with cement mortar mix MM. 7.5 grade. The mortar shall be pressed into the raked out joints according to the types of pointing required. The mortar shall not be spread over the corners, edges or surface of the masonry. The pointing shall then be finished as detailed below. The mortar shall be finished off flush and level with the edges of the stones, so as to give a smooth appearance. The edges shall be neatly trimmed with a trowel and a straight edge.

The pointing shall be cured for seven days.

5.5 Section – Measurement and Payment

Plastering:

The measurement of plastering will be in units of square metres, and it shall be paid at the relevant unit price bid per ten square metres of Plastering in the schedule Bill of Quantities which unit price shall include the cost of materials, their conveyance, charges for preparation of mortar including mixing charges and charges for performing the plastering work as illustrated in this division, including curing.

Pointing

The measurement for pointing will be in units of square metres, and it shall be paid at the relevant unit prices per ten square metres bid in the schedule Bill of quantities which unit price shall include the cost of materials, their conveyance, charges for preparation of mortar including mixing charges and charges for performing the pointing work as illustrated in this division, including curing.
DIVISION-6
CONCRETE

6.1 Concrete Structures

6.1.1 Concrete in Structures

(a) Concrete in structures shall conform to the requirements of Paragraph 6.2

(b) Measurement and payment for concrete in structures will be made as prescribed in paragraphs 6.3 & 6.4.

6.1.2 Construction of Structures

Cast-in-place concrete for the structures shall conform to the requirements of section.

The structures shall be built to the lines, grades and dimensions shown on the drawings. The dimensions of each structure as shown on the drawings will be subject to such modifications as may be found necessary by the Engineer-in-Charge to adopt the structure to the conditions disclosed by the excavation or to meet other conditions. Where the thickness of any portion of a concrete structure is variable, it shall vary uniformly between the dimensions shown.

Where necessary, as determined by the Engineer-in-Charge, the Contractor will be furnished additional detailed drawings of the structures to be constructed. The bidder will not be entitled to any additional allowances above the prices bid in the schedule by reason of the dimensions fixed by the Engineer-in-Charge or by reasons of any modifications or extensions of a minor character to adopt a structure to a structure at site, as determined by the Engineer-in-Charge.

The cost of furnishing all materials and performing all work for installing timber, metal and other accessories for which specific prices are not provided in the schedule, shall be included in the applicable prices bid in the schedule for the work to which such items are appurtenant.

6.2 General Concrete Requirements

6.2.1 Composition

(a) General

Concrete shall be composed of cement, sand, coarse aggregate, water and admixtures (if any) as specified, all well mixed and brought to the proper consistency.
(b) Nominal maximum size of Aggregates

In coarse aggregates to be used in concrete shall be as large as practicable, consistent with required strength, spacing of reinforcement and embedded items, and placement thickness. The size of the coarse aggregate to be used will be determined by the Engineer-in-Charge and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregate for concrete in structures shall be as indicated in the relevant drawings appended to the contract documents. Smaller coarse aggregate than specified shall be used where in the opinion of the Engineer-in-Charge that proper placement of concrete is impracticable with the size of the aggregate specified in the drawings.

(c) Mix Proportions

The proportions of various ingredients to be used in the concrete for different parts of the work will be established by proper mix design by the Engineer-in-Charge during the progress of the work. In proportioning concrete, the quantity of both cement and aggregate should be determined by mass as per clause 9.2 of I.S. 456-1978 water shall be either measured by volume in calibrated tanks or weighted. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked. Adjustments shall be made as directed to obtain concrete having suitable workability, impermeability, density, strength and durability without use of excessive cement. The acceptance or rejection of concrete shall be as per the acceptance criteria laid down in clause 15 of I.S. 456-1978.

The mix design and average concrete strength shall be adjusted according to the cube strength test results conforming to clauses 14.2, 14.3, 14.4, 14.5 of I.S. 456-1978. The bidder shall not be entitled for any additional allowances above the prices bid in the schedule due to adjustments of the mix proportions.

The net water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water-cement ratio for various grades of concrete shall be as determined and ordered by the Engineer-in-Charge.

(d) Consistencies

The slump of concrete at the placement shall be as follows:

Reinforced Cement Concrete:
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Placing Condition</th>
<th>Degree of Workability</th>
<th>Value of Workability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Concreting of lightly reinforced sections without vibration or heavily reinforced sections with vibration</td>
<td>Medium</td>
<td>25 mm to 75 mm slump for 20 mm aggregate</td>
</tr>
<tr>
<td>2.</td>
<td>Concreting of heavily reinforced section without vibration</td>
<td>High</td>
<td>75 mm to 125 mm slump for 20 mm aggregate</td>
</tr>
</tbody>
</table>

ii) For plan concrete work, slump requirements mentioned in item - (i) above are applicable.

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Engineer-in-Charge reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Engineer-in-Charge. The use of any equipment which will not readily handle and place concrete of the specified slump will not be permitted.

To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted to compensate for any variation in the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete after mixing but before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

6.2.2 **Concrete Quality Control Measures and Concrete Quality Assurance Test Programme.**

(a) Concrete Quality Control Measures: The bidder shall be responsible for providing quality concrete to ensure compliance of the bid requirements.

(b) Concrete Quality Assurance Program: The concrete samples will be taken by the Departmental Engineers and its quality will be tested in the departmental laboratory as per the relevant Indian Standard Specifications I.S. No. 516-1959 and I.S. 1199-1959.


Test Facilities: The bidder shall furnish free of cost samples of all ingredients of concrete for testing and obtain approval from the Engineer-in-Charge. He should also supply free of cost, the samples of all the ingredients of concrete for conducting the required tests.
6.2.3 **Cement:**

**General**

Shall conform to paragraph 4.1.4.

6.2.4 **Water:** Shall conform to paragraph 4.1.5

6.2.5 **Sand (Fine Aggregate)**

**General**

The term sand is used to designate aggregate most of which passes 4.75 millimetre I.S. Sieve and contains only so much coarser material as permitted in Clause 4.3 of L.S. 383-1970. Sand shall be predominantly natural sand which may be supplemented with crushed sand to make up deficiencies in the natural sand grading’s.

All sand shall be furnished by the bidder from any source approved by Engineer-in-Charge.

Sand as delivered shall have a uniform and stable moisture content. Determination of moisture content shall be made as frequently as possible, the frequency for a given job being determined by the Engineer-in-Charge according to weather conditions (I.S. 456-1978).

**Quality**

The sand shall consist of clean, dense, durable, un-coated rock fragments, as per I.S.383-1970. Sand may be rejected if it fails to meet any of the following quality requirements.


Sodium Sulphate Test for Soundness: The sand to be used shall pass a Sodium of Magnesium Sulphate accelerated test as specified in I.S. 2386 (Part-V) 1963 for limiting loss of weight.

Specific Gravity: 2.6 minimum

Deleterious Substances:

The amounts of deleterious substances in sand shall not exceed the maximum permissible limits prescribed in Table I Clause 3.2.1 of I.S. 383-1970 (Indian Standard specification for coarse and fine aggregate from natural sources for concrete when tested in accordance with I.S. 2386-1963).
c) **Grading**

The sand as batched shall be well graded and when tested by means of standards sieves shall conform to the limits given in Table-4 of I.S. 383-1970, and shall be described as fine aggregates, grading zones-I, II, III and IV. Sand complying with the requirements of any of the four grading zones is suitable for concrete. But, sand conforming to the requirements of grading Zone-IV shall not be used for reinforced cement concrete work.

6.2.6 **Coarse Aggregate**

**General**

For the purposes of these specifications, the term “Coarse Aggregate” designates clean well grade aggregate most of which is retained on 4.75 mm I.S. Sieve containing only so much finer material as permitted for various types described under clause 2.2 of I.S 383-1970. Coarse aggregate for concrete shall consist of uncrushed, crushed and partially crushed stone.

Coarse Aggregate for concrete shall be furnished by the Contractor from the sources approved by the Engineer-in-Charge.

Coarse Aggregate as delivered shall generally have uniform and stable moisture content. In case of variations, clause 9.2.3 of I.S 456-1978 shall govern during batching.

**Quality**

The Coarse aggregate shall consist of natural occurring (crushed or uncrushed) stones, and shall be hard, strong, durable, clear and free from veins and adherent coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials.

Coarse aggregate for concrete shall be separated into various nominal maximum sizes specified in the relevant drawings. Separation of the coarse aggregate into the specified sizes shall conform to the grading requirements specified in Table-2 of I.S. 383-1970, when tested in accordance with I.S 2386-(Part-I) 1963 (Method of test for aggregates for concrete Part-I Particle size and shape).

Coarse aggregate for mass concrete may be separated as previously herein specified. Separation of the coarse aggregate into the various sizes shall be such that when tested in
accordance with I.S. 2386 (Part-I) 1963 shall conform to the requirements specified in Table-3 of I.S. 383-1970.

Sieves used in grading tests will be standard mesh sieves conforming to I.S. 460 (Part-I) – 1978 (Specification for test sieves Part-I wire cloth test sieves).

6.2.7 Mixing

General

The concrete ingredients shall be thoroughly mixed in mechanical mixers designed to positively insure uniform distribution of all the component materials throughout the concrete at the end of the mixing period. Mixing shall be done as per clause 9.3 of I.S. 456-1978. The mixer should comply with I.S. 1971-1968 (I.S. Specifications for batch type concrete mixers). The concrete as discharged from the mixer, shall be uniform in composition and consistency from batch to batch. Workability shall be checked at frequent intervals as per I.S. 1199-1969. Mixers will be examined regularly by the Engineer-in-Charge for changes in conditions due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform distribution of the materials so that the mass is uniform in colour and consistency and to the satisfaction of the Engineer-in-Charge. If there is segregation after unloading, the concrete should be remixed.

Any mixer that at any time produces unsatisfactory mix, shall not be used until repaired. If repair attempts are unsuccessful, a defective mixer shall be replaced. Batch size shall be at least 10% of, but not in excess of the rate capacity of the mixer unless otherwise authorized by the Engineer-in-Charge.

Concrete Mixers

Water shall be admitted prior to and during charging of mixer with all other concrete ingredients. After all materials are in the mixer, each batch shall be mixed for not less than the time specified by the Engineer-in-Charge. The minimum mixing time shall be 2 minutes. The minimum mixing time specified is based on average mixer performance.

The Engineer-in-Charge will adjust the minimum mixing time as required by the observations of the mix delivered from mixer. Excessive over mixing which require addition of water to maintain the required concrete consistency will not be permitted.
6.2.8 **Forms**

**General:** Forms shall be used wherever necessary, to confine the concrete and shape it to the required lines. The bidder shall set and maintain concrete forms so as to insure completed work is within the applicable to clearance limits prescribed in clause 10 of I.S 456-1978. If a type of form does not consistently perform in an acceptable manner, as determined by the Engineer-in-Charge, the type of form shall be changed and method of erection shall be modified by the bidder subject to approval by the Engineer-in-Charge.

Plumb and string lines shall be installed before, and maintained during concrete placement. Such lines shall be used by the bidder’s personnel and by the Engineer-in-Charge and shall be in sufficient number and properly installed as determined by the Engineer-in-Charge. During concrete placement, the bidder shall continuously monitor plumb, and string line, form positions and immediately correct deficiencies.

Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used, forms shall be sufficiently rigid to effectively transmit, energy, form the form vibrators to the concrete, while not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips shall be placed in the corners of forms and at the top of wall placements to produce leveled edges on permanently exposed concrete surfaces. Interior angle of intersecting concrete surface and edges of construction joints shall not be leveled except where indicated on the drawings.

Suitable struts or stiffeners or ties shall be used for the form work wherever necessary. All supports, shall be braced and cross braced in two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the form work is supported on soils, planks, sleepers etc., shall be used to properly disperse the loads. In case, the supports rest on already completed beam or slab, suitable props shall be provided under the latter.

The form work shall be of well seasoned timber or steel. When timber forms are used, they shall be lined with M.S sheet or other suitable smooth faced non-absorbent material as specified. Supports may be of timber or steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the supports. The
details of the proposed form work and supports shall be submitted to the Engineer-in-Charge and got approved before erection.

In case of columns, retaining walls or deep vertical component, the height of the column shall facilitate any placement and compaction of concrete and suitable arrangement may be made for securing the form to the already poured concrete for placing the subsequent lifts. No steel ties or wires used for securing this form work shall be left exposed on the face of the finished work.

Suitable inserts for block outs for electrical and other service fixtures where necessary shall be provided in the required locations as specified.

**Cleaning and Oiling of Forms:** At the time the concrete is placed informs, the surfaces of the forms shall be free from encrustation of mortar, grout or other foreign materials. Before concrete is placed, the surface of the forms shall be oiled with a commercial forms of oil.

**Removal of Forms:** The stripping of form work shall be conform to clause 10.3 of I.S. 456-1978. The bidder shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on upper sloping faces of concrete such as forms on the water sides of warped transitions, shall be removed as soon as the concrete has attained sufficient to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed immediately by the specified curing.

To void excessive stresses in concrete that might result from swelling of forms, wood forms for wall openings shall be loosened as soon as the loosening can be accomplished without damaged to the concrete. Forms shall be removed with care so as to avoid injury to the concrete, and any concrete so damaged shall be repaired in accordance with paragraph 6.2.16.

**Cost:** The cost of furnishing all materials and performing all work for constructing forms, including any necessary treatment or coating of forms shall be included in the applicable prices bid in the schedule for the items of concrete for which the forms are used.

6.2.9 Concrete Surface Irregularities

**Surface Irregularities**

**General:** Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as “abrupt” or “gradual” and are measured relative to the actual concrete surface.
**Abrupt Surface Irregularities:** Abrupt surface irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in form Lumber, or other similar forming faults. Abrupt surface irregularities are measured using a straight edge held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement.

**Gradual Surface Irregularities:** Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface. Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The magnitude of the gradual surface irregularities is defined herein as a measure of the rate of change in slopes of the concrete surface. The surface irregularities shall not exceed 6 mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 metres in length. The magnitude of gradual surface irregularities on concrete shall be checked by the bidder to insure that the surfaces are within the specified to tolerances. The Engineer-in-Charge will also make such checks to hardened concrete surfaces as determined necessary to ensure compliance with these specifications.

**Repair of Hardened Concrete not within specified tolerance**

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance with paragraph 6.2.16 and shall be accomplished in a manner approved by the Engineer-in-Charge. Concrete repair to bring concrete within the tolerances shall be done only after consultation with a representative of Engineer-in-Charge regarding the method of repair. The Government shall be notified as to the time when repair will be performed.

Concrete which will be exposed to public view shall be repaired in a manner which will result in a concrete surface with a uniform appearance. Grinding of concrete surface exposed to view shall be limited in depth such that no aggregate particles are exposed to view shall be limited in a depth such that no aggregate particles are exposed more than 1.5 millimetres at the finished surface. Where grinding causes exposure of aggregate particles greater than 1.5 millimetres at the finished surface. Concrete shall be repaired by excavating and replacing the concrete.
**Prevention of Repeated failure to meet tolerances**

When concrete placements result in hardened concrete that does not meet the specified tolerances, the bidder shall submit to the Government an outline of all preventive actions such as modification to forms, modified procedure for setting screeds, and different finishing techniques to be implemented by the bidder to avoid repeated failures.

The Government reserves the right to delay concrete placement until the bidder implements such preventive actions which are approved by the Engineer-in-Charge.

6.2.10 Reinforcing Bars

**General:** Reinforcing bars shall be placed in the concrete as shown in the drawings or as directed.

**Materials:** Unless shown otherwise on the drawings, the reinforcement to be used shall be or High Yield strength deformed (H.Y.S.D) bars of grade Fe-415 conforming to I.S. 1786-1979 (IS. Specifications for High Yield strength deformed steel bars and wires for concrete reinforcement).

**Placing:** Reinforcement shall be bent and fixed in accordance with the procedure specified in I.S. 2502-1963 (code of practice for bending and fixing of bars for concrete reinforcement). All reinforcement shall be placed and maintained in the position shown in the drawings, splices shall be located where shown on the drawings provided that the location of the splices may be altered subject to the written approval of the Engineer-in-Charge.

Subject to the written approval of the Engineer-in-Charge, the bidder may for his convenience, splice bars at additional locations other than those shown on the drawings.

All additional splices allowed shall be at the expense of the bidder. In order to meet design and space limitation. On splicing, some bent bars may exceed usual clearance cutting and bending of such bars from stock lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the centre lines of the bars. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position, and amount after it has been placed, but before being covered with concrete.
Before reinforcement is embedded in concrete, the surfaces of the bars and the surfaces of any supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease or other foreign substances which in the opinion of the Engineer-in-Charge, are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap, or equivalent treatment is considered objectionable.

As specified in Clause 11.3 of I.S. 456-1978 unless otherwise specified by the Engineer-in-Charge, reinforcement shall be placed within the following tolerances:

a) For effective depth 200 mm or less - ± 10 mm
b) For effective depth more than 299 m - ± 15 mm

The cover in no case be reduced by more than one third of specified over or 5 mm whichever is less.

Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbance of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Engineer-in-Charge and in conformity with the requirements of clause 11.4 of I.S 456-1978. Chairs, hangers, spacers and other supports for reinforcement shall be of concrete, metal or other approved material. Concrete over shall be as shown on the drawings.

(d) Reinforcement Drawings

The Government will supply drawings of reinforcement details and bar bending schedules for adoption.

(e) Measurement and Payment

Measurement for payment of reinforcement bars will be based on the weight of the bars placed in the concrete in accordance with the drawings supplied by the Government when conformance with these specifications drawings has been determined at the time of embedment. Except as otherwise provided below, payment for furnishing and placing reinforcing bars will be made at the unit price per one kilogram bid in the bill of quantities for furnishing and placing reinforcing bars which unit price shall include the cost of reinforcing bars, attaching wire ties or other approved supports and of cutting, bending, cleaning, securing and maintaining in position reinforcing bars as shown on the drawings.
6.2.11 Preparation for Placing

**General:** No concrete shall be placed until all form work, installation of items to be embedded, and preparation of surface involved in the placement have been approved.

All surfaces of forms embedded materials shall be free from curing compound, dried mortar from previous placement, and other foreign substances before the adjacent or surroundings concrete placement is begun.

Prior to beginning concrete placement, the bidder shall make ready, a sufficient number of properly operating vibrators and operators, and shall have readily available additional vibrators to replace defective ones during the progress of the placement. The Engineer’s representative at the placement may require that the bidder delay the start of the concrete placement until the number of working vibrators available is acceptable.

**(b) Foundation Surface:** All surfaces upon or against which concrete is to be placed shall be free from frost, ice, water, mud and debris.

Rock surfaces shall be free from oil, objectionable coatings, and loose, semidetached and unsound fragments. Immediately prior to placement of concrete, surfaces of rock shall be washed with an air water jet and shall be brought to a uniform surface dry conditions.

Earth foundation surfaces shall be wet to a depth of 15 cm. or to impermeable material whichever is less before concrete is placed.

**(c) Construction Joint:** Construction joints are defined as concrete surface upon or against which concrete is to be placed and to which new concrete is to adhere but which have become so rigid that the new concrete cannot be incorporated integrally which that previously placed.

The provision of construction joints shall conform to clauses 12.4.1 and 12.4.2 of I.S. 456-1978.

When the work has to be resumed on a surface which has hardened such surface shall be roughened. It shall be swept clean and thoroughly wetted. For vertical joints neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of the concrete.
Where the concrete has not fully hardened all balance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgment of particles of aggregate. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry. On this surface, a layer of concrete not exceeding 150 mm in thickness shall first be placed and shall be well rammed against old work, particular attention being paid to corners and close spots, and work thereafter shall proceed in the normal way.

6.2.12 Placing:

General: The Bidder shall notify the Engineer-in-Charge before batching begins for placement of concrete. Placing shall be performed only in the presence of an authorized Engineer’s representative. Placement shall not begin until after all preparations are complete to the satisfaction of the Engineer-in-Charge.

All surfaces upon or against which concrete is to be placed shall be prepared in accordance with paragraph 6.2.11.
Retampering of concrete will not be permitted. Any concrete which has becomes so stiff that proper placing cannot be assured shall be wasted.
Concretes shall not be placed in standing water except with written permission of the Engineer-in-Charge and the method of placing shall be subject to approval. Concrete shall not be placed in running water and shall not be subjected to running water until after the concrete has hardened.
Concrete shall be deposited as nearly as practical in its final position and shall not be allowed to flow in such a manner that the lateral movement will cause segregation of the coarse aggregate from the concrete mass. Methods and equipment employed in depositing concrete informs shall minimize clusters of coarse aggregate. Clusters that occur shall be scattered before the concrete is vibrated.
Forms shall be constantly monitored and their position adjusted as necessary during concrete placement in accordance with paragraph 6.2.8.
All concrete shall be placed in approximately horizontal layers. The depth of layers shall not exceed 25 cm. The Engineer-in-Charge reserves the right to require lesser depths of layers where concrete cannot otherwise be placed and consolidated in accordance with the
requirements of these specifications. All construction joints which intersect exposed concrete surface shall be made straight and level to plumb as shown otherwise on the drawings.

The placing of concrete shall be in accordance with clause 12.2 of I.S.456-1978.

If concrete is placed monolithically around openings having vertical dimensions greater than 60 cm. or if concrete in decks, floor slabs or other similar parts of structures is placed monolithically with supporting concrete, the following requirements shall be strictly observed.

Concrete shall be placed upto the top of the formed openings at which point further placement will be delayed to accommodate settlement of fresh concrete. If levels are specified beneath nearly horizontal structural members such as decks, floor slabs, beams and girders, such bevels being between the nearly horizontal members and the vertical supporting concrete below, concrete shall be placed to the bottom of the levels before delay of placement.

The last 60 cm or more of concrete placed below horizontal members of levels shall be placed with a 50 mm or less slump and shall be thoroughly consolidated.

In placing concrete on unformed slopes so steep as to make internal vibration of the concrete impractical without forming, the concrete shall be placed ahead of non-vibrating slip form screed extending approximately 0.75 metres back from its leading edge. Concrete ahead of the slip form screed shall be consolidated by internal vibrators so as to insure complete filling under the slip form.

A cold joint is an unplanned joint resulting when a concrete surface hardens before the next batch is placed against it. Cold joints will be allowed only in the event of equipment breakdown or other unavoidable prolonged interruption of continuous placing. If such unavoidable delays in placing occur which make it appear that unconsolidated concrete may harden to the extent that alter vibration will not fully consolidate it, the Bidder shall immediately consolidate such concrete to a stable and uniform slope. If delay of placement is then short enough to permit penetration of the underlying concrete, placement shall resume with particular care being taken to thoroughly penetrate and reverberate the concrete surface placed before the delay. If concrete cannot be penetrated with vibrator, the cold joint shall be then treated as a construction joint.
Care shall be taken to prevent cold joints when placing concrete in any part of the work. The concrete placing rate shall insure concrete is placed while the previously placed adjacent concrete is plastic so that the concrete can be made monolithic by normal use of vibrators.

Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete. A cold joint may necessary result from prolonged heavy rainfall.

The bidder shall not be entitled to any additional payment, over the unit prices bid in the schedule for concrete, by reason of any limitation in the placing of concrete required under the provisions of this paragraph.

b) **Transportation**

The transportation of concrete to clause 12.1 of I.S.456-1978.

c) **Consolidation**

The consolidation of concrete shall conform to clause 12.3 of I.S. 456-1978

Concrete shall be consolidated by vibrators. The vibration shall be sufficient to remove the undesirable air voids from the concrete, including the air voids trapped against the forms. After consolidation, the concrete shall be free of rock pockets and honey bomb areas and shall be closed snugly against all surfaces of forms and embedded materials. All concrete shall be properly consolidated before it hardens.

Except as hereinafter provided, consolidation of all concrete shall be by immersion type vibrators. Immersion type vibrators shall be operated in nearly vertical position and the vibrating head shall penetrate and reverberate the concrete in the upper portion of the underlying layer. Care shall be exercised to avoid contact of the vibrating head with embedded items and with formed surfaces which will later be exposed to view. Concrete shall not be placed upon either plastic concrete until the previously placed concrete has been thoroughly consolidated.

6.2.13 **Finished and Finishing:**

The requirements for finishing of concrete surface shall be as specified in this paragraph, paragraph 6.2.9 or as otherwise indicated on the drawings. The bidder shall notify the Engineer-in-Charge before finishing concrete. Unless inspection is waived, in each specific case, finishing of concrete shall be performed only when a Engineer’s representative is
present. Finished concrete which is not within the specified tolerances shall be repaired in accordance with paragraph 6.2.16.

Interior surface shall be sloped for drainage where shown on the drawings or as directed. Surfaces which will be exposed to the weather, and which would normally be level, shall be sloped for drainage.

Floating may be performed by use of hand or power driver equipment. Floating shall be started as soon as the screeded surface has stiffened sufficiently and shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Joints and edge shall be tooled where shown on the drawings or as directed.

6.2.14 Protection

The bidder shall protect all concrete against damage until final acceptance by the Engineer-in-Charge.

The Bidder shall provide protection to prevent erosion to fresh concrete whenever precipitation either periodic or sustaining is imminent or occurring.

When precipitation appears imminent, the bidder shall immediately make ready at the placement site all materials, which may be required for protection of fresh concrete. The Engineer-in-Charge may delay placement of concrete until adequate provisions for protection against weather are made.

All fresh concrete surfaces shall be protected from contamination and from foot traffic until the concrete has hardened. Hardened concrete surfaces which have to receive finish shall be protected against damage from foot traffic and other construction activity by covering with protective mats, ply-wood, or by other effective means. Methods of protection shall be subject to approval by the Engineer-in-Charge.

Concrete curing membranes shall be kept intact, and other curing materials and process shall be maintained as necessary to assure continuous curing for a minimum specified curing time. Protection of curing membranes and other curing methods shall be as described in paragraph 6.2.15.
6.2.15. Curing

a) General

The Bidder shall furnish all materials and perform all work required for curing concrete. The curing of concrete shall conform to clause 12.5 to I.S. 456-1978 and clause 5.8. IS.. 3873 – 1978.

Concrete shall be cured by water curing.

The unformed top surfaces of bridges or culvert decks shall be cured for 28 days with damp sand cover or curing mat cover. The sand or curing mats shall not be kept so wet as to allow water to drain from them and stain other concrete. The sand or curing mats shall be removed after the expiry of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or back fill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed within 24 hours after the concrete has hardened sufficiently conforming to clause 10.3 of I.S. 456-1978, to prevent structural collapse or other damage by careful from removal. Where required, repair of all minor surface imperfections shall be made immediately after form removal and prior to curing. Minor surface repair shall be completed within 2 hours after from removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after from removal until initiation of curing.

b) Materials:

Concrete cured with water shall be kept wet for at least 28 days from the time the concrete has obtained sufficient set to prevent detrimental effects to the concrete surfaces. The concrete surfaces to be cured shall be kept wet by covering them with water-saturated material by using a system of perforated pipes, mechanical sprinklers or porous-hose, or by other methods which will keep all surfaces continuously (not
periodically) wet. All curing methods are subjected to approval of Engineer-in-Charge.

c) **Cost:**

The cost of furnishing all materials and performing all work for curing concrete shall be included in the price bid in bill of quantities for the concrete on which the particular curing methods are required.

6.2.16. **Repair of Concrete**

a) **General**

Concrete shall be repaired in accordance with clause 5.7 to I.S. 3873-1978. Imperfections and irregularities on concrete surface shall be corrected in accordance with paragraph 6.2.9 and clause 5.7. of I.S. 3873-1978.

b) **Types of Repair**

All repairs shall be made with concrete. Repairs to concrete surfaces and addition were required shall be made by cutting regular opening into the concrete and placing fresh concrete to the required lines. The chipped openings shall be sharp and shall not be less than 70mm in depth. The fresh concrete shall be reinforced and chipped and trawled to the surface to the surface of the openings. The mortar shall be placed in layers not more than 20 mm in thickness after being compacted and each layer shall be compacted thoroughly. All exposed concrete surfaces shall be cleaned of impurities, lumps of mortar or grout and unsightly stains.

c) **Cost**

The cost of furnishing all materials and performing all work required in the repair of concrete shall be borne by the Bidder.

6.3. **Measurement of Concrete**

Measurement for payment of concrete required to be placed directly upon or against surfaces of excavation will be made to the lines for which payment for excavation is made.
Measurement for payment of all concrete will be made to the neat lines of the structures, unless otherwise specifically shown on the drawings prescribed in these specification. The unit of measurement will be cubic metre.

In measuring concrete for payment, the volume of all openings, embedded pipes and metal work, each of which is larger than 0.1 square metre in cross section will be deducted.

6.4. **Payment for Concrete**

Payment for concrete in the various parts of the work will be made at the applicable, unit prices bid therefore in the schedule, which unit price shall include the cost of furnishing all materials and performing all works required for the concrete construction, except that payment for furnishing and placing reinforcing bars will be made at the respective unit prices bid therefore in the schedule.
SECTION –VIIB

Specifications for Civil Works

INfiltration Well and Infiltration Gallery

Well sinking:

Infiltration wells sunk for water supply consist of staining of masonry with VRCC M20 mix using 20 HBG metal as indicated in relevant drawings provided with a curb at bottom which is sunk to the required depth by dredging. The well is then provided with a plug at the bottom consisting of graded metal to admit bottom infiltration.

Excavation:

If the river bed is dry, open excavation shall be carried to a depth just above the water level or to such depth as may be specified before the curb is laid. Open excavation shall conform to the following:

In firm soil, the sides of the excavation shall be kept vertical up to a depth of 2 meters and for greater depth, the excavation shall be widened by allowing steps of 500 mm at every 2 meters depth. Where the soil is got loose or slushy, the width and depth of the steps shall be suitably altered or the sides sloped or shored up as directed by the Engineer-in-Charge. It shall be the responsibility of the contractor to take complete instructions in writing from the Engineer-in-Charge regarding the stepping, sloping to be done for excavation deeper than 2 meters.

The excavated materials shall not be placed within 1 meter of the edge of the excavation of half of depth of the excavation whichever is more or a greatest distance as prescribed by the Engineer-in-Charge. All the materials excavated shall be the property of the Government. Materials suitable and useful for back filling or other use shall be stacked separately as directed by the Engineer-in-Charge.

When it is necessary to sink wells in standing water, unless otherwise specified by the Engineer-in-Charge as inland of sand or earth shall be formed before laying the curb. The island shall extend at least 3 meters beyond the outer periphery of the wells to be sunk. The material forming the island shall be free from all stones and other hard materials which are liable to impede the sinking of the well and shall be brought up at least 500 mm above the water level. The sides of the island shall be adequately protected from erosion.

Curb:

The curb shall be made of reinforced concrete with a cutting edge provided where necessary with a steel shoe. The curb shall be laid truly in position and level. Cement concrete for the curb shall be of grade M20. Confirming to the requirements, The concreting of the curb shall be done in one continuous operation.
Staining:

The staining shall be constructed with VRCC M20 mix using 20 mm HBG metal.

The staining shall be built in one straight line from bottom to top. In no case shall it be built in plumb at intermediate stage when the well is tilted.

The staining shall be built in true shape both on the inner and outer edges. The height of staining built at any stage shall be such that the well does not lose stability.

Sinking:

Sinking shall be commended only after the staining is cured for 48 hours.

The sinking of the well shall proceed uniformly so that the well does not go out of position or out of plumb beyond the specified tolerance.

Dredging or sinking load shall be placed in an orderly and safe manner so that it shall not interfere with dredging or damage the staining of the well.

Wells shall not be dewatered during sinking without the specific permission of the Engineer-in-Charge.

Water jetting may be used where necessary to facilitate sinking.

Blasting may be resorted to only with the specific permission of the Engineer-in-Charge. Where so permitted light charges placed below the level of the cutting edge and fired under water shall be used so as not to damage the staining.

A sinking proceeds a record of the different kinds of soil penetrated by the well shall be kept by preserving suitable soil samples. Necessary in situ tests may be conducted where so required.

Suitable gauges shall be painted on the outside of the well staining to provide a continuous indication of the depths cast or sunk.

App precautions shall be taken against possible damage to the foundations of structures in the vicinity of the wells prior to commencement of dredging of the materials from inside of the well.

Careful watch shall be kept curing sinking and any tilts developed shall be immediately attended to whenever the well shows a tendency for tilting. Adequate preventive measures shall be taken by shifting the Kentledge, controlling the dredging, jetting or by any other approved means.

Blasting shall not be permitted before 24 hours have elapsed since the last course of masonry or concrete has been laid.
**Bottom Plug:**

The well shall be plugged with graded metal of approved size to admit bottom infiltration. Graded metal shall be carefully lowered in to the well in gunny bags and evenly distributed on the base.

**Cover Slab:**

The well shall be covered on completion of work with a slab in RCC M20 grade conforming to the specifications as indicated in the drawings. Suitable openings for fixing manhole frame shall be provided as indicated in the drawings.

**Measurement:**

All linear measurements shall be in meters, correct to 0.01 of a meter. Volume shall be worked out to the nearest 0.01 Cum.

**Rate:**

The rate for each work shall be for a unit of 10 Cum and shall include the following and no extra payment shall be made.

- a. Site clearance such as clearing off shrubs, brush wood, under growth and small trees, not exceeding 30 mm in fifth, measured at 1 meter above ground.
- b. Marking out.
- c. All leads and lifts.
- d. Forming temporary steps at sides of deep strenches.
- e. Fencing, protection and other safety measures.
- f. All dewatering required during excavation
- g. All shoring, sheeting, planking and strutting etc.,

The unit rate for sinking shall be per meter depth of sinking including all operations specified in paragraph 10.6

The rate for all structural steel work shall include the cost of materials and labour involved. The unit rate shall be per Kg. As specified in the Schedule bill of quantities.

The unit rate for all RCC work shall include all operations as indicated in Paragraph 5.2.16

The unit rate for plain concrete work shall be per cubic meter. The rate shall include all necessary form work and the cost of the materials, mixing, conveying, placing, compacting, curing, tools and all appliances required for laying the concrete in position. It shall also include the cost of bailing out water and pumping for keeping the excavation free of water unless otherwise specified.
The unit rate for masonry work shall be per one cubic meter of finished work inclusive of cost of manufacture of sand cement blocks, smooth rubbing of joints, stockings, scaffolding, construction, pointing (with same mortar) and curing etc., complete in all respects. The rate shall include charges for leads and lefts, besides conveyance charges.

Whenever required the samples of the materials shall be produced to the Executive Engineer for approval and for keeping at the works spot.

The unit rate for sand filling shall be per 10 cubic meters and shall include all the operations such as cleaning sand free from earth, clay, clods, roots, boulders etc., sieving to obtain graded sand of the required specification and placing position.

INfiltration Galleries

Infiltration Gallery is a horizontally placed perforated pipe or well screen made from open jointed or perforated pipes which is laid below water table and collects ground water.

The gallery should be surrounded with a gravel pack to improve flow towards it and to filter any large particles that might block the perforations.

Construction of Infiltration Galleries

Shall be built at the end of dry season and should be at least one metre under the dry season water table. The sides of the gallery will need to be supported by shuttering during execution.

Timbering and Shoring of Trenches

The Contractor shall at all times support efficiently and effectively the sides of the trenches and other excavations by suitable timbering, shoring, piling and sheeting and they shall be close, in loose or sandy strata and below the sub soil water level.

All timbering, shoring, sheeting and piling with their walls and supports shall be of adequate dimensions and strength and fully braced and strutted so that no risk of collapse or subsidence of the walls of the trench shall take place.

Steel/Timber Sheeting

Steel/timber sheeting shall be of good quality steel or well seasoned wood of requisite strength, good quality, free from knots and cracks and preferably treated with preservative. The sheeting and struts and bracing should be strong enough and suitably spaced to support the sides of excavation and to
prevent any movement of soil. The wooden or steel sheets should be sufficiently long and thick, driven and fixed continuously or at intervals as may be required. Sheet ing and bracing shall be provided by the Contractor whenever in the opinion of the Engineer-in-Charge, such sheeting and bracing are required for proper and satisfactory execution of the work. If the Engineer-in-Charge is of the opinion that at any place, sufficient or proper sheeting has not been provided, he may order for additional sheeting and further strengthening at the Contractor’s expense. The Contractor shall bring to site sufficient quantity of sheeting and bracing materials ahead of starting the excavation work depending on the volume of works involved and the speed to be attained to complete the work within the stipulated time.

As far as practicable, sheeting shall be driven ahead of excavation and finally to a depth sufficiently below the bottom of the trench.

The Contractor shall be held responsible and will be accountable for the insufficiency of all timbering, bracing, sheeting and piling used as also for all damage to persons and property resulting from improper quality, strength, placing, maintaining or removing of the same.

**Shoring**

Close timbering shall be done by completely covering the sides of the trenches and pits generally with short, upright members called ‘polling boards’. The boards shall generally be placed in position vertically side by side without any gap on each side of the Excavation and shall be secured by horizontal wallings of strong wood at maximum 1.2m spacing and suitably strutted. If the soil is very soft and loose, the boards shall be placed horizontally against each side of the excavation and supported by vertical wallings, which in turn shall be suitably strutted. The lowest boards supporting the sides shall be taken into the ground and no portion of the vertical side of the trench or pit shall remain exposed, so as to render the each liable to slip out.

**Contractor’s Responsibility For Secure Shoring And / Or All Damages**

The contractor will be held responsible for providing secure shoring and for adopting every other precaution which may be necessary or proper for protecting any building which may be damaged or be liable damage by the excavation of any trench or otherwise by the execution of the works in the vicinity of such building. If the Engineer shall require the adoption of any special or extra measures or precautions, the Contractor shall forthwith adopt and supply the same, but this provision is not to be read or understood as in any degree relieving the contractor from responsibility. After the work is completed near buildings, the Contractor shall remove any shoring and make good any cutting out or other damage that may have been done.
Liability For Timbering

No work done by the Contractor or his workmen for the fact that the timbering was complied with this specification shall absolve the contractor from his responsibility and he will be responsible for making good any damage caused as a result of the timbering failing to give proper support to the sides of excavation.

The timbering to the sides of excavation for structure shall be carried out in such a way that there is no obstruction caused to the filling of formwork for the walls. The supporting struts shall be removed by the Contractor in stages to suit progress of work.

If the Engineer is not satisfied that the standard of timbering is not good or that the sides of the excavations have not been secured in a manner to render such excavating safe for working, he may after notifying the contractor or his representative in writing, employ his own man to alter the timbering and the cost of such workmen and materials employed shall be paid by the Contractor.

Removal of Shoring

No part of the shoring shall at any time be removed by the contractor without obtaining permission from the Engineer. The pulling out of shoring planks should be carried out in stages. While taking out shoring planks the hollows if any formed, must simultaneously be filled in with soft earth well rammed with rammers and with water. No payment will be made to the contractor towards the shoring material left out in the trench which could not be pulled out.

All works to be clear, clean and perfect

The contractor, after completion of entire work and before seeking settlement of his final bill, shall prove at his expense that the entire line is clear, clean and perfect in the presence of the General Manager or his authorized subordinate. He should provide suitable instruments, appliances etc., and pass them through the pipes and shall show that water passes freely through the entire reach from higher end to lower end.
WBM Roads

1.0 MATERIALS

1.01 Stone Aggregate

For WBM construction stone metal grade – I & II of hard granite or equivalent as approved by Engineer-in-Charge shall be used. River borne or weathered stone metal shall not be used for the work. The stone metal and aggregates shall not be obtained from the rock which has been exposed to atmosphere for a long time. They shall be clean, hard, durable of fairly cubical shape and free from excess flat, elongated, soft & disintegrated particles, fracture, cleavage, dirt & other deleterious materials and organic impurities. The aggregates shall preferable be hydrophobic and low porosity. The aggregates shall satisfy the physical requirements as set forth in Table I.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type of Construction Requirement</th>
<th>Type of Construction Test</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sub-Base (Maximum)</td>
<td>Los Angeles Abrasion Value</td>
<td>IS-2386 (Part-IV) 60%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Aggregate Impact Value</td>
<td>IS-2386 (Part-IV) *50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IS-5640***</td>
</tr>
<tr>
<td>2.</td>
<td>Base (Maximum)</td>
<td>Los Angeles Abrasion Value</td>
<td>IS-2386 (Part-IV) 50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Aggregate Impact Value</td>
<td>IS-2386 (Part-IV) *40%</td>
</tr>
<tr>
<td></td>
<td>(Maximum)</td>
<td>Flakiness Index</td>
<td>IS-2386 (Part-I) **15%</td>
</tr>
</tbody>
</table>

* Aggregates may satisfy requirements of either of the two tests.
** The requirements of flakiness index shall be enforced only in case of crushed / broken stone ..
*** Aggregates like brick metal, kankar and laterite which get softened in presence of water, shall be tested for impact value under wet conditions in accordance with IS:5640.

1.02 Sand / Stone Dust

Sand/ Stone dust shall be clean, hard durable, uncoated, dry and free from injurious soft or flaky pieces and organic or deleterious substances. Quality of sand/ stone dust shall conform to IS: 383.

2.0 ROLLING:
2.01 Rolling shall be done by 80 / 100 KN smooth wheeled power roller (3 wheel or tandem) or vibratory roller of 80 – 100 KN static weight. Rolling shall start as soon as possible after the materials have been spread, deploying a set of rollers as the rolling is to be completed in limited time frame. Rolling shall be done with care to avoid unduly roughening of the pavement surface. The roller shall move at a speed not more than 5 km / hour.

Rolling of longitudinal joints shall be done immediately behind the paving operation. After this the rolling shall commence at the edges and progress towards the centre longitudinally, except that on super elevated and uni-directional cambered portions, where the rolling shall proceed from inner edge to the outer parallel to the centre line of the pavement. First the edge / edges shall be compacted with roller running forward and backward. The roller shall then move inward parallel to the centre line of the road, in successive passes uniformly lapping preceedings tracks by at least one-half width of WBM.

When the roller has passed over the whole area once, any high spots or depressions which become apparent shall be corrected by removing or adding mix material. The rolling shall be continued till the entire surface has been rolled to 95% of the Proctor’s density, there is no crushing of aggregates and all roller marks have been eliminated. Roller shall not stand on newly laid material while there is a risk that surface will be deformed thereby.

2.02 Time Schedule for Rolling Operations

The minimum duration for rolling shall be governed by the guidelines set forth in Table-3. However, Engineer-in-Charge shall have the full authority to increase the duration to an extent as he may deem necessary, to satisfy himself that the compaction must comply with the specifications.

Table-3

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Items</th>
<th>Duration</th>
<th>Surface Area / Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparation of Sub-grade</td>
<td>1 hour</td>
<td>200 sqm</td>
</tr>
<tr>
<td>2.</td>
<td>75 mm thick WBM with Stone Metal Grade – II</td>
<td>1 hour</td>
<td>50 sqm</td>
</tr>
<tr>
<td>3.</td>
<td>150 mm thick WBM with Stone Metal Grade – I</td>
<td>1 hour</td>
<td>100 sqm</td>
</tr>
</tbody>
</table>

3.0 SURFACE FINISH

3.01 General

All works to be performed shall conform to the lines, grades, cross-sections and dimensions shown on the drawings or as directed by Engineer-in-Charge, subject to the permitted tolerances described hereinafter.

3.02 Horizontal Alignment

Horizontal alignment shall be reckoned with respect to the entire line of the carriageway as shown on the drawings. The edges of the carriageway as constructed shall be correct within a tolerance of +/- 10 mm there from. The corresponding tolerance for edges of the roadway and lower layers of pavement shall be +/- 25 mm.

3.03 Surface Levels

The levels of the sub-grade and different pavement courses as constructed, shall not vary from those calculated with reference to the longitudinal and cross-profile of the road shown on the drawings or as directed by the Engineer-in-Charge beyond the tolerances mentioned in Table – 4.
Table 4

<table>
<thead>
<tr>
<th>No.</th>
<th>Course</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sub-grade</td>
<td>+ 20 mm / - 25 mm</td>
</tr>
<tr>
<td>2</td>
<td>Sub-base</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Flexible Pavement</td>
<td>+ 10 mm / - 20 mm</td>
</tr>
</tbody>
</table>

Provided, however, that the negative tolerance for wearing course shall not be permitted in conjunction with positive tolerance for basic course, if the thickness of the former is thereby reduced by more than 6 mm for flexible pavement and 5 mm for concrete pavements.

3.04 Surface Regularity

The longitudinal profile shall be checked with a 3 metre long straight-edge at the middle of each traffic lane along a line parallel to the centre line of the road.

The maximum allowable difference between the road surface and underside of a 3 m straight-edge when placed parallel with, or at right angles to the centre line of the road at points decided by the Engineer-in-Charge shall be as under:

For WBM Sub-base / Base Course 8 mm

3.05 Rectification / Reconstruction of Defective Macadam

Where the surface regularity of sub-grade and the various pavement courses fall outside the specified tolerances, the contractor shall be liable to rectify these at their own cost in the manner described below and to the satisfaction of the Engineer-in-Charge.

3.06 Sub-Grade

Where the surface is high, it shall be trimmed and suitably compacted. Where the surface is low, the deficiency shall be corrected by scarifying the lower layer and adding fresh material and re-compacting to the required density.

3.07 WBM (Sub-base / Base Course)

Where the surface is either high or low, the course to its full thickness shall be scarified over the affected area, reshaped with added material or removed and replaced with fresh material and re-compacted to the required density. In no case shall depressions be filled up with screenings or binding material.

4.0 EARTH WORK

4.01a EARTH WORK IN FILLING

Earth work in filling in banks shall be done in layers, each layer not exceeding 20 cm in thickness and should be properly watered to maintain the optimum moisture content. Consolidation of every 3rd layer (alternate layer) and the top-most layer should be done with power roller of minimum 80-100 KN capacity and got approved by Engineer-in-Charge before compacting the next layer. Required quantity of earth should be obtained from borrow-pits, the sites of which should necessarily be approved by Engineer-in-Charge. No borrow-pits should be dug within 4.5 m of toe of the final section of the embankment. Necessary witness should be left for the purpose of measurement of quantity of earth excavated and used in embankment. Proper profiles of embankment shall be maintained. Requisite allowance in height varying from 25 – 50 mm as directed by Engineer-in-Charge shall be left for settlement. Side slopes shall be maintained strictly as per drawings.
4.01b Earthwork in filling shall be measured in compacted volume of finished work in cubic metres.

4.02 **EARTH WORK IN EXCAVATION**

**General**

All excavation shall be carried out in conformity with the lines, grades, side slopes and levels shown on the drawings or as directed by the Engineer-in-Charge. The contractor shall not excavate outside the limits of excavation. After excavation, the sides of excavated area shall be trimmed and the area contoured to minimize erosion and ponding, allowing for natural drainage to take place.

Rock, when encountered in road excavation, shall be removed up to the formation level. Rocks and large boulders which are likely to cause differential settlement and also local drainage problems should be removed to the extent of 500 mm below the formation level in full formation width.

4.03 **Disposal of Excavated Materials**

All the excavated materials shall be the property of the Employer. The materials obtained from excavation shall be used for filling in the adjacent embankments as directed by the Engineer-in-Charge. All hard rocks, not intended for use shall be stacked neatly on specified land as directed by the Engineer-in-Charge.

Unsuitable and surplus materials not intended for use shall be transported and disposed clear of the site as directed by the Engineer-in-Charge.

5.0 **PREPARATION OF SUB-GRADE**

The optimum moisture content should always be maintained by sprinkling requisite quantity of water in order to keep the sub-grade in established condition in accordance with the direction of Engineer-in-Charge. The sub-grade must not be allowed to become dry and break-up for want of cohesion. The final sectioning should be done to proper camber, gradient and super elevation with the help of template and strings. The rate of preparation and consolidation of sub-grade includes earth work in cutting and filling up to 22.5 cm thickness, if necessary, in order to achieve the desired profile. The dressed surface should be properly consolidated by rolling with power road roller of minimum 80-100 KN capacity.

6.0 **WATER BOUND MACADAM (SUB – BASE / BASE COURSE)**

6.01 **SCOPE**

This work shall consist of clean, crushed aggregates mechanically interlocked by rolling and bonding together with screening, binding material where necessary and water laid on a properly prepared sub grade and finished in accordance with the requirements of these specifications and in close conformity with the lines, grades, cross-sections and thickness as per approved plans or as directed by Engineer-in-Charge.

6.02 **MATERIALS**

6.02.1 **Coarse Aggregate**

Coarse Aggregates shall conform to the grading requirement as set forth in Table – 5

<table>
<thead>
<tr>
<th>Size of Aggregate</th>
<th>IS Sieve Designation</th>
<th>% by Weight Passing IS Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade – I (45 mm to 90 mm)</td>
<td>100 mm</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>80 mm</td>
<td>65-85</td>
</tr>
<tr>
<td></td>
<td>63 mm</td>
<td>25-60</td>
</tr>
</tbody>
</table>
6.02.2 Stone Screenings

Screening to fill voids in the coarse aggregates shall generally consist of the same material as the coarse aggregate. Screening shall conform to the grading requirements as set forth in Table – 6.

Table – 6

<table>
<thead>
<tr>
<th>Size of Screenings</th>
<th>IS Sieve Designation</th>
<th>% by Weight Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2 mm</td>
<td>13.2 mm</td>
<td>100</td>
</tr>
<tr>
<td>11.2 mm</td>
<td>95-100</td>
<td></td>
</tr>
<tr>
<td>5.6 mm</td>
<td>15-35</td>
<td></td>
</tr>
<tr>
<td>180 micron</td>
<td>0-10</td>
<td></td>
</tr>
</tbody>
</table>

6.02.3 Proportioning of Materials

Approximate quantities of coarse aggregate and stone screenings required for Water Bound Macadam base / sub-base course shall be as mentioned in Table-7.

Table - 7

(Quantity for 10 Sqm Area)

<table>
<thead>
<tr>
<th>Classification &amp; Size</th>
<th>Compacted Thickness</th>
<th>Net Quantity</th>
<th>Stone Screening</th>
<th>For WBM Sub-base / Base Course (Net Quantity)</th>
<th>Binding Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade – I 45 mm – 90 mm</td>
<td>100 mm</td>
<td>1.245 m³</td>
<td>Type-A (13.2 mm)</td>
<td>0.285 m³</td>
<td>0.10 m³</td>
</tr>
<tr>
<td>Grade – II 45 mm – 63 mm</td>
<td>75 mm</td>
<td>0.935 m³</td>
<td>Type-A (13.2 mm)</td>
<td>0.135 m³</td>
<td>0.09 m³</td>
</tr>
</tbody>
</table>

* Net quantity means – the quantity of metal measured in stacks and reduced by 7.5%.

6.03 CONSTRUCTION OPERATIONS

6.03.1 Preparation of Base

The surface of the sub grade / sub-base base to receive the Water Bound Macadam course shall be prepared to the specified lines grades & camber and made free of dust and other extraneous material. Any soft yielding places shall be corrected in an approved manner and rolled until firm surface is obtained if necessary by sprinkling water. Any sub-base/base/surface irregularities, where predominant shall be made good by providing appropriate type of profile corrective course (leveling course)

6.032 Spreading Coarse Aggregates

The coarse aggregate shall be spread uniformly and evenly upon the prepared sub-grade to proper profile by using templates placed across the road about 6m apart in such quantities
that the thickness of each compacted layer is not more than 100mm for Grade-I and 75 mm for Grade-II. Wherever possible, approved mechanical devices such as aggregate spreader shall be used to spread the aggregates uniformly so as to minimize the need for manual rectification afterwards.

The surface of the aggregates spread shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregates as may be required. The surface shall be checked frequently with a straight-edge while spreading and rolling so as to ensure a finished surface as per approved drawings.

The course aggregates shall not normally be spread more than 3 days in advance of the subsequent construction operations.

6.03.3 Rolling

Immediately following the spreading of the coarse aggregates, rolling shall be started with three wheeled Power Roller of 80-100 KN capacity or Vibratory Rollers of 80-100 KN static weight. The type of roller to be used shall be approved by the Engineer-in-Charge based on trial run Rolling shall be discontinued when the aggregates are partially compacted with sufficient void space in them to permit the application of stone screenings.

The rolled surface shall be checked transversely and longitudinally, with templates and any irregularities corrected by loosening the surface, adding or removing necessary amount of aggregates and re-rolling until the entire surface conforms to desired grade and camber. In no case shall be use of screenings be permitted to make up depressions. Material which gets crushed excessively during compaction or becomes segregated shall be removed and replaced with suitable aggregates.

6.03.4 Application of Screenings

After the coarse aggregate has been rolled completely, screenings to completely fill the interstices shall be applied gradually over the surface. These shall not be damp or wet at the time of application. Dry rolling shall be done while the screenings are being spread so that vibrations of the roller cause them to settle into the voids of the coarse aggregates. The screenings shall not be dumped in piles but be spread uniformly in successive thin layers either by the spreading motions of hand shovels or by mechanical spreaders.

The screenings shall be applied at a slope and uniform rate (in three or more applications) so as to ensure filling of all voids. This shall be accompanied by dry rolling and brooming with mechanical or hand brooms.

6.03.5 Sprinkling of Water and Grouting

After the screenings have been applied the surface shall be copiously sprinkled with water swept and rolled. Hand brooms shall be used to sweep the wet screenings into voids and to distribute them evenly. The sprinkling, sweeping and rolling operations shall be continued, with additional screenings applied as necessary until the coarse aggregate has been thoroughly keyed, well bonded and firmly set in its full depth and a grout has been formed of screenings. Care shall be taken to see that the base or sub-grade does not get damaged due to the addition of excessive quantity of water during construction.

6.03.6 Application of binder Material (Moorum / Stone Dust)

After the application of stone screening in accordance with Clauses 8.034 and 8.035 the binding material where it is required to be used shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept in with hand brooms or mechanical brooms to fill the voids properly and rolled during which water shall be applied to the wheels of the roller if necessary to wash down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids forms a wave ahead of the wheels of the moving roller.
6.03.7 Setting and Drying

After the final compaction of Water Bound Macadam course the pavement shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings or bending materials as directed, lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the macadam has set.
SECTION –VII C
TECHNICAL SPECIFICATIONS FOR EQUIPMENT

1. **Labels**

1.1 All valves, reduction gears and other similar items shall be labeled as to their function. The letters shall be engraved on the underside of a beveled colorless transparent plastic level not less than 3mm thick engraving being filled, and the underside painted and sealed to form a complete label having white letters with background to standard practices. A list of label designations shall be submitted to the Engineer for approval before manufacture.

1.2 All labels must be affixed to apparatus before final acceptance tests are carried out.

2. **Guarding of Shafts**

2.1 All rotating shafts, couplings, gears, flywheels, belt drives, etc. shall be fully guarded, and comply to the requirement of the Indian Factories Act.

Guards shall be designed to provide ready access to bearings, greasing points, thermometer pockets and other check points to allow routine observations to be made by the operating staff without danger or the need to dismantle any part of the guard. Hinged doors let into the guards with adequate fastenings shall be provided where necessary to facilitate access to the check points.

2.2 Guards shall be of mild steel of an approved gauge and be of the fully covered in type and securing arrangements for guards shall be of substantial construction.

2.3 All mild steel used in the production of guards shall be hot dipped galvanized and nuts, bolts, and washers shall be an ionized unless otherwise specified.

2.4. Drawings of guards etc. shall be submitted to the employer for approval before manufacture.

3. **GENERAL REQUIREMENT, WORKMANSHIP & DESIGN OF PLANT**

3.1 The plant shall be new, of sound workmanship and of robust design.

3.2 The General mechanical and electrical design of the plant and particularly that of the bearings, contacts and other wearing parts shall be governed by the need for long periods of service without frequent maintenance and attention being necessary.

3.3 Unless otherwise specified, all items of plant shall be rated for continuous service at the specified duties under the prevailing atmosphere and operational conditions on site.

3.4 All component parts of the plant shall be manufactured to a strict systems of limits and complete inter changeability of similar parts is required.

3.5 All parts subject to wear shall be readily accessible.

3.6 Provision shall be made for taking up wear in all bearings and other wearing-parts or for easy replacement if adjustment is not practicable. Ball & roller bearings shall be interchangeable all with
similar items from alternative makers. Parts list shall include alternative reference numbers & maker.

3.7 The positions of all greasing and oiling points shall be arranged so as to be readily accessible for routine servicing. Where necessary, to achieve this, suitable extension pipes shall be fitted, Lubrication grease points shall comprise hexagon headed nipples except where the lubrication required is of a special nature; in such event they shall be fitted with metal labels to indicate the special lubricant required. Where continual grease or oil feeding is required the capacity of the reservoir shall be sufficient for not less than seven days continuous service.

3.8 Suitable packers and/or shims shall be fitted for ease of adjustment and re-alignment of all machinery units; particular attention shall be given to combine sets.

3.9 Where fitted bolts, spigots or other means for precise location are not employed in the assembly of the plant, locating dowels shall be fitted on completion of erection, to the satisfaction of the Engineers.

3.10 All pipes shall be checked for alignment and matching of flanges or connections before being secured; they shall not be sprung into position.

3.11 If during the maintenance period any moving parts show, in the opinion of the Engineer, signs of undue wear or unsuitability for the purpose for which they are installed they shall be replaced free of cost notwithstanding that they may otherwise be working in a satisfactory manner.

4. STEEL STRUCTURAL

4.1 All steel structural shall conform to IS : 226-1962 except for M.S. Plates over 20 mm thickness which shall conform IS : 2062 - 1962.

4.2 Rails will be carbon or medium manganese steel, conforming to latest IRS T-12 or IRS -T-18 specification.

4.3 For detailing and construction of welded connections all provisions of IS : 816 (latest) & IS : 823 (latest) shall apply.

4.4 All rivets and bolts are to be generally of 20 mm or 22 mm dia, except where otherwise required or noted.

Where no load is shown in the trusses, bracings or latticed members, minimum 2 Nos. 20 mm dia, rivets, bolts or equivalent welding to be provided. Bolted connections shall be provided at temporary sides and ends where future extensions are indicated.

4.5 All connections are to be riveted, welded or fitted with high strength friction grip bolts except for hand rails and cat walkways which may be bolted (black bolts). Unless otherwise stated, all bolts under direct tension are to be provided with one spring washer.
5. **Bolts and Nuts**

5.1 M. S. bolts and nuts shall conform to IS : 1363, 1364 and 1367 (latest). All nuts, bolts and washers coming in contact with water shall be anodized/galvanized by process which does not make the threads uneven. All bolts, nuts and washers coming in contact with any corrosive liquid or in corrosive atmosphere shall be made of stainless steel, 316 or Nylon depending upon the nature of the service.

6. **Chequered Plates, etc.**

6.1 These shall be manufactured from structural steel complying with the requirements of IS : 226. They shall be of specified size, thickness and pattern as per relevant drawings or as directed by the Engineer. For cover plates, stiffeners shall be provided where necessary or as detailed in the drawings. Cover plates will generally be chequered plates (unless otherwise specified) with or without stiffeners. If required and necessary, the Contractor shall also prepare detailed floor plans for the layout of the cover plates for floors and platforms so as to include all openings, outs, etc. and so as to match the patterns of adjacent cover plates to raise the cover plate on sides, so as to provide slopes in the floors and platforms to drain away any liquid falling on the floors and platforms. It such cases, slopes shall be provided as shown in the drawings or as directed by the Engineer. Necessary gutters at the ends of platforms shall be provided for sloping floors and platforms as shown in the drawings or as directed by the Engineer. Where necessary, kerbs of flats shall be provided around openings and cuts so as to prevent liquids falling to lower floors and platforms.

7. **Open Thread Mesh Plating**

7.1 The Contractor shall supply and install galvanized (hot dipped after fabrication) mild steel open thread mesh flooring at pipe trenches and on the rotating bridge decking including all kerbing. The plating shall be designed to withstand a maximum uniformly distributed load of 1000 kg/m². The plating shall be divided into panels weighting not more than 50 kg. and each complete with nosing all round. Cut outs shall be provided and trimmed so that the plating may be removed without disturbing the machinery.

8. **HAND RAILING**

8.1 Double rows of 30 mm, dia. G.I. tubular hand railing fixed in C. I. Stanchions shall be provided on the edge of the 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, C.I. Stanchions and hand-railing layout shall be of architectural design with pleasing appearance.
9. Painting (Steel Structures)

9.1 The recommendations contained in IS : 1477 - “Code of Practice for painting”

9.2 Surface preparation. The surface, after preparation, shall be given two coats of red lead primer before painting.

9.2.1 Paints shall only be applied to surface which have been adequately prepared as defined in this specification.

9.2.2 All surface to be painted shall be thoroughly cleaned and dried. No painting shall be carried out in damp weather, or whilst dampness prevails from any cause, or during adverse weather conditions such as dusty, windy weather or dew, rain and such moist atmosphere prevails.

9.2.3 The surface to be painted shall be cleaned of all rust, dirt, loose mill scale, oil, grease, or any other foreign matter which might affect the painting. After completion of the pre-cleaning, the surface shall be immediately covered with the primer.

9.2.4 Where the coat of the primer has been damaged exposing original metal surface, a fresh primer coat shall be applied after cleaning.

9.3 Application of Paints or Primer

9.3.1 Priming coat shall be applied by brushes, under coat and finish coat shall be applied by spray painting or brush. Painting by rags or cloth is not allowed, Areas adjacent to spray painting shall have protection from blown spray.

9.3.2 Before drawing the paint from the container it should be well stirred and should be stirred at intervals in a smaller container used for painting with smooth clean stick while it is being applied by brush.

9.3.3 In no case subsequent coat or coats shall be applied over another until the previous coat has been left for at least 24 hours for drying.

9.3.4 Coverage of paints (sqm/litre) shall be governed by the manufacturer's specification.

9.4 Material specification - Primer and synthetic Enamel Paint

9.4.1 The primer coat shall be of red lead primer unless otherwise specified.

9.4.2 Synthetic Enamel Paint shall be a high gloss alkyd enamel with excellent flow and quick drying properties offering outstanding exterior durability under varying weather conditions. This paint should be suitable for all types of surfaces over respective primers and under-coatings.

Compositions - The material shall be based on synthetic resins. It shall be free from nature resins or modified natural resins and shall be of such a composition as to satisfy the requirement of I.S. 2932.

9.4.3 Where contact with water is expected, the metallic surface shall be protected with anticorrosive epoxy paint as instructed as approved by Engineer.
9.5 Preparation of paints

All paints shall be thoroughly and carefully stirred and mixed before use in accordance with the manufacturer’s recommendations. Thinners shall only be added to paints as and when recommended by the paint manufacturer.

9.6 Storage of Paints

All the paints shall be stored in Air-tight containers, precautions shall be taken by the Contractor against any possible fire hazards.

The Contractor will take care to see that whenever the paint container is opened the entire quantity of the paint is used for the day’s work in order to ensure that fresh paint is used every day.

The Contractor shall not be allowed to bring into the site those containers of paint which are not sealed by the paint manufacturer or those on which the manufacturer’s seal is broken.

9.7 Extent of Painting

All structural steel work like frames, bridge, stirrer, railing, ladders, platforms piping supports structures, reduction gears, pumps, etc. associated with the plant shall be painted.

9.8 Inspection

Each coat of paint shall be inspected and approved before the succeeding coat is applied. If any defects are observed, the portion will be repainted by the Contractor, after removing the old paint

9.9 Colour Code This will be decided by the employer and informed to the Contractor before starting the job.

9.10 System of painting

Following system shall be followed for painting of all metal parts and all priming. Over coating and finishing paints shall be of well known make. The Contractor shall furnish the details of paints to the Engineer for approval of paints before commencement of painting work.

<table>
<thead>
<tr>
<th>I. SUBSTRATE :</th>
<th>STRUCTURAL STEEL /CAST IRON</th>
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<tbody>
<tr>
<td></td>
<td>Primercoating</td>
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194
System A: Red Lead
- Approved quality Primer (one coat)
- Approved quality Synthetic Enamel (3 coats)

(to be followed by Primer until otherwise specified)

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<thead>
<tr>
<th>System A</th>
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<tbody>
<tr>
<td>Red Lead</td>
</tr>
<tr>
<td>Approved quality Primer (one coat)</td>
</tr>
<tr>
<td>Approved quality Synthetic Enamel (3 coats)</td>
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</tbody>
</table>

Total D.F.T. = 150 microns

Drying = 24 hours between coats.

Systems B: Each Primer Zinc Chromate
- Approved quality Primer (one coat)
- Approved quality Synthetic Enamel (two coats)

<table>
<thead>
<tr>
<th>Systems B</th>
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<tbody>
<tr>
<td>Each Primer (one coat)</td>
</tr>
<tr>
<td>Zinc Chromate Primer (one coat)</td>
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<tr>
<td>Approved quality Synthetic Enamel (two coats)</td>
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Thickness of metallic coat of zinc to a thickness of 25 microns

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<tr>
<th>Systems B</th>
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<tbody>
<tr>
<td>Each Primer (one coat)</td>
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<tr>
<td>Zinc Chromate Primer (one coat)</td>
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<tr>
<td>Approved quality Synthetic Enamel (two coats)</td>
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</table>

(0.075 mm) Total D.F.T. = 100 microns

Drying - Each primer to overcoated within 2 hours:

Give 12 hours drying between subsequent coats.

System C

(in case of damage to steel work during transportation assembly, storage etc.)

System D

(for parts immersed under water, metal to be cleaned by shot blasting)

II. SUBSTRATE

System E: Pretreatment

Metal pretreatment solution (one coat).

**Primining**

Approved quality Primer (one coat) 25 microns

Patch prime and finish bare metal as per the existing.

**Finishing**

Approved quality pitch epoxy coating

(two coats)

200 microns

Total D.F.T. = 225 microns. Drying = 24 hours between coats Full Cure = 7 days.

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<table>
<thead>
<tr>
<th>System A</th>
<th>(to be followed)</th>
<th>Red Lead</th>
<th>Approved quality Primer (one coat)</th>
<th>Approved quality Synthetic Enamel (3 coats)</th>
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<td></td>
<td>Total D.F.T.</td>
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<td></td>
<td>= 150 microns</td>
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</table>

Drying = 24 hours between coats.

<table>
<thead>
<tr>
<th>Systems B</th>
<th>Each Primer (one coat)</th>
<th>Zinc Chromate Primer (one coat)</th>
<th>Approved quality Synthetic Enamel (two coats)</th>
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(0.075 mm) Total D.F.T. = 100 microns

Drying - Each primer to overcoated within 2 hours:

Give 12 hours drying between subsequent coats.
ZINC OR GALVANISED IRON OR ALUMINIUM

(Parts not immersed under water)

<table>
<thead>
<tr>
<th>Priming</th>
<th>Overcoating</th>
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<tbody>
<tr>
<td>Each Primer</td>
<td>Zinc Chromate</td>
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<tr>
<td>(one coat)</td>
<td>Primer</td>
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<tr>
<td></td>
<td>(one coat)</td>
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<tr>
<td>25 microns</td>
<td>25 microns</td>
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<tr>
<td>Total D. F.</td>
<td></td>
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<tr>
<td>T.</td>
<td>= 100 microns</td>
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</table>

Finishing Approved quality Synthetic Enamel (two coats) 50 microns

Drying = Each primer to be over coated within 2 hours, Give 12 hours drying between subsequent coats.

10 Coupling

10.1 The tenderer shall provide the coupling for motors and pumps together with a suitable guard complying with BS : 1943 and BSC : 3004. The material of the guard shall be of anti-spark types. Couplings shall incorporate all necessary flexibility for axial, lateral and torsional movements to deal with the shock vibratory and driving requirements of the transmitted loads.

11. Sluice Valves and Penstocks

Sluice Valves and penstocks shall be provided with brass direction indicator plates fixed at the centre of the hand wheels with G. M. cap nut, where hand wheels are not provided.

13. Reflux Valves

13.1 The reflux valves shall be of robust construction and shall be of the single door/multi door swing check pattern. It shall be tested to a pressure of 14 kg/cm2. The body, cover and hinge shall be of cost iron (not less than grade 20 of IS: 210) and the hinge pin of bronze, and the seat ring in the body of gunmetal; larger sizes shall have cast iron door with gunmetal ring. The internal assembly of the reflux valve shall be such that it can be lifted bodily out of the valve without disturbing the pipeline. Reflux valves (300 mm bore or above) shall be provided with bye--pass arrangement of proper size. All reflux valves upto 600 mm bore shall be single door type. All valves above 600 mm bore shall be of multiple door type. Reflux valves shall be installed horizontally unless otherwise specified. An arrow showing the direction of flow shall be cast integral with the valve housing.
14. Jointing

14.1 The jointing shall be made with compressible rubber (IS : 638) of thickness 3mm, bolts and nuts. The bolts and nuts shall be of mild steel and these shall conform to IS : 1362 and 1363 unless otherwise specified.

14.2 The bearing surface of the nuts shall be smooth and the nuts shall be taped at right angles to the surface to ensure axial loading. Bolts and nuts shall be coated with a rust preventing lubricant after threading of tapping.

15. C.I/P.V.C/H.D.P.E/A.C. Pipes & Specials

15.1 The design manufacture shop testing, erection testing and commissioning of all piping and special shall conform to the following:

C.I. Pipes (Socket & Spigot)IS : 1536
   (L. A. Class)

C.I. Pipes (Flanged - Class A) IS : 1537

C.I. Fittings (Socket & Flange
   medium class ) IS : 1538
   Mixed Steel Tubes \, Tubulars and
   Other wrought steel fittings IS : 1239
   Electrically welded steel Pipes IS : 3589
   High Density Polyethene Pipes (Series II) IS : 4984
   Unplasticised P.V.C. Pipes IS : 4985
   Asbestos Cement Pressure Pipes (Class II) IS : 1592

16. Pipe Work

16.1 Pipes and fittings for filter pipe gallery, wash water supply, wash and waste water pump suction and deliveries shall be of cast iron flanged and/or S & S and suitable for the maximum working pressure, including surge pressures. On the wash main an expansion joint of approved design at the appropriate position shall be provided. Pipe with puddle flanges shall supplied in all cases where the pipes pass through the walls of the water retaining and basement structures. Detachable fixtures shall be provided whenever possible for ease of maintenance.

16.2 Small bore pipes for pump vents, cooling water supply, etc. shall be of heavy gauge galvanized iron. Galvanized iron pipes upto 50 mm bore may be supplied with screwed and socketed joints, larger sizes shall have screwed flanges.
16.3 Copper pipes upto 25 mm bore may have compression rings, larger sizes shall be flanged.
16.4 All pipes to pressure vessels etc, shall have flanged connections.
16.5 All pipe works shall be supplied to the limits specified.
16.6 The layout and design of the pipe work shall be such as to facilitate its erection and the dismantling of any section for maintenance. Where a common delivery is used, individual pump delivery branches shall be joined to it in a horizontal plane. Adequate supporting arrangements for all pipes shall be included except in cases where they can more conveniently be supported on concrete cradles to the Contractor’s design.

17. Grouting

17.1 Tenderer will include in his price all cost for labour and materials for grouting in all fixings, pipes and any other fittings at the time of construction work. The Contractor will make arrangements for delivery of such items which will be grouted in the building work in time so that construction work can proceed smoothly without any interruption whatsoever.

18. Supports & Fixings

18.1 All supports, fixing bolts, screws and other fixings shall be provided by the Contractor and his price shall be inclusive of such items.

19. Driving Unit Support

19.1 Each driving unit shall be supported on a cast iron or fabricated steel frame or guide rails as appropriate. The fabricated frame shall be constructed to afford adequate access to the coupling between the driving motor and driven unit.

20. Dissimilar Metals

20.1 Where metals of dissimilar character are used in construction, precautions shall be taken to prevent deterioration of the structures due to electrolytic action.

21. Bearings

21.1 Bearings shall be of type, size and construction to ensure that the plant and equipment of which they form part shall operate efficiently and continuously under normal operating conditions without overheating and with minimum inspection and attention.

21.2 Housing and enclosures of bearing assemblies shall be suitable for the worst atmospheric conditions in which they are required to work. All ball and roller bearings shall conform to the International Boundary Plan (ISO). Liners and bushes of plain bearings shall be easily renewable.

21.3 Provision shall be made for ready lubrication of all contact surface having relative movement.
Contact surface of bearings and the lubricant shall be such that there is no corrosion, electrolytic action or excessive wear.

22. Speed Reducers

22.1 All reduction gear boxes shall be of approved make and design with service factor not less than 2.0 and shall be continuously rated. Extra roller bearings to be provided so as the cater for overhung load. All speed reducers shall be of heavy duty type design. All gears shall be capable of transmitting starting overload 100% (minimum). Gears subject to axial thrust shall not be fitted with keys for location. Shaft shall be fitted with oil and dust seals. All gear boxes with oil bath lubrication shall be equipped with dipstick, drain plug and breather. Speed reducer with vertical output shaft shall be of heavy duty “Stirrer Class”.

23. Lubrication

23.1 In designing the equipment, consideration shall be given to ensure that adequate lubrication is achieved with the minimum of attention. The central turntable assembly /wheel bearings shall be pre-packed with ample quantity of grease of appropriate grade and as far as practicable parts shall be so designed that these are not required to be lubricated more frequently than once per month. Adequate provision shall be made for the lubrication of the bearings from convenient points on the bridge decking.

23.2 All equipment, pipelines and fittings for lubrication system shall be manufactured from corrosion resistant materials or shall be suitably protected against corrosion.

23.3 Lubricating oil, grease and graphite paints and seals which require manual replenishing shall be clearly visible and readily accessible. Units to be filled with oil shall be arranged for easy filling without spillage. Protection shall be provided to prevent excess lubricant dripping into platforms and floors. Where connections have to be broken frequently and loss of oil is possible, connections shall be self sealing.

23.4 The grade type and frequency of lubrication to be used shall be stated on metallic lubrication parts permanently attached to the plant. Lubricating oils and grease shall be designated by approved trade name or in terms of mineral, vegetable, animal or blends of these basis together with their viscosity and flash point characteristics and not as ‘Light’ or ‘Heavy’.

24. Couplings Drives & Clutches

24.1 Couplings shall incorporate all necessary flexibility for axial, lateral and torsional movements to
deal with the shock vibratory and driving requirements of the specified transmitted loads.

24.2 All couplings shall be guarded. In couplings of the male/female type, the male section shall be located at the driving end of the coupling.

24.3 Rigid shaft couplings shall have minimum of six bolts and each half shall be marked to indicate it matching half coupling.

24.4 Flexible couplings exposed to dust shall be fitted with oil resisting muff.

24.5 Couplings used for connection of electric motors to drive machinery shall be of the flexible type in cases where a break on the coupling is incorporated, this shall be located on the driven half of the coupling.

24.6 Fluid couplings shall be equipped with a fluid level indicator, Type of fluid required shall be indelible marked on the coupling casing.

24.7 Plates clutch couplings shall be fully engaged and shall be steel bronze type running in oil, or dry type with steel plates and dices with non-metallic facings.

24.8 All belts used on belt drives shall be of the endless type. The number of belts used shall be sufficient for the transmitting load without slip or overheating. Tension on multi belt drives shall be uniform and facilities shall be provided to enable assessment to be made to ensure uniform tension. Without slip, Jocky tensioning devices shall not be used.

24.9 Chain driven shall be of the case hardened roller type and be simplex, duplex or triplex as necessary for efficient and quiet transmission of the specified loads. Wheels used on chain driven assemblies shall have precision machine cut teeth. The assemblies shall incorporate facilities for chain adjustment to take up roller wear.

24.10 All pinions, wheels and couplings shall be pressed on to the associated shaft and keyed as necessary, or make solid with the shaft.

25. Centrifugal Pumps

25.1 The pumps shall be designed to give prolonged running at the specified output under site conditions. The pumps shall be manufactured and tested as per IS : 6595 and other relevant Codes. Waterways through the pumps shall be smooth in finish and free from recesses and obstructions. The pumps shall be so placed that these can be put into operation without priming and that these shall not draw air under any condition.

25.2 Eye rings and wearing plates wherever used shall be of substantial construction and renewable.
25.3 The rotating elements shall be statically and dynamically balanced before final assembly.

25.4 The impeller shall be readily withdrawable from the pump casing without the need to disconnect the adjoining pipe work and with minimum disturbance to pump drive shafting. This provision is particularly applicable for recirculation pumps and sludge pumps.

25.5 The suction arrangement shall be such as will avoid pre-rotation in the suction pipe work and present a good flow pattern at the entrance to the impeller. The NPSH requirement shall be satisfied keeping a margin of 0.5 m. at least.

25.6 Pump bodies, impellers, covers, brackets, bearing blocks, wearing plates, eye-rings, supports, etc. shall be of best quality closed grained cast iron (not below grade 20 of IS: 210) for wash water pumps while these for sludge / recirculation pumps shall be with NPSH requirement to be satisfied keeping a margin of 0.5 m. at least and “non-clog, back pull out”, horizontal, centrifugal type with material of construction as follows:

- Casting - CI IS 210 FG 260
- Impeller - Stainless Steel 316
- Shaft - C 40

Pumps casings shall be substantial construction to give long life under all types of working conditions, Special care shall be exercised in the manufacturing process to avoid undue stress being set up in the finished product.

25.7 Shafting shall be of adequate sizes and proper material to avoid the possibility of fatigue failure and shall be shock and corrosion resistant for pumps handling corrosive liquid.

The shafts of pumps fitted with conventionally packed glands shall be made specially wear resistant by providing suitable stainless steel or equal sleeves. Intermediate shaft (wherever used) shall be made up in suitable lengths coupled together with a steady bearing adjacent to each coupling.

For vertical single entry pumps a short length of shafting above each pump shall be readily removable to facilitate the withdrawal of impeller.

25.8 Glands may be fitted with conventional soft packing. Means for readily removing lantern rings, where fitted, such as tapped holes, shall be provided. Conventional packed glands shall be provided with water flushing or spring loaded non-return greasing arrangements. The lantern rings for soft packed glands shall be provided with means for ensuring their correct location and for checking this under running conditions. A sufficient number of turns of packing shall be allowed above and below
the lantern ring to avoid wastage of grease include flushing water, pipe work, fittings, valves, etc.

25.9 Air release arrangements shall be fitted from the high point of the pump casing (and else if considered desirable by the manufacturer). The pipe work shall be not less than 20 mm nominal bore. The discharge from the air release pipe work shall be arranged to avoid striking platforms and ladders. A shut off valve of saunders required full bore straight through type, or equal approved, shall be fitted at the high point(s). Above this valve shall be fitted a bronze check valve of approved nature. The air release pipe work shall be fitted with crosses to facilitate rodding. Where this pipe work passes through a wall into a wet wall the bore shall be increased to 25 mm and it shall be terminated with an elbow directed downwards.

25.10 The pump drainage arrangements shall be fitted as close to the lowest point of the pump suction as is practicable. The drain valve shall be not less than 50 mm bore, Drainage pipe work shall be led to the floor drainage system and not discharge direct to the floor.

25.11 Gland drainage arrangements shall be fitted; the drainage parts shall be not less than 12 mm bore. Pipe work shall be led to the drainage system.

25.12 Detachable plates shall be fitted around the gland access areas to confine any liquid which may be thrown out in the event of gland failure.

25.13 Air release and pump drainage pipe work shall be of G. I. pipe work unless otherwise directed.

25.14 Pressure and compound gauges of approved make shall be fitted to each pump. The gauges shall be mounted on a mahogany base bracketed to the pump casing, unless otherwise specified.

The diaphragm body shall be screwed to Saunders type 25 mm full bore straight through pattern cast iron diaphragm valve, or equal approved. The valve shall be attached to the pipe work at the gauge tapping points.

Pressure gauges shall have scales reading meter head of water and in kg/cm2. Compound gauges shall additionally read upto 759 mm of mercury vacuum.

25.15 the drive motor, switch gears electrical works required for the completion of the job shall be carried out as per technical specification stated in section H.

26. Road Weigh bridge

26.1 Road weighbridge shall be designed, assembled and tested in accordance with the relevant Indian Standards (IS:1435 and 1436). The Road weighbridge shall be outdoor type weighbridge
having dial with indicating and recording attachment and consisting of platforms not less than 6 M x 2.5 M. width. The minimum graduation shall be 10 kg. Printing mechanism shall be electrically operated suitable for 230 volts, single phase, 50 cycles A. C. supply. The instrument shall be installed complete with all necessary electrical works namely, cabling, switches, earthing, etc. The electrical works shall be carried out in accordance with the specification given in section H.

26.2 The indicating devise of the weighbridge shall be dial type, shock resistant with suitable device for controlling indicator oscillation.

26.3 Recording mechanism shall be so that it can print on both ticket and internal control paper tape weight, consecutive number and one hand set code letter.

The design shall be of non-self contained lever mechanism having levers suspended from reinforced concrete pedestals.

All main levers and transons shall be made of heavy duty cast iron conforming to IS: 210 - 1962 grade 20.

26.4 The weighbridge shall be made of robust constructions having ample safety margin over and above the weighing capacity.

26.5 All longitudinal thrusts should be harmlessly absorbed by a suspension design by allowing the levers to swing in the direction of the traffic.

26.6 The platform shall be of mild steel, roughened 12 mm thick, arranged in convenient lengths. The platform shall be preferably supported by longitudinal joists and cast iron transverse support members. The verges shall be bolted to this. Meeting surfaces of verges and transions shall be machined for perfect alignment.

26.7 The indicating mechanism shall be housed in a dust and moisture proof cabin.

The graduations shall be black on white chart. The weight to be indicated on a 750 mm (approx.) diameter indicating chart.

The indicator shall provide shadow less line to line indication of weight.

The total capacity shall be obtained by replacement unit weights together with consecutive number or code of letters to identify each weighing on a ticket and control tape.

The weight recording shall be prevented until the weight a hand lever situated at the side of the cabinet. The machine shall automatically charge the major figures on the chart at the time of operating unit weights.
26.8 The machine shall be fitted with a self-contained manually or electrically operated recording mechanism. This mechanism shall not have any connection with weighing mechanism except at the instant of reading weight.

The recording mechanism shall make a printed record of weight pointer it at rest by incorporating a suitable safe guarding device in recording mechanism.

The work error shall be printed if the printing handle is pressed while the pointer lies on the under graduated portion of the dial. The time cycle of printing mechanism shall not be more than 4 seconds after arrival of the weight pointer at rest.

The cabinet shall be of cast iron and sheet metal finished in enamel paint. The length of the control, tape shall be sufficient to give at least 5000 impressions.

26.9 The road weighbridge shall be installed slightly above the road level. The accumulated rain water from the main pit has to be bailed out by a suitable bilge pump in case drainage by gravity is not possible due to site condition. Tenderer shall provide one set electrically operated bilge pump (one in action and one stand by) complete with all pipe work for drainage up to the nearest drain.

26.10 The contractor shall after commissioning, maintain the weighbridge in a lawfully running condition paying the statutory charges /fees to the legal Metrology Department of the Government of West Bengal and shall also keep a number of weights at the weighbridge as specified by the said Department. The maintenance shall continue till completion of the maintenance period of 12 months.

27. Weighing Machine

27.1 The platform type weighing machine shall have a dial not less than 500 mm diameter. The platform shall not be less than 900 mm square. Indicator graduation shall be 1000 kg x 2 kg. The indicator shall provide shadow less line to line indication of weight. Platform shall be of cast iron and it shall be mounted on ball bearings. Strong back rail shall be provided on the platform, Scale shall be mounted on four cast iron wheels enclosed in a cast iron frame. Machine shall be capable of absorbing shock loading. The whole mechanism shall be housed within adjust proof and moisture proof housing. The instrument shall be suitable for using in corrosive atmosphere and handling alum. A locking device shall be provided to prevent damage to the indicator mechanism during movement of scale.
SECTION - VII D

PUMPING MACHINERY

1. The pumping machinery of the prescribed type and capacity should be supplied erected and commissioned including maintenance for a period of 30 days working @ 8 hours per day at optimum conditions so as to perform the required characteristics. The scope includes getting approval to the lay out drawings etc. by Chief Electrical Inspector and incoming and outgoing power connections.

1.1. CENTRIFUGAL PUMPS:

The centrifugal pumps should be of reputed make approved by Department conforming to relevant I.S. Specifications (1520-198).

The motor should be of reputed make conforming to I.S. 325-1978 approved by Department. Vacuum gauge on the suction side and pressure gauge on the deliver side of suitable range shall be fixed.

1.2 SUBMERSIBLE PUMPS:

The submersible pump sets should be of reputed make approved by Department conforming to relevant I.S. (8034-1989) specification or any higher standards.

The characteristic curves for the efficiency of motor, pump and combined system efficiency should be furnished to the Engineer-in-Charge before procurement of pumps.

1.3 ACCESSORIES:

The pumps should be supplied with all the necessary accessories duly mounted and inter connected on a suitable sized control panel made out of M.S. angle irons and M.S. sheets as given below. The accessories should be of reputed make and best quality and preferably as given below:

D.O.L / Star Delta / Auto transformer Starter of reputed make approved by Department.

Ammeter
Voltmeter
Power factor metre of best quality.
Indicator Lamps.
H.R.C. Fuses.
Incoming and outgoing switches.
Dry running preventer / Safe guard.
Capacitor.
Single phase preventer / Safe guard.
Water level guard.
PVC/Submersible cables for incoming, outgoing connections.
Required spares for motors, pumps, starters and switches for continuous operation for a period of three years shall be supplied.

Operating tools as detailed below for routine maintenance of the pumps and motors shall be supplied. The tools shall be mounted on T.W. board and shall be provided with a door with weld mesh and lock and key arrangement. Tools are: Ring spanner 3/16 “to 1” set double ended spanners. 3/16 “to 1” – set. pipe wrenches 18” long –1 pipe Wrenches 24” long-1”, Insulated cutting plier (8”,10”) – 2 Nos, 2 Kg, hammer – 1 Kg. 1 No, nose plier 8”-1, flat rough file with handle 10”-1, half round smooth file with handle 10”-1, Round rough file with handle 10”-1, Adjustable spanner 6”-1, Adjustable spanner 10”-1.

1.4 ERECTION:
1.4.1 In the case of centrifugal pumps the pump set should be fixed on to the standard base plate fixed over concrete bed as per drawing and specified in division 6 of section VIIA. The pumps should be erected on a perfect horizontal plane without any tilt. The pipes, specials, valves required for suction and delivery connections shall conform to I.S. specifications as specified in Division 7 of section VIIA. The suction and delivery pipes should be fixed without any eccentricity duly cleaned. All the joints should be water tight without any loss of pressure.

The submersible pump (if required) should be erected to perfect plumb and safely clamped on the top. A non-return valve should be fixed on the delivery main along with a pressure gauge.

1.5 EARTHLING:
All electrical fixtures shall be suitably earthed in accordance with I.E. Act, 1910 and Rules there under as amended from time to time.

1.6 TESTING AND COMMISSIONING:
1.6.1 After completion of erection the pipe connections shall be cleaned and painted with two coats of anticorrosive paint.

The pump after erection should be commissioned and tested working for 8 hours/day for a continuous period of 30 days so as to perform the designed characteristics. It should deliver the required discharge at the designed delivery head only and the pressure head should not be higher than that which will detrimental to the pumping mains.

1.7 PIPE CONNECTIONS:
Velocity of flow in suction and delivery pipes shall be limited to 1.5 to 2.0.
SECTION – VII E

General Conditions for Erection & Commissioning

1. Unloading, Handling & Storage

1.1. The Contractor shall be responsible for the delivery at site/sites of all equipment, material and supplies required for the fulfillment of the contract upto handing over of the plant to the Employer.

1.2. The Contractor shall at his own expense and responsibility transport or shift to plant site, all materials, equipment and supplies furnished for the purpose of this contract. All movement of materials and equipment to and from storage shall be at the expense of the Contractor. Space for storage facilities will be provided by the Employer at the site of the work as available. If the Contractor does not promptly shift and place for use in the premises, where the work is to be done, any material, equipment or supplies delivered, the Employer may do so, and charge all the costs thereof to the Contractor and in any event the Employer shall not be responsible for any damages, arising out of, or in any way connected with such shifting or placing of the same. The Contractor shall further after shifting, unpack the materials, verify contents against invoices and notify shortages or breakages to the Engineer within one week of the receipt of materials and equipment at site, failing which the Contractor shall be held responsible for any consequences.

1.3. If requested by the Engineer, the planned method of transport of equipment shall be submitted to the Engineer for approval. This approval shall not relieve the Contractor of any responsibility for the safety of the equipment and personnel.

2. Contractor Remaining Informed as to Conditions

2.1. The Contractor shall inspect, examine, obtain all information and satisfy himself regarding all matters relating to the execution and maintenance of the works to be carried out under the contract or any hindrances or interferences to or with the construction or maintenance of the works from any cause whatsoever including any other operations of works which may or will be carried out on or adjacent to the site of the works before or during the construction or maintenance of the works under the contract and shall make allowance for all such contingencies in the contract price and will not raise any claims or objections against the Employer in respect of any of the matters mentioned above.

2.2. The Contractor shall take field measurements when or where necessary before detailing, ordering or fabricating any material.

2.3. The acceptance of the order or making of a contract will be construed as evidence that such an examination was made and later claims for labour, equipment or materials required or for difficulties
encountered, which could have been foreseen, will not be allowed.

3. Prosecution of the Work

3.1 The Contractor shall furnish adequate, courteous and competent labour, supervisors and engineers of all classes for the duration of the work to maintain progress of erection in accordance with the requirement of the scheduled completion date, and shall begin the work included in the contract at such time as well ensure its completion as specified and shall complete the same, free of all liens and charges, at or before the time specified for completion. The Contractor shall make available qualified engineers for placing the equipment in operation, carrying out the necessary tests and trials and the training of Employer's operating staff, as directed by the Superintending Engineer.

3.2 The Contractor shall be completely responsible for the satisfactory construction, erection, testing and commissioning of the works notwithstanding that he may have been assisted by the Engineer in doing so.

4. Work Performed At Contractor's Risk

4.1 The Contractor shall take all precautions necessary and shall be responsible for the safety of the work to be performed by him, and shall maintain all lights, guards, signs, temporary passages, or other protections necessary for the purpose. The Contractor shall be responsible for any loss or damages to his personnel, materials, tools or other articles used or held for use in connection with such work. Such work shall be carried on to completion without damage to any work or property of the Employer or of others and without interference with the operation of existing machinery or equipment.

5. Constructions Tools, Equipment and Site Facilities

5.1 The Contractor shall, at his own expense, furnish all necessary false work, erection tools, hoist, cranes, air compressors, rigging, skids, cribbing, blocking, scaffolding, sheet piles, equipment, appliances, materials and supplies required for erection and/or testing for performances and start up (hereinafter in this section called 'construction tools and equipment') that may be required to accomplish the work under contract unless otherwise provided for. Adequacy of such shall be to the entire satisfaction of the Engineer.

5.2 All piping for service, and drinking water to work area shall be furnished, installed and maintained by the Contractor at his own cost. He shall also furnish, install and maintain at his own cost the power lines, junction boxes or any other electrical receptacles, apparatus or equipment from starting points, to his area.
5.3 The Employer shall not be responsible or held liable for any damage to person or property consequent upon the use, misuses or failure of any construction tools and equipment used by the Contractor or any of his sub-contracts, even though such construction tools and equipment may have been furnished, rented or loaned to the Contractor or any of his agents by the Employer. The acceptance and/or use of any such construction tools and equipment by the Contractor or his agents shall be construed to mean that the Contractor accepts all responsibility for an agrees to indemnify and save harmless the Employer from said use, misuse or failure of such construction tools and equipment for which the Employer may be liable.

5.4 The Contractor shall bear and pay all charges including freight, clearing, insurance, duty on all construction tools and equipment furnished by him.

6. Travelling and Living Expenses

6.1 The contract price shall include all salaries and wages, all travelling time and expenses and boarding and lodging allowances for all personnel furnished by the Contractor and all payments which the Contractor may have to make in relation to the work of the labourers and other personnel employed for complete installation.

7. Simultaneous Work by Others

7.1 The Employer reserves the right to perform or have performed in and about the works during the time when the Contractor is performing his work hereunder such other work as the Employer desires and the Contractor shall make all reasonable effort to perform his work hereunder in such manner as will enable such other work to be performed without hindrance from the Contractor and will make no claim for damages against the Employer arising out of such other work or interference therefrom. The Contractor will work in harmony with such other contractors regardless of race, religion, colour or national origin and any dispute between contractors shall be arbitrated by the Employer if necessary.

8. START-UP AND GUARANTEES

8.1 Until such time as the equipment or material installed and erected under the contract is finally accepted by the Employer in keeping with the terms and conditions of this contract and associated specifications the responsibility for proper testing, maintenance and efficient operation of the same shall be that of the Contractor. Prior to start-up, the Contractor shall be required to service the equipment and during start-up render such assistance as may be necessary or requested for by the Employer.

8.2 Where the equipment has not been manufactured by the Contractor, the manufacturer's recommendations for installation of the same shall be strictly adhered to and any defects developing
due to faulty installation and/or erection during start-up or during a trial run and period of one year from the date of commissioning shall be rectified, remedied or made good by the Contractor through the manufacturer if considered necessary by the Employer at his own expense. When the equipment has been manufactured by the Contractor Himself, Rectification Within Similar Period Is Compulsory.

9. Employer Use of Equipment

10. Removal of Debris

10.1 The Contractor shall at all times keep the site free of rubbish, debris and surplus materials so as to render the place of work clean and safe for all personnel working in that area and upon completion of the work shall remove all rubbish and waste materials resulting from his work and leave the works and work site on a clean and finished condition. If the contractor fails to comply, such work will be performed by the Employer at Contractor’s expense.

10.2 Whenever demolition or other work of any kind creates harmful dust or fumes, equipment for the complete protection of all personnel and property against dust fumes shall be installed, maintained and effectively operated by the Contractor as required by statute.

The Employer shall have the right to use the materials and the equipment as he requires, even prior to final acceptance. All such equipment shall be of a type approved by the State govt. / Central Govt. / or municipal or any other regulatory body and the expression harmful dust or fumes shall have the meaning assigned to it be such appropriate regulatory body.

11. Contractor’s Obligations

11.1 Over and above the responsibilities of the Contractor stipulated in this document, the following obligations shall be fulfilled by the Contractor.

11.1.1 The Contractor shall satisfy the Engineer that adequate provision has been made.

   a) to carry out his instructions fully and with promptitude;

   b) to ensure that parts required to be inspected before use are not used before inspection; and

   c) to ensure that adequate supervision is provided at all stages of the work and each portion of the work is checked for accuracy before erection.

11.1.2 The Contractor shall make necessary arrangements including provision of suitable spaces and facilities for testing, for inspection at any stage of manufacture of plant and equipment by the
Engineer or his agents, as and when deemed necessary by the Engineer; the time schedule for any inspection will, however, follow the inspection schedule suggested by the Contractor and agreed upon by the Engineer during scrutiny of delivery plan. Irrespective of any inspection and tests made by the Engineer, the Contractor shall be entirely responsible for the proper execution of the Contract notwithstanding any approval which may have been given by the Engineer or the work or of tests carried out either by the Engineer or the Contractor. At least 15 days notice shall be required for inspection to be carried outside the state.

11.1.3 The Contractor shall at his own cost.

   a) establish and maintain the area placed at his disposal for office/storage purposes.

   b) provide the necessary power and water connection from the supply mains and install and maintain the temporary distribution lines within the working area;

   c) erect and maintain necessary offices and storage space;

   d) provide temporary lighting at erection site required for erection;

   e) arrange for personnel accident insurance for his own personnel at site;

   f) arrange adequate security lighting and watch system to safeguard the equipment from any type of mishandling, theft, fire hazards etc. during the construction period, period of Trial Run and period of maintenance of 12 months;

   g) Gardening and landscaping and beautification of the site before commissioning;

   h) Curved Glow Signboard on each gate covering entire width of gate including supporting frame structures and all electrical accessories. The details of the signboard and its writings shall be as per instruction of the Engineer

   i) Identification metallic signboard for each units of the plant including supporting frame structures and all electrical spotlight arrangements. The details of the signboard and its writings shall be as per instruction of the Engineer.

11.1.4 The Contractor shall design, manufacture, erect and dismantle any false work, staging temporary support, etc. required for safe and accurate plant and equipment erection and structural steelwork and shall be fully responsible for the adequacy of the same. The cost of such work shall be deemed to have been included in the raise quoted in the Schedule of prices.

11.1.5 The contractor shall, if so required by the Engineer, furnish drawings and design of such false work, staging etc.
11.1.6 The Contractor shall provide for the convenience of inspection/testing adequate temporary and sufficiently strong and stable stairs and access ladders, gangways, etc, wherever necessary at his own cost.

11.1.7 The Contractor shall abide by the instructions and decisions of the Engineer at any stage of execution of the job unless he can convince that the same goes against the interest of satisfactory progress and completion of this work as per agreed schedule.

12. Shop Tests

12.1 Shop tests shall include all tests to be carried out at contractor’s works, works of his agents at manufacturer’s works and at works where raw materials supplied for manufacture of equipment.

12.2 The tests to be carried out shall include but not be limited to the tests mentioned below:

i) Composition of all materials, castings, forgings, etc.

ii) Hydraulic test for pressure vessels, tanks, pump castings etc.

iii) Hydraulic tests for valves, specials etc.

iv) Test to check faults in rubber lining (as per IS : 4682) or its equivalent and painting.

v) Static and dynamic balancing test on all impellers.

vi) Static balancing test on agitators, stirrers, paddles etc.

vii) Performance test (Head, Capacity, BHP) on pump and blowers.

viii) Tests on motor as per IS : 4029.

ix) Any other test that may be provided in I. S. Specification and as required by the Engineer.

12.3 All test certificates and reports shall be submitted to the superintending Engineer for approval. All tests are normally to be carried out in presence of the Engineer or his representative. However, waiver may be allowed in specific cases by the Employer at his discretion.

12.4 The employer’s representatives or his appointed agents shall be given full access to all tests, The contractor shall inform the Project Manager allowing adequate time so that the Engineer in charge or his appointed agents can witness the test, if it is so desired by the Engineer in charge.

12.5 No component or equipment shall be dispatched unless accompanied by approved test certificates and reports. The approval shall be given provided the corresponding drawings /technical particulars are already approved an the Employer’s representatives or his appointed agents have witnessed the tests or a letter of inspection waiver is issued by the Engineer in charge.
13. Site Tests

13.1 General

After erection at site, all components, equipment as described below shall be tested to prove satisfactory performance and/or fulfillment of functional requirement without showing any sign of defect as individual equipment and as well as systems. The Contractor shall make all arrangements for testing and inform the Engineer for witnessing the tests.

i) 1.5 times the maximum attainable pressure in the system, to check against leak tightness. A higher factor shall have to be adopted in specific cases if so specified by the I.S./B.S.

ii) All manually operated valves / gates shall be operated throughout 100% of the travel and these should function without any trouble.

iii) All pumps shall be run with the specified fluid form shut off conditions to valve wide open condition. During the test the pumps and drive motors shall run without any undue vibration, leakage through gland, temperature rise in bearing parts, noise, flow pulsation etc.

iv) Visual check on all structural components, welding, riveting, rubber lining, FRP lining, painting etc. and if doubt arises will be tested again.

v) All EOT and HOT hoists and its components shall be subjected to double the full working load during all motions without showing any sign of defect.

vi). Water leakage test of all liquid retaining structures as per IS specifications

vii) Load tests and integrity tests of piles.

viii) Load test of civil structures if desired by the Engineer.

ix) All test instruments and equipment shall be furnished by the Contractor to the satisfaction of the Engineer.

13.2 Mechanical Tests

All the rotating / moving components like agitators, paddles etc. shall be run at the rated speed
with water /chemicals upto the normal water /liquid level continuously for a period of twenty four (24) hours. During this period all the components shall function smoothly without any unbalance vibration, overheating at bearing parts, etc.

14. Erection Schedule

14.1 The Contractor shall prepare a time table for erection schedule of requirements of men and material and tools & tackles or erections and outlines of erection methods together with erection drawings and specifications and submit those for approval of the Engineer. Such schedules shall be submitted well in advance. Any revisions to such schedules shall only be effected after prior approval of the Engineer giving specific reasons for such revisions.

15. Block Groutings

15.1 All equipment after erection shall be properly grouted without charging extra.

16. Setting Out And Foundations

16.1 Where setting out and preparation of foundations are carried out by others, the contractor shall approve the accuracy of the setting out before execution of foundation work. The Contractor shall be responsible also for the adequacy of such setting out an preparation of foundations.

17. Protection of Plant

17.1 All plant shall be afforded adequate protection against corrosion, mechanical damage, deterioration etc. until the plant is taken over., The Contractor shall submit his proposals for achieving this protection for the approval of the Engineer.

17.2 The Contractor shall make good to be satisfaction of the Engineer any deterioration of the protective coatings, paintwork, etc, which may occur during transportation, erection, commissioning etc. until the plant is taken over.

17.3 Finish painting of the plant at site, as specified shall be carried out before the plant is taken over.

17.4 Items of plant which are finished painted at the manufacturer’s works, such as switch boards, etc. shall be suitably encased in crate or their protection before dispatch. This plant may require to be returned to the works for making good of any deterioration of the paintwork etc. at the Contractor’s expense, which may have occurred during the period until the plant is taken over.

18. Tools And Tackles

18.1 All tools and tackles, measuring and testing equipment etc. required for the successful execution of all contract shall be provided by the Contractor as part of his responsibility with respect to erection
and commissioning of the plant as per the terms of contract.

18.2 All tools and tackles supplied by him will be taken back by him after completion of works excepting special maintenance tools which shall be retained by the Employer till the plant is taken over by him.

19. Delivery And Erection Schedule

The tenderer shall quote his best schedules for delivery of equipment and plant, erection and commissioning, and shall indicate the expected delivery schedule required for components to suit the erection schedule of the plant.

20. Compliance With Statutes, Regulation etc.

20.1. The Contractor shall conform in all respect with the provision of any such state Ordinance or law as aforesaid and the regulations or Bye Laws of any local or other duly constituted authority which may be applicable to the work or to any temporary work and with such rules and regulations of public bodies and companies as aforesaid and shall keep the employer indemnified against all penalties and liability of every kind for breach of any such statute ordinance or law regulation or bye law.


21.1 The Engineer shall during the progress of the work have power to order in writing from time to time.

a) The removal form the place of work of site within such time or times as may be specified in the order of any materials which in the opinion of the Engineer are not in accordance with the contract.

b) The substitution of in proper and the suitable materials, and

c) The removal and proper re-execution (notwithstanding any previous test thereof or interim payment there for) of any work which in respect of materials or workmanship is not in accordance with the contract.

22. Packing

22.1 Materials used for packing of the equipment shall be of sound timber of dimensions proportional to the size the weight of contents. The seller shall not use second hand packing materials, All package shall be steel strapped with at least two (2) straps on each package to ensure a solid package and to prevent pilferage. Bundled materials shall be rigidly steel strapped.
22.2 Fragile materials shall be securely packed within the containers or otherwise apply protected and packed to prevent shifting or rattling.

22.3 The empty containers shall be fully covered by strong and durable water proof paper inside, before putting the material, in order to protect the contents from damage, dust and corrosion due to sea or rain water creeping into the cases and, in addition, they shall be properly lined to withstand the elements while in transit or stored without cover.

22.4 Machined parts shall be thoroughly greased and amply protected against rust forming and corrosive elements.

22.5 The Contractor shall not use open type crates or fiber board cartons, unless permission is received from the Employer.

22.6 The Contractor shall not forward any articles without packing as specified herein, without obtaining prior approval of Employer.

22.7 Spare parts shall be packaged separately, under no circumstances they shall be included in the containers with the related commodity.

23. **Damage Risk and Insurance**

23.1 The Contractor shall arrange the plant and equipment and each part thereof, to be insured against loss, damage or destruction to fire, lightening, earthquake theft and such other risks until it is handed over to the Employer after erection and trial run period as provided for in the contract and shall from time to time, when so required by the Engineer produce the policy and receipts for the premiums. All money received under any of such policies shall be applied in or towards the replacement and repair of the plant damaged or destroyed, but this provision shall not affect the Contractor’s liabilities under the contract. Separate insurance policies shall be obtained to cover

i) rail and / or road etc., transit of equipment to site; and

ii) period of storage and erection and commissioning at site.

24. **Commissioning and Performance Tests**

24.1 The Contractor shall undertake the complete responsibility for successful erection and commissioning of the plant and giving successful performance tests.
**SECTION VII –F**

Environment Management Plan

CONSTRUCTION OF 500 KL ELSR AT PHOOLBAGH

**Pre-construction Phase:**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Issue/Potential Negative Impacts</th>
<th>Mitigation Measures</th>
<th>Time Frame</th>
<th>Responsible Agencies</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Clearances</td>
<td>All clearance required for Environmental aspects during construction shall be ensured and made available before start of work.</td>
<td>Before commencement of construction</td>
<td>ULB / Concerned Departments &amp; Contractor</td>
</tr>
</tbody>
</table>
| 2     | Tree Cutting                     | i) Try to save the trees by adjusting the ELSR layout or the alignment of transmission mains.  
   ii) Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars) as required.  
   iii) Identify the number of trees that will be affected with girth size & species type along the transmission mains, pumping station sites and water treatment plant site. The details to be indicated on map to scale and/or a strip map as may be appropriate. Prepare tree cutting schedule to facilitate clearance requirements.  
   iv) Trees identified for cutting shall be removed from the construction sites before commencement of construction with prior permission from the Municipal Commissioner, Vizianagaram.  
   v) Undertake tree plantation  
   v) Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. | Pre-construction & construction phase | Contractor / ULB. |
| 3     | Utility Relocation               | i) Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc.  
   ii) Affected utilities shall be relocated with prior approval of the | Pre-construction & construction phase | Contractor / ULB/ Concerned departments |
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<td>concerned agencies before commencement of construction. iii) Provide advance notice (not less than 10 working days) to affected parties. The advance notice shall be in the form of written notice and a grievance redressal cell shall be established for timely redressal of grievances.</td>
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<td>4</td>
<td>Baseline Parameters</td>
<td>Base line parameters shall be recorded and ensured conformance till the completion of the project.</td>
<td>Pre-construction, construction and post-construction phase</td>
<td>Contractor / ULB.</td>
</tr>
</tbody>
</table>
| 5     | Planning of temporary Traffic arrangements | i) Temporary diversion will be provided with the approval of the Engineer-in-Charge. Detailed traffic control plans shall be prepared and submitted to the engineers for approval at least two weeks prior to commencement of works.  
ii) The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of hazardous materials and arrangement of flagmen.  
iii) Any accidents and/or risk of inconveniences caused to the community shall be borne by the contractor | Pre-construction and Construction phase.                                   | Contractor / ULB.             |
| 6     | Storage of Materials            | The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. These sites shall be operated only after prior approval of the Engineer-in-Charge.                                                                                                                                         | Pre-construction and Construction phase.                                 | Contractor / ULB.             |
| 7     | Construction of labour camps.   | i) Contractor shall follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp.  
ii) The location, layout and basic facility provision of each labour camp will be submitted to Engineer-in-Charge prior to their construction.  
iii) The construction will commence only upon the written approval of the Engineer. The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer-in-Charge. | During the Construction.                                                  | Contractor.          |
### Mitigation Measures

iv) All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the Engineer-in-Charge. The construction camp shall not be located within 1000m from the nearest water stream, residential areas and/or any sensitive land uses like schools, hospitals etc.

### Construction Phase:

|-------|---------------------------|----------------|----------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------|----------------------------------|-------------------------------|---------------------|
| 1     | Sourcing of materials.    | BoQ Item No.1  | Extraction of rocks and material may cause ground instability. | During Collection.  | (i) Verify suitability of all material sources and obtain approval of Project Management authority;  

(ii) Use the approved quarries by the competent authorities. These may Construction Contractor (CC) | Construction Contractor Document. | Contract Document. | |
|-------|----------------|----------------|-------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------|---------------------|
| 2     | Stock piling. | BoQ No.1 Item 1 | (i) Fugitive dust emission (ii) Run-off from stockpiled materials during construction works can contaminate surface water quality near ELSR site at Phoolbagh | During construction activity. | i) Construction Contractor shall identify designated areas for stockpiling of sand, gravel, and other construction materials; 
ii) Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction. 
iii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; | Construction Contractor (CC). | Location of Stockpiles. | The Environment (Protection) Act, 1986 The Air (Prevention and Control of Pollution) Act 1981. |
| 3     | Haulage/Transportation. | BoQ No.1 Item 1 | Emissions from construction vehicles, equipment, and machinery used for excavation and disposal resulting to dusts and increase in | During construction activity | i) All earth work will be protected in a manner acceptable to the engineer to minimize generation of dust. 
ii) Sprinkling of water on construction sites using water tanker when necessary during dry weather. | Construction Contractor (CC). | i) Complaints from sensitive receptors 
ii) heavy equipment and machinery fitted with air pollution control devices | The Environment (Protection) Act, 1986 The Air (Prevention and Control of Pollution) Act 1981. |
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<td>concentration of vehicle-related pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons.</td>
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<td></td>
<td>iii) ambient air for respirable particulate matter (RPM) and suspended particulate matter (SPM); (iv) vehicular emissions such as sulphur dioxide (SO2), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons</td>
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<td>4</td>
<td>Excavation</td>
<td>BoQ Item No.1.</td>
<td>Fugitive Dust Pollution near Settlements.</td>
<td>During construction activity.</td>
<td>i) All earth work will be protected in a manner acceptable to the engineer to minimize generation of dust. ii) Sprinkling of water on construction sites using water tanker when necessary during dry weather.</td>
<td>Construction Contractor (CC).</td>
<td>Complaints from sensitive receptors / residents.</td>
<td>The Environment (Protection) Act, 1986 The Air (Prevention and Control of Pollution) Act 1981.</td>
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<td>5</td>
<td>Shifting of common utilities.</td>
<td>BoQ Item No.1.</td>
<td>Disruption of services.</td>
<td>During construction activity.</td>
<td>i) Ensure community consensus and minimum impact to common utilities like telephone cable, electric cables, electric poles, water taps and etc., ii) Provide advance notice (not less than 10 working days) to affected parties. ii) Affected utilities shall be relocated with prior approval of the concerned agencies before commencement of construction.</td>
<td>Construction Contractor (CC).</td>
<td>Complaints from sensitive receptors</td>
<td>Contract Document.</td>
</tr>
<tr>
<td>6</td>
<td>Dewatering</td>
<td>BoQ Item No.1.</td>
<td>Improper disposal can contaminate nearby water bodies.</td>
<td>During construction activity.</td>
<td>Adequate care has to be taken by the contractor not to let out the pumped water into the nearby water bodies falling under construction activity.</td>
<td>Construction Contractor (CC).</td>
<td>Analysis of water samples.</td>
<td>The Water (Prevention and Control of Pollution) Act 1974.</td>
</tr>
<tr>
<td>7</td>
<td>Pollution from Fuel and Lubricants</td>
<td>BoQ Item No.1.</td>
<td>Leakage of Fuel and lubricants used in the machinery is the main source of water and soil pollution.</td>
<td>During construction activity.</td>
<td>i) The contractor shall ensure that all construction vehicles parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located away from rivers and irrigation canal/ponds. ii) Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and</td>
<td>Construction Contractor (CC).</td>
<td>Analysis of water and soil samples.</td>
<td>The Environment (Protection) Act, 1986. The Water (Prevention and Control of Pollution) Act 1974</td>
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|       | **Noise Levels (Vehicles, Plant & Equipment)** | BoQ Item No.1. | Vehicular noise pollution at residential / sensitive receptors. | During construction activity. | (i) Plan activities in consultation with ULB which will result in least disturbance;  
(ii) Minimize utilization of horns;  
(iii) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s and Conduct noise level monitoring at sensitive receptors and major residential areas  
(iv) Servicing of all construction vehicles and lubricants does not contaminate the ground.  
(iii) Contractor shall arrange for collection, storing and disposal of oily wastes to the preidentified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines.  
(iv) Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws. | Construction Contractor (CC).        | i) Complaints from sensitive receptors  
ii) Conduct noise level monitoring at sensitive receptors and major residential areas | Noise Pollution (Regulation and Control) Rules, 2000 |
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<td>10</td>
<td>Disposal of Debris / spoil</td>
<td>BoQ Item No.1.</td>
<td>Solid wastes as well as excess construction materials impact aesthetic and land environment.</td>
<td>During construction activity.</td>
<td>Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas as per ULB; • Avoid stockpiling of excess excavated soils; • Coordinate with Vizianagaram Municipal Corporation for beneficial reuse.</td>
<td>Construction Contractor (CC).</td>
<td>(i) Waste Management Plan; (ii) complaints from sensitive receptors (iii) ULB to report in writing that the necessary environmental restoration work has been done.</td>
<td>The Municipal Solid Wastes (Management and Handling) Rules, 2000.</td>
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<td>11</td>
<td>Stacking of Pipes.</td>
<td>BoQ Item No.1.</td>
<td>Improper stacking of pipes leads to traffic problems and accessibility to properties.</td>
<td>During construction activity.</td>
<td>Pipes shall be properly stacked and protected at designated place.</td>
<td>Construction Contractor (CC).</td>
<td>Location of stacking areas, complaints from sensitive receptors;</td>
<td>Contract document Appropriate Construction Techniques</td>
</tr>
<tr>
<td>12</td>
<td>Socio-Economic – Income.</td>
<td>BoQ Item No.1.</td>
<td>Impede the access of residents and customers to nearby shops during laying of DI pipe inlets to ELSRs.</td>
<td>During construction activity.</td>
<td>(i) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles; (iii) Increase workforce in front of critical areas such as institutions;</td>
<td>Construction Contractor (CC).</td>
<td>i) Complaints from sensitive receptors (ii) Number of walkways, sign boards, and metal sheets placed at subproject sites.</td>
<td>Contract document compensatio n matrix in SEAMF.</td>
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<td>13</td>
<td>Occupational Health and Safety</td>
<td>BoQ Item No.1.</td>
<td>Occupational hazards which can arise from working in Project sites</td>
<td>Throughout the working period at project</td>
<td>(i) Implement Health and Safety (H and S) measures including: (a) excluding public from the site; (b) ensuring all workers are provided with and use of Personal Protective Equipment like helmet, gloves and gumboots at concreting locations, nose musk at dust producing areas, safety belt during work at height; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times (at working sites and camp). First Aid box shall be easily accessible</td>
<td>Construction Contractor (CC).</td>
<td>(i) Health and Safety (H and S) measures; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of Environment, Health, and Safety (EHS) Guidelines-Water and sanitation (2007) prepared by World Bank Group.</td>
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<td>throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Provide supplies of potable drinking water; (v) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (vi) Provide H and S orientation training to all new workers; (vii) Use fall protection equipment when working at heights (such as helmets, safety belts); (viii) Maintain work areas to minimize slipping and tripping hazards; (ix) For night work, provision of proper illumination for the work space, while controlling glare so as not to blind workers and passing motorists; (x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (xi) Ensure moving</td>
<td>H and S orientation trainings; (viii) personal protective equipments; and (ix) % of moving equipment outfitted with audible backup alarms;</td>
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| 14    | Work Camps     | BoQ Item No.1.  | Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. | Throughout the working period at project | The contractor shall guarantee the following:  
  i) The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction.  
  ii) The construction will commence only upon the written approval of the Engineer.  
  iii) The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for | Construction Contractor (CC). | i) Complaints from sensitive receptors  
  ii) water and sanitation facilities for employees; and  
  iii) ULB report in writing that the camp has been vacated and restored to pre-project conditions | Contract document Environment, Health, and Safety (EHS) Guidelines-Water and sanitation (2007) prepared by World Bank Group The Municipal Solid Wastes |
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<td>15</td>
<td>Chance Found Archaeological Property.</td>
<td>BoQ Item No.1.</td>
<td>Risk of archaeological chance finds</td>
<td>Throughout the working period at project.</td>
<td>drinking, cooking and washing. iv) Supply of sufficient quantity of potable water in every workplace/labour camp site at suitable and easily accessible places and regular maintenance of such facilities. v) The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.</td>
<td>Contractor</td>
<td>Chance finds</td>
<td>The Ancient Monuments and Archaeological Sites and Remains Act 1958.</td>
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<td>16</td>
<td>Clearing of construction camps and restoration.</td>
<td>BoQ Item No.1</td>
<td>Affect Land Aesthetics.</td>
<td>After completion of the project.</td>
<td>i) Contractor to prepare site restoration plans, the plan is to be implemented by the contractor prior to demobilization. ii) On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at Construction Contractor.</td>
<td>Final clearance certificate from the Engineer in Charge.</td>
<td>Contract Document.</td>
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<tr>
<td>S.No.</td>
<td>Activity</td>
<td>BoQ Reference</td>
<td>Anticipated Impact</td>
<td>Duration of Impacts</td>
<td>Mitigation Measures</td>
<td>Responsible Agency</td>
<td>Monitoring Indicators of Mitigation</td>
<td>Reference Document</td>
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<td>the contractor’s expenses, to the entire satisfaction of the engineer.</td>
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Supplementary Information

General Information of the Town

Vizianagaram town is the district headquarters of Vizianagaram district of Andhra Pradesh. Kolkata – Chennai railway line passes through the town dividing it into two distinct parts such that about 70% of population resides in the East while the balance 30% on the West of the railway line. The 2011 census population of the town is 2,00,177 and the area of the town fall under Vishakhapatnam Urban Development Authority which proposes Vizianagaram to be developed as a Satellite town. The general topography of the town is such that it slopes towards south with ground level varying from R.L. +75.000 in North to R.L. +42.000 in the South. The substrata consist of clay almost 1 to 2 meter depth followed by disintegrated weathered rock. The sub soil water level is around 8 meters below ground level. The area in North beyond Palkonda road does not have much habitation at present and slopes towards North and North-East.

History of the Town

Vizianagaram town is located in the northeastern part of Andhra Pradesh state close to the border of States of Orissa and Chhattisgarh. Vizianagaram town is headquarters of Vizianagaram district and NH 43 i.e. Rajapulova to Raipur road is passes through this. It is well connected by rail on the Bhubaneswar – Chennai route and is 394 km from Bhubaneswar – the capital of Orissa. It is located about 54 km away from harbor town Vishakhapatnam and is 35 kms away from the seacoast. The town is well developed and has all the facilities like Banks, Telephone, Power, Cyber Cafes etc.

Vizianagaram is Regional Trade and Commerce Centre of not only for the District but also for the entire hinterland Region. It caters to the needs of the people from Godavari to Mahanadi and up to Baster (M.P) in the trading items like mill made cloth, pulses, jute, Ground-nut etc., Vizianagaram being a nodal center of Transport (both road and Railways) it has trade links with important cities like Calcutta, Bombay, Bangalore, and many Small and Medium Towns in Orissa, Madhya Pradesh and Andhra Pradesh. Vizianagaram plays a dominant role in the
field of trade and commerce in the region. Next to trade and Commerce in Vizianagaram town is Industrial estate which is located at V.T. Agraharam, south of the Town and Nellimerla at North developed in the recent past. The Nellimalra Jute Mill, Sarvaraya Textiles, A.P. Tanneries are the medium industries existing with number of Small scale industries located in the town. Present water supply system for Vizianagaram Municipality is shown in the figure given below.

Present sources of drinking water for ULB:

(a)River Champavathi (Nellimarla and Ramathirthalu Head Works)
   (i) Nellimarla Source
   Infiltration Gallery in the River Champavathi at NellimarlaHead Works with installed capacity of 5 MLD. The water from these infiltration wells is conveyed with 300mm φ C.I
pipe to the collection, which is further connected to 70 KL Suction Well by a gravity main of 450mm φ C.I. The water from the Suction well is conveyed to the 1500 KL sump at the Master Pump house through a 500 mm φ CI pumping main of length 2.8Km.

(ii) Ramathirthalu Source

There are six number of infiltration wells of 3 mts φ constructed at Ramathirthalu and with installed capacity of 6 MLD. Water from these infiltration wells is conveyed to 500 KL sump using submersible pumps. The water from this sump located at Ramatherthalu Head Works is conveyed to 1500 KL sump at Master Pump House near Nellimarla Railway Gate through a 300 mm φ DI pumping main of length 2.2 Km.

(b) River Gosthani (Madhupada Head Works)

There exists ten numbers of infiltration wells of 3 mts φ constructed in the bed of River Gosthani on the downstream of Thatipudi Reservoir. Water from these infiltration wells is pumped to 450 KL Sump. The water from this sump is further pumped to the 1000 KL balancing reservoir located at Tadipudi through a 600 mm φ PSC main of length 3.5 Km. The water from this balancing reservoir is conveyed by gravity to the distribution reservoirs in the town i.e., at Cantonment, Kothaagraharam, Balajinagar & VT agharam.

(c) Ramathirtha Sagar (UIDSSMT Scheme)

This is an additional source of water to Vizianagaram town being implemented at present. Irrigation department is constructing Ramathirhasagar project near Saripalli village, which is 10 Kms from the Vizianagaram. The government issued orders allocating 0.48 TMC (37 MLD) of water to Vizianagaram town vide Memo. No.24155/A1/2007-1 dated 21-11-2007. Subsequently under the UIDSSMT a proposal was made to draw the allocated raw water from the Ramathirhasagar Project and proposed a Water Treatment Plant (WTP) of 30 MLD at Kumili and to the supply clear water to the Town.

The proposed components of this scheme are.

1. Construction of 4.0 mts Diameter Intakewell at Ramatherhasagar Reservoir Project
2. Providing 900 mm Φ DI connecting main from Intakewell to Proposed Treatment plant
3. Construction of 28 MLD capacity Rapid Gravity WTP at Kumili Reservoir
4. Providing 900 mm Φ DI pipeline from WTP to Proposed 1500 KL sump.
5. Construction of 1500 KL sump near proposed WTP
6. Construction of Pump House at WTP
7. Supply delivery & Erection of 110 KW Centrifugal pumps 3 nos with 6540 lpm for a head of 80m at WTP.
8. Supply delivery and erection of 2X750 KVA Transformer near proposed WTP
9. Construction of 200 mts long foot bridge across the River Champavati for laying of pipeline
10. Supply, delivery, laying and jointing and testing of 700mm Φ DI K9 Clear water pumping main from proposed WTP to Kothapeta Junction.
11. Supply, delivery, laying and jointing and testing of 600mm Φ DI K9 Clear Water pumping main from Kothapeta Junction to ELSR’s at Kotha agraharam.
12. Supply, delivery, laying and jointing and testing of 500mm Φ DI K9 Clear Water pumping main from Kothapeta Junction to ELSR’s at Kotha agraharam.
13. Supply, delivery, laying and jointing and testing of 400mm Φ DI K9 Clear Water pumping main from Junction points to various reservoirs.
14. Supply, delivery, laying and jointing and testing of 300mm Φ DI K9 Clear Water pumping main from Balajinagar Junction to ELSR’s at V.T. Agraharam.
15. Construction of 500 KL ELSR at Kotha agraharam
16. Constructoin of 1500 KL ELSR at Balaji nagar
17. Providing and Remodeling of Distribution Network
EXISTING WATER SUPPLY DISTRIBUTION SYSTEM

The extent of the ULB at present is 29.27 Sq.Km. and it is divided into 38 political wards. Entire area of the ULB is divided into 4 water supply distribution zones based on the physical barriers present in the town, railway track, location of service reservoirs, population density etc. The figure shown here provides the extent coverage by each zone.

There are 13 numbers of Elevated Service Reservoirs (ELSR) with their total storage as 12.55 ML. Ground Level Service Reservoirs (GLSR) are 2 in numbers with their total storage capacity as 1.5 ML.
SECTION VIII

DRAWINGS
## Drawings

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<tr>
<td>1</td>
<td>SITE PLAN -1</td>
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<td>2</td>
<td>SITE PLAN -2</td>
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<td>3</td>
<td>SECTIONAL ELEVATION</td>
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<td>4</td>
<td>500 KL ELSR PLAN</td>
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Section IX : BILL OF QUANTITIES

(ATTACHED AS SEPARATE EXCEL SHEET)

Note:

1. Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer : ITB Clause 14.2 and GCC Clause 43.3)

2. Unit rates and prices shall be quoted by the bidder in Indian Rupees [ITB Clause 14.1]

3. Where there is a discrepancy between the rate in figures and words, the rates in words will govern. [ITB Clause 28.1(a)]

4. Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITB Clause 28.1(b)].
Section X. Security Forms

Samples of acceptable forms of Bid, Performance, and Advance Payment Securities are provided in this Section X. Bidders shall not complete the Performance and Advance Payment Security forms at this stage of the procurement process. Only the successful Bidder shall be required to provide these two securities.
Forms of Securities

Acceptable forms of securities are annexed. Bidders should not complete the Performance and Advance Payment Security forms at the time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

Annex A : Bid Security (Bank Guarantee)
Annex B : Performance Bank Guarantee
Annex B1 : Performance Bank Guarantee for Unbalanced Items
Annex C : Bank Guarantee for Advance Payment
Form of Bid Security (Bank Guarantee)

WHEREAS,______________ [name of Bidder] (hereinafter called “the Bidder”) has submitted his Bid dated _______________ [date] for the construction of Comprehensive water supply service improvements in VizianagaramMunicipality – Construction of 500 KL ELSR at Phoolbaugh.____________________ [name of Contract] (hereinafter called “the Bid”).

KNOW ALL PEOPLE by these presents that We ____________ [name of bank] of ______________ [name of country] having our registered office at _______________ (hereinafter called “the Bank”) are bound unto Municipality, Vizianagaram, AP,India.____________________ [name of Employer] (hereinafter called “the Employer”) in the sum of _______________ 23 for which payment well and truly to be made Commissioner, Vizianagaram to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this __________ day of _______ 19____.

THE CONDITIONS of this obligation are:

(1) If after bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;
Or
(2) If the Bidder having been notified of the acceptance of his bid by the Employer during the period of Bid validity:
   (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions of Bidders, if required; or
   (b) fails or refuses to furnish the Performance Security, in accordance with the Instruction to bidders; or
   (c) does not accept the correction of the Bid Price pursuant to Clause 28.

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date __________ 24 days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date.

DATE __________ SIGNATURE OF THE BANK__________________________

WITNESS__________ SEAL________________________

[Signature, name and address]

23 The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1 of the Instructions of Bidders.

24 45 days after the end of the validity period of the Bid.

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Performance Bank Guarantee

To: Commissioner,
VIZIANAGARAM Municipality,
VIZIANAGARAM
Andhra Pradesh
INDIA
Pin code – 535001

WHEREAS ________________[name and address of Contract] (hereinafter called “the Contractor”) has undertaken, in pursuance of Contract No.________ dated_________ to execute Comprehensive water supply service improvements in Vizianagaram Municipality – Construction of 500 KL ELSR at Phoolbaugh.__________ [name of Contract and brief description of Works] (hereinafter called “the Contract”);

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _______ [amount of guarantee]________ [in words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of __________[amount of guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you 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 valid until...........(i.e.) 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor___________________
Name of Bank______________________________
Address____________________________________
Date ___________________________________________________________________

An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.
PERFORMANCE BANK GUARANTEE (for unbalanced items)

To:
Commissioner,
VIZIANAGARAM Municipality,
VIZIANAGARAM
Pin code – 535001
Andhra Pradesh
INDIA

WHEREAS ____________________ (name and address of Contract) (hereinafter called “the Contractor”) has undertaken, in pursuance of Contract No.________ dated_________ to execute Comprehensive water supply service improvements in Vizianagaram Municipality – Package I___________ (name of Contract and brief description of Works) (hereinafter called “the Contract”);

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _________ (amount of guarantee) _______ (in words), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of __________ (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you 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 valid until………..(i.e.) 28 days from the date of issue of the certificate of completion of works.

Signature and seal of the guarantor___________________
Name of Bank____________________________________
Address________________________________________
Date ___________________________________________

26 An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.
BANK GUARANTEE FOR ADVANCE PAYMENT

To: Commissioner,
VIZIANAGARAMMunicipality,
VIZIANAGARAM
Pin code – 535001
Andhra Pradesh
INDIA

_________________ [ name of Contract]

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub clause 51.1 (“Advance Payment”) of the above-mentioned Contract, _____________ [name and address of Contractor] (hereinafter called “the Contractor”) shall deposit with Commissioner, Vizianagaram Municipality, Vizianagaram. _____________ [name of Employer] a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of ___________ [amount of guarantee] _______ [in words].

We, the _____________ [bank or financial institution], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _________________ [name of Employer] on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding _________________ [amount of guarantee] _______ [in words].

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between ___________ [name of Employer] 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 remain valid and in full effect from the date of the advance payment under the Contract until ________________ [name of Employer] receives full repayment of the same amount from the Contractor.

Yours truly,

Signature and seal of the guarantor___________________
Name of Bank/Financial Institution__________________
Address________________________________________
Date __________________________________________

27 An amount shall be inserted by the bank representing the amount of the Advance Payment, denominated in Indian Rupees.