

PAITHAN MEGA FOOD PARK PVT. LTD. AT PAITHAN (MH)

TENDER FOR CONSTRUCTION AND INSTALLATION FOR WATER SUPPLY SYSTEM

BID NO.: PMFPPL – WS – 01 – 2015



Paithan Mega Food Park Pvt. Ltd.

Nath House, Nath Road, Aurangabad-431005, Maharashtra

Project Management Consultants (PMC)



Abhyuday Techno Economic Consultants Pvt. Ltd.

211-212, Patel Avenue, Near Gurudwara

S.G. Highway, Thaltej, Ahmedabad – 380054, Gujarat

A/E Consultants



SEM MAC Consultants Private Limited

'Conjeevaram House' , 2nd Floor, 6-1-276,

Padmarao Nagar, Secunderabad – 500 025.

PAITHAN MEGA FOOD PARK PVT. LTD.

AT PAITHAN (MH)

BOOK NO. 1

Bid Information, General Conditions, Special Conditions, Appendix

BID NO. PMFPPL – WS – 01 - 2016

Section 1	: Bid Information
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Section 3	: General Conditional of Contracts
Section 4	: Special Conditions of Contracts
Section 5	: Appendix



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Section 1: Instruction to Bidders

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A. General

1. Scope of Bid

- a) Paithan Mega Food Park Private Limited, Aurangabad (referred to as Employer in these documents) invite bids for Construction & Installation of Water Supply Systems. (As defined in these documents and referred to as “the Works”) detailed in Preface.
- b) The successful bidder will be expected to complete the works within a period of 4 months including rainy season.

2. Source of Funds: It is a Central Government aided project

3. Eligible Bidders

- a) Eligible Bidder's Qualification criteria
 - i. **The bidder should have satisfactorily completed at least one similar work (Construction & Installation of Water Supply Systems) with a contract value of at least Rs. 1.20 Crs or two similar works of Rs 0.75 Crs in any one of 12 month continuous period within last 5 financial years.**

The average annual turnover of the bidder should be more than Rs. 1.20 Crs for last three financial years.

The Bidders should have sound financial status, in support of which, the annual turnover statement of the preceding 3 years, Certified Balance sheet of the three proceeding 3 years for the previous year and Solvency Certificate from a Nationalised Bank shall be submitted.

- ii. The Solvency certificate shall be for a minimum amount equalling 20% of the quoted tender.
- iii. The bidder having successfully completed similar type of Industrial project of similar under reputed Consultants in last Five years. The bidder shall submit an attested copy of completion certificates of these projects.

The bidder shall also furnish details of work in hand on other contracts.

4. Forms of Bid and Qualification Information

- a) All bidders shall fill in Section 2, Forms of Bid and Qualification Information”.

5. One Bid per Bidder

- a) 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 Sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.
- b) Tender documents are not transferable

6. Cost of bidding

- a) The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs

7. Site visit

- a) The Bidder should visit the site 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

8. Contents of Bidding Documents

- a) The set of bidding documents comprises the documents listed in the table below and addenda issued in accordance with Clause 10:

Book 1 : Invitation for Bids containing Sections as below

<i>Section 1</i>	<i>: Instructions to Bidders</i>
<i>Section 2</i>	<i>: Forms of Bid and Qualification Information</i>
<i>Section 3</i>	<i>: General Conditions of Contract</i>
<i>Section 4</i>	<i>: Special Conditions of Contract</i>
<i>Section 5</i>	<i>: Appendix</i>

Book 2 : Bills of Quantity

Book 3 : Tender Drawings

Book 4 : Technical Specifications

- b) Only one set of original bidding document will be provided. The original documents prepared for submission have to be photocopied by the Bidder, for submission together with the Original.
- c) Each Bidder should submit one original documents & one duplicate document in all respect.
- d) Each Bidder should submit one copy of BOQ in Excel sheet in CD with financial bid.

9. Clarification of Bidding Document

- a) A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by fax at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 7 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.
- b) Pre-bid meeting
- The bidder or his official representative having authorization to attend, will be invited to attend a pre-bid meeting which will be arranged by the Employer. The purpose of meeting will be to clarify issues if any. The Bidder may send for points of clarifications with respect to tender if any by e-mail to Employer/ Consultants before Pre- bid meeting. Date, time and venue will be conveyed to the Bidder. **Pre bid meeting of this tender will be on 02nd April, 2016 at Nath House, Aurangabad at 11.00 Am.** The notice of Pre Bid Meeting shall be displayed on the employer's website. Bidders are advised to check the website routinely.

10. Amendment of Bidding Documents

- a) Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing tender addends.
- b) Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing through email or by fax to all the purchasers of the

bidding documents. Prospective bidders shall acknowledge receipt of each addendum by fax to the Employer. Addenda shall be incorporated in the bids submitted by the Bidder.

C. Preparation of Bids

11. Language of the Bid

- a) All documents relating to the bid shall be in the English language

12. Documents comprising the Bid

- a) The bid submitted by the bidder shall comprise the following:
 - i. The Bid (in the format indicated in Section 2) and the Bill of Quantities wherein the Bidder shall fill in the rates; original plus one photocopy
 - ii. EMD and Qualification Information Form and Documents; original plus one photocopy
 - iii. Originals only of Specifications and Drawing Volumes duly stamped on all pages by the Bidder
 - iv. Any other materials required to be completed and submitted by bidders in accordance with these instructions

All documents shall be filled in without exception. Supporting documents related to qualifying criteria shall be duly attested / notarised true copies.

13. Bid Prices

- a) The unit rate so quoted in the Bill of Quantity (BOQ) shall be applicable irrespective of any future change in quantities. Contractor has to quote for all items, if rate for any item/ items not quoted then Bid will be liable to reject.
- b) The quoted item rate shall include for all duties, taxes and other levies payable by the Contractor under the contract, and no claim whatsoever, in this respect shall be entertained by the Employer.
- c) The item rate quoted by the bidder shall be fixed during the tenure of the Contract.

14. Currencies of Bid and Payment

- a) The rates and the prices given are in Indian Rupees.

15. Bid Validity

- a) Bids shall remain valid for a period not less than 90 (Ninety) days from the last date for bid submission. A bid corrected by the Bidder as valid for a shorter period shall be rejected by the Employer as non-responsive.
- b) 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 fax. 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 15(a) hereinafter, but will be required to extend the validity of his bid security for a period of the extension.

- c) The rates in BOQ shall remain fixed during the extended period of validity/extended period of contract.

16. Earnest Money Deposit:

- a) The Bidder shall furnish, as part of his Bid, an EMD of **Rs. 0.75 Lakhs** in favour of Paithan Mega Food Park Private Limited, Aurangabad and may be in one of the following forms:
 - i. A bank guarantee issued by a Nationalized / Scheduled Commercial banks notified by RBI (excluding co-operative / Rural banks)
 - ii. Demand draft or Bankers Cheque or Pay order drawn on Nationalized / Scheduled Commercial banks notified by RBI (excluding co-operative / rural banks) in favour of Paithan Mega Food Parks Private Limited.
- b) Bank guarantees issued as surety for the bid should be valid for 45 days beyond the validity of bid.
- c) Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16 (a) and 16(b) above shall be rejected by the Employer as non-responsive.
- d) The EMD of unsuccessful bidders will be returned within 30 days from the end of the bid validity period specified.
- e) The EMD of the successful bidder will be returned/ discharged when the bidder has signed the Agreement and furnished the required Performance Bank guaranty.
- f) The EMD may be forfeited
 - i. If the Bidder withdraws the Bid after Bid opening during the period of Bid validity.
 - ii. If the Bidder does not accept the correction of the Bid Price, pursuant to Clause 28.
 - iii. In the case of a successful Bidder, if the Bidder fails within the specified time limit to
 - a) Sign the Agreement or Furnish the required Performance Bank Guarantee.
- g) No interest shall be paid on any EMD/ Performance Bank Guarantee in lieu thereof.

17. Alternative Proposals by Bidders

- a) Alternative bids shall not be considered for any part of the Works.

18. Format and Signing of Bid

- a) The Bidder shall prepare the Bid as specified in clause 12 and following the instruction in clause 19.
- b) The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. All pages of the bid where entries or amendments have been made shall be initialled by the person or persons signing the bid.

- c) The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the bid.

D. Submission of Bids

19. Sealing and Marking of bids

- a) There shall be two parts for the bids, part 'A' and part 'B'. The part 'A' shall contain Technical part of the bid and Part 'B' shall contain financial part of the bid. The Bidder shall enclose the original and one photocopy of Part A in one envelope marking it as, Envelope-A, TECHNICAL BID-ORIGINAL and COPY. He will then enclose the original and one photocopy of Part-B in another envelope marking it as Envelope B, FINANCIAL BID ORIGINAL and COPY. These envelopes shall then be put inside one outer envelope.

Part 'A', Technical BID of the bid shall contain

- i. EMD as per tender requirement. If the EMD is not deposited the tender shall be declared as non-responsive and rejected
- ii. The Technical Qualification Information indicated in Section 2 duly filled in original and photocopy
- iii. Conditional Tender will be rejected outright.
- iv. Originals only of Book - 1 Conditions of Contract and Book - 3 Drawing volume duly stamped and initialled on each page by the bidder as proof of their having scrutinized the documents.

Part 'B', Financial bid shall contain

- i. Form of Bid duly filled in original plus photocopy
- ii. Book - 2 Bill of Quantities wherein the Bidder shall fill in the unit rates in digits and words and each page duly signed and sealed

- b) The inner and outer envelopes shall
 - i. Be addressed to the Employer at the following address:

20. Paithan Mega Food Park Private Limited

Nath House, Nath Road,
Aurangabad - 431005,
Maharashtra State

PMC Address : Abhyuday Techno Economic Consultants Pvt. Ltd., 211-212, Patel Avenue, Near Gurudwara, S.G. Highway, Ahmedabad-380054.

E-mail : pmc@abhyuday.in

- a) Bear the following identification
 - i. Bid for Construction and Installation of Water Supply Drains.
 - ii. Bid Reference No.: PMFPPL - WS - 01 - 2016
- b) In addition to the identification required in Sub-Clause 19 (b), the inner envelopes shall indicate the name and address of bidder.

- c) If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

21. Deadline for Submission of the Bids

- a) Bids must be received by the Employer at the address specified above no later than **17.30 Hours on 11th April 2016**. In the event of the specified date for the submission of bids declared a holiday for the Employer, the Bids will be received up to the appointment time on the next working day.
- b) The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

22. Late Bids

- a) Any Bid received by the Employer after the deadline prescribed in Clause 21 will be liable to rejection.

23. Modification and withdrawal of bid: No modification or withdrawals shall be permitted after submission. EMD shall not be refunded.

E. Bid Opening and Evaluation

24. Bid Opening: The received bids will be opened on next working day. Any changes in the date will be notified on the website.

25. Process to Be Confidential

- a) Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to the Bidders or any other persons not officially concerned with such process until the award to the successful Bidder had 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

- a) To assist in the examination, evaluations and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including of the unit rates.
- b) Subject to sub clause 25 (a), 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 employer, he should do so in writing.
- c) Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decision may result in the rejection of the Bidders' bid.

27. Examination of Bids and Determination of Responsiveness

- a) Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents.
- b) 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 right 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.
- c) 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 non-conforming deviation or reservation.

28. Correction of Errors

- a) Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:
 - i. Where there is a discrepancy between rates in figures and in words, the rate in words will govern; and
 - ii. Where there is a discrepancy between the unit and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.
- b) The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder, if the Bidder does not accept the corrected amount the Bid will be rejected and the Bid security may be forfeited in accordance with Sub-Clause 16.(f)

29. Short listing of Eligible Bids: The bids shall be evaluated for technical capability first. An empowered Tender Committee shall evaluate the qualification criteria based on internally decided scoring pattern and shall shortlist contractors based on the information and supporting evidence provided.

30. Evaluation of Bids.

- a) **The contractor shall be shortlisted on the basis of their technical bid.**
- b) The Employer will open, evaluate and compare the financial Bids only for shortlisted proposals (based on their technical evaluation) and take his decision for award of work. The process of Evaluation shall not be disclosed to any Bidder or others.
- c) Shortlisted contractor shall be invited for negotiations by the employer.
- d) The Employer reserves the right to accept or reject any variation, deviation from the bid document, or any 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

F. Award of Contract

31. Award Criteria

As per clause 30, the bids will be evaluated on technical and financial basis and the bidder will be selected on the basis of capability and price offer.

32. Employer's Right to Accept any Bid and to Reject any or all Bids

- a) Notwithstanding Clause 30, the Employer reserves the right to accept or reject any Bid or part of the 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 of Bidders of the grounds for the Employer's action.

33. Notification of Award and Signing of Agreement

- a) 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 fax confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") 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 "Contract Price").
- b) The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance Bank Guarantee in accordance with the provisions of Clause 33 (a) of Contract Price.
- c) The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be kept ready for signature of the successful bidder in the office of employer within 15 days of receipt of Letter of Acceptance; the successful Bidder will sign the Agreement and deliver it to the Employer.
- d) Upon accepting the Performance Bank Guarantee for the Successful Bidder and signing of the agreement, the employer shall issue a LOI / Notice to Proceed' to the Contractor, in which the date of commencement of the Contract shall be indicated.
- e) Upon furnishing of the Performance Bank Guarantee by the successful Bidder, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. Performance Bank Guarantee

- a) Within 15 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Bank Guarantee in any of the forms given below for an amount equivalent to **5%** of the Contract price plus..
- b) A bank guarantee, Validity shall be **13 months** from the date of Mobilisation or up to completion of work, whichever is later in the form given in Section 2.

- c) Bank draft, in favour of Paithan Mega Food Park Private Limited, Aurangabad, payable at Aurangabad.
- d) If the Performance security is provided by the successful Bidder in the form of a Bank Guarantee, it should be issued by a Nationalized Bank or a Scheduled Bank in the format attached herewith.
- e) Failure of the successful bidder to comply with the requirements of sub-clause 33(b) shall constitute a breach of contract, cause for annulment of the award, forfeiture of the EMD, 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.

35. Mobilisation Advances and Security

- a) The Employer will provide a Mobilisation Advance Payment, **maximum 10 % of the Contract Price** as stipulated in the Conditions of Contract. , as stated in the Contract Data, against submission of Bank Guarantee from Nationalised Bank or a Scheduled Bank only, validity of this BG should be **13 months** or up to complete recovery of Mobilisation advances or as decided by SPV & part at the time of negotiations.

36. Corrupt or Fraudulent Practices

- a) The Employer expects the Bidders, Suppliers, Contractors and Consultants; observe the highest standard of ethics during the procurement and execution of such contracts. Therefore, the Employer
 - i. Defines, for the purpose of this provision, the terms set forth below as follows:
 - a) “corrupt practice” means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the action of the Employer in the procurement process or in contract execution;
 - b) “fraudulent practice” means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;
 - c) “collusive practice” means a scheme of arrangement between two or more Bidders, with or without the knowledge of the Employer, designed to establish bid prices at artificial, non-competitive levels; and
 - d) “Coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract.
 - ii. 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 or coercive practices in competing for the Contract in question;

SECTION - 2: FORMS OF BID, QUALIFICATION INFORMATION AND LETTER OF ACCEPTANCE, SECURITIES

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FORMATS	
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NOTE:-

* BOTH THESE FORMS ARE TO BE FILLED IN BY THE TENDERER AND SUBMITTED AS PART OF HIS BID.

Form 1: Contractor's Bid

This will be submitted with Financial Bid. In this book Bidder are requested to submit this letter without mentioning contract price.

Description of the Works : Construction & Installation of Water Supply Systems.

BID No. : PMFPPL – WS – 01 - 2016.

To : Paithan Mega Food Park Private Limited.

Address : Nath House, Nath Road, Aurangabad – 431005, Maharashtra

GENTLEMEN,

Having examined the bidding documents including addendum, we offer to execute the Works described above in accordance with the Conditions of Contract, Specifications, Drawings and Bill of Quantities accompanying this Bid, for a contract price as submitted in Financial Bid.

This bid shall be valid for a period of 90 (Ninety) days from the day the bid is opened.

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 certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

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"

We hereby confirm that this Bid complies with the Eligibility, Bid Validity and Bid Security required by the Bidding documents.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory : _____

Name of Bidder : _____

Address : _____

Contractor No. : _____

Email ID : _____

Company Seal/ Stamp

Form 2: Qualification Information

The information to be filled in by the Bidder in the following pages will be used for purposes of Evaluation of Technical Submission as provided for in Clause 29 of the Instructions of Bidders.

The Contractor shall use this format and prepare the submission in as many pages as he wishes.

Particular care shall be taken to submit certification from the previous clients in support of the Bidder's claims. *(The supporting documents should be duly attested or notarized)*

1.1 Constitution or legal status of Bidder *[Attach copy]*

Place of registration: _____

Principal Place of business: _____

Power of attorney of signatory of Bid *[Attach]*

1.2 Total value of Civil Engineering construction work
Executed and payments received in the last three year
(In Rs. Crores)

2012--2013 _____ #

2013-2014 _____ #

2014-2015 _____ #

1.3.1 Work performed as prime contractor (in the same name) on works of a similar nature over the last three years.

<u>Project Name</u>	<u>Name of the Employer*</u>	<u>Description of work</u>	<u>Contract no.</u>	<u>Value of contract (Rs. Millions)</u>	<u>Date of issue of work order</u>	<u>Stipulated period of completion</u>	<u>Actual date of completion*</u>	<u>Remark explaining reasons for delays and work completed</u>

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works:

<u>Description of work</u>	<u>Place & State</u>	<u>Contract No. & Date</u>	<u>Name and Address of Employer</u>	<u>Value of Contract (Rs. Millions)</u>	<u>Stipulated period of completion</u>	<u>Value of works* remaining to be completed (Rs. Millions)</u>	<u>Anticipated date of completion</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1.5 Contractor's Plant, tool and Equipment essential for carrying out the Works shall be listed below

Contractor should engage all required tools and machinery, including Testing apparatus on site to execute the said work and the items in the BOQ (enclosed within this Tender)

- 1.6 Construction management and QC Organisation, Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.

<u>Position</u>	<u>Name</u>	<u>Minimum Qualification</u>	<u>Years of experience(Years) (general)</u>	<u>Years of experience in the proposed position(Years)</u>
Project Manager -1		Engineering Graduate	15	8
Sr. Site Engineers-1		Engineering Graduate/Diploma	8-10	5
Site Engineers-1		Engineering Graduate/Diploma	4-7	3
Site Supervisors-1		Engineering Diploma/ITI	4-7	2

- 1.7 A statement regarding the number of Skilled and unskilled workers, the company has on its rolls at the time of tender submission. The statement also should indicate the number of skilled and unskilled workers proposed to be deployed on this project.
- 1.8 evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copies of support documents *[sample format attached]*
- 1.9 Name, address and telephone, telex and fax numbers of the Bidders' bankers who may provide reference if contracted by the Employer.
- 1.10 Information on litigation history in which the Bidder is involved.

<u>Other party('s)</u>	<u>Employer</u>	<u>Cause of dispute</u>	<u>Amount involved</u>	<u>Remarks showing Present status</u>

- 1.11 Statement of compliance under the requirements of Sub Clause 3.(a) of the instructions to Bidders.
- 1.12 Proposed work method and schedule of work demonstrating monthly targets so that the work is completed within the desired time frame. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents.

SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES (ON THE LETTER HEAD OF BANK)**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..... 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

Letter of Acceptance
(Letterhead paper of the Employer)

To: _____ [name and address of the Contractor] _____-____-2014

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of..... (Bid No.: PMFPPL - WS - 01 - 2016) for the Contract Price of Rs. _____ (Rupees _____) as corrected and modified in accordance with the Instructions to Bidders' is hereby accepted by our Agency.

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

[OR]

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

[Delete whichever is not applicable]

You are hereby requested to furnish Performance bank Guarantee for an amount of Rs. ----- within 15 days of the receipt of this letter of acceptance valid up to 28 day from the Defects Liability Period i.e. up to and sign the contract, failing which action as stated in Para 33 c of Section 1, clause 33c may be taken.

Yours faithfully,

Managing Director
Paithan Mega Food Park Private Limited

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 Bank Guarantee as stipulated in clause 33(a) Section 1 and signing of the contract agreement for.....@ a Bid Price of Rs. _____ (Rupees _____) you are hereby instructed to proceed with the execution of the said works in accordance with contract documents. The date of commencement will be _____.

Yours faithfully,

Managing Director
Paithan Mega Food Park Private Limited

Agreement Form**Agreement**

This agreement, made the _____, between Paithan Mega Food Park Private Limited (hereinafter called "the Employer") of the one part and _____ [name and address of Contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor executes Construction & Installation of Water Supply Systems (Bid No. PMFPPL - WS - 01 - 2016) (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. _____ (Rupees _____)

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression 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 aspects 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 the defects wherein 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.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
 - i. Letter of Acceptance;
 - ii. Contractor's Bid;
 - iii. Book 1 containing Invitation to bid, General Conditions of Contract, Special Conditions of Contract, Appendix
 - iv. Book 2: Duly filled Bill of Quantities & Rates
 - v. Tender Drawings-Book 3 including Technical Specifications

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

The Common Seal of _____

Was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____

In the Presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

Forms of Securities

Approved forms of Securities are attached here with. The performance and Mobilisation Advance are to be given by the successful bidder after the Employer issues the Letter of acceptance.

- Bank Guarantee in lieu of EMD with the Bid Submission
- Performance Bank Guarantee with letter of acceptance
- Bank Guarantee for Mobilisation Advance Payment (before receiving mobilization Advance)

BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT

BANK GUARANTEE (To be executed on Stamp Paper of Rs.100/- or such higher value as per this Stamp Act of the State in which the Guarantee is issued. Stamp Paper should be in the name of the Nationalized Bank Issuing the Guarantee.)

To,
Paithan Mega Food Park Private Limited
Nath House, Nath Road,
Aurangabad – 431005, Maharashtra

1. In consideration of M/s. Paithan Mega Food Park Pvt. Ltd. (herein called “the Employer”) having agreed to extend M/s _____ Contractor incorporated under the provision of the Companies Act, _____ demand, under the terms and conditions contained in the Tender No. _____ Dated _____ 2016 (hereinafter called “the said Tender”) of Earnest Money Deposit for the due fulfilment by the said Parties of the terms and conditions contained in the said Tender, on the production of a Bank Guarantee for Rs. _____ (Rupees _____ Only) we, name of _____ Bank, address _____ (hereinafter referred to as “the Bank”) do hereby undertake to pay to Employer an amount not exceeding Rs. _____ (Rupees _____ Only) against any loss of any breach by the said Party of any of the terms and conditions contained in the said tender.
2. We _____ (Name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Employer stating that the amount claimed is due by way of damage caused, to or would be caused to or suffered by the Company by reason of any breach by the said Party of any of the terms of conditions contained in the said Tender or by reason of the party’s failure to perform the said Tender. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee.
3. We _____ (name of Bank), further agree to that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Tender and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Tender have been fully paid and its claims satisfied or discharged or till the Managing Director Paithan Mega Food Park Private Limited, Certifies that the terms and conditions of the said tender have been fully and properly carried out by the said Party and accordingly discharge the guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before the date. _____ we shall be discharged from all liability under this Guarantee thereafter.
4. We _____ (name of Bank), further agree with the Company that the Company shall have the fullest liberty without our consents and without affecting in any manner

our obligation hereby to vary any of the terms and conditions of the said Tender or extend time of performance by the said Party from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Party and to forbear or enforce any of the terms and conditions relating to the said Tender and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said party or for any forbearance, act of omission on the part of the Company or any indulgence by the Company to the said party or by any such matter of thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

5. We, _____ name of Bank, lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Notwithstanding anything contained hereinabove:

- a) The liability of the Guarantor under this guarantee is restricted to Rs _____ (Rupees _____ Only).
- b) This guarantee shall remain enforce until its expiry on _____.
- c) Unless a suit or action to enforce a claim under this guarantee is made against the rights within _____ months from the aforesaid date of expiry, i.e. _____ all the rights of the beneficiary under the said guarantee shall be forfeited and the guarantee shall be released and discharged and discussed from all liabilities thereof.

Witness

For _____

Signature _____

Seal

PERFORMANCE BANK GUARANTEE

PERFORMANCE BANK GUARANTEE (To be executed on Stamp Paper of Rs.100/- or such higher value as per this Stamp Act of the State in which the Guarantee is issued. Stamp Paper should be in the name of the Nationalized Bank Issuing the Guarantee.)

In consideration of the Paithan Mega Food Park Pvt. Ltd. (hereinafter called "the PMFPPL") having agreed to exempt M/s. _____ (hereinafter called "the said Contractor(s)") from the demand under the terms and conditions of an agreement dated _____ made between Paithan Mega Food Park Pvt. Ltd. and M/s. _____ for _____ work at Paithan Mega Food Park Pvt. Ltd, Aurangabad, (hereinafter called "the said Agreement") of security deposit for the due fulfilment by the said Contractor(s) of the terms and conditions contained in the said Agreement on production of a bank guarantee for Rs. _____ (Rupees _____) only.

We, _____ bank (hereinafter referred to as "the Bank") at the request of M/s. _____ (Contractors) do hereby undertake to pay to the PMFPPL an amount not exceeding Rs. _____ (Rupees _____ only) against any loss or damage caused to or suffered by the PMFPPL by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

We, _____ Bank do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from PMFPPL stating that the amount claimed is due by way of loss or damage caused to or is likely to be caused to or suffered by the PMFPPL by reason of breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ (Rupees _____ only.)

We, _____ Bank undertake to pay to the PMFPPL any money so demanded not withstanding any dispute or disputes raised by the Contractor(s) in whether any suit or proceedings before any Court or Tribunal or otherwise, relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

We, _____ Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the existence of the said Agreement and that it shall continue to be enforceable till all the dues of PMFPPL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____ whichever is late, or Paithan Mega Food Park Pvt. Ltd. has certified that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before the _____ we shall be discharged from all liability under this Guarantee thereafter.

We, _____ Bank agree with the Paithan Mega Food Park Pvt Ltd shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance of the said terms and conditions by the said Contractor(s) from time to time, or to postpone for any time or from time to time any of the powers exercisable by the PMFPPL against the said Contractor(s) and/or forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the PMFPPL or any indulgence by the PMFPPL to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision have effect of so relieving us.

The Guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

We, _____ Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the PMFPPL in writing.

Dated this _____ day of _____

PERFORMANCE BOND FOR UNBALANCED ITEMS

Performance Bond will not be accepted.

BANK GUARANTEE FOR MOBILISATION ADVANCE PAYMENT

BANK GUARANTEE (ADVANCE) (To be executed on Stamp Paper of Rs.100/- or such higher value as per this Stamp Act of the State in which the Guarantee is issued. Stamp Paper should be in the name of the Nationalized Bank Issuing the Guarantee.)

To,
Paithan Mega Food Park Pvt. Ltd.
Nath House, Nath Road,
Aurangabad-431005, Maharashtra

With reference to your Letter, Order No.....Dated.....Concluded between Paithan Mega Food Park Pvt Ltd hereinafter referred to as "Employer" and M/s.....hereinafter referred to as "The Contractor" for Civil Construction of Paithan Mega Food Park Pvt Ltd . as detailed in the above contract, herein after referred to as "The said contract" and in consideration of the Employer having agreed to make an advance payment, in accordance with the terms of the said contract to the said Contractor. We "The Bank" hereby irrevocably undertake and guarantee to you that if the said Contractor would fail to complete Civil Construction work in conformity with the terms of the said contract for any reason whatsoever or fail to perform the said contract in any respect or should the whole or part of the said on account payment at any time become repayable to you for any reason whatsoever, we shall, on demand and without demur pay to you all and any sum up to a maximum of Rs.....

We further agree that the Employer shall be the sole judge as to whether the Contractor has failed to abide by the terms of said contract or has failed to perform the said contract in any respect or the whole part of the on account payment made by the Employer has become repayable.

- d) We further hereby unconditionally undertake to pay the amount due and payable under this guarantee without any demur merely on a demand from the Employer stating the amount claimed. Any such demand made on the bank shall be conclusive and binding upon us. The liability of the Guarantor under this guarantee is restricted to Rs_____ (Rupees_____ Only).

We further agree that this Guarantee shall remain in full force for a period ofMonths unless it is released by you, on an application by Contractor made after the Bank Guarantee period has expired or such extended period of Guarantee, whichever is later, provided the Contractor has:

- (a) Completed Civil Construction work its obligations for Civil Construction work under the said Contract and adjusted the advance amount covered under this Guarantee.
- (b) Produced a Certificate of due completion of the aforesaid Civil Construction work under the said Contract.
- (c) Submitted a "No Demand Certificate" signed by your Managing Director.

Should it be necessary to extend this Guarantee beyond the said date we undertake to extend the period of this Guarantee without reference to the Contractor. Immediately after its lodging period or extended lodging period has expired, this document is to be returned

to us. No matter whether this document has been returned or not, no claim after the expiry of lodging period/ extended lodging will be accepted.

This Guarantee shall not be affected by any change in the Constitution of the Contractor or us nor shall it be affected by any change in your constitution or by any amalgamation or absorbable by the Absorbing/amalgamated Company or concern.

We further agree that the Employer shall have the fullest liberty without affecting in any way our obligations hereby guaranteed us, as aforesaid, and we hereby expressly waive all our rights of surety ship and other rights if any which are in any way inconsistent with the above or any other provision of the guarantee.

We further agree that the Employer shall be the fullest without affecting in any way our obligation hereunder, with or without our consent or knowledge to vary any of the terms and conditions of the said contract or to extend the time of completion period from time to time or postpone for any time or from time to time any of the powers exercisable by the Employer against the Contractor and either of forbear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variation or any indulgence or forbearance shown or any act or omission on the part of the Employer or by any such matter or thing whatsoever under the law relating to sureties would but for this provision have the effect of so relieving us.

It shall not be necessary for you to proceed against the Contractor before proceeding against us and the Guarantee herein contained shall be enforceable against us, notwithstanding any security which you may have obtained or obtain from the Contractor at any time or when proceeding taken against us, hereunder, be outstanding or realized.

We further agree that this Guarantee shall come into force simultaneously with your making the said advance payment to the Contractor and shall not be revoked by us whether before its coming into force or any time during its currency without your previous consent in writing signed by your Managing Director.

Notwithstanding anything contained herein before, our liability under this guarantee is restricted to Rs.....(Rupees.....) and it will remain in force up tounless a suit to enforce any claim under this Guarantee is filed against us on or before (The claim lodging period should be 60 days beyond the date of expiry of Guarantee, Thus if the Guarantee is valid up to date_____ the claim lodging period should be _____, all your rights under this Guarantee shall be forfeited and we shall be relived and discharged from all liabilities there under.

Dated this.....day of2016.

COUNTERSIGNED

WITNESS:

SIGNATURE: (BANK)

NAME:

SECTION 3 - GENERAL CONDITATION OF CONTRACT

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1. Interpretations

In construing these conditions, the specifications, schedule of quantities and the Contract Agreement, the following words shall have the meanings herein assigned to them except, where the subject or context otherwise requires.

- a) 'EMPLOYER/ OWNER 'shall mean Paithan Mega Food Park Pvt Ltd. having its registered office at Paithan and shall include their legal representatives, Assigns, successors or managing Committee or anyone authorized by them on their behalf
- b) 'CONTRACTOR' shall mean the tenderer and shall include his/ their legal representative/s, assigns/or successors
- c) 'PMC' shall mean M/s. Abhyuday Techno Economic Consultants Private Limited, 211-212, Patel Avenue, Near Gurudwara, S. G. Highway, Thaltej, Ahmedabad - 380054, Gujarat their nominees and also the Engineer-in-Charge or Engineer appointed by the Employer
- d) 'SITE' shall mean the site of the Contract works including any building and erections thereon and any other land (inclusively) as aforesaid allotted by the Employer for the Contractor' use
- e) 'THIS CONTRACT' shall mean the Articles of Agreement, the General Conditions, the Special Conditions, the Appendix, the Schedule of Quantities, Specifications drawings, and other letters attached hereto and duly signed
- f) 'NOTICE IN WRITING' or 'WRITTEN NOTICE' shall mean a Notice in writing, typed or printed characters sent (unless delivered personally or otherwise Proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered
- g) 'ACT OF INSOLVENCY' shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Act or any Act amending such original

Words importing the persons include firms and corporations

Words importing the singular only also include the plural and vice versa where the context requires

2. Scope of Contract

The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Employer / PMC/Architect / Engineer-in-charge. The Architect and Engineer-in-Charge on their own may from time to time issue further drawings and/or written instructions, details, directions and explanations which are hereafter collectively referred to as "Works Instructions" in regard to:

- a) The variation or modification of the design, quality or quantity of works or the addition or omission or substitution of any work

- b) Any discrepancy in the Drawings or between the Schedule of Quantities and/or Drawings and / or Specifications
- c) The removal from the site of any material brought thereon by the Contractor and the substitution of any other material therefore
- d) The removal and / or, re-execution of any works executed by the Contractor
- e) The dismissal from the works of any persons employed thereupon
- f) The opening up for inspection of any work covered up
- g) The amending and making good of any defects under clause

The Contractor shall forthwith comply with and duly execute any work comprised in such works Instructions provided always that verbal instructions, directions and explanations given to the Contractor or his representative upon the works by the Architect and Engineer-in-charge shall, be confirmed in writing by the Contractor within seven days, and if not dissented from in writing within a further period of seven days, such shall be deemed to be "Works Instructions" within the Scope of the Contract

3. Inspection of Site

The Employer shall have made available to the Contractor such as data on sub-surface conditions as shall have been obtained by or on behalf of the Employer from investigations undertaken relevant to the Works, but the Contractor shall be responsible for his -own interpretation thereof and deemed to have visited the site and done own analysis.

4. Sufficiency of Tender

The Contractor shall also be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the works and of the rates and prices stated in the priced Bill of Quantities and the Schedule of Rates and Prices, which Tender rates and prices shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper execution and maintenance of the Works.

5. Program To Be Furnished

- a) Within the time stated of these Conditions, the Contractor shall, after the acceptance of his Tender, submit to the Engineer for his approval a program showing the order in which he proposes to carry out the works. The Contractor shall whenever required by the Engineer or Engineers' Representative, also provide in writing for his information a general description of the arrangements and methods which the Contractor proposes to adopt for the execution of the works
- b) If at any time it should appear to the Engineer that the actual progress of the works does not conform to the approved program referred to in sub-clause of this Clause, the Contractor shall produce, at the request of the Engineer, a revised

program showing the modifications to the approved program necessary to ensure completion of the works within the time for completion as decided and reworked to the satisfaction of the Employer

6. Drawings and Schedule of Quantities

The Copy of the Contract shall remain in the custody of the Employer. The Contractor on the signing thereof shall be furnished by the Architect with a copy of the priced Schedule of Quantities, one copy of each of the said drawings and the specifications and three copies of all further drawings issued during the progress of the work. The Contractor shall keep one copy of all the Drawings on the works and Employer, Engineer-in-Charge or the Architect or his representative shall, at all reasonable-times, have access to the same. Before the issue of the Final Certificate to the Contractor, he shall forthwith return to the Architect all drawings and specifications, All the drawings supplied by the Architect will be in the form of Hardcopy.

7. Contractor To Provide Everything Necessary

The Contractor shall provide everything necessary for the proper execution of the works according to the intent and meaning of the Drawings, Schedule of Quantities and Specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancy in the Drawings or between the Drawings, Schedule of Quantities and Specifications, he shall immediately and in writing refer the same to the Architect who shall decide which is to be followed

8. Authorities, Notices and Patents

The Contractor shall conform to the provision of any act of the Legislature relating to the works and to the Regulations and Bye-Laws of any Authority, and of any Water, Lighting and other Companies and/or Authorities with whose system the structure is proposed to be connected and shall, before making any variations from the Drawings or Specifications that may be necessitated by so conforming, give to the Architect written notice specifying the variation proposed to be made and the reason for making it, and apply for instructions thereon. In case, the Contractor shall not within twenty days receive such instructions, he shall proceed with the work, conforming to the Provisions, Regulations or Bye-Laws in question, and any variation so necessitated shall be dealt with under clause no.13

The Contractor shall bring to the attention of the Architect all notices required by the said Acts, Regulations or Bye-Laws to be given to any Authority and pay to such Authority or to any Public office all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Architect

The Contractor shall indemnify the Employer and Architect against all claims in respect of patent rights, and shall defend all actions arising from such claims and shall himself pay all royalties, license fees, damages, costs and charges of all and every sort that may be legally incurred thereof.

9. Setting Out Works

The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works, the Contractor shall at his own expense rectify such error if so required to the satisfaction of the Architect and the Engineer-in-Charge. The checking of any setting-out or of any line or level by the Engineer-in-charge or the Engineers representative shall not in any way relieve the contractor of his responsibility for the correctness thereof

10. Materials and Workmanship To Conform To Description

All materials and workmanship shall so far as procurable be of the respective kinds described in the Schedule of Quantities and/or Specification and in accordance with the "Works Instructions" and the Contractor shall, upon the request of the Employer/Architect, furnish him with all invoices, accounts receipts and other vouchers to prove that the materials comply therewith. The Contractor shall at his own cost arrange for and/or carry out any test of any materials which the Architect/ the Engineer-in-Charge may require

11. Contractors Superintendence And Representative On The Works

The Contractor shall give all necessary personal superintendence during the execution of the works, and so long thereafter as the Architect or Engineer-in-Charge may consider necessary until the expiration of the "Defects Liability Period" stated in the Appendix thereto. The Contractor shall also, during the whole time the works are in progress, employ a competent representative whose name is informed to the Employer/Architect who shall be constantly in attendance at the building while the men are at work. Any directions, explanations, instructions or notices given by the Architect or Engineer-in-Charge or Employer to such representative shall be held to be given to the Contractor. Such a person shall be a qualified engineer whose qualification and experience must be made known to the Architect / Engineer-in-charge and must have the approval

12. Dismissal of Workmen

The Contractor shall, on the request of the Architect or the Engineer-in-Charge or Employer, immediately dismiss from the works any person employed thereon by him who may, in the opinion of the Architect or the Engineer-In-Charge or the Employer, be incompetent or misconduct himself, and -such person shall not be again employed on the works without the permission of the Architect or Engineer-in-charge

13. Access To Works

The Architect and his representative or the Engineer-In-Charge or the Employer shall at all reasonable times have free access to the works and/or to the workshops, factories, or other places where materials are lying or from which they are being obtained and the Contractor shall give every facility to the Architect and his representative, the Engineer-In-Charge or the Employer necessary for inspections and examination and test of the materials and workmanship. Only persons authorized by the Architect, the Engineer-in-

Charge or the Employer, except the Representatives of Public Authorities, shall be allowed on the works at any time

14. Engineer-In-Charge/ The Engineer

The term 'Engineer-in-Charge' shall mean the person nominated by the employer and acting under the orders of the Employer/ to inspect the works. The Contractor shall offer the Engineer-in-Charge every facilities and assistance for the inspection of the works and materials and for checking and measuring the works carried out by the Contractor. The Engineer-In-Charge or any representative of the Employer shall have power to give notice to the Contractor or his representative of non-approval of any work or materials and such work shall be suspended or the use of such material be discontinued. The work will from time to time be examined by the Architect ' the Engineer-in-Charge or the Employer but such examination shall not in any way exonerate the Contractor from the obligation to remedy any defect which may be found to exist at any stage of the work or after the same is completed. In case of Contractor not removing the rejected material nor rectifying the defective work pointed out by the Engineer-in-Charge, the Contractor will be liable to the consequences as per the Agreement. The Contractor shall honour all letters, notices issued by the Engineer-In-Charge as if they are issued by the Architect. The Engineer-In-Charge may be empowered by the Architect to issue certificates for payment and the Employer shall honour such certificates provided the Architect has obtained a written consent from the Employer or has informed the Employer in writing.

15. Care of Works

- a) From the Commencement of the Works until the date stated in the Certificate of Completion for the whole of the works pursuant to Clause 48 (d) hereof the Contractor shall take full responsibility for the care thereof. Provided that if the Employer/Architect issues a Certificate of Completion in respect of any part of the Permanent Works the Contractor shall cease to be liable for the care of that part of the Permanent Works from the date stated in the Certificate of Completion in respect of that part and the responsibility for the care of that part shall pass to the Employer. Provided further that the Contractor shall take full responsibility for the care of any outstanding work, which he shall have undertaken to finish during the Period of Maintenance until such outstanding work is completed. In case any damage, loss or injury shall happen to the Works or to any part thereof, from any cause whatsoever, save and except the excepted risks as defined in sub-clause (b) of this Clause, while the Contractor shall be responsible for the care thereof the Contractor shall, at his own cost, repair and make good the same, so that at completion the permanent works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineers instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall, if and to the extent required by the Engineer-in-charge and subject always to the provisions of the contract, repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of completing any outstanding work or complying with his obligations under clause 48 hereof.

b) Excepted Risks

The "excepted risks" are war, hostilities (whether war be declared or not), invasion, and act of foreign enemies, rebellion, and revolution. insurrection or military or usurped power, civil war, employees of the Contractor or of his sub-contractors and arising from the conduct of Works, riot, commotion or disorder, or a cause solely due to the design of the Works or ionizing radiations or contamination by radio-activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radioactive, toxic explosive or other hazardous properties of any explosive, nuclear assembly or nuclear component thereof, pressure waves caused by aircraft or other aerial devices traveling at sonic or supersonic speeds, or any such operation of the forces of nature are collectively referred to as "the excepted risks".

16. Assignment and Sub-Letting

The whole of the works included in the Contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or underlet the Contract or any part share thereof or interest therein without the written consent of the Employer/Architect and no undertaking shall relieve the Contractor from the full and entire responsibility of the Contract or from active superintendence of the works during their progress

17. Variation Not To Vitate Contract

No alteration, omission or variation shall vitiate this contract but in case the Architect and the Engineer-in-Charge in consultation with the Employer thinks proper at any time during the progress of the works to make any alterations in or additions to or omissions from the works or any alteration in the kind or quality of the materials to be used therein and shall give notice thereof in writing under his hand to the Contractor, the Contractor shall alter, add to or omit from as the case may require, in accordance with such notice, but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the Contract, Stipulation, Specification or Contract Drawings without the previous consent in writing of the Engineer-in-Charge and the Employer jointly.

18. Schedule of Quantities

The schedule of Quantities, unless otherwise stated, shall be deemed to have been prepared as per mode of measurement specified in Technical Specification and Bill of Quantity attached with the Tender, Any error in description or in quantity or in omission of items from the Schedule of quantities shall not vitiate this Contract but shall be rectified and the value thereof as ascertained under Clause hereof shall be added to or deducted from the Contract Amount (as the case may be) provided that there shall be no rectification of errors in the Contractor's Schedule of Rates.

19. Sufficiency Of Schedule Of Quantities

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the works and of the prices stated in the Schedule of Quantities and / or the Schedule of Rates and Prices which rates and prices

shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of the works.

20. Measurement Of Works

The measurement and valuation in respect of the Contract shall be completed within "Period of final measurement" stated in the Appendix or if not so stated then within three months of the completion of the contract works as defined in Clause hereof.

21. Non Tender Items

The Contractor shall, when ordered in writing by the Architect and with the concurrence of the Employer, perform work not covered by the specifications or included in the Bills of Quantities but forming part of the work contracted for, on the same conditions in all respect in which he agrees to do the main work. Extra work and supply of such material shall be carried out at a rate settled by written agreement between the Contractor and the / the Engineer-in-Charge with the concurrence of the Employer.

22. Status of Workmen

None of the employees of the contractor shall be construed or deemed to be the employees of PMFFPL at any time and the Contractor shall indemnify and keep indemnified PMFFPL against any claim, loss or whatsoever in this connection.

There shall never exist any employer and employee relationship between PMFFPL and the manpower engaged by Contractor. PMFFPL shall not have any responsibility to nor shall be held directly or indirectly responsible or liable for the person so employed by the contractor for performing/providing services in terms of this agreement to PMFFPL in terms of its contractual obligations hereunder.

23. Quality of Materials & Workmanship and Tests

- a) All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer's instructions and shall be subjected to tests from time to time to such other place or places as may be specified in the Contract, or at all or any of such places. The Contractor shall provide assistance instruments, machines, labor and materials as are formally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the work for testing as may be selected and required by the Engineer.
- b) Cost of Samples / Shop Drawings: All samples / shop drawings / fabrication drawings shall be supplied by the Contractor at his own cost.
- c) Cost of Tests: The Cost of making any Tests shall be borne by the Contractor.

24. Inspection of Operation

The Engineer and any person authorized by him shall at all times have access to the works and to all workshops on or off the site and places where work is being prepared

or from where materials, manufactured articles or machinery are being obtained for the works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access. All works carried out off the site shall be duly brought to the notice of the Engineer.

25. Examination of work

- a) No work shall be covered up or put out of view without the approval of the Engineer or the Engineer's Representative and the Contractor shall afford full opportunity for the Engineer or the Engineer's Representative to examine and measure any work which is in view and to examine foundations about to be covered up or put out of before permanent work is placed thereon. The Contractor shall give due notice to the Engineer's Representative whenever any such work or foundation is or are ready or about to be ready for examination and the Engineer's Representative shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such works of examining such foundations.
- b) Uncovering & Making Openings: The Contractor shall uncover any part or parts of the works or make openings in or throughout the same part or parts to the satisfaction of the Engineer-in-Charge. If any such part or parts have been covered up or put off view after compliance with the requirements of sub-clause (a) of this Clause and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating and making good the same shall be borne by the Employer, but in any other case all costs shall be borne by the Contractor.

26. Removal of improper Works and Material

- a) The Engineer-in-Charge shall during the progress of the works have power to order in writing from time to time
 - i. The removal from the Site, within such time or times as may be specified in the order, of any materials, which in the opinion of the Employer, are not in accordance with the Contract
 - ii. The substitution of proper and suitable materials and
 - iii. The removal and proper re-execution, notwithstanding any previous test thereof or interim payment thereof, any work which in respect of materials or workmanship is not, in the opinion of the Engineer, in accordance with the Contract

27. Default of Contract in compliance: In case of default on the part of the Contractor in carrying out such order, the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor after giving due notice in writing by the Employer, or may be deducted by the Employer from any money due or which may become due to the Contractor

28. Suspension of Work

- a) The Contractor shall, on the written order of the Engineer, suspend the progress of the Works or any part thereof for such time or times and in such manner as the

Engineer may consider necessary and shall during such suspension properly protect and secure the work, so far as is necessary in the opinion of the Engineer. The extra cost incurred by the Contractor in giving effect to the Engineer's instructions under this clause shall be borne and paid by the Employer unless such suspension is

- i. Otherwise provided for in the Contract, or
- ii. Necessary by reason of some default on the part of the Contractor, or
- iii. Necessary by reason of climatic conditions on the site, or
- iv. necessary for the proper execution of the works or for the safety of the works or any part thereof in so far as such necessity does not arise from any act or default by the Engineer or the Employer or from any of the excepted risks defined in the clause hereof

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Engineer within fifteen (15) days of the Engineer-in-Charge's Order. The Engineer shall settle and determine such extra payment and / or extension of time under clause hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer-in-Charge, be fair and reasonable.

b) Suspension lasting more than 90 days

If the progress of the works or, any part thereof is suspended on the written order of the Engineer and if permission to resume work is not given by the Engineer within a period of ninety days from the date of suspension then, unless such suspension is within paragraph (i), (ii), (iii) or (iv) of sub-clause (a) of this clause the contractor may serve a written notice on the Engineer requiring permission within twenty-eight days from the receipt thereof to proceed with the works, or that part thereof in regard to which progress is suspended and, if such permission is not granted within that time, the Contractor by a further written notice so served may, but is not bound to, elect or treat the suspension where it affects part only of the works as an omission of such part under clause hereof, or, where it affects the whole works, as an abandonment of the Contract by the Employer.

29. Defects during execution and after completion of works

Any defect, shrinkage, settlement or other faults which may appear during execution or within the "Defects Liability Period" stated in the Appendix hereto, or if none stated then within 12 months after the virtual completion of the works, arising in the opinion of the Employer from materials or workmanship not in accordance with the contract, shall upon the directions in writing of the Employer, and within such reasonable time as shall be specified herein, be amended and made good by the Contractor, at his own cost unless the Architect & Engineer-in-Charge in concurrence with the Employer shall decide that he ought to be paid for such amending and making good, and in case of default the Employer may employ and pay other persons to amend and make good such defects, shrinkage, settlements or other faults, and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss and expenses shall be recoverable from him by the

Employer or may be deducted by the Employer upon the Architect's & Engineer-in-Charge's Certificate in writing from any moneys due or that may become due to the contractor, or the Employer may in lieu of such amending and making good by the Contractor deduct from any moneys due to the Contractor a sum to be determined by the Architect and the Engineer-in-Charge in concurrence with the Employer equivalent to the cost of amending such work and in the event of the amount retained by employer being insufficient recover the balance from the Contractor, together with any expenses the Employer may have incurred in connection therewith.

Should any defective work have been done or material supplied by any sub-contractor employed on the works, who has been nominated or approved by the Architect / the Engineer-in-Charge and the Employer jointly as provided in the clause, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the contractor and been subject to the provisions of this clause and the clause thereof. The Contractor shall remain liable under the provisions of this clause notwithstanding the signing by the Architect or the Engineer-in-Charge or the Employer of any Certificate or the passing of any accounts

30. Insurance

Without limiting his obligations and responsibilities, the contractor shall insure in the name of the Employer against all loss or damage for all works under (a) below and in the joint name of the Employer and the Contractor against any loss or damage for all items under (b) below from whatever, cause arising, including riot and excepted risks and for which he is responsible under the terms of the Contract and in such manner that the Employer is covered for the period stipulated hereof and are also covered during the period of Maintenance for loss or damage arising from a cause, occurring prior to the commencement of the Period of Maintenance, and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the Purpose of complying with his obligation under clause hereof:

- a) The Works for the time being executed to the estimated current contract value thereof, or such additional such as may be specified together with the materials for incorporation in the works at their replacement value.
- b) The Constructional Plant and other things brought on to the site by the contractor to the replacement value of such constructional plant and other things.
- c) Such insurance shall be affected with an insurer and in terms approved by the Employer and the Contractor shall, deposit with the Engineer or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premiums. All money payable by insurers shall be received by the Employer and disbursed to the Contractor in instalments.

31. Damage to Persons & Property

The Contractor shall indemnify the Employer, PMC and the Architect against all claims in respect of injuries or damage to any person or material or physical damage to any property whatsoever which may arise out of or in consequences of the execution and maintenance of the works and against claims, proceedings, damages, costs, charges and expenses whatsoever in respect of but not limited to, to include payment of Wages Act

1936 (Latest), Minimum Wages Act 1948 (Latest), Employers Liability Act 1938 (Latest), Workmen's Compensation Act 1947 (Latest), Industrial Disputes Act 1947 (Latest), Maternity Benefit Act 1961 (Latest) The Contract Labour (Regulation and Abolition Act, 1970 and any modifications thereof or of any law relating thereof in relation thereto including any compensation or damages for or with respect to

- a) The permanent use of occupation of Land by the works or any-part thereof.
- b) The right of the Employer to execute-the works or any part thereof on, over, under, in or through any land.
- c) In case of any expenses arising from any such injury or damage to persons of employer and architects on site, the compensation shall be made by the contractor of the actual expenses without any delays which may arise out of claim filed and settled by the Insurance Company.

32. Third Party Insurance

- a) Before commencing the execution of the works the Contractor, but without limiting his obligations and responsibilities under clause hereof, shall insure against his liability for any material or physical damage, Loss or injury which may occur to any property, including that of the Employer, or to any person, including any employee of the Employer, by or arising out of the execution of the Works or in the work being carried out by the Employer, by or arising out of the referred to in provision hereof.
- b) Minimum amount of Third Party Insurance

Such insurance shall be affected with an insurer and in terms approved by the Employer, and for at least the amount stated in the Appendix to the Tender. The Contractor shall deposit with the Engineer or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premiums.

- c) Provision to indemnify Employer

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

33. Accident / or Injury to Workmen

- a) The Employer shall not be Liable for or in respect of any damages or compensations payable at Law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-contractor.

The Contractor shall indemnify and keeps indemnified the Employer against all such damages and compensation and against all claims, proceedings, costs, and charges, whatsoever in respect thereof or relation thereto.

b) Insurance against Accident etc. to Workmen

The Contractor shall insure against such liability with an insurer approved by the Employer and shall continue such insurance during the whole of the time that any persons are employed by him on the works and shall, deposit with the Engineer or the Engineer's Representative such policy of insurance and the receipt of payment of the current premium.

Provided always that, in respect of any persons employed by any sub-Contractor, the Contractor's obligation to insure as aforesaid under this sub clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such sub-contractor to deposit with the Engineer of the Engineer's Representative, such policy of insurance and the receipt for the payment of the current premium.

34. Remedy on Contractors Failure to Insure

If the Contractor fails to effect and keep in force the insurance referred to in clauses hereof, or any other insurance which he may be required to effect under the terms of the contract, then and in any such case the Employer may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor, or recover the same as a debt due from the contractor.

35. Commencement of Works

The Contractor shall commence the works on site within the period named in the Appendix to the Tender after the receipt by him a written order to this effect from the Engineer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer. The time for commencement and completion of work shall be of the essence of the contract.

36. Possession of Site

- a) Save in so far as the Contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portion shall be made available to him and, subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will, with the Engineer's written order to commence the works, give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the works in accordance with the program referred to in Clause hereof, if any, and otherwise in accordance with such reasonable proposals of the Contractor as he shall, by written notice to the Engineer, make and will, from time to time as the works proceed, give to the Contractor possession of such further portions of the

site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with said program or proposals, as the case may be. If the Contractor suffers delay or incurs cost from failure on the part of the Employer to give possession in accordance with the term& of this Clause, the Engineer shall grant an extension of time for the completion of the works. In case of dispute the Employer may ask the contractor to leave the site and hand over the possession of the site. The contractor shall do so immediately.

37. Time for Completion

Subject to the requirement in the Contract as to completion of any sections of the works before completion of the whole, the whole of the works shall be completed, in accordance with the provisions of clause hereof, within the time stated in the Contract calculated from the last day of the period named in the Appendix to the Tender as that within which the Works are to be commenced, or such extended time as may be allowed under clause hereof.

38. Rate of Progress

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the works or any section is at any time, in the opinion of the Engineer, too slow to ensure completion by the prescribed time or extended time for completion, the Engineer shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer may approve to expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this Clause, the contractor shall seek the Engineer's permission to do any work at night or on Sundays, if locally recognized as days of rest, or their locally recognized equivalent, such permission shall not be unreasonably refused.

39. Liquidated Damages for Delay

If the Contractor fails to achieve completion of the works either in whole or part within the time prescribed, then the Contractor shall pay to the Employer the sum stated in the Appendix as liquidated damages for such default for everyday or part of a day which shall elapse between the time prescribed by clause hereof and the date of certified completion of the works. The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies in his hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works or from any other of his obligations and Liabilities under the contract.

40. Certification of Completion of Works

- a) When the whole of the Works have been substantially completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer or to the Engineers Representative accompanied by an undertaking to finish any outstanding work during the period of Maintenance. Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Engineer to

issue a Certificate of completion in respect of the works. The Engineer shall, within thirty days of the date of delivery of such notice either issue to the Contractor, a Certificate of Completion stating the date on which, in his opinion, the works were substantially completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, requires to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the works specified therein. The Contractor shall be entitled to receive such Certificate of Completion within twenty-one days of completion to the satisfaction of the Engineer of the works so specified and making good any defects so notified.

b) **Certification of completion by Stage**

Similarly, in accordance with the procedures set out in Sub-clause (a) of this clause, the Contractor may request and the Engineer shall issue a Certificate of Completion in respect of

- i. Any section of the permanent works in respect of which a separate time for completion is provided in the Contract and
- ii. Any substantial part of the Permanent Works, which has been both, completed to the satisfaction of the Engineer and occupied or used by the Employer.

- c) If any part of the Permanent Works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed in the Contract, the Engineer may issue a Certificate of Completion in respect of that part of the Permanent Works before completion of the whole of the works and upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the works during the Period of Maintenance.
- d) Provided always that a Certificate of Completion given in respect of any section of part of the Permanent Works before completion of the whole shall not be deemed to certify completion of any ground or surfaces requiring reinstatements, unless Certificate shall expressly so state.

41. Period of Maintenance/ Defect Liability

a) **Period of Maintenance**

The expression "Period of Maintenance" shall mean the period of maintenance named in the Appendix to the Tender, calculated from the date of completion of the Works, certified by the Engineer in accordance with Clause hereof, or, in the event of more than one certificate having been issued by the Engineer under the said Clause, from the respective dates so certified and in relation to the period of Maintenance the expression "the Works" shall be constructed accordingly.

b) Execution of Work of repair, etc.

To the intent that the works shall at or as soon as practicable after the expiration of the Period of Maintenance be delivered to the Employer in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer, the Contractor shall finish the work, if any, outstanding at the date of completion, as certified under Clause 40 hereof, after such date and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the Period of Maintenance, or within fourteen days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to its expiration.

c) Cost of execution of work of repair etc.

All such work shall be carried out by the Contractor at his own expense if the 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 due to neglect or failure on the part of the Contractor to comply with any, obligations, 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.

d) Remedy on Contractor's Failure to carry out work required:

If the Contractor fails to do any such work as aforesaid required by the Engineer, the Employer shall be entitled to employ and pay persons to carry out the same and if such work is work which, in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, then all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any monies due or which may become due to the Contractor.

e) Contractor to search

The Contractor shall, if required by the Engineer in writing, search under the directions of the Engineer for the cause of any defect, imperfection or fault appearing during the progress of the works or in the period of Maintenance. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Employer. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the Cost of the work carried out in searching as aforesaid shall be borne by the Contractor and / he shall in such case repair, rectify and make good such defect, imperfection or fault at his expense in accordance with the provisions of clause hereof.

42. Payment Withheld

The Engineer may withhold or on account of subsequently discovered evidence nullify the whole or a part of any certificate to such extent as may be necessary in the opinion to protect the Employer from loss on account of

- a) Defective work not remedied.
- b) Failure of the Contractor to make payments properly to sub-contractor for materials or labour or to Contractor's employees / workmen or failure to discharge any other obligations under applicable laws.
- c) A reasonable doubt that the Contract cannot be completed in the balance time.
- d) Damage to another Contractor's or sub-contractor's work.
- e) Claims filed or reasonable evidence indicating probable filing of claims.

43. Delay and Extension of Time

If, in the opinion of the Employer, the works be delayed

- a) By force majeure or
- b) By reason of any exceptionally inclement weather or
- c) By reason of proceedings taken or threatened by or dispute with adjoining or neighboring owners or public authorities arising otherwise than through the Contractor's own default or
- d) By the works or delays of other Contractors or Tradesmen engaged or nominated by the Employer or the Architect / the Engineer-in-Charge and not referred to in the Schedule of Quantities and / or specification or
- e) By reason of "Works Instructions" as per Clause or
- f) By reason of civil commotion, local combination of workmen or strike or lockout affecting any of the building traders or
- g) in consequence of the Contractor not having received in due time necessary instructions from the Architect / the Engineer-in-Charge or the Employer for which he shall have specifically applied in writing, the Employer in consultation with the Architect / the Engineer-in-Charge shall make a fair and reasonable extension of time for completion of the Contract Works; in case of such strike or lock-out the Contractor shall, as soon as may be, give written notice thereof to the Architect, the Engineer-in-Charge and the Employer; but, the Contractor shall nevertheless constantly use his endeavors to prevent delay and shall do all that may reasonably be required to the satisfaction of the Architect / the Engineer-in-Charge and the Employer to proceed with the work.

44. Termination of Contract by the Employer

The Employer may terminate this contract by giving one month notice.

The Employer may terminate this contract, if the Contractor being an individual or a firm commit any "act of insolvency" or shall be adjudged an insolvent or being an Incorporated Company having an order for compulsory winding up made against it or pass an effective resolution forwarding up voluntarily or subject to the supervision of the Court and of the official Assignee of the Liquidator in such acts of insolvency or winding up shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Architect / Owner with the concurrence of the Employer that he is able to carry out and fulfill the Contract, and to give security therefore, if so required by the Employer.

Or if the Contractor (whether an individual, firm or Incorporated Company) shall suffer execution to be issued.

Or shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractors,

Or shall assign or sub-let this Contract without the consent in writing of the Architect / the Engineer-in-Charge and the Employer first obtain,

Or shall change or encumber this Contract or any payments due or which may become due to the Contract there under;

Or if the Architect and the Engineer-in-Charge shall certify in writing the Employer that the Contractor

- a) Has abandoned the Contract, or
- b) has failed to commence the works, or has without any lawful excuse under these Conditions suspended the progress of the Works for 14 days after receiving from the Architect / the Engineer-in-Charge written notice to proceed, or
- c) Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
- d) has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Architect and the Engineer-in-Charge, written notice that the said materials or work were condemned and rejected by the Architect and the Engineer-in-Charge under these conditions, or
- e) has neglected or failed persistently to observe and perform all or any of the acts matters or things by this Contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same, or
- f) has to the detriment of good workmanship or in defiance of the PMC/ Architect's/ Engineer-in-Charge's and Employer's instructions to the contrary sub-let any part of the Contract, then and in any of the said cases, the Employer in consultation with the Architect / the Engineer-in-Charge may not withstanding any previous waiver after giving seven days' notice in writing to the Contractor, determine the Contract, but without hereby affecting the powers

of the Architect / the Engineer-in-Charge or the obligations and liabilities of the contract, the whole of which shall continue in force-as fully as if contract had not been so determined and-as if the works subsequently executed had been executed by or on behalf of the contractor.

- g) The Employer under advice of the Engineer-in-Charge / Architect may enter upon and take possession of the works and all plant, tools, scaffoldings, sheds, machinery, steam and other power generation unit and materials lying upon the premises or the adjoining lands or roads, and use the same as his own property or may employ the same by means of his own persons and workmen in carrying on and completing the works or by employing any other Contractors or other person or persons to complete the works.
- h) The Contractor shall not in any way interrupt or do any act, matter or things to prevent or hinder such other contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter as convenient the Architect and the Engineer-in-Charge shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Employer shall sell the same by public auction, and shall give credit to the Contractor for the amount realized. The Architect and the Engineer-in-Charge shall, thereafter, ascertain and certify in writing under their hands (if anything) shall be due or payable to or by the Employer for the value of the said plant and materials so taken possession of by the Employer and the expense or loss which the Employer shall have been put to in procuring the works to be completed, and the amount if owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Employer, as the case may be, and the certificate of the Architect and the Engineer-in-Charge shall be final and conclusive between the parties.

45. Termination of Contract by the Contractor

The Contractor may terminate this contract if the payment of the amount payable by the Employer under CERTIFICATE of the Architect and the Engineer-in-Charge with interest as provided for hereinafter shall be in arrears and unpaid for forty five days after notice in writing requiring payment of the amount with interest as aforesaid shall have been given by the Contractor to the Employer, or if the Employer interferes with or obstructs the issue of such Certificate or the Employer commits any "act of insolvency", or (being and Incorporated Company) shall have an order made against him or pass an effective resolution for winding up, either compulsorily or subject to the supervision of the Court or Voluntary, or if the official Assignee or the Employer shall repudiate the Contracts or if the official Assignee or the Liquidator, in any such winding up, shall be unable within fifteen days after notice to him requiring him so to do, to show to the reasonable satisfaction of the Contractor that he is able to carry out and fulfill the Contract and to make Contractor, to give security for the same, or if the works be stopped for all payments due, and to become due thereunder and, if required by the three months under the order of the Employer or by any injunction or other order of any Court of Law, then and in any of the said cases the Contractor shall be at liberty to determine the Contract by notice in writing to the Employer and he shall be entitled to recover from the Employer payment for all works executed.

In arriving at the amount of such payment, the net rates contained in the Tender Agreement shall be followed.

46. Certificates and Payments

- a) Unless otherwise provided, payments shall be made at monthly intervals in accordance with the conditions set out
- b) Advances on Constructional Plant and Materials

No advances are to be made by the Employer to the Contractor in respect of Constructional Plant and Materials, the conditions of payment and repayment shall be as set out.

- c) Approval only by Maintenance Certificate

No certificate other than the Maintenance Certificate referred to in clause D hereof shall be deemed to constitute approval of the works.

- d) Maintenance Certificate

The Contract shall not be considered completed until a Maintenance Certificate has been signed by the Engineer-in-Charge and delivered to the Contractor stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer within twenty-eight days after the expiration of the Period of Maintenance, or, if different periods of maintenance shall become applicable to different sections or parts of the works, the expiration of the latest such period, or as soon thereafter as any works ordered during such period, pursuant to clause hereof, shall have been completed to the satisfaction of the Engineer and full effect shall be given to the clause, notwithstanding any previous entry on the works or the taking possession, working or using thereof or any part thereof by' the Employer. Provided always that the issue of the Maintenance Certificate shall be a precondition to payment to the Contractor of the second portion of retention money in accordance with the Appendix.

Cessation of Employer's Liability:

The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the works, unless the Contractor has made a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause

47. Valuation at Date of Forfeiture

The Engineer-in-Charge shall, as soon as practicable after any such entry and expulsion by the Employer, fix and determine ex parte, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably

earned by or would reasonably accrue to the Contractor in respect of work when actually done by him under the Contract and the value of any of the said unused or partially used materials and any Temporary Works

a) **Payment after Forfeiture**

If the Employer enters and expels the Contractor under this clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of execution and Maintenance, damages for delay in completion, if any, and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer-in-Charge. The Contractor shall then be entitled to receive only such sum or sums, if any, as the Engineer-in-Charge may certify as payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

48. Urgent Repairs

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

49. Special Risks

The Employer shall repay to the Contractor any increased cost of or incidental to the execution of the Works, other than such as may be attributable to the cost of construction work condemned under the provision of clause hereof, prior to the occurrence of any special risk, which is however attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this clause hereinafter contained in regard to outbreak of war, but the Contractor shall as soon as any such increase of cost comes to his knowledge forthwith notify the Engineer thereof in writing.

a) **Special Risks**

The Special risks are war, hostilities, (whether war be declared or not), invasion, act of foreign enemies, the nuclear and pressure waves risk described in clause hereof, or insofar as it relates to the country in which the works are being or are to be executed or maintained, rebellion, revolution, insurrection, military or usurped power, civil war, or unless solely restricted to the employees of the contractor or of his sub-contractors and arising from the conduct of the works, riot, commotion or disorders.

b) Outbreak of War

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

c) Removal of Plant on Termination

If the Contract is determined under the provisions of the last preceding sub-clause, the Contractor shall, with all reasonable dispatch, remove from the site all Constructional Plant, staff, workers; identify those of Sub-Contractors to do so.

50. Payment if Contract is terminated

- a) The amounts payable in respect of any items, so far as the work or service comprised therein has been carried out or performed, and a proper proportion as certified by the Engineer in Charge in Writing of any such items, the work or service which has been partially carried out or performed.
- b) The cost of materials or goods reasonably ordered for the works which shall have been delivered to the Contractor at site or of which the Contractor is legally liable to accept delivery for works being fabricated off site, or propriety goods ordered in both cases where due prior notice has been given to the Engineer, in writing, such materials or goods becoming the property of the Employer upon such payments being made by him.
- c) A sum to be certified by the Architect & Engineer-in-Charge in writing being the amount of any expenditure reasonably incurred by the Contractor towards, site office, site stores, fabrication yard, fencing in the expectation of completing the whole of the works insofar as such expenditure shall not have been covered by the payments in this sub-clause before mentioned.
- d) On any account, if the Contract is terminated by Employer, no liquidated damages shall be payable to the Contractor on account of profit on remaining portion of the contract or loss on account of premature termination. In such a

case, the Contractor will be entitled to remove his material/equipment only after settling the account in full and final with Employer.

- e) Provided always that against any payments due from the Employer under this sub-clause, the Employer shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Constructional Plant and Materials and any other sums recoverable by the Employer from the Contractor under the terms of the Contract.

51. Frustration

a) Payment in the event of Frustration

If a war, or other circumstances outside the control of both parties, arises after the contract is made so that either party is prevented from fulfilling his contractual obligations, or under the law governing the Contract, the parties are released further performance, then the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under clause 50 / 52 as the case may be hereof if the Contract had been terminated under the provisions of clause 50 hereof.

52. Procedure for Disputes

In case of Dispute or Difference arising between Employer and the Contractor relating to any matter arising out of this contract, such disputes or differences 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 jointly nominated by the two Arbitrators and he shall be the presiding arbitrator. If there is no agreement about nomination of the third Arbitrator, then the third and presiding Arbitrator shall be appointed by the Indian Council of Arbitrations/ president of Institute of Engineers.

The Arbitration proceedings shall be at Aurangabad and the operative language shall be English.

The decision of the Majority of Arbitrators shall be binding upon both parties. The Cost of Arbitration proceedings shall be shared equally by the parties. The expenses towards preparation and fees of Arbitrator by each party shall be borne by the parties themselves.

If the contract value is Rs 500 Lacs or less, the dispute shall be referred to a sole Arbitrator to be appointed jointly by the parties. If there is no agreement on this, the Sole Arbitrator shall be appointed by the Indian Council of Arbitration/president, Institute of engineers. Decision of the sole Arbitrator shall be binding on the parties.

Performance of the Contract shall continue during the Arbitration proceedings.

53. Safety Code

a) General

Contractor shall submit a Safety organization structure along with the Safety plan for approval before commencing the job.

Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with Owner safety rules as set forth herein prior to start of construction, Contractor shall be furnished copies of Owner's Safety Code' for information and guidance. The contractor shall erect, display and maintain signage at different locations of the site, to show safety requirements during work, regulations regarding protective equipment, clothing and the like.

b) Safety Regulations

- i. In respect of all labour, directly or indirectly employed in the work for the performance of Contractor's part of this agreement, the Contractor shall at his own expense arrange for all the safety provisions as per (i) Safety codes of C.P.W.D. & Indian Standards Institution (ii) The Electricity Act, (iii) The Mines Act, and (iv) Regulations, Rules and orders made there under and such other act as applicable
- ii. The Contractor shall observe and abide by all Fire and Safety Regulations of the Owner. Before starting construction work, Contractor shall consult Owner's safety engineer or Engineer-in-charge and provide all required precautionary measures to this effect. The Contractor must make good to the satisfaction of the Owner any loss or damage due to fire to any portion of the work done under this contract or to any of the Owner's existing property.
- iii. The contractor shall obtain necessary licenses and approvals from appropriate authority under labour enactment as required to carry out obligations under this contract including license required under The Contract Labour (Regulation and Abolition Act, 1970)

c) First Aid and Industrial Injuries

- i. Contractor shall maintain first aid facilities for his employees and those of his Sub-contractors. He shall arrange Medical Treatment without any loss of time in the event of an accident or injury.
- ii. All critical injuries shall be reported promptly to Owner. All such injuries shall be thoroughly investigated and a copy of Contractor's report covering - cause, remedy and preventive measures (for each personal injury requiring the attention of a physician) shall be furnished to the Engineer-in-Charge in an approved format.
- iii. The contractor shall have a trained person at the site for administering first aid.
- iv. The Contractor shall have a Safety Inspector for the works

54. Setting Up Of Field Laboratory

The Contractor shall set up a field laboratory at the site at his own expense to carry out the tests as per requirements

All required equipment as per relevant IS test procedure shall be available along with applicable IS codes. In addition to the above, the Contractor shall provide all other necessary equipments to carry out any other field tests required by the Engineer-in-charge.

All the equipments should be calibrated by a third party periodically and certificates should be kept in the laboratory.

The Contractor shall carry out the various mandatory tests as per BIS Specifications and the technical documents that shall be furnished to him during the performance of the work. All the tests, either on the field or outside laboratories concerning the execution of the work and supply of materials for the same shall be carried out by the Contractor at his own cost. Price quoted by the Contractor shall be deemed to include the cost of such tests and inspections.

55. Taxes

- a) The Rates in Bills of Quantities shall be inclusive of transporting, loading, unloading, storage, security & all other charges such as toll, Octroi, local taxes, excise duty, other payments and compensations, if any in connection with the procurement and handling of materials, fabrication and execution of works or any method or process connected with the works or Temporary works. However Service Tax & VAT shall be paid as per actual.
- b) Notwithstanding anything contained elsewhere in the contract, the Owner shall deduct at source, from the payments due to the Contractor, any taxes required to be deducted at source by law. The amounts so deducted shall be deposited by the Owner with the concerned authorities as per law. It is for the Contractor to deal with the concerned authorities directly in respect of any claim or refund relating to the above deductions and the Owner shall not be liable or responsible for any claims or payments or reimbursement in this regard.

56. Contractors Subordinate Staff and Their Conduct

- a) The Contractor on award of the work shall nominate and depute a qualified graduate engineer having sufficient experience in carrying out works of similar nature, as full time resident project manager of the Contractor for the work, to whom instructions for works may be given. The Contractor shall also provide to the satisfaction of the Owner/ Engineer-in-charge, sufficient and qualified staff to supervise the execution of the works, competent sub agents, foremen and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the contract in such manner as shall ensure the best quality and expeditious working. At any time in the opinion of the Engineer-in-charge, any additional, qualified and experienced staff is considered necessary; they shall be employed by the Contractor without additional charge. The Contractor shall ensure to the satisfaction of the Engineer-in-charge that his Sub-

contractor's if any, shall provide competent and efficient supervision over the work entrusted to them.

- i. If any of the Contractor's agents, sub agents, assistants, foremen or any employee in the opinion of Engineer-in-charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the Owner or the Engineer-in-charge, undesirable for administrative or any other reasons, for such person (s) to be employed on the works, then at the directions of Engineer-in-charge, the Contractor shall at once remove such persons(s) from employment at the works. The person(s) so removed from the works shall not again be employed in connection with the works without the written permission of the Engineer-in-charge. Vacancy so created shall be immediately filled at the expense of the Contractor by a qualified and competent substitute. Shall the Contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection therewith?
- ii. The Contractor shall be responsible for the proper behaviour of all the staff, foremen, workmen and others, and shall exercise proper degree of control over them and in particular without prejudice to the said generality the Contractor shall be bound to prohibit / prevent any employees from trespassing in anyway detrimental or prejudicial to the interest of the community or the properties or occupiers of land or properties in the neighbourhood. In the event of such trespassing, the Contractor shall be responsible for all consequent claims or action for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-charge upon any matter arising under this clause shall be final.
- iii. All employees of the Contractor shall be properly identified by badges of a type acceptable to the Owner, and must be worn at all times on the site.
- iv. Along with the tender, the bidder shall submit his schematic organization chart of staff to be employed at the works, along with their qualifications and experience.

b) Sub Letting Of Work

- i. No part of the contract be transferred, assigned or sublet by the Contractor directly or indirectly to any person, firm or corporation whatsoever except as provided for in the succeeding sub clauses without the consent of the Owner.

c) Sub-Contracting Of Works

- i. The Engineer-in-charge may give written consent to the Contractor for the execution of any part of the works/ specialized part of the works at the site, provided the Contractor submits credentials of each individual agency to the Engineer-in-charge for approval. Sub-contracting the work as a whole by the Contractor shall not be permitted. Furthermore, if it is

noticed by the Owner that the Contractor has not made payments to one or any agencies working under him, without prejudice to the other conditions herein, the Owner reserves the right to make such payments directly to the concerned agency after due verification.

d) Contractor's Liability Not Limited By Agencies To Contractors

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

e) Owner May Terminate Sub Contracts Of Contractor

- i. If any Agency of contractor engaged upon the works at the site executes any work which in the opinion of the Engineer-in-charge is not in accordance with the contract, the Owner may by written notice to the contractor, request him to terminate such Agencies. The contractor upon the receipt of such notice shall terminate and dismiss the Agency. The Owner shall have the right to remove such Agency from the site if the Contractor fails to get the Agency immediately vacated.

f) No Relief For Action Under This Clause

- i. Action taken by Owner under the above clauses shall not relieve the Contractor of any of his liabilities under the contract or give rise to any right or compensation, extension of time or otherwise.

g) Contractor's Responsibility With Other Agencies

- i. Without repugnance to any other condition, it shall be the responsibility of the Contractor executing the work of civil construction to work in close cooperation and to co-ordinate in the works with the Piling, mechanical, electrical, air-conditioning, equipment, production machinery and intercommunication with other Contractors and other agencies or their authorized representatives, in providing the necessary grooves, recesses, cuts and openings etc. in wall, slabs, beams, and columns etc. and making good the same to the desired finish as per specification, for the placement of cables, conduits, air-conditioning inlets and outlets, grills and other equipment in the false ceiling and other partitions. The Contractor, before starting up the work shall in consultation, with the electrical, mechanical, equipment, inter communication, air-conditioning contractors and other agencies, prepare and put up a joint scheme, showing the necessary openings, grooves, recesses, cuts, the methods of fixing required for the works of the aforesaid, and the finishes therein, to the Engineer-in-charge and get the approval. The Contractor before finally submitting the scheme to the Engineer-in-charge shall have the written agreement of the other agencies. The Engineer-in-charge, before communicating his approval to the scheme, with any required modification shall get the final agreement

of all the agencies, which shall be binding. No claim shall be entertained on account of the above.

- ii. The Contractor shall conform in all respects with the provisions of any statutory regulations, ordinance or bye laws of any local or duly constituted authorities or public bodies which may be applicable from time to time to the works or any temporary works. The Contractor shall keep the Owner indemnified against all penalties and liabilities of every kind, arising out of non-adherence to such status, ordinances, laws, rules, regulations etc.

h) Other Agencies At Site

The Contractor shall have to execute the work in such place and condition where other agencies shall also be engaged for other works such as electrical and mechanical engineering works or other works etc. No claim shall be entertained due to work being executed in the above circumstances.

i) Serving Of Notices

i. To The Contractor

Any notice may be served on the Contractor or his duly authorized representative at the site or by registered mail directly to the postal address furnished by the Contractor at the time of tender. Proof of issue of such notice shall be conclusive of the Contractor having been duly informed of the contents therein.

ii. To The Owner

Any notice to be given to the Owner under the terms of the contract shall be served by sending the same by Registered mail to or delivering the same at the respective site office of the Owner addressed to the Engineer-in-charge.

57. Patents, Royalties, Liens

- a) The Contractor shall indemnify the Owner from and against all claims and proceedings for or on account of infringement upon any patent, design, trade mark or name or other protected rights in respect of constructional plants, machines or materials used for or in connection with the works, temporary works therefore or any part thereof, and from and against all claims demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- b) Liens
 - i. If at any time there shall be evidence or any lien, claim for which the Owner might have become liable, which is chargeable to the Contractor, and then the Owner may pay and discharge the same and deduct the

amount so paid by him, from any amount which may be or become due to the Contractor.

SECTION - 4: SPECIAL CONDITIONS OF CONTRACT**Contents**

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1. General

The Contractor may please note that Special conditions hereinafter are part of the Contract Documents, which he shall fulfil in all respects. The cost towards these shall be included in BOQ rates. In case of variation the contents in Special conditions of contract shall take precedence over General Conditions of Contract.

2. Drawings

- (a) Tender Drawings issued with the Bid documents give details necessary to understand the work. Good for Construction Drawings shall be released as per project requirements to match the approved construction schedule
- (b) For structural steel fabrication work the Architect/Engineer shall issue the Design Drawings. Based on these the Contractor shall prepare fabrication Drawings as per BIS conventions and get the same approved from The Engineer. His approval shall however not relieve the Contractor of accuracy in details and dimensions. The Fabrication work shall start after such approval.
- (c) The fabrication drawings shall be in AutoCAD format. Contractor shall submit 3 hard copies and Digital files.

3. Addition/ reduction in scope of work

- (a) Any additional work within the site, instructed by The Engineer during the contract period shall be carried out by the Contractor as per BOQ rates. The Employer reserves right to reduce the scope of work in the contract

4. Water

- (a) Water shall be given by PMFFPL at one point at free of cost & all internal distribution arrangement shall be done by the Contractor at his own cost.. Contractor shall arrange to install the piping work and storage tanks, pumping as per requirement at his own cost. **Water for Labour colony shall be arranged by Contractor at his own cost.**

5. Electric power

- (a) Electric power for construction machinery, equipment, lighting at site shall be facilitated by PMFFPL at one point & all internal distribution shall be done by contractor at his own cost. The wiring/cablings/ earthing shall be safe and as per PWD Electrical Inspector's requirements. The installation shall be erected, operated, maintained and monitored on day to day basis by competent electrical supervisor. The contractor shall get a sub-meter installed and make the payments as per the readings.
- (b) DG sets of adequate capacity shall be installed, run and maintained so as to meet work quantum and schedule requirement by the contractor.
- (c) Necessary safety gear, gloves shall be available at site for the operating staff as provided by contractor.

6. Material testing lab at site

- (a) The Contractor shall provide at site and maintain and operate throughout the tenure of contract, Testing equipments for testing in situ, Hydro Pipe pressure test, gauges for thickness measurements etc. However other routine & non routine tests as required on request of the SPV Engineer/ PMC Engineer shall be carried out and shall be approved Third party in their laboratory, (all costs to be borne by contractor). Test apparatus shall be calibrated in approved laboratory periodically.
- (b) The Testing shall be manned and operated by qualified and experienced technicians.
- (c) All the tests as mentioned in the specifications and BOQ are mandatory & to be carried out as per standard practice, as per intimation or guidance of Engineer In Charge & to be submitted with R.A. Bills. R.A. Bill shall not be accepted without Test reports some of the test are given below.
 - 1. Hydrostatic Pipe Pressure Test.
 - 2. Flow Tests.
 - 3. Booster connection and pump tests.
 - 4. Leakage detection Tests.

7. Progress reports and photographs

- (a) Contractor shall prepare and submit following to The Engineer.

Daily Progress Report (DPR) giving details of man power, staff, plant and equipment, cement consumption (in email to SPV and PMC).

Weekly report giving details of major items of work executed, cement and steel consumed.

Monthly progress report giving details of work executed in the month ,month wise billing statement, value of work done in the month cement and steel consumed, stock position, review of construction schedule (M S Project), summary of action taken for Quality, planning of work in the next month and 8 photographs of work executed in the month.

The monthly report of the last month shall be submitted in the first week of current month.

8. Environment protection

- (a) Contractor shall take adequate measures to reduce dust, mud, and smoke and noise nuisance to people working at site and in the neighbourhood. Such measures shall inter alia include sheet barricade of adequate height, sprinkling water on aggregate storage, application of modern construction machinery and equipment meeting statutory provisions.
- (b) All the trees at site shall be thoroughly protected by guards as per requirement.

9. Site facilities

- (a) The Contractor shall establish his office, laboratory, stores, steel storage and fabrication yard, cement storage shed in watertight construction and of adequate capacity, drinking water facilities, sanitization facilities, rest room, crèche for his staff and workers. Proper access and internal roads for vehicular traffic in all-weather shall be provided by the contractor. As required lock and key arrangements shall be provided for all valuables.
- (b) Statutory approvals, licenses for above mentioned facilities shall be obtained and maintained by the contractor at his own cost.

10. Royalty

- (a) Royalty applicable on supply of building and quarried materials to site as also on excavation work at site shall be paid by the contractor and the Original copies of documents showing evidence of having paid the same shall be lodged with the Employer

11. Service tax and VAT

- (a) **The Service Tax and VAT, on the contract bills paid by the Employer-** Contractor have to submit the copy of challans. If copy of these Challans are not submitted for continuous two months or previous two consecutive R. A. Bills, then the amount shall be recovered from next R. A. Bill payment including any applicable penalty.

12. Measurement book

- (a) Measurements of work done shall be written jointly by The Engineer or his representative and contractor's Engineer and signed. The Book shall remain in the custody of The Engineer.
- (b) Measurements of work done in a particular month shall be completed before 7th day of the next month.
- (c) Contractor's Bill shall be accompanied by Xerox copies of duly signed measurements.

13. Monthly Running Bill:

Contractor shall prepare and submit monthly running bill covering work done in that particular month. The Engineer shall check, certify and forward to the Employer for further necessary action.

14. Terms of payment :

The payment terms of the payment will be as below or as decided by SPV and Party at the time of negotiations

14.1 Mobilization advance

Mobilization advance of 10% of the contract value will be paid to the contractor against the Bank Guarantee of any Nationalized /Scheduled Commercial Banks notified by RBI (except co-operative/Rural Banks) valid for 15 months from the date of LOI / notice to proceed or up to the total recovery of Mobilization advance whichever is earlier.

10% mobilization advance will be deducted from second Running Bill till completion or in equal instalments.

After recovery of the total mobilization advance, the Bank guarantee received against the mobilization advance will be returned to the contractor.

14.2 Monthly R.A. Bill:

Monthly consolidated single bill should be presented for settlement. The R.A. Bills will be checked by EIC within a period of 15 days & certified by the Consultant within a period of 20 days and payment shall be made within 10 working days from the date of certification by Consultants and necessary deductions like 10 % Mobilisation advance, 5 % Retention money & any other payment made, Income tax as per Terms. All bills shall be submitted in soft copy as well as hard copy. The reconciliation of Cement & Steel to be submitted along with R.A. bill. All Test reports, J.M.R., Progress report with Photographs also to be submitted along with R.A. Bills. **Original Royalty Slips also needs to be submitted along with the bills. In failure of doing so, the employer will deduct the applicable royalty payment from the RA Bill amount.**

The Consultants shall be within his right to adjust and deduct the advances such that full recovery will be made at appropriate stage.

14.3 Retention Money:

5% contract value will be deducted as retention money from each RA bill (it shall be in addition to the Performance Bank Guarantee of 5% of the contract value).

On submission of final bill/Completion of the contract, the retention money will be released against the Bank guarantee of equivalent amount of any Nationalized/Scheduled Commercial Banks notified by RBI (except co-operative/Rural Banks) valid for 12 months defect liability period from the date of final completion of work/handing over of site.

Bank Guarantee will be returned after the expiring of the defect liability period i.e., 12 months from the date of completion of work/handing over of site.

14.4 Final Bill

Only on obtaining final completion certification from the Consultants & Employer, the Contractor shall submit the FINAL BILL which will be settled within a period of two months provided there is no dispute. The completion certificate will be issued only after all the defects pointed out are rectified completely to the satisfaction of the Consultants and the Employer. The reconciliation of all materials to be submitted along with the bill.

15. Quality assurance and Quality control

The Construction Quality Management is necessary to ensure that the Construction Quality meets or exceeds the intents of the technical specifications and drawings set forth in the Contract Documents. This is a system in which The Construction Manager

(contractor) and The Engineer in Charge (employer/consultant) perform defined tasks independently to achieve the Objective cited above.

- (a) Quality Control (QC) is regulatory process to be performed by the Construction manager and which includes following:
 - (i) Specific standards are set for Construction performance, deduced or derived from the Technical Specifications/Drawings/Contract Conditions.
 - (ii) Construction methodology and planning and detailed time schedule.
 - (iii) Planning and deployment of appropriate resources like plant/ machinery/ manpower
 - (iv) Systems for workmanship in process supervision, checks and corrections.
 - (v) Testing of Construction Materials and site facilities.
 - (vi) Quantification of work done.
 - (vii) Meetings/workshops for safety and improvement in quality Plan
- (b) The Construction Manager prepares Quality Plan particular to the Project and same is finalized in conjunction with Engineer in Charge. The Quality Plan shall comprise of
 - (i) QC Organization defines qualifications, hierarchy, authority and responsibility.
 - (ii) Construction method statement.
 - (iii) Procedure for material sample approvals.
 - (iv) workmanship checks for work in progress
 - (v) Material tests-standard/frequency/tolerances
 - (vi) Forms
 - (vii) procedure for interaction with Engineer in Charge
 - (viii) Bar Chart
 - (ix) safety manual
- (c) Quality Assurance (QA) includes defining criteria, applying procedures to ensure that QC system is effective .Thus the main functions of the Engineer in Charge are (1) to verify, vet contractor's Quality Plan and the QC system. (2) To monitor the working of QC systems. (3) Taking remedial measures in case of failures and strengthening the system

The Engineer in Charge makes his Quality Plan which comprises of

- (i) QA Policy and goal.
- (ii) QA standards and procedure, procedure for QA/QC interface.
- (iii) Development of QC norms specific to the project.
- (iv) Organization
- (v) Acceptance criteria
- (vi) Site surveillance and checks to control and prevent non conformities.
- (vii) Audit of completed work
- (viii) Maintaining QA records.
- (ix) Periodic internal QA/QC audits and remedial measures as per requirement.
- (x) Periodic joint site visits and meetings with the Construction Manager to sort out quality related matter.

16. Supply of Required Materials Like Pipes, Pumps, Pressure Gauge, Reels, Valves & Etc. for contract work

(a) The Contractor shall supply above materials at his own cost for contract work.

(b) Weighing, unloading at site, handling, storage, security and testing of samples in approved laboratory shall be done by the contractor and same shall be included in relevant item rates.

The Contractor shall maintain at all times proper records of material received, consumed and stock of all materials for use by the Contractor in the construction of civil works at the site.

17. The Material reconciliation statement shall be provided to the employer on demand only if needed.

18. Variations in Quantity and Non tender items

- (a) Even if the final quantity of work done differs from the BOQ quantity for the particular single item to any extent and this change causes variation in the Total Contract Price, there will not be any variation in the approved rates given in the attached BOQ.
- (b) Wherever applicable, the rates of non-tender items shall be deduced from similar items of work in BOQ and if this cannot be done then from DSR of Maharashtra State PWD for the nearest District HQ.

- (c) If above cannot be applied, then the Engineer shall arrive at the rate on the basis of actual cost incurred add 15% towards overheads, profits, transportation, handling, storage etc.

$$L + M + 15\%$$

L= Cost of Labour

M= Cost of Materials

- (d) For working out (18(c) above) the Contractor shall submit detailed analysis and supporting documents deemed necessary by the Engineer in advance and get the approval from the Engineer/ Employer before executing the work.

19. Completion period, completion certificate and taking over

- (a) The Contractor shall complete the contract works in all respects within the Completion period as per Appendix.
- (b) On completion of contract work, the contractor shall give a written Intimation to the Engineer to this effect. Joint Inspection by Employer, The Engineer, and contractor shall be done within 10 days of intimation and the punch list or defect list shall be prepared and signed. The defects shall be rectified within 14 days, again the rectifications work will be verified jointly. After all the defects are rectified to the satisfaction of Employer/the Engineer, Acceptance report will be signed jointly and the Employer shall take over the work within 7 days of signing the Acceptance report.

20. Defect liability

- (a) The Defect liability period shall be as per Appendix. The contractor shall be responsible to make good at his own expenses every defect which may develop during this period and which in the opinion of The Engineer is due to defective materials / defective workmanship/erroneous construction method.
- (b) The Employer shall intimate the defects in writing to the contractor and the contractor shall rectify the same within 7 days of such intimation. Failing this, the Employer shall be within his right to get such defects rectified from other sources and recover the cost from the retention amount.

21. Liquidated damages

- (a) The liquidated damages to be recovered from the contractor for delay in completing the work shall be as per Appendix.
- (b) This clause shall be applicable delay in Mile Stones if so stated in the Appendix.

22. Performance Bank Guarantee

- (a) Performance Security shall be provided by the contractor of an 5 % of Contract Value plus additional security for unbalanced Bids in accordance with Clause No. 21 of Appendix (section 5) to the Employer not later than the date given in the Letter of Acceptance. The amount, time period of keeping in force and banker shall be as specified in the Appendix. The performance security shall be by way of Bank Guarantee.
- (b) The format for the Bank guarantee shall be as per Tender Documents.

23. Labour and compliances with labour regulations

- (a) The contractor shall deploy adequate force of skilled and unskilled workers, foremen, supervisors of requisite skills to ensure quality construction as per schedule.
- (b) During the currency of contract, the contractor, his sub-contractors shall abide all existing or deemed statutory Labour Enactments, Rules, and Regulations as applicable.
- (c) The Contractor shall keep the Employer, The Engineer indemnified in case any action is taken by competent authority due to contravention of any Act/rules/regulations including amendments if any.

24. Spaces for quarters

- (a) The Employer shall provide Open Space at site for contractor's workers residential quarters. Contractor shall barricade such area, maintain sanitation and hygiene and completely vacate and hand over to the Employer within 15 days of termination of contract.
- (b) All Statutory permits shall be arranged by the Contractor at his cost. He shall keep the Employer indemnified from any penalties, legal sanctions that may be imposed by the Authorities in this matter.

25 Safety at site.

- (a) The Contractor shall maintain high quality safety standards to control and arrest accidents, injuries, occurrences of fire and resultant damages. The compliances in this regards have been listed and discussed herein after. The Contractor may make his assessment and add more items as may become necessary and prepare Contractor's Safety Plan for site operations. Such Plan shall be reviewed in conjunctions with the Engineer and modified to achieve higher standards
- (b) Contractor's Construction Manager shall set up Vigilance cum Safety Committee to implement and monitor the Safety Plan. The constitution of the committee shall be as follows :

Chairman	Construction Manager.
Coordinator	Safety officer/Engineer
Members - minimum 6.	Site engineers/supervisor/Foreman Two from each

Associate Work group.
 The Engineer/ his representative.

The members shall be different work groups such as Machinery & Mechanical, Electrical Supervisor, Fabrication, carpentry, concreting, and earthwork etc. The members shall reach the employees in the group and make them aware of the safety measures and rules etc.

The first Workshop and briefing shall be held at the commencement of work. Subsequently the members shall continue periodic briefings to each group.

The Committee meetings may be held bi monthly to review and take suitable action

- (c) For creating greater awareness, appropriate safety posters and signages shall be put up neatly at prominent places. These should be visible.
- (d) The internal circulation roads, storages, site office, fabrication yards, material stacking, construction water lines, cable routes shall be made as per proper plan for smooth movements.
- (e) Following protective equipment/items shall be provided :
 - Safety shoes, helmets for all employees/workers at site.
 - Safety belts canvass shoes while working on roofing.
 - Safety goggles, leather gloves, face screen by welders, fitters, gas cutters, and khalasis.
 - Shock resistant shoes, hand gloves, for wiremen, electricians.
 - Asbestos fibre gloves/rubber gloves while handling chemicals.
 - Protective heavy quality nylon net to be provided on the underside where work is on at an elevation.
 - Fire extinguishers and sand buckets.
 - 3m high sheet metal barricade to protect the neighbourhood from dust and noise.
- (f) Preliminary requirement of staff and Machinery/plant/equipment:
 - Vehicle drivers, crane drivers/operators, Electricians/wiremen, shall have well Experience, expertise and valid license from RTO/Electrical Inspector
 - Welders/fitters, mechanics should have good work knowledge and ITI licenses
 - Winches, cranes, pulley blocks, wire ropes shall have a valid test report and worthiness certificate of a chartered engineer
 - Approved capacity for load shall be clearly exhibited on cranes
 - transit mixers, trucks, vehicles shall have valid permits
 - At any time minimum 2 trained First Aid workers shall be available. They must be trained for artificial respiration, dressing the wounds, handling the causality in correct way
- (g) Standing instructions for safety :
 - Alcohol and tobacco is prohibited
 - Children/minors not allowed entering site
 - Earth work, fabrication areas to be barricaded
 - Movement of vehicles/Poclain/jcb etc to be controlled by a foreman

- Transportation of heavy articles at site to be closely controlled to protect workers / nearby objects
 - The main switch boards shall have double earthing. All earth moving equipment to have effective earthing
 - Circuit breakers shall be used
 - Only armoured cable/ heavy rubber insulated cables of minimum 660 V grade shall be used
 - Adequate lighting arrangements to be made
 - All electrical installation shall be protected from rains/leaking water etc.
 - Cranes/earth moving equipment shall have audio-visual signalling during operation
 - Sturdy staging, platforms with railing shall be provided for work at elevation
 - First Aid boxes and one stretcher to be available throughout the day and night
 - Telephone and address of the nearest Hospital to be displayed in site office
 - Vehicle to be available for evacuating causality
- (h) In case of accident arrangements shall be done very fast for evacuation, first aid, and admittance to a Hospital
- (i) Proper records shall be maintained as required by the Factory Inspector

SECTION - 5: APPENDIX**Contents**

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APPENDIX

[illegible]

			<p>Mobilization advance, 5 % Retention money & any other payment made, TDS as per Terms. All bills shall be submitted in soft copy as well as hard copy. The reconciliation of Cement & Steel to be submitted along with R.A. bill. All Test reports, J.M.R., Progress report with Photographs to be submitted along with R.A. Bills. R. A. Bill is not accepted without Test Reports.</p> <p>The Consultants shall be within his right to adjust and deduct the advances such that full recovery will be made at appropriate stage.</p> <p>Deduction of 5% towards retention, 10% towards recovery of mobilization advance, payments already made and recovery of any other dues/income tax.</p>
5.	Final Bill-Clause 14.4 of Special Conditions of Contract	:	Final Bill shall be complete in all respects including duly signed final measurements, material reconciliation statements, authentication of non tender items by quantity and by rates agreed upon. Payment against final bill will be made as set out in Special Conditions of Contract-Clause14, after deducting full mobilization advance, 5% retention, other dues/TDS and recoveries.
6.	Time for Completion & Mile Stone : Clause19 of Special Conditions of contract	:	4 Months from date of LOI.
7.	Liquidated Damage-Clause 21 of Special conditions of contract	:	In the event of delay in completion of work, the contractor shall pay liquidated damages at the rate of 0.5% of contract price per week of delay subject to a maximum of 5% of contract price.
8.	Penalty	:	Rs.1,000/- per incident of unsafe act / non compliance of Legal / Statutory requirements as may be pointed out by the Consultants / Employer. Such fault shall also include acts that are specifically prohibited under various provisions / clauses provided as part of this tender document.
9.	Reconciliation of Material	:	The Contractor shall maintain at all times proper

			<p>records of material received, consumed and stock of all materials for use in the construction of civil works at the site.</p> <p>The Contractor shall also provide a proper reconciliation of the material consumed, duly verified by the Consultants / Employer, and along with the RA bills submitted from time to time and also Final reconciliation Statement with final Bill.</p>
10.	Contract Rates.	:	The Contract rates as per BOQ shall remain firm throughout the currency of the contract. No escalation or price adjustment shall be done due to any reason.
11.	Certified Payments - Clause 14 of Special Conditions of Contract	:	All payments made against the certificate issued by the Architect and Employer shall be deemed as advance payments. Payments made will not be construed as the items are complete and without any defects. Only on receiving completion certificate & settlement of final bill, the work shall be considered as complete and payment made against the final bill be considered as full payment against the work.
12.	Mobilization Time – Clause 14 of Special conditions.	:	The Contractor shall mobilize to the satisfaction of the Engineer and start construction work at site within a period of Ten Days from the date of LOI.
13.	Labour - Clause 23 Special Conditions	:	The Contractor shall comply with the provision of all relevant Acts of Central or State Govt. including Payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maternity Benefit Act 1961, Mines Act 1952, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970 or PF Act 1952 any modification thereof or any other law relating thereto and rules made there under from time to time. No child labour should be employed at site.
14.	Insurance	:	<p>The Insurance Policies to be taken and kept in force by the contractor throughout the construction and defect liability period: These policies will be in joint names of contractor and Employer</p> <p>Theft/pilferage insurance for steel, cement at site</p>

			<p>and in contractor's custody. Contractor's Plant and equipment at site.</p> <p>Personal injury or death insurance-third party liability up to Rs. 10.00 lacs (Rupees Ten Lacs) per occurrence and covering 10 occurrences during the Contract.</p> <p>Personal injury or death Insurance for Contractor's staff, employees.</p> <p>Motor vehicle insurance including third party.</p>
15.	Notice to Local Bodies	:	The Contractor shall comply with and give notices required by any Government authority, instrument, rule or order made under any Act of Parliament, State laws or any regulation or bye-laws of any local authority relating to the works.
16.	Indemnification	:	<p>The contractor shall indemnify and keep the Employer indemnified against any liability in respect of :</p> <p>(i) Any fee or charges payable under any Act of Parliament, State Laws or any Govt. instrument, rule or order and any regulation or bye-laws of any local authority in respect of the works.</p> <p>(ii) Any loss or damage caused to any building road or fence of the company or any other party in the working area due to negligence of the contractor.</p>
17.	Licenses and local approvals	:	The contractor shall obtain at his cost Govt/Quasi Govt/Municipal licenses/permits required for labour, site facilities, construction work

18.	Mobilization advance Clause 14 of Special conditions of contract	<p>Mobilization advance of 10% of the contract value will be paid to the contractor against the Bank Guarantee of any Nationalized /Scheduled Commercial Banks notified by RBI (except co-operative/Rural Banks) valid for 12 months from the date of LOI / notice to proceed or up to the total recovery of Mobilization advance whichever is earlier.</p> <p>12% mobilization advance will be deducted from each Running Bill. After recovery of the total mobilization advance, the Bank guarantee received against the mobilization advance will be returned to the contractor.</p>
19.	<p>Supply of Materials and reconciliation. Clause no 16 of special conditions of contract</p> <p>Basic rates :</p>	<p>All required materials to execute the work as per mentioned in the BOQ and drawings and for items amended during contract period, if any.</p> <p>Should Be finalized At the Time Of Contract.</p> <p>All Materials to be procured should be approved by BIS, ISI and should be Confirming to NBC (Latest Revision) India. Contractor has to submit quotations & submit to PMFPPL / PMC in 15 days advance for their approval. Procurement shall be start after approval only.</p>
20.	Site office & conference facilities-Clause 9 Special Conditions.	Contractor to provide lockable and properly ventilated site office of about 100 Sq.M. carpet area with toilet facility, pantry, electric supply for lighting and computers, fans etc... with conference facility, at his own cost.
21	Additional Performance Security for unbalanced Bids	If the Bid of the Successful Bidder is seriously unbalanced in relation to the Consultants 's estimate of the cost of work to be performed

		under the contract, the Employer may require the Bidder to produce detailed price analysis of any of all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction. The employer may decide to seek additional performance bank guarantees for the bids.
22	Co-ordination with PEB Vendor & other Vendor	Coordination is requiring with PEB Vendor & other vendor.

PAITHAN MEGA FOOD PARK PVT. LTD. AT PAITHAN (MH)

BOOK No. 2

Bill of Quantities (BoQ)

BID NO. PMFPPL – WS – 01 - 2016



Paithan Mega Food Park Pvt. Ltd.

Nath House, Nath Road, Aurangabad-431005, Maharashtra

Project Management Consultants (PMC)



Abhyuday Techno Economic Consultants Pvt. Ltd.

211-212, Patel Avenue, Near Gurudwara

S.G. Highway, Thaltej, Ahmedabad – 380054, Gujarat

A/E Consultants



SEM MAC Consultants Private Limited

'Conjeevaram House', 2nd Floor, 6-1-276,

Padmarao Nagar, Secunderabad – 500 025.

PROJECT: PAITHAN MEGA FOOD PARK AT PAITHAN, AURANGABAD

RAW WATER SUPPLY WORKS (Revised 14.03.2016)

S.NO.	DESCRIPTION	UNITS	QTY	MATERIAL COST		LABOR - COST	
				RATE (Rs.)	AMOUNT (Rs.)		
	GENERAL						
	a) All the works to be carried out as per relevant IS specifications & code of practices. b) The quoted rate shall include for providing brackets, clamps etc., in ducts and under ceiling for supporting the pipes etc., two coats of enamel painting for the brackets, colour coding the exposed pipe works, identification labels, making bores in masonry/RCC, chasing the surfaces for concealed plumbing and making good the chased surfaces and bores in CM 1:4/PCC 1:2:4 curing etc., complete. c) Only electric groove cutting, hammer drilling, core cutting and other equipment shall only be allowed for cutting and drilling etc.,						
	d) If Employer supplies all the required CP and porcelain fittings, the successful bidder has to fix them in position with their tools, tackles and the required fixing materials like thread, paint, saphead, screws, sand, cement, metal and bricks etc., complete. The rate of the same shall be deducted from the running bills of the contractor.						
WS	WATER SUPPLY						
WS-1	Providing,fixing,testing and commissioning of approved make Heavy quality G.I. Pipes Class 'C' with 'R' brand/band GI malleable specials such as tees, elbows, check nuts, unions, flanges reducers etc., including threading, cutting and laying in ground shall have two coats of bitumen paint over which wrapped with pype coat and all exposed piping work shall be painted with one coat of zinc chromatic primer & 2 coats of enamel paint of approved colour & make by Architect/Engineer. Rate shall also including for necessary excavation in all sort of soil, back filling, consolidation and disposing surplus materials as directed within a site etc., complete.						
a	50mm NB .	Rmt	635				
b	80mm NB	Rmt	306				
c	100mm NB.	Rmt	2394				
d	150mm NB.	Rmt	24				
e	200 mm NB.	Rmt	924				

S.NO.	DESCRIPTION	UNITS	QTY	RATE (Rs.)	AMOUNT (Rs.)		
WS-2	Supply and fixing of C.S gate Valve , material specification of the body, body connector and gate is ASTM A 351 Gr. CF8M , stem made out of AISI 316 and seat material is PTFE. Rate shall include necessary jointing materials like threaded nipples Teflon tape etc., and complete.						
a	50mm dia (Screwed ends)	Each					
b	80mm dia (Screwed ends).	Each	2				
c	100mm dia (Screwed ends).	Each	9				
d	150mm dia (Screwed ends).	Each	150				
e	200mm dia (Screwed ends)	Each	3				
WS-3	Supply of butterfly valves (PN 16) with vertical/horizontal gear unit with hand wheel.						
a	100mm dia.	Each	RO				
b	150mm dia.	Each	RO				
WS-4	Providing & construction of Valve Chamber of size 600x600x800mm depth with 230mm thick TM brick in CM 1:6 , The chamber is constructed over 100mm thick PCC 1:4:8 internal and external plastering in CM 1:4, supply and fixing of Medium duty CI frame & cover of size 600x600mm. The Cover and frame should be approved by Architect/Engineer. The quoted rate shall include for necessary excavation in all sort of soil, back filling, consolidation and disposing surplus materials as directed within a site etc., complete.as per drawing .	Each	RO				
WS-5	Providing,fixing,testing and commissioning of Water Meter having stainless steel gears of deshmesh with 'Y' strainer of approved make . Rate should include "Y" strainer and required specials (like flanges and etc.,) .						
a	150mm dia.	Each	2				
b	Meters for other area. 1" NB	Each	RO				
c	Meters for other area. 2 " dia.	Each	RO				
	Sub Total of WS (Rs.)						
P	PUMPS						
P-1	Hydropneumatic system						

S.NO.	DESCRIPTION	UNITS	QTY	RATE (Rs.)	AMOUNT (Rs.)		
	Supply, erection, testing and commissioning of Transfer system comprising of (2W+1S) Stand by pump vertical , self priming,multistage type, fitted with standard motor impeller and other vital parts of the pump , high quality control panel comprising of change over dry run protection, DOL starter, suction and discharge manifolds, isolation valves,NRV, pressure gauges and pressure switches, inclusive of wiring from panel to pump etc., complete.This entire system should have Compatibility to integrate with BMS system						
	Capacity : 75cum/Hr @ 40m head each.	Set	3				
	Sub Total of P (Rs.)						
SP	SOFTNER PLANT						
SP-1	Supply,instalation & testing of Softner Plant with feed water pumps of 10 cum/hr at 30m head, Dual media filter, dosing system,Softner, brine tank,, valves, pressure gauges, flow switchs, internal piping, including all necessary fiittings and electrial pannels & internal wiring..						
a	Capacity: 10 cum/hr @ 30m head	No.s	1				
SP-2	Soft water Transfer Pump to Boiler or Cooling Towers						
	Supply, erection, testing and commissioning of Transfer system comprising of (1W+1S) pump vertical , self priming,multistage type, fitted with standard motor impeller and other vital parts of the pump , high quality control panel comprising of change over dry run protection, DOL starter, suction and discharge manifolds, isolation valves,NRV, pressure gauges and pressure switches, inclusive of wiring from panel to pump etc., complete.This entire system should have Compatibility to integrate with BMS system.						
	Capacity : 5cum/Hr @ 50m head each	No.s	2				
	Suction Side -						
	65mm dia brass strainer						
	65 mm dia- butterfly valves						
	Delivery Side						
	50 mm dia- gate valves						
	50 mm dia-Non-return Valves						
	C.I. Foot valve Ball type, Flanged end, nuts, bolts and gaskets etc.						

S.NO.	DESCRIPTION	UNITS	QTY	RATE (Rs.)	AMOUNT (Rs.)		
MW	MISCELLANEOUS WORKS :						
MW-1	Supply, Installation & Commissioning of level sensor/switch (for all water tanks) with complete working system consisting of control panel , probe-mounted vertically from water tank, adjustable, switching hysteresis for pump control application, main supply 230V, 50 Hz. These to be housed in stoving enamel painted cast aluminium weather proof suitable for wall mounting, will be used for mounting levels in water tank (HL,LL) and interfaced with pump controller for automatic pumping. All complete as per approved manufacturer's specification. Rate quoted shall include for carrying out control armoured copper multicore cabling from level switch located on water tank upto motor and starter interconnection inside pump room with necessary contactors for starter of pumps a Control cables for level sensor to transfer pumps.	Each	6				
MW-2	Supply, fixing, testing and commissioning of RCC pipes of NP2 class with suitable collars filling the recess at joints of pipes with hemp dipped in hot bitumen or other suitable compound for chalking of joint by jack, setting up of loose space over the collar joints chalked with CM 1:2, finished both ends to a slope of 1:1 including curing, testing of pipes, etc., complete.						
a	300 mm dia	RM	RO				
	Sub Total of MW (Rs.)						
	Grand Total (WS+P+SP+MW) (Rs.)						
	Note: All mentioned quantities are approximate only , which may get increased or decreased as per actual requirements while job execution.						
	Taxes						
	Grand Total. (Inclusive of Taxes)						

PAITHAN MEGA FOOD PARK PVT. LTD. AT PAITHAN (MH)

BOOK No. 2

Bill of Quantities (BoQ)

BID NO. PMFPPL – WS – 01 - 2016



Paithan Mega Food Park Pvt. Ltd.

Nath House, Nath Road, Aurangabad-431005, Maharashtra

Project Management Consultants (PMC)



Abhyuday Techno Economic Consultants Pvt. Ltd.

211-212, Patel Avenue, Near Gurudwara

S.G. Highway, Thaltej, Ahmedabad – 380054, Gujarat

A/E Consultants



SEM MAC Consultants Private Limited

'Conjeevaram House', 2nd Floor, 6-1-276,

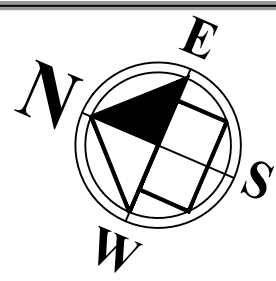
Padmarao Nagar, Secunderabad – 500 025.

KEY MAP

LEGEND:

-  1200mmx1200mmx1500mm Depth VALVE CHAMBER
-  400Ø R.C.C HUME PIPE
-  200Ø GI. 'C' CLASS PIPE

NOTE:
HYDROPNEUMATIC SYSTEM AT WTP ARAE
SYSTEM CAP.120CUM/HR@80M HEAD.
EACH PUMP OF 40CUM/HR@80M HEAD(3W+1S)



ARCHITECT PROJECT MANAGER	NOTES	1. ALL DIMENSIONS ARE IN MTS. & ARE TO BE READ NOT MEASURED.	REVISIONS	SN	DATE	REVISION	LEGEND	REFERENCE			PROJECT :PAITHAN MEGA FOOD PARK AT VILLAGE DHANGAON&GUT NO. 53,55,56 & 62/2 & WAHEGAON, TQ,PAITHAN, DIST. AURANGABAD.	PURPOSE: TENDER	
		2. DISCREPANCY FOUND IN DRG SHOULD BE BROUGHT TO THE NOTICE OF UNDERSIGNED IMMEDIATELY BEFORE COMMENCEMENT OF WORK.										TITLE: EXTERNAL WATER SUPPLY LAYOUT	
		3. ARCH. DWGS. TO HAVE PRECEDENCE OVER STRL. DWGS. FOR LVLS & DIMENSIONS.										PROJ.NO. : H-10-11/013	DRG.NO.:FPA-PH-SP-601&2
		4. LARGE SCALE DRGS TO HAVE PRECEDENCE OVER SMALL SCALE DRGS										CHECKED : CKS	DEALT :
		5. ALL DIMENSIONS ARE TO THE FINISHED SURFACE DIMENSIONS.										DRAWN : GANESH	
		6. ALL LEVELS ARE TO THE FINISHED FLOOR LEVELS.										DATE : 29-05-2014	SCALE -1:1500
		7. FINISHES THICKNESS TO BE DEDUCTED OR ADDED IF REQUIRED.											
		8. ± 0.00M. Lvl CONSIDERED AS FRL		00	27-03-14	FOR TENDER							

PAITHAN MEGA FOOD PARK PVT. LTD. AT PAITHAN (MH)

BOOK NO. 4

TECHNICAL SPECIFICATION

BID NO. PMFPPL – WS – 01 – 2015



Paithan Mega Food Park Pvt. Ltd.

Nath House, Nath Road, Aurangabad-431005, Maharashtra

Project Management Consultants (PMC)



Abhyuday Techno Economic Consultants Pvt. Ltd.

211-212, Patel Avenue, Near Gurudwara

S.G. Highway, Thaltej, Ahmedabad – 380054, Gujarat

A/E Consultants



SEM MAC Consultants Private Limited

'Conjeevaram House' , 2nd Floor, 6-1-276,

Padmarao Nagar, Secunderabad – 500 025.

**TECHNICAL SPECIFICATIONS FOR WATER SUPPLY AND
EFFLUENT DRAIN WORKS**

PROJECT

PAITHAN MEGA FOOD PARK

CLIENT

PAITHAN MEGA FOOD PARK PVT LTD

PMC:

Abhyuday Techno- Economic Consultants Pvt. Ltd.

CONSULTANT:

M/s.SEMAC CONSULTANTS PVT.LTD

Architects & Consulting Engineers
Conjeevaram House, Archana Block,
2nd Floor, 6-1-276, Padmaraonagar,
Secunderabad - 500025 (A.P)
Ph : 27508968, 65197368, 27502072.

INDEX

SECTION-1

General Provisions

SECTION-2

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SECTION-1: GENERAL PROVISIONS

Scope:

The General character and the scope of work to be carried out under this section is illustrated in the drawings and specifications attached herewith. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The Contractor shall furnish all labour, materials, appliances, tools and equipment necessary for the work for plumbing services installation including testing and commissioning as specified herein, and as per the relevant Bureau of Indian Standards (BIS), British Standards codes, **National Building Code** and as shown on the drawings. This also includes any material, appliances and equipment not specifically mentioned herein or noted on the drawings as being furnished or installed which are necessary and customary to make a complete installation properly connected and in working order.

Carry out all incidental works connected with plumbing services installation such as excavation of trenches and back filling, cutting and chasing in concrete and brick and making good, cutting/drilling holes through walls, floors, and grouting for fixing of fixtures/equipment and so forth.

Furnish and install complete workable plumbing services installation as shown on the drawings and described in this specification and as per the latest Bureau of Indian Standards (BIS), British Standards (BS) specifications including all that which is reasonably inferred to all the buildings, internally and externally.

Complete installation of the sewerage and sewerage appurtenances internally as well as around the building.

Complete installation of all sanitary and plumbing fixtures in all buildings.

Co-operation with other trades in putting the installation in place. Any work done without regard or consultation with other trades, shall be removed by the contractor without additional cost to the Owner, to permit proper installation of all other work, as desired by the Architect/Consultant.

Repair all damage done to the premises as a result of this installation and remove all debris left by those engaged for this installation to the satisfaction of Architect/Consultant.

Cleaning of all plumbing and sanitary fixtures, testing and proving the satisfactory performance of all fixtures at the time the buildings are handed over to the Owner.

It is the responsibility of the contractor to take care of all the fixtures fitted until the time of handing over to the Architect/Consultant.

Painting of all concealed and exposed pipes as specified.

Assume full responsibility for getting the entire installation duly approved by the authorities concerned and for all expenses in connection with the same. Assume responsibility for obtaining and delivering to the Owner certificate of final inspection and approval by the concerned authorities.

Licensed Plumber:

All work performed by the contractor shall be through licensed plumbing supervisor possessing a valid plumbing contractor's license employing Engineers, Technicians, Foremen, Plumbers, Masons, Helpers, etc., as required.

Regulations and Standards:

The installation shall conform in all respects to the following standards in general:

IS 651 – 1992	: Specification for Salt Glazed stoneware pipes and fittings (fifth revision).
IS 7558 – 1974	: Code of practice for domestic hot water installation
IS 5329 – 1983	: Code of practice for sanitary pipe work above ground for buildings.
IS 12251 – 1987	: Code of practice for drainage of building basements
Is 2064 – 1973	: Code of practice for selection, installation and maintenance of sanitary appliances
IS 6924 – 1973	: Code of practice for construction of refuse chutes in multistoried buildings
IS 1200 (Part 1)	: Method of measurement of building earthwork
IS 1200 (Part 16)	: Method of measurement of laying of water and sewer lines including appurtenant
IS 1200 (Part 19)	: Method of measurement of water supply, plumbing and drains.
IS 783 – 1959	: Code of practice for laying of concrete pipes
IS 13592 – 1992	: Specification for unplasticized PVC pipes for soil and waste discharge system inside building including ventilation and rainwater.
IS 2527 – 1984	: Code of practice for fixing rainwater gutters and down

pipes for roof drainage.

IS 2685 – 1971	: Code of practice for selection, installation and maintenance of sluice valves.
IS 6784 – 1984	: Method of performance testing of water meters (Domestic type).
IS 12235 (Parts 1 to 11)	: Methods of test for unplasticized PVC pipes for portable water supplies.
IS 458 – 1988	: Specification for precast concrete pipes (with or without reinforcement)
IS 2692 – 1989	: Specification of ferrules for water services
IS 12701 – 1989	: Specification for rotational moulded polyethylene water storage tanks.
IS 771 – (Part 3to 6)	: Specific requirements for urinals
IS 2548 (Part 1&2)	: Specification for plastic seats and covers for water closets.
IS 3004 – 1979	: Specification for plug cocks for water supply purposes.
IS 1711 – 1984	: Specification for self closing taps for water supply
IS 1703 – 1977	: Specification for ball valves (Horizontal plunger type) including floats for water supply purposes.
IS 4038 – 1979	: Specification for foot valves for water works purposes.
IS 782 – 1978	: Specification for Caulking Lead.(Third revision)
IS 1172 – 1983	: Code of basic requirements for water supply, drainage & sanitation (revised).
IS 1239 – 1990 (Part I)	: Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 1239 – 1992 (Part II)	: Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 1726 – 1991	: Code for cast iron manhole frame and cover (third revision).

IS 1742 – 1983	: Code of practice for building drainage.(Second revision)
IS 2064 – 1973	: Code of practice for selection, installation and maintenance of sanitary appliances.
IS 2065 – 1983	: Code of practice for water supply to buildings.
IS 4111 – 1986	: Code of practice for Ancillary structures in sewerage system
IS 4127 – 1983	: Code of Practice for laying glazed stone ware pipe.
BS 4515	: Specification for unplasticized PVC pipe fittings.
IS 4985 – 1988	: Specification for unplasticized PVC pipes for portable water supplies (second revision)
IS 732 & IS 2274 – 1963	: Indian Standard code of practice for electrical wiring & installation.
IS 1536 – 1976	: Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
IS 1537 – 1976	: Specification for vertically cast iron pressure pipes for water, gas and sewage.
IS 1538 (Part-1 to 23) – 1976	: Specification for cast iron fittings for pressure pipes for water, gas and sewage.
IS 1729 – 1979	: Specification for sand cast iron socket and spigot soil, waste and ventilating pipes, fittings and accessories.
IS 780 – 1984	: Specification for sluice valves for water works purposes.

National building code for Water Supply, drainage and Sanitation. Part IX Plumbing services section 1 and 2.

The installation shall also be in conformity with the bylaws and requirements of the local authority in so far as these become applicable to the installation. Wherever this specification calls for, a higher standard of materials and /or workmanship than those required by any of the above regulations and standards, then this specification shall take precedence over the said regulations and standards.

Wherever drawings and specifications require something that may conflict with the regulations, the regulations shall govern. This shall be referred to the Superintendent for arbitration.

Fees, Permits and Notices:

Contractor shall comply with all bye-laws and regulations of local and other statutory authorities having jurisdiction over the works and shall be responsible for the payment of all fees and other charges and giving and receiving of all necessary notices. Contractor shall keep the Superintendent timely informed about regulations and requirements of statutory authorities and shall obtain the final certificates of inspection and approval from the authorities.

Drawings and Specifications:

The drawings and specifications shall be considered as part of this contract and any work or materials shown on the drawings and not called for in the specifications or vice versa shall be executed as if specifically called for in both.

The tender drawings indicate the extent and general arrangement of the fixtures, drainage system, etc... The drawings indicate the points of supply and termination of work shall be installed as indicated in the drawings. However, any changes found essential to co-ordinate with this work and other trades shall be made without any additional cost. The drawings and specifications are meant for the assistance and guidance of the contractor, and exact location, distance and levels will be governed by the individual building and site conditions. Therefore, approval of the Superintendent shall be obtained before commencement of work.

Shop Drawings:

The contractor shall submit to the Owner four copies of the shop drawings.

Shop drawings shall be submitted under the following conditions:

Showing any changes in layout in the contract drawings.

Floor plans, Enlarged toilet details, schematic showing water supply and sanitary installation works

Pumps/Equipment layout, control panel, wiring and piping diagram.

Manufacturer's or Contractor's fabrication drawings for any materials or equipment.

The contractor shall submit four copies of catalogues, manufacturer's drawings, equipment characteristic data or performance charts as required by the Owner.

As Built Drawings:

On completion of works, the Contractor shall submit one complete set of original tracings and two prints of “As built” drawings to the Owner. He also submits all drawings / information in AutoCAD R14 or later version. These drawings shall have the following information:

Exact run and sizes of all piping on all floors and vertical stacks.

Ground and invert levels of all drainage pipes together with location of all manholes and connections up to outfall.

Run of all water supply lines with diameters, location of control valves, access panels.

Location of all mechanical equipment with layout and piping connections.

Contractor shall provide four sets of catalogues, performance data and list of spare parts together with the name and address of the manufacturer for all electrical and mechanical equipment provided by him.

All “Warranty Cards” given by the manufacturers shall be handed over to the Superintendent.

Manufacturers’ Instructions:

Where manufacturers have furnished specific instructions relating to the materials used in this job and methods of construction that are not specifically mentioned in these documents, such instructions shall be followed in all cases. The contractor shall also furnish detailed instruction and operation manuals in triplicate including detailed completion drawings and Fire Safety Plans on a tracing cloth to approved scale. Further it is the responsibility of the contractor to train the Owner's personnel in the operation and maintenance of the system.

Materials:

Materials shall be of approved make and quality specified. They shall conform to the respective Bureau of Indian Standards, British Standards Specifications and supported by Manufacturing Certificate / test certificate.

Samples of all materials shall be as per the list of approved brand manufacture, which shall be approved by the Superintendent before placing the order.

In any case of no availability of materials in metric sizes, the nearest size of FPS units shall be provided with prior approval of the Superintendent at no extra cost to the owner.

Guarantee:

The contractor shall guarantee both the material and workmanship of first class quality corresponding to standard engineering practice. Any defective materials / workmanship shall be rejected, the contractor has to rectify / replace at his own cost. Guarantee certificate of the materials supplied shall be handed over to the owner.

SECTION-2 : WATER SUPPLY SYSTEM:

Scope:

Provide and install a complete water supply system as per drawings and as described below and on the drawings.

Manuals:

Three sets of all manuals for the systems shall be submitted to the client. This shall include instruction and maintenance manuals.

As-Built Drawings:

As built drawings as specified in the contract shall be submitted to the client on completion of work.

Drawing shall clearly show pipe routes, component details including

Training:

It is the responsibility of the Contractor to train the Owner's personnel in the operation and maintenance of the system.

Water Supply System:

Overview:

Required number of deep bore wells in addition to the city municipal water connection supply water to an underground water tank.

The underground water tank comprises raw water storage, fire service water storage and domestic treated water storage. Two manhole access holes are provided for each compartment in the tank system to provide for access into the tank for maintenance purposes. Air vents are fitted to each compartment.

GI Pipes and Fittings:

GI pipes and fittings shall be used for cold and hot water services above and below ground applications. All internal and external piping shall be of high quality (Class C) galvanised iron, screwed socketed and shall conform to IS 1239 (Part-I). All fittings shall be malleable iron galvanized fittings of approved best Indian make. The details of pipes and sockets regarding nominal bore, thickness and weight in kg/m are as per IS-1239 (Part-I).

The following manufacturing tolerances shall be permitted on tubes and sockets.

Thickness:

- | | | |
|----------------------------|---|--|
| i) Light tubes butt welded | : | + Not limited - 8 percent |
| ii) Medium and Heavy tube | : | + Not limited - 10 percent butt welded |
| iii) Medium tubes seamless | : | + Not limited - 12.5 percent |

Weight:

- | | | |
|---|---|--|
| i) Single tube (light series) | : | + 10 percent - 8 percent |
| ii) Single tube (medium and heavy series) | : | +/- 10 percent |
| iii) For quantities per load of 10 tonnes | : | +/- 5 percent Min (light series) |
| iv) For quantities per load of 10 tonnes | : | +/- 7.5 percent
Min (medium and heavy series) |

Laying and Fixing:

Where pipes have to be cut or re-threaded, ends shall be carefully filed so that no obstruction to the bore is offered. For internal work all pipes and fittings shall be fixed truly vertical and horizontal, either by means of standard pattern holder bat clamps keeping the pipes 1/2" (12mm) clear of the wall everywhere or concealed as directed. For external work, G.I. pipes and fittings shall be laid in trenches. The width of the trench shall be the minimum width required for working. The pipes laid underground shall be not less than 60cm. from the finished ground level and a minimum horizontal distance of 60CM shall be maintained between other services lines.

Wrapping for Concealed GI Pipes:

Cleaning:

Pipe surfaces shall be thoroughly cleaned and dried before tape is applied and shall be free of dirt, grease and rust scale or other foreign matter. The pipe shall be cleaned mechanically.

Oil and grease, if present on the pipe surface should be removed by using suitable solvent and clean rags. The use of dirty, oily rags should not be permitted.

Field Application of Tape:

The tape shall be wrapped in accordance with the manufacturers recommendations in a manner that shall meet the adhesion requirement. During application, care shall be taken to ensure that there are no air pockets or bubbles beneath the tape.

The tape should be wrapped with an overlap of 50% for TEES. The first wrapping shall be done individually. The tape may be cut if required to suit the profile. There shall be two layers of tape wrappings. The first layer is to be wrapped on the pipe directly after cleaning

the pipe surface. The second layer is to be applied over the first layer. The second layer should also be wrapped with 50% overlap.

Testing:

Before any pipes are painted or covered, they shall be tested to a hydrostatic pressure of 7kg/sqcm. Or twice the working pressure of the pumping main whichever is lighter. Pressure shall be maintained for at least eight hours without an appreciable drop in pressure. In addition to the sectional testing of water supply pipes, the contractor shall test the whole installation to the entire satisfaction of the Engineer in charge. He shall rectify any leakages, failure of fittings or valves.

Disinfection of the Pipe Network:

The entire water distribution network is to be disinfected by using residual chlorine of 0.2 ppm for a period of 2 (two) hours. The entire chlorinated pipe network is to be flushed out with fresh water before the water supply system is put into operation for domestic usage.

Mode of Measurement:

G.I. pipes above ground shall be measured along the centre line of the pipes and fittings. The quoted rate for respective item shall be per Rmt and shall include the following:

- a) Cost of respective pipes and specials.
- b) Laying, fixing and jointing with standard pipe clamps available for different sizes inside the wall chase and fixed on MS angle iron brackets and GI U clamps for pipes in ducts as shown on the drawing.

- c) Cutting holes and chases in walls, floors, etc. And making good the same.
- d) All supporting arrangements, brackets, etc.

Testing and making good the defects, if any. G.I. pipes below ground shall be measured as stated elsewhere in the specifications.

Anti Corrosive Treatment for Underground Piping:

G.I pipe laid outdoor in trenches/buried in earth shall be wrapped with “Pypkote” make 4mm thick membrane consisting of seven layers of polyethylene polymerized bitumen and polyester mat laid over a suitable primer of fibre and solvent based rubber modified bituminous primer of density 0.9 g/cum applied at the rate of approx 200 -250 g/sq.m. Material to be laid strictly as per manufacturer's specification.

Pipes passing through masonry walls, foundation, beams shall be taken through embedded pipe sleeve of same material. The pipe sleeve size to be at least 1/2 times the diameter of the crossing pipeline. The pipeline running below floor shall be given anticorrosive treatment same as for underground piping.

Fields of Application:

Hot and cold water application in homes, apartments, hotels, resorts, hospitals, high and low rise buildings corporate and commercial houses, academic institutes etc. for pure hygienic water supply.

Valves, Strainers and Pressure Gauges:

General:

This section deals with different type of valves like butterfly valves, gate valves, ball valves, check valves, balancing valves and Strainers and pressure gauges. The contractor shall refer to the approved make of materials specified in the document & relevant drawings.

Valves shall be provided on branch pipe connections to mains and at connection to equipment where indicated. All valves are to be located for easy access. All valves shall be supported wherever necessary with MS brackets. Valves shall comply with IS 780 (Class I) for C.I sluice valves and IS 778 for G.M valves and tested.

Pressure gauges shall have outer diameter not less than 115mm with 10mm BSP full thread, brass body syphon and gauge cock of size 10mm. Dial gauges shall have adequate response for the pressures encountered within the specified (Range 0-15Kg/sq.cm).

Gate Valve:

The primary function of a gate valve is for starting and stopping of flow. It has a disc actuated by a stem screw and hand wheel, moves up and down at right angles to the path of flow of fluid and seats against two faces to shut of flow. As the disc of the gate valve presents a flat surface to the direction of flow, this valve is only for starting and shutting the flow in the pipe.

These valves are of GM make. Supplying, fixing and testing correspond to IS 778-1984, Specifications for Copper Alloy Gate, Globe and Check Valves for Water Works.

All globe and check valves shall have working parts suitable for hot and cold water, as required. Valves shall be tagged with permanent label under hand wheel indicating type or duty.

All valves should have manufacturer's test certificate indicating the date of shop test and other quality control tests with the material used for the same. Gate valves shall be of the size as specified in the BOQ.

Also the following standard corresponds to their manufacture.

Design	-	API600/BS1414
Face to Face/ End to End	-	ANSI B 16.10
Flange Dimension	-	ANSI B 16.5
Butt Weld Ends	-	ANSI B 16.25
Pressure/ Temperature		
Ratings	-	ANSI B 16.34
Testing	-	API 598

Ball Valve:

The ball valve shall be of high pressure type and shall be of sizes as specified in the BOQ. The normal size of a ball valve shall be that, corresponding to the size of the pipe to which it is fixed. Ball valves shall have body of carbon steel. The ball and the shaft shall be of stainless steel. The seat shall be of PTFE. The valve shall be complete with socket weld ends and the float of copper sheet. The minimum thickness of copper sheet used for making the float shall be 0.45mm for a float exceeding 115mm dia. The body of the high pressure ball valve when assembled in working condition with the float immersed to not more than half of its diameter shall remain closed against a test pressure of 3.5kg/sqcm.

The ball valve shall generally conform to IS specification No.1703:1977. The weight of ball cock and the size of the ball cock shall be as per IS specification.

Foot Valve:

Foot valves are provided with cast iron body with brass disc and strainer of approved quality as specified in BOQ. The foot valve shall be of spring loaded or flapper type depending on the requirement. The valves should be tested physically for free operation before being mounted or assembled to the pipeline.

Butterfly Valve:

Butterfly valves shall be slim seal, short wafer type with standard finish. The valves shall be suitable for mounting between flanges drilled to ANSI 125. The valve body shall be cast iron. The disc shall consist of disc pivot and driving stem shall be in one piece centrally located. The disc shall move in bearings on both ends with 'O' ring to prevent leakage. The seat shall be moulded with black nitrile rubber or nylon and shall line the whole body. The spindle shall be AISI 41 steel. The valve shall be suitable for a working pressure of 16.5 kg/sq.cm and shall be complete with flow control lever and notches, factory machined companion flanges and bolts and nuts. These valves conform to BS 5155 with electro steel nickel coated SG Iron (N) and seat material EPDM3.

Also the following standard corresponds to their manufacture

Design	-	API609/BS5155
Face to Face/ End to End Flange Dimension	-	ANSI B 16.10
Butt Weld Ends Pressure/ Temperature Ratings	-	ANSI B 16.5 ANSI B 16.25 ANSI B 16.34
Body	-	Heavy duty CI to IS210 Gr FG220 & BS 1452
Seating	-	moulded insitu resilient Lining of black nitride rubber.
Disk	-	Nylon coated SG iron of IS 1865/SF400/127BS2729 Gr. 420/12
Shaft	-	shafts are to be made of SS AISI 431 Only, flanged valves to be used with Flanges drilled to BS10 table F; valves shall be capable of being locked in open Position. Hand wheel shall be with Worm and worm wheel operated for Smooth opening and closing. Key rod with MS Coated extended spindle to be provided wherever the valves are not approachable from the ground surface.

Check Valve:

Check valves are designed to prevent reversal of flow. These are also called Non-return valves or reflux valves to avoid reversal of flow. Check valves shall be Dual Plate check valves with CI body, aluminum bronze plate SS 316 hinge pins and springs and Buna-N seals to ANSI series 125. They can also conform to IS 778-1984, Specifications for Copper Alloy Gate, Globe and Check Valves for Water Works.

Also the following standard corresponds to their manufacture

Design	-	BS1873/IS 5312 Part I
Face to Face/ End to End	-	ANSI B 16.10
Flange Dimension	-	ANSI B 16.5
Butt Weld Ends	-	ANSI B 16.25
Pressure/ Temperature Ratings	-	ANSI B 16.34

Y-Strainer:

Y-strainers up to 50mm shall be of gunmetal and above 50mm shall be of cast iron body. Strainers shall incorporate a removable bronze screen with 3.175 mm (1/8") perforations and a permanent magnet. Strainers shall be provided with flanges at both inlet and outlet. They shall be designed to enable blowing out of accumulated dirt and facilitate dirt and facilitate removal and replacement of the screen without disconnection of the main pipe.

All strainers shall be provided with equal size isolating "Slim Seal" butterfly valves of approved brands as shown in drawings so that the strainer may be cleaned without draining the system

Flanges and Unions:

Sufficient number of flanges and unions shall be provided as required to facilitate maintenance work after the piping is installed. Mild steel flanges shall be used for pipes. The flanges shall be connected to the pipeline by screwing or welding depending on the requirement. The flanges shall conform to the relevant ASTM standard for the particular material used for its manufacture. The flanges shall also conform to IS 5211.

Brass Bib Cock and Stop Cock:

A bib cock is a draw off tap with a horizontal inlet and free outlet and stop cock (stop tap) is a valve with a suitable means of connections for insertion in a pipe line for controlling or stopping the flow. They shall be of specified size and shall be screw down type. The closing device should work by means of a disc carrying a renewable non-

metallic washer which shuts against water pressure on a seating at right angles to the axis of the threaded spindle which operates it. The handle shall be either crutch or butterfly type securely seated pattern. The cocks (taps) shall open in anticlockwise direction.

The bib cock and stop cock shall be polished bright (Chrome plated). The minimum finished weights of bib tap (cock) and stop tap (cock) as given in the IS specification are reproduced in the table:

Size (mm)	Minimum Finish Weight	
	Bib Tap	Stop Tap
8	0.25	0.25
10	0.30	0.30
15	0.40	0.40
20	0.75	0.75

Level Sensor:

Level sensor shall consist of control unit, preamplifier and one full insulated probe-mounted vertically or two part insulated probe mounted from tanks side wall adjustable switching system for pump control application, the same to be housed in stove enamel painted cast aluminium weather proof suitable for black panel / wall mounting etc.,

The enclosure of probes shall be manufactured with SS316 material. The least count of the central unit with amplifier should be +/- 0.10mm for response value of 30 seconds.

Level Indicator:

A level control system with electronic level probes is mounted on the face of the reservoir. The top two level sensors provide the ON-OFF signal for the treated water transfer pumps. A third level sensor enunciates a low level alarm condition to the paging system and a fourth sensor enunciates an alarm to the paging system and stops the domestic water pumps from operating.

Relief Vent:

Drainage systems, especially those in tall buildings, are frequently found to develop extremely high and objectionable pneumatic effects in several specific portions of such piping. Special air pressure relief vents are recommended to control, within tolerable limits...

The air pressure relief vent ,at least one-half the diameter of the building drain , should be provided at the top of vertical offset so as to supply such additional air to the drain as may be required by the sudden increase in liquid velocity in the vertical offset Where a building trap or other sharp change in flow direction is provided in the building drain downstream from the vertical offset ,an air pressure relief vent should be provided at the base of, and within 3 ft (0.900m) of, the vertical offset. Lower relief vent should be branch –connected to the upper relief vent at a sufficient height.

The recommended provision for soil and waste stacks more than ten stories in height is to provide a yoke relief vent at each tenth story of the drainage stack, counting downward from the top story. The lower end of the yoke relief vent should connect to the drainage stack by means of a Y located below the horizontal branch drain serving fixtures in that story, and the upper end should connect to the vent stack by means of a T or inverted Y located at least 3 ft (0.900m) above the floor level as shown in the drawing.

Installation of Valves:

Valves should be installed in true tolerance of +/-5mm with respect to the center line of the pipe. Where threaded joints are encountered the threads should be initially sealed with PVC tape to avoid leakage due to improper tightening and leakage from threading.

Proper care has to be taken in welded installation so that the centerline of valve should not deviate from the pipe causing uneven load on the pipe and further stress during its operation. The welding should be done only after proper inspection of the joint by the Engineer-in-charge in the tacked position of the joint.

Before putting the line in operative mode the valves should be checked for free and easy operation of the hand wheel. Any burrs or foreign materials should be removed by flushing before final operation so that no choking in the valves should occur which might damage the valve seat.

Mode of Measurement:

Valves shall be measured in number only and the cost shall include:

- a) Cost of valves and jointing materials.
- b) Fixing and jointing with necessary bolts, nuts, rubber inserting, etc.
- c) Testing and making good the defects if any.

Water Hammer Arrestors:

The effective fluid hammer which results in breaking of pipeline caused due to series of hydraulic shock should be arrested by means of a water hammer arrestor. The arrestor

shall be capable of withstanding pressures up to 500 P.S.I. and temperatures in the range of –400F to 2120F (-540 C to +1000C). It shall be maintenance free with a companion flange to suit in the pipeline. The following materials are used for its manufacture

Barrel – Type ‘K’ hard drawn copper.

Cap – Standard wrought copper fittings attached to Barrel with 95-5 solder.

Piston & Thread

Adaptor – Machined of free turning brass.

Seals – “O” rings shall be of Parker spec. EP-5778-80

Seal

Lubricant – Dow-corning silicone compound #111, FF & DA
Listed for use in portable water system or
Nickel plated for sea water application.

Pumps:

Different Types of Pumps:

The pump set offered shall be generally horizontal centrifugal pump, single stage or multistage or monoblock pump to satisfy the duty conditions stipulated in the bill of quantities. The pump set shall conform to IS 8034-1972, IS 5120-1968 for handling water, IS 8034-1976 for submersible pump sets and IS 5600-1970 for pumping storm water and sewage.

The pumps shall be selected having their maximum efficiency at average operating conditions. The maximum speed at which a pump shall run is determined by the net positive head available at the pump, the quantity of liquid being pumped and the total head.

Multi-Pump Hydro Pneumatic Booster System:

The packaged water booster pump system shall be a standard product of a single pump manufacturer. The manufacturer of the packaged pump system shall also be the manufacturer of the pumps. Non-standard, “one of a kind” packaged (assembled) pump systems shall not be considered equal.

The packaged water booster pump system shall be GRUNDFOS Model or approved equal.

The packaged water booster pump system shall use advanced variable frequency drive and dedicated electronic pump controller to maintain a constant water pressure.

Pump:

The pumps shall be GRUNDFOS Model or approved equal. The pumps shall be of the vertical multi-stage centrifugal design. The pump suction/discharge chamber (base) shall be in CI or SS as per requirement. Motor stool and pump shaft coupling shall be constructed of cast iron.

The impellers, pump shaft, diffuser chambers, outer discharge sleeve, impeller seal rings, and seal ring retainers shall be constructed of stainless steel. Optional materials for the suction/discharge chamber and motor stool liner shall be stainless steel. The pump impellers shall be secured directly to the pump shaft by means of a spline shaft arrangement for model of the lower sizes, and the pump impellers shall be secured to the shaft by a split cone and nut for higher sizes. The shaft journal and chamber bearings shall be Tungsten Carbide and Ceramic/Bronze. All pumps shall be equipped with a high temperature cartridge mechanical seal assembly with Tungsten Carbide/Carbon or Tungsten Carbide seal faces mounted in stainless steel components. The shaft seal shall be of the cartridge design, The larger pumps (with 7.5 Kw and above motors) shall be designed so that the cartridge seal may be replaced without removing the motors.

Motor & Variable Frequency Drive:

The motors shall be TEFC type, class F insulation, 2 poles, efficiency class “Eff –2”, should be a NEMA standard motor. Drive-end motor bearings shall be designed to absorb thrust and shall be adequately sized to ensure long motor life.

The variable frequency drive enclosure shall include dry-contact fault-output relay contacts along with analog and digital inputs. The motor shall detect/protect itself against under voltage, over voltage, excessive temperature, and set-point signal fault.

Electronic Controller:

An electronic dedicated pump logic controller shall be a Grundfos PMU2000 or approved equal. The controller shall operate the pumps to maintain the required system pressure while using minimum energy and alternating between pumps to maintain relatively equal pump operating hours.

As flow demand begins, one of the pumps will start at low speed. As demand increases, the pump will speed up until it reaches full RPM. At this point the second pump will start. The speed of the first pump will vary until it builds up required system pressure. This sequence will continue for additional pumps.

Pumps will changeover automatically to maintain the system pressure depending on demand, time, and fault.

When flow demand is zero, the system shall shut off. If the system runs continuously, the lead pump shall alternate every 24 hours. If the system includes an optional standby pump, the controller shall exercise the standby pump as a part of the system and equally run the pump as other pumps in the system. The controller shall accept a low-suction pressure or other suction fault input to shut down the system. The controller shall have a keypad and multi line LCD display unit

Programmable Functions:

System functions shall be programmable through the keypad. These programmable functions and information shall include, but not be limited to:

1. Closed loop control.
2. Automatic pump alterations
3. Automatic cascade control of pumps
4. Set point adjustment and control
5. Clock Program
6. Pump priority
7. Standby pump designation
8. Friction Loss Compensation (set point)
9. Pump status
10. Elapsed running hours for each pump
11. System pressure set point
12. Actual system pressure
13. Pump speed (percentage)
14. System faults
15. Pressure transducer design settings
16. High and low discharge pressure shut-down limit
17. Analog input for remote set-point control
18. Digital input for remote stop/start

Control Cabinet:

The controller shall be mounted in a control cabinet with an IP 54 enclosure of suitable rating (or specified optional cabinet) with the keypad and display screen mounted through the outer door. In addition to the electronic pump controller, the control cabinet shall include circuit breakers for each pump and the control circuit and control relays for alarm functions.

Control cabinet shall include the following, but not be limited to:

1. Motor protection
2. Dry run protection
3. Bus communication

4. 2X 24 character LCD display
5. Pump Fault Lights – A Red light for fault indications
6. Visual Alarm
7. Pump Elapsed Time Meters
8. Manual Operation

The entire packaged pumping system shall be mounted on a Hot Dipped Galvanized MS or SS fabricated skid. The control cabinet shall be mounted in one of the following ways depending on the size of the cabinet.

1. On a Hot Dipped GI MS or SS fabricated control cabinet stand attached to the system skid.
2. On a Hot Dipped GI MS or SS fabricated skid, separate from the main system skid
3. Floor mounted control cabinet with plinth.

Material of Construction for Centrifugal Pump Set:

Material of construction for different parts of pump set shall be as per IS 5120. Following are indicated for guidance for pumps handling clear, cold fresh water

Bronze fitted pump

Casing – cast iron – grade 20 of IS 210-1970

Impeller, casing ring,

Impeller ring, shaft

Sleeve -Bronze – grade V of IS 318-1962

Shaft

-Steel

All cast iron

-Grade 20 of IS 210-1970

All bronze

-Grade V of IS 318-1962

Standard fitted

Casing - cast iron – grade 20 of IS 210-1970

Impeller, casing ring,

Impeller ring, shaft

Sleeve -Bronze – grade V of IS 318-1962

The material of construction for different classes of construction shall be generally as follows:

All cast iron pump All bronze Bronze fitted STD. Fitted

Casing	Cast iron gr.20	Bronze	Cast iron	Cast iron
Impellers	Cast iron gr.20	Bronze	Bronze	Bronze
Impeller Wearing				
Rings & bush	Cast iron gr.20	Bronze	Bronze	Bronze
Shaft	Steel	Steel	Steel	Steel
Shaft sleeve	Mild steel	Bronze	Bronze	Bronze
Sleeve nuts	Mild steel	Bronze	Bronze	Bronze
Gland	Cast iron / GM	CI / GM	CI / GM	CI / GM

Material of Construction for Submersible Pump Set:

Generally confirm to IS: 8034-1976

Bearing sleeve	: Grade 3, 4 or 5 of IS: 318-1962
Casting wear ring	: Grade 3, 4 or 5 of IS: 318-1962 or gr. FG 200 of IS: 210-1978
Discharge casing	: Grade FG 200 of IS: 210-1978.
Impeller	: Grade 2 of IS: 318-1962 or grade FG 200 of IS: 210-1978.
Pump bowl	: Grade FG 200 of IS: 210-1978.
Pump shaft	: 12 percent chromium steel (grade 04 or 13, 12 or 13 and 20 Or 13) conforming to IS: 1570 (Part-V)-1972 or grade C40 or C45 of IS: 1570-1961 'Schedules for wrought steels for general engineering purposes'.
Suction casing	: Grade FG 200 of IS: 210-1978.

General Requirements:

Since the motor and the pump are directly coupled or close coupled, the manufacturer shall indicate the minimum size of the bore hole in which the submersible pump can be erected and suspended freely.

For smooth and efficient working of the submersible pump set, the manufacturer shall recommend the minimum submergence.

Submersible Motor:

The submersible motor shall be squirrel case induction motor.

The windings shall be wet or dry type.

The motors shall be suitable for operation on voltages and the frequency conforming to IS: 585-1962 voltage and frequency for AC transmission and distribution systems (revised).

The earthing of the motor shall comply with IS: 3043-1966 'code of practice for earthing'.

The thrust bearing shall be of adequate size to withstand the weight of all rotating parts as well as the imposed hydraulic thrust. These shall be lubricated suitably.

The motor shall be protected by means of cable glands, rubber seals, etc., from ingress of bore well water, sand and other foreign matter.

The rotor shaft shall be provided with shaft protecting sleeves having a surface finish conform to IS: 3073-1967. However, for short length of shaft made of stainless steel, protecting sleeves may not be provided.

The motor shall be made of corrosion resisting materials or suitably treated materials to resist corrosion under normal conditions.

The motor shall have a name plate giving the following information:

- a) Induction motor
- b) Name of manufacturer
- c) Manufacturer's number and frame reference
- d) Type of duty
- e) Frequency in Hz
- f) Number of phases
- g) Rated output in KW
- h) Rated voltage and winding connections
- i) Current, approximate, in amperes at rated output and
- j) Speed in revolution per minute at rated output.

There shall also be an indication to identify a motor with its pump.

The cable used for submersible motors shall conform to IS: 694 (Part-I)-1964 – Specification for PVC insulated cables with copper conductors.

Material of construction for other parts of pumps shall be as per IS: 5120 for pumps handling clean cold fresh water.

Material of construction for handling sewage shall be as per IS: 5600-1970.

All cast iron fitted – grade 20 of IS: 210-1962.

All stainless steel - Schedule I of IS: 1570-1961.

Gaskets, Seals and Packings:

The gaskets, seals and packing are used in special purpose pumps shall be suitably chosen so as to withstand the effect of liquid being pumped.

Liquid pumped	Material for seals.
Clear cold fresh water	Mechanical seal or cotton yard (lubricated) seal.
Sewage	Mechanical seal or white metal foil seal crinkled, lubricated asbestos yarn.

Accessories:

Essential for pump set used for pumping water.

- a) Oil lubricator with oil level indicator if the pump is lubricated.
- b) Grease cup for grease lubricated bearings.
- c) Flanged ball valve/Gate valve on suction side if there is positive suction.
- d) Flanged ball valve/Gate valve on delivery side.
- e) Flanged horizontal/vertical check valve on delivery side.
- f) Pressure relief valve.
Pressure gauge (for delivery pipe) and vacuum gauge (for suction pipe) with copper tubing and vinch cock.
- g) Priming funnel with separate or integral air cock.
- h) Float switches or automatic level operated control switch.
- i) Base plate.
- j) Foundation bolts and nuts.

Essential for pump set used for pumping storm water/sewage.

- (a) Vacuum pump if there is no positive suction.
- (b) Flanged sluice valve on suction side if there is a positive suction.
- (c) Flanged reflux valve on delivery side.
- (d) Flanged sluice valve on delivery side.
- (e) Pressure relief valve (for high head pumps)
- (f) Coupling.
- (g) Pressure (for delivery pipe) and vacuum gauge (for suction pipe) with brass/copper tubing and vinch cock.
- (h) Base plate.
- (i) Foundation bolts and nuts.
- (j) Ball type air relief valve.
- (k) An automatic level operated control switch may be provided as an optional accessory.

Essential Design Features:

The pumps shall have suitable features properly designed to ensure satisfactory performance. In particular design features, such as the following shall be incorporated.

For Water Pump Sets:

- a) In case of more than one duty point, the performance range is to be indicated and the prime mover should be of sufficient power to take the entire load in this range. Head (restrictions) shall be indicated in the name plates to avoid overloading of the prime mover.
- b) For working in parallel pumps should be with stable head capacity characteristics.
- c) Arrangement for cooling of bearings where required.
- d) Balancing water leakage connection should be provided in case of multistage pumps with balancing discs.
- e) Thrust bearing of adequate size.

Information to be furnished by the supplier along with tender for performance with clear cold fresh water.

- a) Pump type.
- b) Discharge in liters per second.
- c) Head in meters.
- d) Suction pipe size in mm dia.
- e) Delivery pipe size in mm dia.
- f) Power at shaft in Kw.
- g) Speed in revolution per minute.
- h) Required NPS in meters.
- i) Performance curves.
- j) Materials of construction.

Casing – cast iron Gr. 20 IS 210-1470

Casing ring – GM Gr. 20 IS 210-1470

Impellers – cast iron

Impeller wearing rings and bush cast iron /GM

Shaft – steel

Shaft sleeves – mild steel.

Gland – cast iron /GM

Sleeve nuts – CI/GM

k) Recommended :

Suction pipe size in mm dia.

Delivery pipe size in mm dia.

Weight of the pump in Kg.

Any special instruction for installation, operation and maintenance use of special tools.

- l) Sealing arrange :
- m) Recommended spares for 2 years service and cost.
- n) Prime mover – all information corresponding to the particular in the item for satisfactory performance of the pump.

Pump Test:

Pump tests are made to determine the following:

- a) The discharge against the specified head when running at the rated speed under specified suction lift or head.
- b) The power absorbed by the pump at the pump shaft (BP) under the above specified conditions and
- c) Efficiency of the pump under the above specified conditions.

The pump has to be tested at manufacturers works and a test certificate furnished before supply and tested at site after installation as per procedure as per clause 13 of 5120 – 1968.

Pump Installation:

Installation:

Certain precautions must be observed in planning a pump installation and during the erection period. Some of these point will now be considered.

Piping:

Both the suction and discharge lines should be independently supported so as no strains will be thrown on the casing such strains may cause distortions and rubbing.

The suction line should be as short and straight as possible. Any elbows should have large radii. For pumps operation with suction lifts no valves other than a foot –valve should be placed in it. Generally, the diameter is made one or two sizes larger than the pump flange size. All these precautions insure the maximum available suction head on the pump. When an oversize line is used an eccentric reducer which is horizontal at top is placed between it and the pump flange size.

It is very important to have the suction line airtight and to avoid high spots at which dissolved gases or air might separate out and destroy the vacuum. After piping is installed and the pump is running all joints should be inspected with a flame, as air leakage will draw the flame to the opening. The same method can be used to determine leakage through the packing box; the eccentric reducer is used at the suction flange to avoid high spot at which the air might collect. The inlet end of the suction line i.e., submergence should be 1 to 2 m below the minimum water level of the pump (not less than 1 m) to prevent air from being drawn into the pipe with the water.

It is desirable to have as long a length of straight piping between the elbow and suction flange as possible to even out the flow of the water as it enters the pump. The pump should be placed to secure the greatest possible suction head and yet to be available for inspection and repair work.

A check valve and gate valve are usually placed in the discharge line. The gate valve is used to regulate the flow and the check valve prevents backflow into the pump which might cause it to operate like a turbine and perhaps be damaged on account of over speed. The check valve is placed between the gate valve and the pump so that it may be inspected or rewired without emptying the discharge line.

Foundation:

The foundation should be heavy to reduce vibrations and should be rigid to avoid any twisting or misalignment. A space of 2 to 4 cm is allowed between the base plate and top of the foundation which is filled with grouting to secure a uniform load distribution.

When the grouting had dried the base plate should be drawn down evenly to avoid springing it. After this has been done the shaft is finally aligned both radially and axially with the driver by means of shims or wedges so that it turns freely. If the shaft is not properly aligned there will be vibration and excessive wear on the bearings, packing and wearing rings.

Pump Operation:

Trail operation:

The operation of centrifugal pump is quite simple and safe. There are relatively few valves and the pump will not be damaged even if the discharge valve is closed for short periods of time.

Starting:

The pump must be primed before it will deliver any fluid. Failure to prime the pump may cause the wearing, rings, rub and seize or the shaft may be scored at the packing boxes. During starting it is wise to have the vent cock in the casing open slightly to remove any dissolved air in the water.

It is best to have the discharge valve set so that the least load is thrown on the driver when the pump is started. The valve should be opened gradually to avoid throwing a large sudden load on the driver and to prevent a sudden surge in the discharge line. The discharge valve should be fully open when starting mixed flow or propeller pumps because the brake horse power will then be a minimum.

Running:

When the unit is running it requires very little attention beyond occasionally checking to see that

- a) The journal and thrust bearings are running cool and have a sufficient supply of oil.
- b) the packing is adjusted to permit a slight leakage to cool and lubricate it, and
- c) The water is flowing to the water seal of the suction gland to prevent air from leaking in.

Shutting Down:

When shutting down, the discharge valve should be in the same position as when starting up by closing the discharge valve gradually so that less power is dropped from the line and any sudden pressure surges in the pipe system are avoided.

Inspection and Maintenance:

Manufacturer supply instruction books which give directions for the operations for the operation and maintenance of each pump. The following information is general.

The wearing ring clearance should be checked as they will increase with time and thus cause a decrease in efficiency. The frequency of the inspection will depend upon the liquid handled. If the liquid contains gritty materials or is corrosive, inspection may be made monthly, but if clear water is pumped it may be sufficient to check them annually. A general rule is to replace the rings when the clearance has increased 100 percent above the original.

The packing should be replaced after it becomes hard and tends to score the shaft. When the packing is being replaced the finish of the shaft sleeves should be examined for smoothness. It is essential that the lantern ring be placed directly under the water inlet when putting in the new packing to insure a circulation of the water and a satisfactory seal. The packing should be gradually compressed with the pump running. It should not be compressed too much as local heating of the shaft and consequent misalignment will result. A slight leakage will insure proper lubrication and cooling.

If the base is not too rigid the shaft alignment should be checked occasionally when the pump is at a temperature corresponding to running conditions. This must be done with

the packing removed. At the same time the clearance of the journal bearings should be checked for wear.

The oil should be changed as required and at that time inspected for the presence of water. If water appears in the oil the pump casing should be examined to find the leak.

Guarantee of Performance:

- a) The pumps shall be guaranteed by the manufacturer/supplier against defects in material and workmanship under normal use and service for a period of at least one year from the date of dispatch.
- b) Guarantee of performance: the supplier shall indicate the working range of the pump and the efficiency of the pump shall be guaranteed at a specified point of rating only and shall not be guaranteed to cover the performance of the pump under conditions varying there from nor for a sustained performance for any period of time. If the purchaser so desires, the manufacturer shall guarantee the non-overload of the prime mover for variations in the head in the working range. In the case of pumps where acceptance tests cannot be conducted on the liquid for which the pump is designed, the manufacturer shall indicate the liquid performance of the pump based on the results of the tests conducted by him on the pump with water as indicated under 13 and interpolated as explained under 14 (IS 5120) . However, in these cases, the manufacturer shall guarantee for the performance of the pump with water for the specified range.
- c) Tolerance: A tolerance of ± 2.5 percent shall be permissible on discharge. However, for small discharge up to 9000 litres per minute, a tolerance of ± 2.5 percent or +24 liters per minute whichever is higher is allowed. While the negative tolerance 2.5 percent is maintained.
- d) The pump efficiency shall be not less than the specified value by more than 2.5 percent. This tolerance may be raised to 5 percent in case the prime mover does not get overloaded.

General Requirements:

- a) The specified range shall lie on the stable portion of the head characteristic curve. This is applicable in case of parallel operations of pumps only.
- b) Suction and delivery ends: The size of the suction end of a double suction pump should preferably be one size larger than that of the delivery. This is to offset the increased loss in the suction. Typical practices of piping used are :

85/65m, 100/75m, 125/100m, 150/125m, 200/150m and 250/200m etc.,

- c) For a high pressure pump, a reflux valve shall be connected on the delivery side and a pressure relief valve installed in pumping main outside pump house. Need for surge control devices verified.
- d) Fluid passages: All the liquid passages in the casing and the impeller which are inaccessible to machining shall be finished to smooth surface as far as possible.
- e) Drainage plugs: Tapped drain holes with plugs shall be provided for draining the fluid that may drip from the sealing arrangement. The sealing arrangement shall be sufficiently deep to provide for sufficient quantity of packing to prevent leakage of air.
- f) Lantern ring: In case, where a lantern ring is used in a stuffing box, it shall be sandwiched between rows of pickings and shall be easily removable.
- g) Casing: Casing shall be of robust construction and tested to withstand 15. Times the shut-off pressure or twice the rated pressure whichever is higher.
- h) Impeller: The impeller shall be properly balanced along with any other un-machined rotating parts on proper balancing equipment so as not to cause any vibrations.
- i) Shaft: The shaft shall be finished to close tolerance at the impeller coupling, pulley and bearing diameters. The impeller, pulley and shaft sleeves shall be firmly secured to the shaft by keys or nuts of both.
- j) Shaft couplings: Shaft couplings, where provided, shall be properly aligned and firmly secured to the shaft by keys or nuts on both.
- k) The size of the shaft shall be calculated on the basis of the maximum combined shear stress. This shall not exceed 30 % of the elastic limit in tension or 18% of the ultimate tensile strength.

The next higher standard size of shaft in accordance with the relevant standard shall be chosen.
- l) The design of the shaft shall also be taken into consideration the critical speed of the shaft which shall differ from the actual working speed by at least ten percent on either side.
- a) Bearings: The bearings should be designed for a minimum life of 20,000 hours or 40,000 hours as required. The bearing housings are designed in such a manner that no liquid being pumped should enter the housing.

- b) The bearing may be ball, roller or sleeve bearings. In the latter case, some sort of thrust bearings are necessary. If sleeve bearings are used, they are to be machined for close running fit. The bearings shall be so designed as to take up the necessary radial load as well as the net hydraulic axial thrust. Bearings shall be lubricated properly.
- c) Where there is a possibility of fluid entering the bearing the pump shall be provided with suitable preventive arrangements for example. deflectors.
- d) Stuffing Boxes: The stuffing boxes shall be extra deep and provided with a cooling water jacket if so required. In addition, provision for tapping off the leakage liquid shall also be making. The packing materials employed shall be suitable for withstanding special conditions such as temperature, corrosion due to the fluid being handled etc. Wherever possible, suitable mechanical seals may be used.
- e) Base plates: The base plates which accommodates the pump and the prime mover, when provided shall be rigid so that alignment is not affected under normal working conditions.
- f) Prime mover: the prime mover shall be of a such capacity a provide, under working site conditions a power which is more then maximum power required by the pump at any point in the specified range should be a specific margin be required by the customer in the power of the prime mover, he should go advise the manufacturer for obtaining the proper recommendations.
- g) Name plate: Every pump shall have a name plate indicating:
 - i) Name and address of the pump manufacturer.
 - ii) Type, size and serial number of the pump and
 - iii) Speed, total head, capacity and corresponding pump input for the duty point.
- h) For corrosive liquids the material of the name plate shall suitable to withstand the corrosive atmosphere.

Tank Fitments:

Puddle Flanges for Reservoir:

Inlets, outlets, interconnection sleeves and drain outlets for the reservoir shall be made through mild steel bath galvanised puddle flanges obtained from reputed manufacturers and to be inserted at suitable levels as indicated on the drawings. The Contractor shall be responsible for placing the inserts at required level well in advance and before making the final shuttering layout for casting the walls.

Manhole Covers:

The manhole covers shall be of heavy duty type (cast iron) with double seal, locking arrangement and lifting hooks. (Weight 110kgs.) Manufactured as per IS-1726. The shape of the cover to be as per the drawings.

Aluminium Step Ladder:

For effective maintenance of the reservoir portable aluminium step ladder to suit the depth of the tank shall be provided with necessary hooks.

Link Seals::

Link seal is a seal which is used as a substitute for puddle flanges in underground sumps and overhead tanks and in places where positive hydrostatic sealing is mandatory. The link seals shall be suitable to withstand a pressure of 20 psig (40 feet of head). It should be capable of withstanding temperatures from as low as -60°F to as high as 400°F , it should provide three minimum three hours of protection against flames, smoke, gases and water even when exposed to temperatures up to 1900°F . The seal should be of HDPE thermoplastic / heavy wall welded or seamless pipe to withstand angular and off-centre pipe misalignment and has to seal effectively.

The following table indicates the materials for accessories of different models of link seals.

MODEL	TYPE	SEAL ELEMENT	PRESSURE PLATES	BOLTS & NUTS	TEMPERATURE RANGE ($^{\circ}\text{F}$)
C	Standard	EPDM Black	COMPOSITE	STEEL zinc-dichromate	-40 to +250
S	Stainless	EPDM Black	COMPOSITE	316 STAINLESS STEEL	-40 to +250
O	Oil-resistant	NITRILE Green	COMPOSITE	STEEL zinc-dichromate	-40 to +210
OS	Oil-resistant	NITRILE Green	COMPOSITE	316 STAINLESS STEEL	-40 to +210
T	High/low temperature	SILICONE Grey	STEEL zinc-dichromate	STEEL zinc-dichromate	-67 to +400
FD/FS	Fire seals	SILICONE Grey	STEEL zinc-dichromate	STEEL zinc-dichromate	-67 to +400

M	Non-insulating	EPDM Black	STEEL	STEEL zinc-dichromate	-40 to +250
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Water Pipe Insulation:**Use:**

Hot water flow and return pipes will be insulated with fibreglass wool. Cold water pipes embedded in walls shall be insulated with same material as embedded hot water pipe.

Cold water pipes underground shall be wrapped as detailed in this section.

Cleaning:

Before proceeding with the insulation works for hot water supply and return pipes the pipe surface should be thoroughly cleaned and made free from oil, grease or any other foreign material.

Glass Wool:

Suitable thickness of glass wool shall be provided and wrapped with 20 gauge GI lacing at 150mm centre and covered with GI wire netting of 24 gauges all around the pipe insulation.

Pipes 50 mm and below shall have 25 mm thickness and 65 mm and above shall have 40 mm thickness of insulation. The pipe shall be clad with 20 gauge aluminium sheet including all bends, unions, flanges, valves etc., to complete the insulation. The fiber glass wool shall have density = 100 Kg/m³ and K value of not less than 0.045 Kcal/m. h⁰ C. at 1000 C. The manufacturer of fibre glass shall be either Owens Corning or approved equivalent.

Elastometric Insulation:

Alternatively, high quality closed cell light weight elastomeric insulation material as manufactured by M/s Poly bond organics shall be used for both hot and cold water pipe insulation. The insulation shall be carried out as follows:

Pipe surfaces shall be thoroughly cleaned and dried before the vidoflex rubber insulation is applied and shall be free of dirt, grease and rust scale or other foreign matter. The pipe shall be cleaned mechanically.

Oil and grease, if present on the pipe surface should be removed by using a suitable solvent and clean rags. The use of dirty, oil rags should not be permitted.

Field Application of Tape:

The vidoflex rubber insulation shall be wrapped in accordance with the manufacturers recommendations in a manner that shall meet the adhesion requirement. During application, care shall be taken to ensure that there are no air pockets or bubbles beneath the tape. The tape should be wrapped with an overlap of 50% of Tees. The first wrapping shall be done individually. The tape may be cut if required to suit the profile. There shall be two layers of tape wrappings. The first layer is to be wrapped on the pipe directly after cleaning the pipe surface. The second layer is to be applied over the first layer, wrapped with 50% lap.

Cold Water Pipes Below Ground:

The cold water pipes passing below ground shall be wrapped and coated with 2mm thick upto 67mm dia and 4mm thick for higher dia with 50% overlap.

Valves:

Location:

Valves shall be provided on branch pipe connections to mains and at connection to equipment where indicated. All valves are to be located for easy access and are to be full bore of pipe connected together. All valves shall be supported wherever necessary.

Specification:

Valves for copper pipes and fittings shall be 70/30 dezincification resistant brass. The valve shall be copper to copper and the internal part made out of material resistant to dezincification.

From 54 mm and above valves shall be provided with metric flange connection either with bimetal flange (steel outer with Gun metal inside) or with brazing metal slip-on flange.

The on-line valves shall be copper to copper ball valves with stainless steel or dezincification resistant brass internal parts.

All valves shall be compatible to use with copper pipes and fittings.

SECTION-2: EFFLUENT DRAIN PIPE WORKS:

1. High Density Polyethylene (HDPE) Piping Work:

General:

The item includes supplying of HDPE pipes with fittings of specified diameter including laying, fixing, cutting, jointing.

Material:

The pipes and fittings shall conform to series IV of IS 4984-1978. HDPE pipes and fittings shall be free from cracks, flaws and defects and shall be able to withstand a pressure as mentioned in the schedule.

Examining:

Before laying the pipe line, it shall be first examined for damages and cracks. No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

Cleaning:

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

Laying:

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. All the pipe shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length. The entire length of pipe shall be evenly supported on bed of the trench through out. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work the open end shall be suitably plugged.

Fixing:

The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with GI clamps not less than 2 mm thick or with suitable diameter HDPE clamps. The clamps shall be fixed into the wall with GI nails not less than 40 mm long, wooden gutties etc.

Making Joint :

The jointing of pipes and fittings generally shall be done by Butt weld with heat mirror joining. The pipe shall be cut to desired length. Care shall be taken that profile of cut surfaces changed and the fibrous material shall be removed with scraper or knife. The Butt weld jointing shall be made with electrical heated plate at the required temperature around 205 + or -5 degree centigrade. While jointing, care shall be taken that formation of the rim at end of pipe after heating by hot plate should be made uniform and complete on both the ends. Holding and pressing of pipe is done manually or mechanically to give the leak proof joint.

Detachable Joint:

Detachable joints shall be made where pipes of different materials have to be jointed or as specified in the schedule. The flanges are first pushed over the pipe ends and rim is made by heating the pipe end in a suitable device to 70-180 degree centigrade and welding preheated rim of the pipe.

Antisyphonage :

The PVC pipes shall be used for antisyphonage including provision, cutting, wastage, bending, dressing, jointing with cement solution, necessary plugs, brass fittings such as brass thimbles, brass union, brass cleaning caps and other brass fittings as required.

Dewatering:

The contract rate shall include bailing or pumping out all the water till completion' of work if accumulated during the progress of work either from seepage, springs, rain or any other cause.

Testing:

The joints shall be tested hydraulically to a pressure as specified in the schedule. The leaky joints shall be remade and section re-tested at no extra cost. The period of test shall be for 2 (two) hours.

The rate includes for:

Supplying of HDP pipes and fittings of specified diameter.

Laying and cutting the pipe wherever necessary and wastage.

Making the solution joint or mirror joint

Fixing the pipe line with GI clamps not less than 2 mm thick and GI nails length not

Less than 40 mm or HDP clamps, screws, wooden gutties etc.

Replacing the defective pipes and fittings.

Dewatering the pit or trench till completion of work.

All necessary labour, materials and use of tools.

Mode of measurement :

The measurement shall be for unit running metre length of pipe line laid or fixed. The measurement shall be taken along the longitudinal axis center to center. No measurement shall be recorded separately for fittings, making joint, painting and testing.

Mode of payment :

The contract rate shall be for unit running metre length of pipe line laid or fixed.

2. Inspection Chamber:

General:

The item includes provisions of inspection chamber of brick masonry of internal size as specified in the schedule including concrete in foundation, haunches and benching, brick masonry in cement mortar 1:2 with 1: 1 cement mortar or as specified in the schedule of work.

Material:

Concreting, Brick work, plastering etc. shall be as per specification as given in general specification

Construction:

Internal dimensions and initial depth shall be as specified in the schedule or as shown in the drawing.

Foundation of 1:2:4 concrete shall be 150 mm thick and shall have 150 mm offset.

The concrete 1:2:4 shall be laid to necessary shapes to form the channel for the pipe being received in the channel. It shall be of appropriate diameter and shall be half round. The sides shall be kept sloping towards the channel.

Brick masonry shall be in cement mortar 1:2

Brick masonry shall be plastered with 1:1 cement mortar, inside and outside surfaces in two courses and inside surface finished smooth with neat cement punning.

The pipes connecting the chamber on Receiving and outgoing ends shall be embedded in RCC 1:2:4.

Mixing waterproofing chemical in mortar and PCC 1:2:4, to provide water tight and proof chamber

fixing of water swelling bar in “O” ring like Hydrotite of M/s Water Seal India Pvt. Ltd. around the inlet and out let pipe before embedding into RCC block,

Dewatering:

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work from rain, seepage, springs or any other cause. The rate includes for:

Concreting in foundation, forming the channels, constructing brick masonry and plastering over the brickwork.

Breaking existing stoneware / RCC hume pipe line to facilitate construction of new manhole.

Dewatering the pit if found necessary till completion of work.

All necessary labour, materials and of tools.

Including Waterproofing the chamber to make the chamber Watertight

Mode of measurement:

The measurement shall be for one Inspection Chamber of specified internal size and depth.

Mode of payment:

The contract rate shall be for one Inspection Chamber of specified internal size \ and depth.

3. Circular Manhole:

General:

The item includes provision of circular manhole of brick masonry of internal size, as specified in the schedule including cement concrete in foundation, haunches and benching, brick masonry in cement mortar 1:2 with 1: 1 cement mortar.

Material:

Concreting, Brick work, plastering etc. shall be as per specification as given in general specification.

Construction:

Internal dimensions and initial depth shall be as specified in the schedule or as shown in the drawing

Foundation of 1 :2:4 concrete shall be 300 mm thick and shall have 300 mm offset.

The concrete 1:2:4 shall be laid to necessary shapes to form the channel for the pipe being received in the channel. It shall be of appropriate diameter and shall be half round. The sides shall be kept sloping towards the channel.

Brick masonry shall be in cement mortar 1:2. One meter height from top shall be conical in shape and shall be constructed in 230 mm thick brick masonry and remaining height shall be 345 mm thick in cylindrical shape. ,

Brick masonry shall be plastered with 1:1 cement mortar, inside and outside surfaces in two courses and inside surface finished smooth with neat cement punning.

The pipes connecting the chamber on Receiving and outgoing ends shall be embedded in RCC 1:2:4.

Mixing waterproofing chemical in mortar and PCC 1:2:4, to provide water tight and proof chamber

fixing of water swelling bar in "O" ring like Hydrotite of M/s Water Seal India Pvt. Ltd. around the inlet and out let pipe before embedding into RCC block

Dewatering:

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work either from rain, seepage, springs or any other cause.

The rate includes for:

Concreting in foundation, forming the channels, constructing brick masonry and plastering over the brick work.

Breaking existing stoneware / RCC hume pipe line to facilitate construction of new manhole

Dewatering the pit if found necessary till completion of work

All necessary labour, materials and use of tools.

Including Waterproofing the chamber to make the chamber Watertight

Mode of measurement:

The measurement shall be for one circular manhole of specified internal size and depth.

Mode of payment:

The contract rate shall be for one circular manhole of specified internal size and depth.

4. Extra Depth for Inspection Chamber and Manhole:

General:

The item includes provision for extra depth of Inspection Chamber and manholes of brick masonry including brick masonry in cement mortar 1:2 with 1: 1 cement mortar plaster.

Material:

Concreting, Brick work, plastering etc. shall be as per specification as given in general specification

Construction:

Internal dimensions shall be as specified in schedule 3!ld depth as shown in the drawing.

Brick masonry shall be in 1:2 cement mortar.

Brick masonry shall be plastered with 1: 1 cement mortar, inside and outside surfaces in two courses and inside surface finished smooth with neat cement punning.

C.I./P.V.C. Soil quality pipe of specified diameter shall be fixed for the extension of drop in the circular drop manhole.

The projected C.I./P.V.C. pipes shall be cut.

The pipes connecting the chamber on Receiving and outgoing ends shall be embedded in RCC 1:2:4.

Mixing waterproofing chemical in mortar and PCC 1:2:4, to provide water tight and proof chamber

fixing of water swelling bar in “O” ring like Hydrotite of M/s Water Seal India Pvt. Ltd. around the inlet and out let pipe before embedding into RCC block

Dewatering:

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work either from rain, seepage, springs or any other cause.

The rate includes for

Constructing brick masonry and plastering over the brick work

Fixing the C.I. soil quality pipe in circular drop manhole for extension of drop.

Dewatering the pit if found necessary till completion of work.

All necessary labour, materials and use of tools.

Including Waterproofing the chamber to make the chamber Watertight

Mode of measurement:

The measurement shall be for unit meter depth or part thereof for inspection chamber,

circular manhole or circular drop manhole constructed.

Mode of payment:

The contract rate shall be for unit meter depth of Inspection Chamber, circular manhole or circular drop manhole constructed.

5. C.I. Frame and Cover:

General:

The item includes supply LD/MD/HD C.I. frame and cover as specified in schedule including fixing and painting.

Material:

C.I. Frame and Cover shall conform to IS 1720-1974 and shall have “ISI” certification mark with grade LD/MD/HD and the weight of frame and cover shall not be less than as specified in the schedule.

Fixing:

Frame shall be fixed in the cement concrete 1 :2:4 on the brick masonry wall of the chamber of manhole shall be done in 1:2 cement plaster.

Painting:

The frame and cover shall be painted with two coats of approved black bitumastic anticorrosive paint over a coat of primer.

The Rate includes for:

C.I. Frame and cover, cement concrete, painting etc.

All necessary labour, material and use of tools.

Mode of Measurement:

The measurement shall be for C.I. frame and cover on actual unit weight basis.

Mode of payment:

The contract rate shall be for C.I. frame and cover on actual unit weight basis.

6. R.C.C.Frame and Cover:

General:

The item includes supply LD/MD/HD fibre reinforced RCC frame and cover as specified

in schedule including fixing and placing.

Material:

The precast RCC frame and cover shall be of steel fiber reinforced as per IS 1726 (part-I 1974). The frame and cover shall be LD/MD/HD grade, size and thickness as mentioned in the description of the item. The defective frame and cover shall be replaced by the contractor at his own cost and charges.

Fixing:

Frame shall be fixed in cement concrete 1:2:4 on the top of masonry wall of chamber or manhole and finishing shall be done in 1:2 cement plasters.

The rate includes for:

Precast RCC frame and cover, cement concrete etc.

All necessary labour, material and use of tools.

Mode of measurement:

The measurement shall be for unit set of precast RCC frame and cover fixed.

Mode of payment:

The contract rate shall be for unit set of precast RCC frame and cover fixed.

7. P.V.C. Insulated Cast Iron Step:

General:

The item includes supplying of P.V.C. Insulated cast iron steps including fixing.

Material:

The steps shall be of cast iron and minimum 150 mm wide. The minimum weight of each step shall not be less than 5 kg or as specified in the schedule.

Fixing:

The steps shall be fixed in brick masonry wall with 1:2:4 cement concrete with 50 mm cement concrete cover at all around the step. The first step shall be 450 mm below from top surface of structure and next shall be fixed 300 mm centre to centre in two rows at 300 mm distance or as shown in the drawing.

Painting:

The projected portion of the cast iron step shall be painted if It is uninsulated with two coats of approved black bitumastic anticorrosive paint over a coat of primer.

Dewatering:

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work other than rain, seepage, springs or any other cause.

The rate includes for:

C.I.Steps cement concrete and painting etc.

Dewatering if found necessary till completion of work.

All necessary labour, material and use of tools.

Cement concrete 1:2:4, 150 mm. Thick as per drawing.

Mode of measurement:

The measurement for C.I.steps shall be on actual unit weight basis.

Mode of payment:

The contract rate for C.I. steps shall be on actual unit weight basis or each step.

APPROVED MAKES FOR WATER SUPPLY & EFFLUENT DRAIN PIPE WORKS

Bidders shall consider any of the following makes while quoting against this enquiry.

It will not be possible to change the makes after finalization of order.

1. G.I.Pipes	:	Jndal / Tata
2. G.I.Fittings	:	RB / ISI / Unik / HB / Zoloto
3. Bronze Ball Valve	:	RB / Zoloto / Advance / Leader
4. Gun Metal Valves, NRV, Foot Valve	:	Advance / Hawa / Zoloto / Leader
5. 'Y' Stainer	:	H.sarkar / Lehry / Sant
6. HDPE Pipes	:	Sudhkar / Manikya / Godawari
7. Pumps	:	Grundfoss / Kirloskar / CRI / DP
8. Motor	:	Grundfoss / Kirloskar / CRI / DP
9. HDPE Tanks	:	Sintex
10. Level Controller Units	:	Sridhan International / Midas Marketing
11. Water Meters	:	Deshmesh / Capatan / Kent
12. Hydro Pneumatic Systems	:	Grundfoss / DP / Kirloskar / CRI
13. Air Release Valves	:	Elmes / Zoloto / Newage
14. Pressure Gauge	:	H.Guru / Warree / Fiebig