

**STANDARD BIDDING
DOCUMENT PROCUREMENT OF CIVIL
WORKS**



NAME OF WORK: -

BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021-2021-22,2022-23) UNTIED, TIED GRANT.

**THE CHIEF OFFICER
KHAMBHAT NAGARPALIKA
KHAMBHAT**

KHAMBHAT NAGARPALIKA KHAMBHAT

NAME OF WORK: RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

VOLUME -I - TECHNICAL BID

MILESTONE DATES	
Bid Documents Downloading Start Date	: Date: 10/06/2026
Last Date for Submission of Online Tender	: On Date : 09/07/2026 up to 18:00 Hrs.
Dates of Submitting the Tender Fee / E.M.D and relevant Documents of the Tender By RPAD Only.	: Up to Date 18/07/2026 18:00 Hours At the Khambhat Nagarpalika Dist. Anand, Gujarat-India.
Openings Dates for online Tender Technical Bid Price Bid	: Technical Bid on Date 20/07/2026 at 12:00 Hrs. Price Bid date to be intimated later. (If Possible)
Estimated Cost	: Rs. 33,75,100.00
EMD	: Rs. 33,800.00
Tender Fee	: Rs. 1,770.00
Class Of Contract	: "E1" Class and Above
Duration Of Work	: 04 months.

-: OFFICER INVITING BIDS: -

THE CHIEF OFFICER
KHAMBHAT NAGARPALIKA
KHAMBHAT

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INVITATION FOR BID (IFB)

KHAMBHAT NAGARPALIKA KHAMBHAT
INVITATION FOR BID
NATIONAL COMPETITIVE BIDDING

1. The **Chief Officer KHAMBHAT NAGARPALIKA KHAMBHAT** invites bids for the construction of works detailed in the table. The bidders may submit bids for any or all of the following works.

Package No.	--
Name of work	RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.
Approximate Value of Works	Rs. 33,75,100.00
Bid Security (EMD)	Rs. 33,800.00
Cost of document (Tender Fee)	Rs. 1,770.00
Period of Completion	04 Months
Class of Registration / Category of Contractor if required	"E1" Class and Above

2. Prospective / Interested bidder may download the Bid Documents from website <https://www.tender.nprocure.com> free of cost till the Time and Date as mentioned on online NIT at website <https://www.nprocure.com>.
3. However, Bidder who is submitting the Bid Online will have to pay the Bid Document Fee / Tender Fee through Demand Draft only of any Schedule Bank payable at Khambhat and in favor of **CHIEF OFFICER KHAMBHAT NAGARPALIKA**. Once the Bid is received online, Bid Document / Tender Fee will not be refundable. as per GoG R&B Department's Circular No. PARACH/102/000/IB/221/(59)/C, Dtd. 24/01/2007.

The Demand Draft for Bid Document / Tender fee and FDR / ~~Bank Guarantee~~ against Bid Security / EMD shall be submitted in electronic format through online (by scanning) while uploading the bid, this submission shall mean that bid document / tender fee and Bid Security / EMD has been received. Accordingly, the offer of only those shall be opened whose Bid Document / Tender Fee and Bid Security / EMD have been received electronically. However, for the purpose of realization of prequalification Technical Bid Documents, Demand Draft in original, and FDR in original / ~~Bank Guarantee~~ bidder shall be received by the Employer at the address specified above not later than **18/07/2026** up to 18.00 Hrs. through registered post/ speed post only.

Penaltative action for not submitting Demand Draft / FDR / ~~Bank Guarantee~~ in original to Chief Officer / Tender Inviting Authority by bidder shall be initiated. **(WRD GR No. PRC-102014-1-MICell-K.1, Dtd. 29/10/2014)**

4. Bids received online, will be opened on the time, date and place as specified in the online NIT at website <https://www.nprocure.com> in the presence of the bidders or their authorized representatives, who wish to remain present. If the office happens to be closed on the day of

opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.

~~5. A pre bid meeting will be held onathrs. at the office of to clarify the issues and to answer questions on any Matter that may be raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents.~~

6. Bid Security (EMD) is equal to 1% of Estimated Amount put to bid / tender and should be rounded off to the next thousand rupees.

7. Other Information is as under:

- a. Agencies can prepare and edit their offers a number of times before the end of the tender submission date and time. After the tender submission date and time, the bidder cannot modify / edit / withdraw their submitted offer in any case. No written or online request in this regard shall be granted.
- b. Offers in physical form will not be accepted in any case.
- c. Demand Draft purchased by the other than bidder and issued after the last date of submission of Bids, will not be considered or accepted.
- d. The cost incurred by the contractor for this offer for clarification or attending discussion, conferences or site visits will not be reimbursed by the Employer or Engineer-in-Charge.
- e. Conditional tender shall not be accepted.
- f. Any changes, addition, alternation made in the prescribed form attached with tender are liable to be rejected.
- g. Any change in format or conditional Bank Guarantee will not be accepted and the bidder will be considered non-responsive.
- h. All the bidders are instructed to fill in information strictly in accordance with the format given in the checklist / qualification document / tender document.
- i. It is mandatory for the bidders to supply each and every information as asked strictly in electronic format at appropriate places only.
- j. Blank / insufficient information shall be treated as nil information and shall result in disqualification.
- k. Even if the bidder has been qualified in a similar or larger size of project in the past, it shall not be deemed to be a ground / reason for not giving required information for this work / bid.
- l. Information supplied for earlier projects shall not be considered while evaluation of this bid. The Government will not ask for any other information, unless it is found absolutely necessary by the competent authority.
- m. If found necessary, the contractor will be intimated for negotiation,

BID EVALUATION / PRE-QUALIFICATION CRITERIA / ELIGIBILITY CRITERIA

For the works costing up to Rs. 7.5 crore (WRD Works), Rs. 7.0 crore (ROAD/BRIDGE/ BUILDING WORKS), Rs. 0.5 Crore (Electrical Works) kindly refer to GoG NWRWS & K Department's Circular No. Paracha/1097/1397(11)/pa.fa./MICELL (k-1), dtd. 18/01/2018 and Dtd. 30/09/2022.

For the works costing under Rs. 7.5 crore for Construction work of Water Resources Department, Rs. 7.0 crore for Roads, Bridges and Building and Rs. 0.50 crore for Electrical work following documents shall be submitted in electronic format through online by scanning and also Technical Bid Documents, Demand Draft in original, and FDR in original / ~~Bank Guarantee~~ bidder shall be received by the Employer at the address specified above not later than **18/07/2026** up to 18.00 Hrs. through registered post/ speed post only.

Following Physical Document are compulsory to submit before the last date of submission of bid. Physical Document shall be sent through Register post R.P.A.D./Speed Post and Scan copy also must be submitted online along with tender. If any of the following documents is not attached with the technical bid and online tender, your tender shall not be considered valid.

1. Bid Document Fee / Tender Fee Original.
Attach Required Tender Fee in Form of D.D in Original
2. Bid Security / EMD.
Attach Required EMD in Form of D.D/F.D.R in Original
3. Registration Certificate of Appropriate Class.

Registration: Copy of Valid Registration of class "**E1 "Class and Above**" With the Govt. of Gujarat, / Irrigation Dept./ Other state Govt./ Other Govt. bodies / GWSSB / Central Govt. having similar criteria as per magnitude of work also equivalent qualifying criteria to R&B Department of Gujarat State will have to be justified by the Bidder.

4. Work Experience,

Experience of having successfully completed similar work of **(Water Supply Work)** during last 7 years ending last day of the month previous to the one in which application are invited should be either of the following with Enhancement Value given in Enhancement Factor /Escalation factor Table (clause No.4.5.2) should be either of the Following.

- A. One similar completed work of **(Water Supply Work)** costing not less than the amount equal to 80 % of the Estimated Cost. **i.e., Rs. 27.00 Lac.** (Only in Form 3-A Certificate from Government of Gujarat/ Semi Government Bodies only.)
OR
- B. Two similar completed work of **(Water Supply Work)** costing not less than the amount equal to 50 % of the Estimated cost. **i.e., Rs. 16.87 Lac.** (Only in Form 3-A Certificate from Government of Gujarat/ Semi Government Bodies only.)
OR
- C. Three similar completed work of **(Water Supply Work)** costing not less than the amount equal to 40% of the estimated cost. **i.e., Rs. 13.50 Lac.** (Only in Form 3-A Certificate from Government of Gujarat/ Semi Government Bodies only.)

The Khambhat Nagarpalika Khambhat may verify the above certificate/documents from respective department if deemed Necessary.

The experience certificate from private individuals / company from whom the works are Executed/ being executed, shall not be acceptable.

The experience of work carried out by bidder as a SUB CONTRACTOR to the other Agency will not be considered.

The above documents will be analyzed and after satisfaction, the price bid will be opened. Khambhat Nagarpalika Khambhat

May verify the documents, experience certificates from authority who have issued such certificates / details.

Work Experience only for (Water Supply Work) Attach Attested Copy of All Form 3A and Work Completed Related Documents.

5. Average Annual Financial turnover during the last 3 years, ending 31st march of the previous financial year, should be at least **30% i.e., (Rs. 10.12 Lakhs)** of the Estimated Cost. (The audited balance sheet/C.A. Certificate for turnover should be submitted in support of the same.)
6. Latest Bank Solvency Certificate of minimum 20% amount of Estimated Cost of this work, **i.e., Rs. 6.75 Lacs**, for Current Calendar Year. Solvency Certificate from any Nationalized Bank / Schedule Bank / Co-operative Bank Ltd. As Per Attached G.R. of Government of Gujarat Finance Department of Dated: 11-4-2024.
7. Attach Attested Copy of PAN Card
8. Attach Attested Copy of Last Three Years Income Tax Return.
9. Attach Attested Copy of EPF Registration.
10. Attach Attested Copy of GST Registration.
11. Attach Attested - Site visit Certificate must be attached with tender Document with signature of Nagarpalika Engineer by Bidder (Format as per SBD-Section1 Clause 7.2).
12. Anti-Blacklisting Information as PER SBD-Section1 Qualification Information Page No.44
13. The Bidder/Contractor will have to Submit the Letter of Submission of Bid, Assurance Letter for Acceptance of Above terms and Condition Unconditionally and Signed by the Bidder and Attached the Same in Bidding Document. (As Per format given in SBD Section 8 Page No.275)

Notes: -

1. Above all documents must be attached online and same as in physical submission if the bidder fails to submit any one of the above documents, the bidder will be liable for disqualification.
2. The Bidder shall submit documentary evidences in support of all above Qualification criteria, failing in which the price bid shall not be opened. Chief Officer Khambhat Nagarpalika Khambhat also reserves the right to waive off the Qualifying criteria/ except or reject any or all Tender without assigning any reason thereof.

GENERAL IMPORTANT INSTRUCTION TO THE BIDDER

1. Bidders have to carried out and submit following types of total station survey work.(1) Proposed/ existing road alignment survey & alignment demarcation on site.(2) Existing ground data survey work.(3) Earth Work / Embankment Qty (pre & post) survey with Reference to original ground data survey for earth work. Qty verification work. 4) Total Station works for land acquisition process if required by Khambhat Nagarpalika at Khambhat 5) Necessary Permission for Building Use, GPCB Board, Fire Safety Related Permission etc. will have to be Obtained by the Successful Bidder from Competent Authority as per the Estimate Given in Schedule-B at his Own Risk and Expanse, No Extra Expanse/Payment for the same will be Made by Khambhat Nagarpalika Khambhat regarding the same.
2. Bidders have to carry out various types of Pre and Post total station survey work in connection with stipulated quantities in Schedule-B for smooth running of project and site layout management.
3. Bidder/Contractor will have to Obtained Soil Bearing Capacity Report(From Government Approved Laboratory) at various locations for Deciding the Depth of Foundation and other criteria and also verified the Soil Strata etc. considering the same the Structure Design Should be Prepared and verified from competent Authority(Such as competent Authority(Register Structure Engineer)/Government Engineering Collage etc. For Approval of Such type of Design and Drawings) having as possible as Economical and Safe Provision as per provision considering Latest IS Code's and Standard etc. at his Own Expanses Khambhat Nagarpalika Khambhat will not pay any Extra Amount/Payment Regarding the same and also the Quantity, Item should be as far as possible in Limit and Connection to Uploaded Schedule-B/BOQ.
4. Foundation and Foundation Footing for Above Work are to be designed after obtaining Soil Bearing Capacity Report and considering the S.B.C Value Depth of Foundation Footing and Other Foundation depth should be Determined and taken with at most care and as far as possible economical and with respect to stipulated Quantity Given in Schedule B also Excess/Extra Quantity Should be avoided.
5. Construction Work should only be started after Approval of Structure Design from competent Authority and submission of the same to Khambhat Nagarpalika, Khambhat having Quantity Should be in limit and in connection with Quantity given in Schedule B with reference to Obtained Soil Bearing Capacity.

6. All Material Used for Construction will have to be tested before execution as Per Schedule of Testing of Road and Building Department Attached Herewith.
7. For Leveling and fixing Datum Level for as far as Flat Ground and Contour Level for the reference should also be Obtained and the Quantity of Cutting and Filling should be workout in such a manner that the Quantity for the Filling should be as far as possible minimized and also should be assured that water lodging doesn't (Avoided) take place in the Premises.
8. R.C.C. and T.M.T Steel are as Per the Government Norms (company make mentioned in tender) should use by the Successful Bidder and Structure Design for the same should be approved by competent Authority.
9. Construction Material Testing and Concrete Work Testing according to Concrete Strength Should be Conducted from Government Approved Laboratory and GERI(ગૅરી) as per norms Mentioned in R&B Resolution Letter SMR-1092-129-10-G Dated 24/10/1994,
10. Site Photographs Stage Wise, at Regular Interval and on Completion will have to be submitted by the Successful Bidder to Khambhat Nagarpalika at regular interval to notified the progress of work and Final Completion of the Work (The Photographs should contain Following Details Name of Work, Ward Name, Amount of Expanse etc.
11. Work should be commenced only after obtaining required Building Construction Permission from Local Spatial Authority (Local Urban Authority) for Building Construction Drawing.
12. After Completion of the Building required Building Use Permission (B.U. Permission) will have to be Obtained from Local Spatial Authority (Local Urban Authority) or Competent Government Department.
13. Any Additional Instruction from Regional Commissioner Municipality, Vadodara, Gujarat Municipal Finance Board, Government of Gujarat etc. will have to followed/ Obey.
14. Successful Bidder/Contractor will have to compulsory Place Holding/Big Permanent Granite Plate/Name Plate Mentioning necessary details such as Name of Work, Date of Starting of Work, Date of Completion, Name of Grant, Other Details required by Nagarpalika / Logo of Swarnim Gujarat/Amrut Mohotsav etc., Other Details Mentioned by Government of Gujarat etc. at his own expanse.

15. Bidders shall have to carry out Concrete MIX DESIGN for all Control Cement Concrete Works Items before Execution of works if required.
16. Bidders have to carry out all kinds of Tests For works as per various IS Code and Specification Listed in Material Section and Schedule of Material Testing.
17. Goods and Service Tax (GST) Amount as per Government Rules and Regulation will be Deducted from Contractors / Bidder Running Bill / Final Bill by Nagarpalika Stage / Bill Wise.
18. Consulting Engineer Service Charges as Approved with NAGARPALIKA (3.00 % + G.S.T) will Have to be considered while quoting rate, same will have to be bear by the Bidder.
19. Third Party Inspection Service Charges as Approved with Nagarpalika (1.15 %+ G.S.T) will have to be considered while quoting rate, same will have to be bear by the Bidder.
20. No objection Certificate and required permission after construction work of building for electrification work and fire safety work from component authority will have to obtain by bidder.
21. Overlap have to be done as per design specification no extra payment for the overlap will be done to the bidder. (as per resolution PDW/10-2017-01-C DATED 15-02-2017)
22. The bidder have to follow all instruction of Saheri vikas and Saheri Gruh-Nirman resolution No.SGY/102011/4144/Dated 23/08/2011.
23. All cost towards the testing shall be borne by the contractor.

SECTION - 1
INSTRUCTIONS TO BIDDERS
(ITB)

Section 1: Instructions to Bidders

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A. GENERAL

1. Scope of Bid

- 1.1 The **Chief Officer Khambhat Nagarpalika Khambhat invites bids for the RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT....**Construction of works (as defined in these documents and referred to as ‘the works’’) detailed in the table given in IFB. The bidders may submit bids for any or all of the works detailed in the table given in IFB.
- 1.1 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.
- 1.2 Throughout these bidding documents, the terms ‘bid’ and ‘tender’ and their derivatives (bidder/ tenderer, bid / tender, bidding/ tendering, etc.) are synonymous.

2. Source of Funds

- 2.1 The expenditure on this project will be met from the budget of Govt. of Gujarat / Govt. of India for centrally sponsored projects.

3. Eligible Bidders

- 3.1 This Invitation for Bids is open to all eligible bidders.
- 3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is neither associated, nor has been associated, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

4. Qualification of the Bidder

- 4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary. The proposed methodology should include a program of construction backed with equipment planning and deployment duly supported with broad calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specifications, within stipulated period of completion.
- 4.2 Deleted
- 4.3 Deleted
- 4.4 Deleted

#4.5 QUALIFICATION CRITERIA:

(Applicable for the works which require Post Qualification)

- 4.5.1** Qualification will be based on Applicant’s meeting all the following minimum pass/fail criteria regarding the Applicant’s general and particular experience, personnel and equipment capabilities and financial positions, as demonstrated by the applicant’s responses in the forms attached to the letter of application (~~specified requirement for~~

~~joint ventures are given under para 4.6 below~~) Subcontractors experience and resources shall not be taken in to account in determining the applicants compliance with the qualifying criteria To qualify for more than one contract, the applicant must demonstrate having experience and resources sufficient to meet the aggregate of the qualification criteria for each contract given in paragraphs 4.5.4, 4.5.5 and 4.5.9 below

4.5.2 Base year and Escalation

The base year shall be taken as Current financial year

Following enhancement factors will be used for the costs of works executed and the financial figure to a common base value for works completed in India.

Year	Financial Year	Enhancement Factor
Base (year of inviting tender)	2025-2026	1.00
-1	2024-2025	1.10
-2	2023-2024	1.21
-3	2022-2023	1.33
-4	2021-2022	1.46
-5	2020-2021	1.61
-6	2019-2020	1.77
-7	2018-2019	1.94

Applicant should indicate actual figures of costs and amount for the works executed by them without accounting for the above-mentioned factors.

In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will not be applied. Instead, the current market exchange rate (State Bank of India BC Selling rate as on the last date of submission of the bid) will be applied for the purpose of conversion of the amount in foreign currency into India rupees.

4.5.3. General Experience.

The Applicant shall meet with the following minimum criteria:

- Achieved a minimum annual financial turnover (defined as billing for works in progress and completed in all classes of civil engineering construction works only) Average Annual Financial turnover during the last 3 years, ending 31st march of the previous financial year, should be at least 30% i.e., **(Rs. 10.12 Lakhs)** of the Estimated Cost. (The audited balance sheet/C.A. Certificate for turnover should be submitted in support of the same.)
- Experience in successfully completing work As per Bid Evaluation Criteria on page no.7 or substantially completing at least one contract of **(Water Supply Work)** of at least 80 percent/ Two contract of **(Water Supply Work)** of at least 50 percent/ Three contract of **(Water Supply Work)** of at least 40 percent of the value of proposed contract within the Seven years.

The works may have been executed by the applicant as prime contractor or as a member of a joint venture or as a nominated sub-contractor. As subcontractor, he should have acquired the experience of execution of all major items of works under the proposed contract. In case a project has been executed by a joint venture, weight towards experience of the project would be given to each joint venture in proportion to their financial participation in the joint venture.

Substantially completed works means those works which are at least 90 %

completed as on the date of submission (i.e. gross value of work done up to the last date of submission is 90 % or more of the original contract price) and continuing satisfactorily.

For these, a certificate from the employers shall be submitted along with the application incorporating clearly the name of the work, contract value, billing amount, date of commencement of works, satisfactory performance of the contractor and any other relevant information.

(The experience certificate should be signed by the officer not below the rank of EE)

4.5.4. Personnel Capabilities.

The Bidder must have suitably qualified personnel to fill the following positions. The Bidder will supply information on a prime candidate and an alternate for each position, both of whom should meet the qualification and Experience requirements specified below:

Sr No.	Position	Qualification	No. of Personnel's required	Total experience (Years)	In similar works (Years)	In similar work in similar capacity (Years)

4.5.5. Equipment Capabilities

Based on the studies carried out by the Engineer, the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the Appendix.

The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.

List of Plant & Equipment to be deployed on contract work.			
SL No.	Type of Equipment	Maximum Age on	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

4.5.6. Financial Position

The Applicant should give undertaking that he has access to, or has available, liquid assets (aggregate of working capital, cash in hand and uncommitted bank guarantees) and / or credit facilities up to 25 percent of the value of the contract / contracts applied.

- 4.5.7.** The audited balance sheets for the last five years should be submitted, which must demonstrate the soundness of the applicant's financial position, showing long – term profitability including an estimated financial projection for the next two years. If necessary, the employer will make inquiries with the applicant's bankers.

4.5.8. Litigation History

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the applicant.

4.5.9. Disqualification

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

Made misleading or false representation in the forms, statements submitted, and / or Record of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non – performance of the contractor; consistent history of litigation awarded against the applicant or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non – performance, such as Most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will, however, not affect the qualification of the individual partners.

#4.6 — ~~JOINT VENTURE: (Maximum 3 Members i.e. 1 Lead & 2 others)- (Applicable only for estimated project cost of 50 Crore and above)~~

~~4.6.1. — Joint ventures must comply with the following requirement:~~

~~(a) — Following are the minimum qualification requirements:~~

~~(i) The lead partner shall meet not less than 50 percent of all criteria given in para 4.5.3 & 4.5.6 above. The joint venture must collectively satisfy the criteria of para 4.5.3 & 4.5.6 above. The experience of the other joint venture partners shall be considered if it is not less than 30 percent of the qualifying criteria in para 4.5.3 & 4.5.6 Above.~~

~~(ii) — Individually each member must satisfy the requirements of para 4.5.7 & 4.5.8 above.~~

~~(b) — Bid shall be signed so as to legally bind all partners, jointly and severally, and shall be submitted with a copy of the joint venture agreement providing the joint and several liabilities with respect to the contract.~~

~~4.6.2. — Qualification of a joint venture does not necessarily qualify any of its partners individually or as a partner in any other joint venture. In case dissolution of a joint venture, each one of the constituent firms may qualify if they meet all the qualification requirements, subject to the written approval of the Employer.~~

4.7. Bid Capacity.

Applicants who meet the minimum qualification criteria will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the works. The available bid capacity will be calculated as under:

Assessed Available Bid Capacity = (A*N*2-B), where

A = Maximum value of work executed in any one year during the last five years (updated to the price level of the year indicated in appendix) taking into account the completed as well as works in Progress.

B = Value at current price level of the existing commitments and ongoing works to be completed during the next__ (period of completion of work for which bids are

invited); and

N = Number of years prescribed for completion of the works for which the bids are invited.

Note: - ~~In Case of joint venture, the available bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the work.~~

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

Made misleading or false representation in the form, statements submitted; and /or Records of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non-performance of the contractor; consistent history of litigation awarded against the Bidder or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non-performance, such as most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will, however, not affect the qualification of the individual partners.

5. One bid per bidder

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

6. Cost of Bidding

6.1. 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

- 7.1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of work and its surrounding 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.

7.2 Letter of Confirmation of Site Visit.

(ON COMPANY'S LETTER HEAD)

To
The Chief Officer
KHAMBHAT NAGARPALIKA
KHAMBHAT.

Dear Sir,

SUB: BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

1. With reference to the tender invited by you for the above mentioned work/s, I/We do hereby confirm that I/We have carried out site visit and understood the project requirements in detail.
2. I / We have satisfied ourselves as to the current site conditions as on date _____, and agree to execute the project in accordance with the tender requirements.
3. We agree that at your sole discretion and without assigning any reason whatsoever, you reserve the right to accept and/or reject any or all tenders. The Chief Officer **Khambhat Nagarpalika** does not bind itself to accept the lowest tender.

Signature of Engineer
Khambhat Nagarpalika

Yours faithfully,

Date:

(Signature of the tenderer with the seal of the firm)

Witness:

B. BIDDING DOCUMENTS

8. Content of Bidding Documents

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

Section	Particulars	Volume No.
-	Invitation for Bids	I
1	Instructions to Bidders	
2	Qualification Information, and other forms	
3	Conditions of Contract	
4	Contract Data	
5	Technical Specifications	II
6	Form of Bid	III
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings	IV
10	Documents to be furnished by bidder	V

- 8.2 Volumes I, II, III and IV are available online and documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume- V in two parts (refer clause 12).
- 8.3 The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, and technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. **Pursuant to clause 26 hereof** bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

9. Clarification Bidding Documents

- 9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or through E-mail 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 15 days prior to the deadline for submission of bids. Employer's response will be published on website including a description of the enquiry but without identifying its source.

Intending bidders are advised to submit their queries in regards of the bidding documents through email np_Khambhat@yahoo.co.in and replies of which will be given through return mail.

~~9.2. Pre-bid meeting~~

~~9.2.1. The bidder or his official representative is invited to attend a pre-bid meeting which will take place at the address, venue, time and date as indicated in the appendix.~~

~~9.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.~~

~~9.2.3. The bidder shall be required to submit any questions in writing or e-mail to reach the Employer not later than 03 days before the meeting.~~

~~9.2.4. Minutes of the meeting, including the question raised (Without identifying the source of enquiry) and the responses given will be published without delay on the tender website i.e. www.nprocure.com. Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.~~

~~9.2.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.~~

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2 Any addendum thus issued shall be part of the bidding documents. The Employer will assume no responsibility for the same.

10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

C. PREPARATION OF BIDS

11. Language of the Bid

11.1 All documents relating to the bid shall be in the English language.

12. Documents Comprising the Bid

12.1. The bid be submitted by the bidder as Volume V of the bid document (refer Clause 8.1) shall be in two separate parts:

Part I shall be named “Technical Bid” and shall comprise

- (i) Bid Security in the form specified in Section 8
- (ii) Qualification Information and supporting documents as specified in Section 2
- (iii) Certificates, undertakings, affidavits as specified in Section 2
- (iv) Any other information pursuant to Clause 4.5 of these instructions
- (v) Undertaking that the bid shall remain valid for the period specified in Clause 15.1

Part II shall be named “Financial Bid” and shall comprise

- (i) Form of Bid as specified in Section 6
 - (ii) Priced Bill of Quantities for items specified in Section 7
- 12.2. The Bidder shall submit the details / information pertaining to each part i.e. technical as well as financial and must be submitted online only.
- 12.3. Following documents will be deemed to be part of the bid.

Section	Particulars	Volume No.
Invitation for Bids (IFB)		
1	Instruction to Bidders	Volume I
3	Conditions of Contract	
4	Contract Data	
5	Specifications	Volume II
9	Drawings	Volume IV

13. Bid Prices

- 13.1 The Contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.
- 13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price

(Both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the Bill of Quantities.

18. The rates to be quoted by the contractor are inclusive of sales GST & all other taxes. No extra payment on this account will be made to the contractor.

13.3 Deleted

13.4 The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Condition of Contract **(Irrespective of the time limit and Bid Amount)**

14. Currencies of Bid and Payment

14.1 The unit rates and the prices quoted by the bidder shall be entirely in Indian Rupees. All payments shall be made in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period of not less than 120 days after the deadline date for bid submission specified in Clause 20.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified period. 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, but will be required to extend the validity of his security for a period of the extension, and in compliance with Clause 16 in all respects.

#16. Bid Security

16.1. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This Bid security shall be in favor of **The Chief Officer Khambhat Nagarpalika** payable at **Khambhat** as named in Appendix and may be in one of the following forms;

- a. Bank Guarantee from any scheduled Indian bank, in the format given in Volume III. **(Bank Guarantee is applicable only for Bid Estimated Amount of 01 Crore and above)** and Bank Guarantee of Schedule and Private Banks shall be considered as per GoG Finance Department's Circular No. FD/MSM/e- file/4/2023/0057/D.M.O. Date 21/04/2023 or as per their latest amendment.
- b. Fixed Deposit Receipt issued by any Scheduled Indian Bank or a foreign Bank approved by the Reserve Bank of India.

OR

~~# A Valid Bid Security / EMD Exemption Certificate issued by (1) Road & Building Department or (2) Narmada Water Resources, Water Supply and Kalpsar Department of Govt of Gujarat. Exemption Certificate is applicable only when Registration Certificate of Appropriate Class and Category of Approved Contractors is required as eligible criteria of bidder.~~

- 16.2. Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid i.e. total validity of $120+45 = 165$ Days.
- 16.3. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.
- 16.4. The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1
- 16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.
- 16.6. The bid Security may be forfeited
- (a) If the Bidder withdraws the bid after Bid opening during the period of Bid validity.
 - (b) If the Bidder does not accept the correction of the Bid Price, if any or
 - (c) In the case of a successful Bidders, if the Bidder fails the specified time limit to
 - (i) Sign the Agreement; or
 - (ii) Furnish the requirement Performance Security.
 - (d) #If found necessary, the bidder will be intimated for negotiation, He will be intimated maximum three times within the validity period for negotiation, If contractor does not respond in time, his Bid Security (EMD) will be forfeited and his tender will be rejected. Punitive action will be taken on such contractors. (As per GoG R&B Dept's Gr. No. S/22/2017/6369/D, Dt.08/06/2018)

17. Alternative Proposals by Bidders.

- 17.1. Bidders shall submit offers that fully comply with the requirements of the bidding documents, including the conditions of contract (including mobilization advance or time for completion), basic technical design as indicated in the drawing and specifications. Conditional offers or alternative offers will not be considered further in the process of tender evaluation.

18. Format and Signing of Bid

- 18.1. The Bidder shall prepare documents comprising the bid as described in Clause 12 of these Instructions to bidder as the "Technical Bid "and "Financial Bid" in separate parts to be uploaded.

D. SUBMISSION OF BIDS

19. Deleted

20. Deadline for Submission of the Bids

20.1. Complete Bids must be received online by the Employer at the tender website specified above not later than the date indicated in appendix.

20.2. The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all right and obligation of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Bids

21.1. Any Bid received by the Employer after the deadline prescribed in Clause 20 will be returned unopened to the bidder.

22. Modification and Withdrawal of Bids

22.1. Bidders may modify or withdraw their bids online before the deadline prescribed in Clause 20 or pursuant to Clause 23.

22.2. Deleted

22.3. No bid shall be modified or withdrawn after the deadline for submission of Bid.

22.4. Withdrawal or modification of a bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

E. BID OPENING AND EVALUATION

23. Bid Opening

- 23.1 The Employer will open all the Bids received including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clauses 20 and 23.3, In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.
- 23.2. Deleted.
- 23.3. The “Technical Bid” shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the invitation for bid (ref. Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the technical bid will not be opened.
- 23.4. (i) Subject to confirmation of the bid security by the issuing Bank, the bids accompanied with valid bid security will be taken up for evaluation with respect to the Qualification information and other information furnished in part I of the bid pursuant to Clause 12.1.
- (ii) If required, the bidder will be asked in writing to clarify his Qualification Documents with respect to any required clarification.
- (iii) The bidders will respond in not more than 7 days of issue of the clarification letter.
- (iv) Immediately (usually within 3 or 4 days), on receipt of these clarification the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration.
- 23.5. Deleted
- 23.6 At the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.7 the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.8 In case bids are invited for more than one package, the order for opening of the “Financial Bid” shall be in order of estimated amount of Bids from highest to lowest.
- 23.9 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.6.

24 Process to be Confidential

- 241 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

25. Clarification of Financial Bids

- 25.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by e-mail, but no change in the price or substances of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids.
- 25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to his Bid opening to the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.
- 25.3. 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.

26. Examinations of Bids and Determination of Responsiveness

- 261 During the detail evaluation of "Technical Bid", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding document. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.
- 262 A substantially responsive "Financial Bid" is one which confirms all the terms, conditions and specifications of bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
- 263 If a "Financial 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.

27. Correction of Errors

27.1. "Financial 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:

- (a) Where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and
- (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

27.2. The amount stated in the "Financial Bid" will be corrected by the Employer in accordance with the above procedure and the bid amount adjusted with the concurrence of the Bidder in the following manner:

- (a) If the Bid price increases as a result of these corrections, the amount as stated in the bid will be the 'bid price' and the increase will be treated as rebate;
- (b) If the bid price decreases as a result of the corrections, the decreased amount will be treated as the 'bid price'

Such adjusted bid price 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 16.6 (b).

28. Deleted

29. Evaluation and Comparison of Financial Bids

- 29.1. The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.
- 29.2. Deleted.
- 29.3. The Employer reserves the right to accept or reject any variation or deviation. Variation and deviations 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 in to account in Bid evaluation.
- 29.4. The estimated effect of the price adjustment conditions under Clause 47 of the Conditions of Contract, during the period of implementation of the Contract, will not be taken in to account in Bid evaluation.
- 29.5. If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract the Employer may require the Bidder to produce detailed consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful /bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
- 29.6. A bid which contains several items in the bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder may be rejected as non-responsive.

30. Deleted

F. AWARD OF CONTRACT

31. Award Criteria

- 31.1. Subject to Clause 32, the Employer will award the contract to the Bidder whose Bid has been determined.
- (i) to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and
 - (ii) to be within the available bid capacity adjusted to account for his bid price which is the lowest evaluation in any of the packages opened earlier than the one consideration.
- In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluation bid price.

32. Employer's Right to accept any Bid and to reject any or all Bids

- 32.1. Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or Bidder or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

33. Notification of Award and Signing of Agreement

- 33.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition 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").
- 33.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause.
- 33.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.
- 33.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. Performance Security

- 34.1. (A) Within 10 (Ten) days of receipt of Letter of Acceptance, the successful Bidder shall furnish to the Employer an irrevocable and unconditional guarantee from a Bank in the form set forth in Section 8 (the "Performance Security") for an amount equal to 5% (five percent) of its Contract Price. In case of bids mentioned below, the successful Bidder, along with the Performance Security,

shall also furnish to the Authority an irrevocable and unconditional guarantee from a Bank in the same form given at Section 8 towards an Additional Performance Security (The "Additional Performance Security") for an amount calculated as under:

- (a) If the Contract Price offered by the Selected Bidder is lower than 10% but upto 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 20% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
- (b) If the Contract Price offered by the Selected Bidder is lower than 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 30% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
- (c) This Additional Performance Security shall be treated as part of the Performance Security.

(B) The Performance Security shall be valid beyond 60(sixty) days of the Defects Liability Period and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

- 34.2. If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer. As per GoG Finance Department's Circular No. FD/MSM/e-file/4/2023/0057/D.M.O. Date 21/04/2023 or as per their latest amendment.
- 34.3. Failure of the successful Bidder to comply with the requirement of Sub-Clause 34.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security.

~~35 — Advance Payment and Security~~

~~35.1 — The Employer will provide an Advance payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.~~

36. Dispute Review Expert

The Employer proposes that [name of proposed Dispute Review Expert as indicated in Appendix] be appointed as Dispute Review Expert under the Contract, at a daily fee as indicated in Appendix plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in the Bid. If in the Letter of Acceptance, the Employer has not agreed on the appointment of the Dispute Review Expert, the Dispute Review Expert shall be appointed by the Council of Indian Roads Congress at the request of either party.

37. Corrupt or Fraudulent Practices

- 37.1 The Employer will reject a proposal if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in completing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways Authority of India/ State PWD and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in completing for the contractor, or in execution.
- 37.2 Furthermore, Bidders shall be aware of the provision stated in Sub- Clause 59.2 of the Conditions of Contract.

APPENDIX TO ITB

Clause Reference

With respect to

Section -I

1.	The Name of the Employer is The Chief Officer Khambhat Nagar Palika Khambhat.	[Cl.1.1]
2.	The last five financial years.	
	2024 - 25	
	2023 - 24	
	2022 - 23	
	2021 - 22	
	2020 - 21	
3.	This Annual Financial Turnover Amount is Rs.....	[Cl.4.5.3(a)]
4.	Value of Work is Rs.	
5.	Deleted	
6.	The cost of electric work is Rs.....	
7.	The cost of water supply / sanitary works is Rs.	0
8.	Liquid assets and / or availability of credit facilities is Rs.....	[Cl. 4.5.6]
9.	Price level of the financial year 2024-25	[Cl. 4.5.2]
10.	The pre-bid meeting will take place at The Chief Officer Khambhat Nagarpalika Khambhat	[Cl. 9.2.1]
11.	The technical Bid will be opened through website https://tender.nprocure.com on dt 20/07/2026 at 12.00 AM/PM	
12.	Address of the Employer: The Chief Officer Khambhat Nagarpalika Khambhat Three Darwaja, Khambhat -388620 (di-Anand) Phone (o) 02698-221300	
13.	Deleted	
14.	The bid should be submitted latest by 09/07/2026 at 18.00 hrs. As stated on online NIT.	[Cl. 20.1 & 20.2]
15.	The bid will be opened at https://www.tender.nprocure.com on 20/07/2026 at 12.00 Hrs (time and date) As stated on online NIT	[Cl. 23.1]
16.	The Bank Draft in favor of The Chief Officer Khambhat Nagarpalika and Payable at Khambhat	
17.	Deleted	
18.	Escalation factors (for the cost of works executed and financial figure to a common base value) for works completed.	[Cl.4.5.2]

<u>Year</u>	<u>Financial Year</u>	<u>Multiplying factor</u>
Base year of inviting tender	2025-26	1.00
-1	2024-25	1.10
-2	2023-24	1.21
-3	2022-23	1.33
-4	2021-22	1.46
-5	2020-21	1.61

#LIST OF KEY PLANT & EQUIPMENT TO BE DEPLOYED ON CONTRACT WORK

[Reference CL. 4.5.5]

The contractors shall also give a list of machineries in his possession and which they propose to use on the work.

Sr. No.	Plant or Machinery	Location	Age of Machinery (maximum m 15years)	Make	Capacity	Approximate Value	Remark
1	2(a)	2(b)	3	4	5	6	7

List of Key Personnel to be deployed on Contract Work

(Reference Cl. 4.5.4)

Employment of a qualified site Engineer by the Contractor.

The Contractor shall employ full-time technically qualified staff during the execution of this work as under: -

1. Two graduate Civil Engineers and three diploma Civil Engineers when cost of the work to be executed is more than Rs.50 lakhs.
2. **One graduate & two Diploma, Civil Engineers when the cost of the work to be executed is more than Rs.15 lakhs but less than Rs.50 lakhs.**
3. Minimum one Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs.
4. Minimum two Diploma Civil Engineers for the work when the cost of work to be executed is less than Rs. 5 lakhs. The Engineer so employed for the Government work must have sufficient experience to handle the work independently. Such an Engineer shall have to stay at the site of work and he shall not be entrusted with other duty except this work.

In case the contractor or partner of the contractor firm is a Civil Graduate Engineer, Employment of a separate Engineer will not be necessary provided that the Engineer partner himself attends the execution of the work on the site.

Within 15 days of issue of work-order the Contractor will have to furnish to the Chief Officer -in-charge of the work the Name, Qualifications, copy of marksheet, Colour Photograph and the appointment order issued such engineers engaged for this contract work. If 15 days after issue of work order such designated Site Engineers do not resume or do not remain present on site of work, the recovery at the rate of Rs.15,000-00 per month per Engineer will be made from the bills/deposit/dues of the contractor. Such recovery shall be non-refundable.

SECTION - 2

QUALIFICATION INFORMATION

QUALIFICATION INFORMATION

The information to be filled in by the Bidder in the following pages will be used for the purpose of post qualification as provided for in Clause 4 of the Instruction to Bidders. This information will not be incorporated in the Contract.

1. For Individual Bidders

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 constructions Work performed in the last five years (in Rs. Lakhs)

2025-26

2024-25

2023-24

2022-23

2021-22

1.3.1 Work performed as prime contractor, work performed in the past as a nominated sub-contractor will also be considered the sub-contract involved execution of all main items of work described in the bid documents, provided further that all other qualification criteria are satisfied (in the same name) on works of a similar nature over the last five years and in current year before the submission of the bid.**

Project Name	Name of the Employer	Description of work	Contract No.	Value of contract (Rs. Crore)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remark explaining reasons for delay & work Completed

* Attach certificate(s) from the Engineer(s)in-charge

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

#1.3.2 Quantities of work executed as prime contractor, work performed, in the past as a nominated sub-contractor, will also be considered provided the sub-contract involved execution of all main items of work described in the bid document, provided, further that all other qualification criteria are called (in the same name and style) in the last five years** and in current year before the submission of the bid.

Year	Name of the work	Name of the Employer	Quantity of work performed (Cum/MT)				Remarks* (indicate contract Ref)
			Cement Concrete (Including RCC & PCC)	Masonry	Earth Works	Bituminous Work	
2025-26							
2024-25							
2023-24							
2022-23							
2021-22							

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:

Description of works	Place & State	Contract No.	Name & Address of Employer	Value Contract (Rs. Cr)	Stipulated Period of Completion	Value of Works* remaining to be completed (Rs. Cr)	Anticipated of completion
1	2	3	4	5	6	7	8

*Attach certificate (s) from the Engineer(s) in-charge

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

- 1.5 Availability of key items of Contractors Equipment for carrying out the works (Ref. Clause 4.5.5). The Bidder should list all the information requested below.

Item of Equipment	Requirement		Availability Proposals			Remarks (from whom to be purchased)
	NO	Capacity	Owned/ Leased to be procured	Nos/. Capacity	Age/ Conditions	

- 1.6 Qualifications and experience of key personnel required for administration and execution of the contract. Attach biographical data. Refer also to Sub Clause 9.1 of the Conditions of Contract.

Position	Name	Qualification	Year of Experience (General)	Year of experience in the proposed position

- 1.7 Proposed sub-contract and firms involved

Sections of the works	Value of Sub-Contractor	Sub-Contractor (Name & Address)	Experience in similar work

- 1.8 Attach copies of certificates on possession of valid license for executing water supply/ sanitary work/ building electrification works.
- 1.9 Financial reports for the last five years: balance sheets, profit and loss statements, Auditors' reports (in case of companies/corporations), etc. List them below and attach copies.
- 1.10 Evidence of access to financial resources to meet the qualification requirements: Cash in hand, lines of credit, etc. List them below and attach copied documents.
- 1.11 Name, address, and telephone, telex, and fax numbers of the Bidders bankers who may provide references if contacted by the Employer.

1.12 Information on Litigation history in which the Bidder is involved.

Other Party (ies)	Employer		Cause of Dispute	Amount Involved	Remarks showing Present Status

1.12. Statement of compliance under the requirements of Sub Clause 3.2 of the instruction to Bidders. (Name of Consultant engaged for project preparations is *.....)

1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. (Refer ITB Clause 4.1)

1.14 Programme

2. Deleted

3. Additional Requirements

3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

- (i) Affidavit
- (ii) Undertaking

* Fill the name of Consultant

**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR
AVAILABILITY OF CREDIT FACILITIES**

(CLAUSE 4.5.6 OF ITB)

BANK CERTIFICATE

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

If the contract for the work, namely _____ 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 during the contract period.

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

AFFIDAVIT

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. _____
_____ have not abandoned any work of Government of Gujarat/Government of India/any Board or Corporation under Government of Gujarat/Government of India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.
3. The undersigned hereby authorize(s) and request (s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding any (our) competence and general reputation.
4. The Undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

(Signed by an Authorized Officer of the Firm)

Title of Officer

Name of Firm

Date

UNDERTAKING

I, the undersigned do hereby undertake that our firm
M/s.....would invest a minimum cash
up to 25% of the value of the work during implementation of the contract.

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

ANTI-BLACKLISTING INFORMATION
(On Stamp Paper Rs. 300) Notarized.

M/s _____ hereby certify and confirm that I or any of our Partner/ Promoter/s/director/s are not barred by Government of Gujarat (GOG)/any other entity of GOG or blacklisted by any State Government or Central Government/Department/Agency in India or from abroad from participating in Work/s, as individually/Partnership Firm as on Dt. _____ We further confirm that we are aware that our bid for the captioned tender would be liable for rejection in case any material misrepresentation is made or discovered about the requirements of this tender at any stage of the bidding process or thereafter during the agreement period. Dated this _____ day of, 2026.

Name of the Bidder:

Signature of the Authorized person:

Name of the Authorized Person:

SECTION - 3
CONDITIONS OF CONTRACT

Conditions of Contract

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CONDITIONS OF CONTRACT

A. GENERAL.

1. Definitions

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meaning.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid

Compensation Events are those defined in Clause 44 hereunder

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1

The Contract is the contract between the Employer and Contractor to execute, complete and maintain the Works **till the completion of Defects Liability Period**. It consists of the documents listed in Clause 2.3 below.

The **Contract data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body who's Bid to carry out the Work has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial Bids.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days: **months** are calendar months.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

The Engineer is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensations Events.

Equipment is Contractor's machinery and vehicles brought temporarily to the site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the works.

Plant is any integral part of the work which is to have mechanical, electrical, electronic or chemical or biological functions.

The **Site** is the area defined as such in the Contract Data.

Site Investigation Reports are those which were included in the Bidding documents and are factual interpretive reports about the surface and subsurface conditions at the site.

Specifications means the Specifications of the works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

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

Temporary Works are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer, which varies the Works. The

Works are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Heading have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion date, and Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole works)

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

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with works
- (3) Contractor's Bid

- (4) Contract Data
- (5) Conditions of Contract including Conditions of Contract
- (6) Specifications
- (7) Drawings
- (8) Bills of quantities and
- (9) Any other document listed in the Contract Data as forming part of the Contract.

3. Language and Law

- 3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineers Decisions

- 4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

- 5.1 The Engineer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

- 6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Sub-Contracting

- 7.1 The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**
- 7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.

8. Other Contractors

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities and the Employer between the dates given in the Schedule of other Contractor. The Contractors shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modifications.

9. Personnel

- 91 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.
- 92 If the engineer asks the Contractor to remove a person who is a member of the Contractor Staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractors Risks

- 10.1 The Employer carries the risk which these Contract states are Employer's risks, and the Contractor carries the risks which these Contracts states are Contractors risk.

11. Employer's Risks

- 11.1 The employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive.

12. Contractor's Risks

- 12.1 All risks of loss of or damages to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

- 13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract data for the following events which are due to the Contractor's risks:
- (a) Loss of or damage to the works, Plant and materials,
 - (b) Loss of or damage to Equipment
 - (c) Loss of or damages of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and
 - (d) Personal injury or death.
- 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

133 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

134 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

135 Both parties shall comply with any conditions of the insurance policies.

14. Site Investigation Report

14.1 The Contractor in preparing the Bid shall rely on any site Investigation reports referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract data

15.1 The engineer will clarify queries on the Contract Data

16. Contractor to Construct the Works

16.1 The Contractor shall construct and install the works in accordance with the specification and Drawings.

17. The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion date

18. Approval by the Engineer

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary works to the Engineer, who is to approve them if they comply with the Specifications and drawings.

18.2 The Contractor shall be responsible for design of temporary works.

18.3 The Engineer's approval shall not alter the contractor responsibility for design of the Temporary works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary works where required.

18.5 All Drawings prepared by the Contractors for the execution of the temporary or permanent work are subject to prior approval by the Engineer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

- 20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the property of the Employer. The contractor is to notify the engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

21. Possession of the Site

- 21.1 The Employer shall give possession of all parts of the site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.
- 21.2 If within 25% of the time limit of the project, 80% of possession of the site is not handed over to the Contractor, then contractor/ Employer may fore-close the contract. Contractor/Employer has to foreclose the work within 30 days after lapse of 25%-time limit and after 30 days foreclosure option will be closed.

22. Access to the Site

- 22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plants are being manufactured/ fabricated/ assembled for the works.

23. Instructions

- 23.1 The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable laws where the site is located.
- 23.2 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Employer, if so required by the Employer.

24. Disputes

- 24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **#Superintending Engineer** (Higher Authority) within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the **#Superintending Engineer**.
- 24.2
- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer**, both the parties have to refer to the Chief Engineer concern for the conciliation process.
 - (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer**, both the parties have to refer to the **#Secretary, Roads & Building Department, Government of Gujarat** for the conciliation process.

If the dispute is not resolved through the conciliation process, he may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time and he should not stop the work.

25. Procedure for Disputers

- 25.1 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

26. Deleted

B. TIME CONTROL

27. Programme

- 27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements orders, and timing for all the activities in the works along with monthly cash flow forecast.
- 27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The Contractor shall submit to the Engineer, for approval an updated programme at intervals no longer than the period stated in the Contract data. If the Contractor does not submit an updated programme within this period, the Engineer may withhold the amount stated in the Contract data from the next payment after the date on which the overdue programme has been submitted.
- 27.4 The Engineer's approval of the programme shall not alter the Contractor's obligations. The Contractor may revise the programme and submit it to the Engineer again at any time. A revised programme is to show the effect of Variations and Compensations events.

28. Extension of the Intended Completion Date

- 28.1 The Engineer shall extend the Intended Completion Date if a compensation Event occurs or a Variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.
- 28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 35 days of the Contractor asking the Engineer for a decision upon the effect of a compensation event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 28.3 The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The employer shall in not more than 21 days communicate to the engineer the acceptance or otherwise of the Engineer's decision. If the employer fails to give his acceptance, the Engineer shall not grant the extension and the contractor may refer the matter under Clause 24.1

29. Deleted

30. Delays Ordered by the Engineer

- 30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the works.

31. Management Meetings

- 31.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

- 32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract price or delay the execution of works. The Engineer may require the contractor to provide an estimate of the expected effect of the future event or circumstance on the contract price and completion date. The estimate is to be provided by the Contractor as soon as reasonably possible.
- 32.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

C.QUALITY CONTROL

33. Identifying Defects/ Defect liability period

33.1 : Defect liability period: The contractor shall be responsible to make good and remedy at his own expense any defect which may develop or may be noticed before the period mentioned hereunder from the certified date of completion. The Engineer in charge shall give the contractor a notice in writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the part of the contractor, the Engineer-in-charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, Incurred by him in rectification, removal or re-execution. The Defects Liability period shall be as under....

- (a) For all works costing up to Rs. 50,000 (amount put to tender), the period shall be 3 Months from the certified date of completion.
- (b) For all works costing more than Rs. 50,000 and up to Rs. 1 crore (amount put tender), the period shall be 12 (Twelve) months from the certified date of completion or one monsoon, whichever is later.
- (c) For major projects costing more than Rs. 1 crore, the period shall be **12 Months** from the certified date of completion which should include three monsoons.
- (d) For original building works the defect liability period will be 4 years or elapse of 4 monsoon period following date of possession of building taken over by user agency following the certified date of completion, whichever is later. For the purpose of deciding the monsoon period, the 30th September shall be treated as the last date.

Modified vide R & B D Circular No. PAC-11-102008-2076-N dated 31/8/2009, PRCH/102013(2976) 2759-N, Dated 27/05/2013 and Circular No.TNC/10/2016/Clause 17A (Correction/(1)C Dated 12/05/2016]

33.2 Free maintenance guarantee period for works of Road/Bridge construction

- (a) For resurfacing work of road free maintenance guarantee period one year from the date of completion.
- (b) In case of widening of the road/strengthening of the road/bridge, the contractor shall have to give four years free maintenance guarantee from the certified date of completion. During this period the contractor shall visit the site every six months along with the concerned Section Officer / Chief officer and will examine the work already carried out in this contract like road work, jungle cutting, side shoulders, side gutter, road furniture, patta etc. and will prepare Km. wise inspection report duly signed by all concerned and any defect observed shall be done within 15 days by the contractor at his risk and cost as per the direction of Engineer in charge. The contractor needs to do videography of these visits and require to submit at the time of release of FMG. If B.T. the surface during the maintenance period of 4 years is worn out then agency shall have to provide renewal coating as per tender item as directed by the Engineer-in- charge. The amount equivalent to 5% of each running bill shall be withheld and will be released after the free maintenance guarantee period (i.e. 4 years) is over.

However, this amount shall be released against fixed deposit or bank guarantee pledged in the name of Chief Officer after completion certificate of work is issued.

(1) The flakiness and elongation index (combined) for coarse aggregates under no circumstances shall exceed the allowable limit set forth in the relevant clause for the material in question.

(2) 2% of the amount eligible for the payment of bituminous items shall be withheld till the miscellaneous items like earthwork in embankment / cutting for side shoulders, side gutters, kilometer / indicator / guard stones, sign boards etc. are completed in all respect by the contractor. After completion of the miscellaneous items, the above said 2% withheld amount shall be released.

(Govt. of Gujarat's G.R. No.: TNC-10-2013-3(Part-3)/C, Dtd. 13/12/2013).

(3) Videography for the surface under Maintenance Guarantee is to be done as per Govt. letter No.: SSR/10/2015-16/26/C, Dtd. 26/11/15 for the work costing more than Rs. 5.00 Crore.

(4) Setting up of adequate laboratory & deployment of quality engineers.

The contractor shall have to set up the laboratory with adequate equipment. Till the setting up of adequate laboratory is completed & reported of this to the engineer (subject to due verification by engineer's representative) by contractor in writing, Rs.2,00,000/- shall be withheld. The qualified quality Engineer shall be deployed exclusively for this contract by the contractors. If quality Engineer is not deployed by contractor within one month after the date of work order, the amount equivalent to Rs.20,000 per month shall be recovered till the actual deployment of quality engineer. The amount so recovered towards the deployment of quality engineers shall not be refunded.

(5) Asphalt work will have to be cross checked as per G.R. No.: RGN/60/2006/35/C, dtd.31/05/07 before final bill is paid.

(6) Maintenance during Construction Period

During the Construction Period, the Contractor shall maintain, at his own risk and cost, the existing lane(s) of the road so that the traffic worthiness and safety thereof are at no time materially inferior as compared to their condition 10 (ten) days prior to the date of the Agreement, and shall undertake the necessary repair and maintenance works for this purpose; provided that the Contractor may, at his cost, interrupt and divert the flow of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided

Further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the Chief Officer which approval shall not be unreasonably withheld. For the avoidance of doubt, it is agreed that the Contractor shall at all times be responsible for ensuring safe operation of the road.

- 33.3 The Engineer shall check the Contractor's work and notify the Contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities the Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

34. Tests

- 34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.

- 34.2 #1% of the amount of **work done** should be deducted from R.A. Bill of the contractor for testing the quality of material workmanship, irrespective of actual charges.

- 34.3 Agency has to establish testing laboratory on site for the various test to be carried out in the work for this purpose agency shall construct a pukka laboratory building with all facility on site at location specified by the engineer in charge.

35. Correction of defects

- 35.1 The engineer shall give notice to the Contractor of any defects before the end of the defects Liability Period, which begins at Completion and is defined in the contract data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

- 35.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer's notice.

36. Uncorrected Defects

- 36.1 If the Contractor has not corrected a defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

C. COST CONTROL

37. Bill of Quantities

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

38. Change in the Quantities

- 38.1 The Engineer shall have power to make any alterations in or addition to the original specifications , drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instruction in this connection which may be given to him in writing signed by the Engineer and such alteration shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in the tender for the main work.

Except that when the quantity of any item exceeds the quantity as in the tender by more than 130%, the contractor will be paid for the quantity in excess of 130%, at the rate entered in the SOR of the year during which the excess in quantity is first executed.

39. Variations

- 39.1 All Variations shall be included in updated programmes produced by the Contractor.

40. Payments for Variations

- 40.1 If the additional or altered work includes any class of work for which no rate is specified in this contract, then such class of work shall be carried out as under.
- (i) At the rate derived from the item within the contract which is comparable to the one involving additional or altered class of work; where there are more than one comparable items, the item of the contract which is nearest in comparison with regard to class or classes of the work involved shall be selected and the decision of the Superintending Engineer as to the nearest comparable item shall be final and binding on the contractor.
 - (ii) If the rate cannot be derived in accordance with (i) above, such class of works shall be carried out at the rate entered in the Schedule of Rates of the division

for the year in which the tender was received, increased or decreased by the percentage by which the tender amount is more or less as compared to the amount arrived at the rates in the “Schedule of Rates” of the Division in the year in which the tender was received. If the Schedule of rates of the Division does not contain all the items, the percentage increase or decrease of the tender shall be calculated considering such items which were included in the “Scheduled Rates” of the division for the year and for materials consumed on such item the rate to be charged would be the basic rate taken into account for fixing the rate in S.O.R. referred to above.

- (iii) If it is not possible to arrive at the rate from (i) and (ii) above, such class of work shall be carried out at the rate decided by the competent authorities on the basis of detailed rate analysis after hearing the contractor before a Committee of two Superintending Engineers stationed at the same place or the nearest place.

- 402 If the additional or altered work, for which no rate is entered in the “Schedule of Rates” of the Division is ordered to be carried out before the rate is agreed upon, then the contractor shall within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate, which it is his intention to charge for such class of work and if the Engineer in charge does not agree to this rates, he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider it advisable, provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of the dispute, the decision of the Superintending Engineer of the Circle shall be final.

Where, however, the work is to be executed according to the designs, drawings and specifications recommended by the contractor and accepted by the competent authority, the alternation above referred to shall be within the scope of such designs, drawings and specifications appended to the tenders.

The time limit for the completion of the work shall be extended in the proportion that the increase in the cost occasioned by alterations bears to the cost of the original work and the certificate of the Engineer-in-charge as to such proportion shall be final and conclusive.

41. Cash Flow Forecasts

- 41.1 When the programme is updated, the contractor is to provide the engineer with an updated cash flow forecast.

42. Payment certificates.

- 421 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 422 The Engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor after taking in to account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 32.3 of the Contract Data (secured Advance).
- 423 The value of work executed shall be determined by the Engineer.
- 424 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 425 The value of work executed shall include the valuation of variations and compensation events.
- 426 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information

43. Payments

- 431 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate.
- 432 Payment of GST (prevailing rates) on the amount payable under the contract to the Contractor will be made by the Employer. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.
- 433 Items of the works for which no rate or price has been entered in will not be paid by the Employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation events

- 441 The following are compensation Events unless they are caused by the Contractor:
- (a) The Employer does not give access to a part of the Site by the site Possession date stated in Contract data to the Contractor
- 442 In case of compensation event occurs and it prevents the work being completed beyond the Intended Completion Date then Authority will approve EOT with eligible contractual price escalation.

45. Tax

- 45.1 The rates quoted by the Contractor must be inclusive of all taxes prevailing on due date of bid submission including GST. However, any subsequent changes in the tax structure by Government after due date of bid submission will be compensated (+/-) on availability or submission of actual documentation. Contractor will have to intimate Engineer regarding changes occurred in the tax structure after bid submission. If the contractor fails to provide such information and if any financial obligation may arise due to change in tax structure, same will be recovered from the contractor.
- 45.2 GST will not be paid separately on the bills. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.

46. Currencies.

- 46.1 All payment shall be made in Indian Rupees.

47. Price Adjustment

- 47.1 Contract price shall be adjusted for increase or decrease in rates and price of labor, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:
- (a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.
 - (b) The price adjustment shall be determined during each month from the formula given in the contract data.
 - (c) Following expressions and meanings during to the work done during each month
R = Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month less the amount of secured advance recovered, if any during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.
- 47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clause in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

48. Retention

- 48.1 The Employer shall retain from each payment due to Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

- 482 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.
- 483 On completion of the whole works, the contractor may substitute retention money with an “on demand” Bank guarantee.

In case, Contractor requests for refund of the Retention Money deducted by the Employer under the provision of this clause, Employer shall consider the said request of the Contractor provided that the refund hereunder shall be made in tranches of not less than 1% (One Percent) of the Contract Price and Contractor furnishes an irrevocable and unconditional Bank guarantee for an equal amount substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 day beyond the scheduled / extended Defects Liability Period. On completion of the whole works, the contractor has however an option to submit a fresh irrevocable and unconditional Bank Guarantee for an amount equal to 5% of the total value of work executed substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 days beyond the Defect Liability Period and yet refund the Retention Money Bank Guarantee submitted for refund of Retention Money.

49. Liquidated Damages

- 491 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payment due to the Contractor. Payment of liquidated damages does not affect the Contractor’s liabilities.
- 492 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall not be entitled for any interest on the over payment calculated from the date of payment to the date of repayment.
- 493 If the contractor fails to comply with the time for completion as stipulated in the tender, then the contractor shall pay to the employer the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the contract data.

The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the contractor. The payment or deduction of such damages shall not relieve

the contractor from his obligation to complete the works on from any other of his obligations and liabilities under the contract.

- 49.4 If, before the Time for Completion of the whole of the Works or, if applicable any Section, a Taking Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over-Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

50 Bonus

- 50.1 If the contractor achieves completion of the whole of the works prior to the intended Completion Date prescribed in Contract Data the Employer shall pay to the contractor a sum stated in Contract Data as bonus for every completed month **but subjected to maximum amount as stated in Contract Data**; which shall elapse between the date of completion of all items of works as stipulated in the contract, including variations ordered by the Engineer and the time prescribed in Clause 17.
- 50.2 Bonus shall be paid only to works amounting to above INR 5 crore with time limit of the works is equal or more than 6 months. The bonus would be paid as under

% of Time Saved	% of Initial Contract Price entitled for Bonus
50 %	5%
40 %	4%
30 %	3%
20 %	2%
10 %	1%
Less than 10%	0%

~~51. Advance Payment.~~

- ~~51.1 The Employer shall make advance payment (not to be paid less than two installments except in special circumstances for which the reason to be Recorded in writing) to the Contractor of the amounts stated in the Contract Date by the date stated in the Contract Date, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to be at least 110% of the advance payment. The guarantee shall remain effective until the~~

~~Advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The Mobilization advance would be deemed as interest bearing advance at an interest rate of 10 % to be compounded, quarterly.~~

~~512 The Contractor is to use the advance payment only to pay for Equipment, plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the engineer.~~

~~513 The advance payment shall be repaid by deduction proportionate amount from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, variations, price adjustments, Compensation Events, or Liquidated damages.~~

514 Deleted

52. Securities

521 The performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The performance Security shall be valid until a date 60 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

53. Deleted

54. Cost of Repairs.

541 Loss or damage to the Works or Materials to be incorporated in the Works between the Start date and the end of Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damages arises from the Contractor's acts or omissions.

D. FINISHING THE CONTRACT

55. Completion

- 55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the works and the Engineer will do so upon deciding that the work is completed.

56. Taking Over

- 56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

57. Final Account

- 57.1 The Contractor shall supply to the Engineer a detailed final account of the total amount that the Contractor considers payable as full and final settlement of all claims under the Contract for items before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.
- 57.2 If reversal in characteristic of tender (L1 becoming L2) on account of excesses and savings in final account is observed, the Engineer/Employer shall be at liberty to restrict the final payment of BOQ items to the lowest amount evaluated of the bids considering the final quantities and the rates quoted including the rebates if any. Payment of variation items shall however be made at the rates approved by the Employer, within 90 days from the physical completion of work.

58. Operating and Maintenance Manuals

- 58.1 If "as built" drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract data.
- 58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

- 59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

592 Fundamental breaches of Contract include, but shall not be limited to the following:

1. The contractor stops work for 28 days when no stoppage of work is shown on the current programme and the stoppage has not been authorized by the Engineer
2. The Engineer instructs the Contractor to delay the progress of the Works and the instructions is not withdrawn within 28 days;
3. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstructions or amalgamation
4. A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate
5. The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
6. The Contractor does not maintain a security which is required;
7. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
8. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

593 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

594 Notwithstanding the above, the employer may terminate the Contract for convenience.

60. Payment upon Termination

601 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a Certificate for the value of the work done less advance payments received up to the date of the issue of the

Certificate, less other recoveries due in terms of the contract, less taxes due to deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

- 602 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the contractor and available at site, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the works, and the Contractor's cost of protecting and securing the Works and less advance payment received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to deducted at source as per applicable law.

61. Property

- 61.1 All materials on the Site, Plant Equipment's, Temporary Works and Works are deemed to be property of the Employer, if the Contract is terminated because of a Contractor's default.

62. Release from Performance

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

E. SPECIAL CONDITIONS OF CONTRACT

63. LABOUR

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment of housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labor from time to time employed by the Contractor on the site and such other information as the Engineer may require.

64. COMPLIANCE WITH LABOUR REGULATIONS

During continuance of the contract, the Contractor and his sub-contractor shall abide at all times by all existing labor enactments and rules made thereunder, regulations, notification and bye laws of the State or central Government or local authority and any other labor law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labor law in future either by the State or the Central Government or the local authority. Salient features of some of the major labor laws that are applicable to the construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have the right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

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

SALIENT FEATURES OF SOME MAJOR LABOUR AND OTHER LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTIONS WORK

- A) **Workmen Compensation Act 1923:-** The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- B) **Payment of Gratuity Act. 1972 :-** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more on death, the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- C) **Employees P.F. and Miscellaneous Provision Act 1952:-** The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33% The benefits payable under the Act are :
1. Pension or family pension on retirement or death, as the case maybe.
 2. Deposit linked insurance on the death in harness of the worker.
 3. Payment of P.F. accumulation on retirement/death etc.
- D) **Maternity Benefit Act 1951 :-** The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- E) **Contract Labour (Regulation & Abolition) Act 1970 :** The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer, if they employ 20 or more contract labor.
- F) **Minimum Wages Act 1948 :-** The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Building, Roads, Runways are scheduled employment.
- G) **Payments of wages Act 1936:-** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- H) **Equal remunerations Act 1979 :-** The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against female employees in the matter of transfer, training and promotions etc.
- I) **Payments of Bonus Act 1965 :-** The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20 % of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs. 2500/- per month or above Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not

Apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

- J) **Industrial Disputes Act 1947 :-** The Act lays down the machinery and procedure for resolutions of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- K) **Industrial employment (standing Orders) Act 1946 :-** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.
- L) **Trade Unions Act 1926:-** The Act lays the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have given certain immunities from civil and criminal liabilities.
- M) **Child Labour (Prohibition & Regulation Act 1986 :-** The Act prohibits employment of children below 14 years of age in certain occupations and process and provides for regulation of employment of children in all other occupations and processes. Employment of Child labour is prohibited in Building and Construction Industry.
- N) **Inter – State Migrant workmen’s (Regulation of Employment & Conditions of service) Act 1979:-** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state).The inter-state migrant workmen, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- O) **The Building and Other Construction workers (Regulation of employment and Conditions of Service) Act 1996 and the Cess Act of 1996:-** All the establishments who carry on any building or other constructions work and employ 10 or more workers are covered under this Act.
All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, First Aid facilities, Ambulance, Housing accommodations for workers near the workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

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

Q) **Royalty charges-**The contractor shall pay the royalty to the competent authority as per rule. The **royalty** charges paid shall be borne by the contractor and shall not be reimbursed by the Employer.

R) **Following Pollution control Acts and amendments made thereof from time to time shall be applicable.**

1. Water (Preservation and control of Pollution) Act, 1974
2. Air (Prevention and Control of Pollution Act 1981
3. Environmental (Protection) Act 1986

The contractor must commit to adopting Environmental management plan for best energy use, waste management, the reduction of pollution as in EMS (Environmental Management system)ISO-14001- 2015

65. ARBITRATION (GCC Clause 24)

The procedure for arbitration will be as follows: -

24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **#Superintending Engineer** (Higher Authority) within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the **#Superintending Engineer**.

24.2

- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer**, both the parties have to refer to the **#Chief Engineer** concerned for the conciliation process.
- (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **Superintending Engineer**, both parties have to refer to the **#Secretary, Roads & Building Department, Government of Gujarat** for the conciliation process.

If the dispute is not resolved through the conciliation process, contractor may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time. However, during such period, he would not stop the work in any case.

66. MODEL RULES FOR LABOUR WELFARE

66.1 Definitions

- a) Work place means a place at which, on an average, twenty or more workers and employed.
- b) Large work place means a site at which, on an average, 250 or more workers are employed

66.2 First Aid

At every work place, there shall be maintained in a readily accessible place first aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the factory rules of the state in which the work is carried on the appliances shall be kept in good order and, in large work places, they shall be placed under the charge of a responsible person who shall be readily available during working hours.

At large workplaces where hospital facilities are not available within easy distances of the workers, first Aid posts shall be established and be run by a trained compounder.

Where large workplaces are remotely situated and away from regular hospitals, an indoor ward shall be provided with one bed for every 250 employees.

Where large work place are situated in cities or in their suburbs and no beds are considered necessary owing proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to these hospitals. At other workplaces, some conveyance facilities shall be kept readily available to take injured person or persons suddenly taken seriously ill, to the nearest hospital.

At large workplace there shall be provided and maintained an ambulance room containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed. For this purpose, the relevant provisions of the factory rules of the state government of the area, where the works carried on, may be taken as the prescribed standard.

66.3 Accommodation for Labour

The contractor shall during progress of the work provide, erect and maintain necessary temporary living accommodation and ancillary for labour at his own expenses to the standards and scales as approved by the CONSULTANT .

66.4 Drinking Water

In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where drinking water shall be stored.

Every water supply storage shall be at a distance not less than 15 meters from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, well shall be properly chlorinated before water drawn from it for drinking. All such wells

shall be entirely closed in and be provided with a trap door which shall be dust proof and water proof.

A reliable pump shall be fitted to each covered well. The trap door shall be kept and opened only for cleaning or inspection, which shall be done at least once a month.

66.5 Washing and Bathing Places

Adequate washing and bathing places shall be provided separately for men and women, such places shall be kept in clean and drained condition.

66.6 Scale of Accommodation in Latrines and urinals

There shall be provided within the precincts of every workplace, latrines and urinals in an accessible place and the accommodation, separately for each of these shall not be less than at the following scale.

	No of seats	
a) Where number of persons does not exceed	50	2
b) Where number of persons exceed but does not exceed	100	3
c) For additional person per 100 or part thereof	3	

In particular cases, the CONSULTANT shall have the power to increase the requirement, whenever necessary.

66.7 Latrines and Urinals

Except in work places provided with water/flushed latrines connected with a water borne sewage system, all latrines shall be provided with receptacles on dry-earth system which shall be cleaned at least four time daily and at least twice during working hours and kept in a strictly sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

If women are employed, separate latrine and urinals, screened from those for men and marked in the vernacular in conspicuous letters "For women only" shall be provided on the scale laid down in rule (vi) those for men shall be similarly marked "For Men only". A poster showing the figure of a man and women shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water, close to latrines and urinals.

66.8 Construction of Latrines

Inside walls shall be constructed of masonry or other non- absorbent materials and shall be cement washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrines shall have at least thatched roof.

66.9 Disposal of Excreta

Unless otherwise arranged for by the local sanitary authority, arrangement for proper disposal of excreta by incineration at the workplace shall be made means of suitable incinerator approved by the local medical, health and, municipal or cantonment authorities. Alternatively, excreta may be disposed off by putting a layer or night soils at the bottom of a pucca tank prepared for the purposed and covering it with a 15 cm layer of waster or refuse and then covering it with a layer of earth for a fort night (when it will turn in to manure).

The contractor shall, at his own expense carry out all instructions issued to him y the CONSULTANT to effect proper disposal of soil and other conservancy work in respect of contractor's work purpose or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by municipal or cantonment authority for execution of such work in his behalf.

66.10 Provision of shelters during rest

At every workplace, there shall be provided, free of cost, four suitable sheds, two for meals and two others for rest, separately for use of men and women labour. Height of each shelter shall not be less than 3 meters from floor level to lowest part of roof sheds shall be kept clean and the space provided shall be on the basis of at least 0.5 sq.m. per head.

66.11 Crèches

At a place at which 20 or more women are ordinarily employed, there shall be provided at least one hut for use of children under the age of 6 years belonging to such women. Huts shall not be constructed to a standard lower than that of thatched roof. Mud floor and wall with wooden planks spread over mud floor and covered with matting.

Huts shall be provided with suitable an sufficient openings, for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be two maid servants in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health an municipal or cantonment authorities. Use of huts shall be restricted to children, there attendants and mothers of children.

Where the number of women workers is more than 25 but less than 50 the contractor shall provide at least one hut and one maid servant to look after children or women workers.

Size of crèche(s) shall very according to the number of women workers employed.

Crèche (s) shall be properly maintained and necessary equipment like toys, etc. Provide.

66.12 Canteen

A cooked fool canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary.

66.13 Planning, setting and erecting of the above mentioned structures shall be, approved by the CONSULTANT or his representative and the whole of such temporary accommodation shall at all times during the progress of the work be kept tidy and in a clean and sanitary condition to the satisfaction of the CONSULTANT or his representative and at the contractor's expense. The contractor shall conform generally to sanitary requirement of local medial health and municipal or cantonment authorities and at all times adopt such precautions as may be prevent soil pollution of the site.

On completion of the works, the whole of such temporary structures shall be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in an effectively sealed of and the whole of site left clean and tidy at the contractor's expense, to the entire satisfaction of the CONSULTANT .

66.14 Enforcement

Inspecting office mentioned in the contractor's labor regulations or any other officer nominated on his behalf by the CONSULTANT shall report to the CONSULTANT shall report to the CONSULTANT all cases of failure on the part of the contract and/of his sub-contractor to comply with the part of the contract and his sub-contractor to comply with the provisions of these rules either wholly or in part and the CONSULTANT shall impose such fines and other penalties as are prescribed in conditions of contract.

66.15 Interpretations etc

On any question as to the application, interpretation or effect of these rules, the decision of the chief labor commissioner or deputy chief labor commissioner (central) shall be final and binding.

- 66.16 The OWNER may, from time to time, add to or amend these rules and issue directions a it may be considered necessary for the proper implementation of these rules or for the purpose of removing and difficulty which arise in the administration thereof.

67.00 PROVISIONS OF SECTION 297/299 OF COMPANIES ACT

The Certificate submitted by the CONTRACTOR as per the prescribed format in terms of section 297 / 299 of Companies Act 1956 (with latest amendment) forms part of the CONTRACT.

67.1 The CONTRACTOR shall give all notices and pay / bear all duties, taxes, charges, fees and expenses, except where otherwise expressly provided in the CONTRACT, required to be given or paid by any National or State statute, ordinance or other law or any regulation or bye law of any International, local or other duly constituted authority in relation to the performance of the WORKS or of any TEMPORARY WORKS and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the WORKS or any TEMPORARY WORKS. The CONTRACTOR shall acquire all permits, approvals and or licenses from all local, State or Central Government authorities or Public Sector Undertakings in the country, where the SITE is located, which, such authorities require the CONTRACTOR to obtain in his name and which are necessary for the performance of the CONTRACT including interest limitations, import license for materials and VISAS for the CONTRACTOR's and SUB CONTRACTOR's personnel and entry permits for all imported CONSTRUCTIONAL PLANT AND EQUIPMENT and shall acquire all other permits, approvals and / or licenses, which are not the responsibility of the OWNER and which are necessary for the performance of the CONTRACT.

67.2 The CONTRACTOR shall comply with and conform in all respects and shall ensure that all his SUB CONTRACTORS also comply with and conform in all respects with the provisions of any statute, ordinance or law as aforesaid and the regulations or bye laws of any international, local or other duly constituted authority, which may be applicable to the WORKS or to any TEMPORARY WORKS and with such rules and regulations of public bodies and companies as aforesaid and shall be responsible for all costs arising from compliance and / or violation of the same and shall keep the OWNER indemnified against all penalties and liabilities of every kind for breach of any statute, ordinance or

law, regulations or bye laws.

67.3 The CONTRACTOR shall indemnify and hold the OWNER harmless from and against all penalties, liabilities, damages, claims, fines and expenses of whatever nature, arising out of or resulting from the violation of such laws or rules or regulation having the force of law within the scope of clause No.22.6, 22.8 & 22.9 by the CONTRACTOR or his SUB CONTRACTORS including their personnel.

68. CONTRACTOR TO INDEMNIFY OWNER

68.1 The CONTRACTOR shall indemnify the OWNER and every member, officer and employee of the OWNER , also the ENGINEER-IN-CHARGE and his staff against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of or in connection with the matters referred to in Labor Laws or clause mentioned in the CONTRACT / elsewhere and all actions, proceedings, claims, demands, costs and expenses which may be made against the OWNER for or in respect of or arising out of any failure by the CONTRACTOR in the performance of his obligations under the CONTRACT. The OWNER shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workman or other person in the employment of the CONTRACTOR or his SUB CONTRACTOR and CONTRACTOR shall indemnify and keep indemnified the OWNER against all damages and compensation and against all claims, damages, proceedings, costs, charges and expenses, whatsoever, in respect thereof or in relation thereto.

68.2 Should the OWNER have to pay any money in respect of such claims or demands as aforesaid and the costs incurred by the OWNER shall be charged will be paid by the CONTRACTOR and the CONTRACTOR shall not be at liberty to dispute or question for the same.

68.3 WAIVER OF RECOURSE Except for claims of breach of the CONTRACT or for claims specifically assumed or authorized therein, the CONTRACTOR and the OWNER waive recourse each against the other claims which may arise with respect to the WORKS.

69.00 IMPLEMENTATION OF APPRENTICES ACT 1961

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

70.00 SAFETY PROVISIONS

The contractor shall comply with all precautions as required for the safety of the workmen by the I.L.O. convention No. 62 as far as they are applicable to the contract. The contractor shall provide all necessary safety appliances, gears like goggles, helmets, masks etc. to the workmen and the staff.

- i) Suitable scaffolds shall be provided for workmen for all work that cannot safely be done from the ground. Or from solid construction except for such short period work as solid construction except for such short period work as can be done safely from ladders. When a ladder is used, an extra labor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot holds and hand holds shall be provided on the ladder, which shall be given an inclination not steeper than 1/4 to 1(1/4) horizontal in 1 vertical)
- ii) Scaffolding or staging more than 3.25 meters above the ground or floor, swing, or suspended from an overhead support or erected with stationary support, shall have guard rail properly attached, bolted, braced and otherwise secured at least 1 meters high above the floor or platform of such scaffolding or staging and extending along the entire length may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the support for structure.
- iii) Working platform gangways, and stairways shall be so constructed that they do not sag unduly or unequally and if a height of a platform or gangway or stairway is more 3.25 meters above ground level or floor level, it shall have closely spaced boards, have adequate width and be suitably provided with guard rails as directed in (ii).
- iv) Every opening in floor of a structure or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of one meter.
- v) Safe means of access shall be provided to all working platforms and other working places every ladder shall be securely fixed. No portable single ladder shall be over 9 meters shall in no case be less than 30 cm for ladders up to and including 3 meters in length. For longer ladders the width shall be increased at least 6 mm for each additional 30 cm of length. Spacing of steps shall be uniform and shall, not exceed 30 cm. Adequate precautions shall be taken to prevent danger form electrical equipment. No materials on any of the sites shall be so stacked or place as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect public form accidents and shall be bound to bear expenses of defending every suit, action or other proceeding at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceeding to any such person or which may with the consent of the contractor be paid to compromise any claim by any such person.
- vi) Excavation and Trenching

All trenches, 1.5 meters or more in depth, shall at any times by supplied with at least one ladder each 20 meters in length or fraction there of ladder shall be extended from bottom of trench to at least 1 meters above surface of the ground sides of a trench which is 1.5 meters or more in depth shall be stepped back to

give suitable slope or securely held by timber bracing so as to avoid the danger of collapsing of sides. Excavated material shall not be placed within 1.5 meters of edge of trench or half the depth of trench whichever is more. Cutting shall be done from top to bottom. Under to circumstances, undermining or undercutting shall be done.

vii) Demolition

Before any demolition work is commenced and also during the process of the work

- a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- b) No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by operator shall remain electrically charged.
- c) All practical steps shall be taken to prevent danger to persons employed by the OWNER, from risk of fire or explosion or flooding. No floor roof, or other part of a building shall be so overloaded with debris or materials as to render it unsafe.

viii) All necessary personal safety equipment as considered adequate by the CONSULTANT / EIC shall be available for use of persons employed on the site and maintained in a condition suitable for immediate use and the contractor shall take adequate steps to ensure proper use of equipment by those concerned.

- a) Workers employed on mixing asphaltic materials, cement, lime mortars/ concrete shall be provided with protective footwear and protective goggles.
- b) Those engaged in handing any material which is injurious to eyes shall be provided with protective goggles.
- c) Those engaged in welding works shall be provided with welder's protective eye-shield.
- d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- e) When workers are employed in sewers and manholes, which is in use, the contractor shall insure that manholes covers are open and manholes are ventilated at least for an hour before workers are allowed to get in to them. Manholes so open shall be cordoned off with suitable railing and provided warning signals or boards to prevent accident to public.

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

No paint containing lead or lead products shall be used except in the form or readymade paint.

Suitable face masks shall be supplied for use by workers when paint is applied in the form of spray or a surface having lead paint dry rubber and scrapped.

Overalls shall be supplied by the contractor to workmen and adequate facilities shall be provided to enable workers to wash during and on close of day's work.

- ix) When work is done near any place where there is risk of drowning all necessary equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.
- x) Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following.
 - a - (i) These shall be of good mechanical construction, sound material and adequate strength and free from patent defects and shall be kept in good working order and properly maintained.
 - (ii) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, & free from defects.
 - b Every crane driver or hoisting appliance operators shall be properly qualified and no person under the age of 21 shall be in charge of any hoisting machine including scaffold or of signals to operator.
 - c In case of every hoisting machine and of every chain hook, shackle swivel and pulley block used in hoisting, lowering or as a means of suspension, safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with safe working load. In case of a hoisting machine or a variable safe working load, each safe working load and condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in the paragraph shall be loaded beyond safe working load except for the purpose of testing.
 - d In case of the OWNER's machine, safe working load shall be notified by the CONSULTANT or his representative. As regards contractor's machine the contractor shall notify safe working load of each machine to the CONSULTANT or his representative whenever he brings it to site of work and get it verified by him.
- xi) Motors, gearing, transmission, electric wiring and other dangerous part of hoisting appliance shall be provided with efficient safeguards. Hoisting appliance shall be provided with such means as will reduce the risk of accident during descent of load to the minimum. Adequate precautions shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, working apparel such as gloves, sleeves, and boots as may be necessary, shall be provided, workers shall not wear any rings, watches and carry keys or other material which are good conductors of electricity.

- xii) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places work.
- xiii) There safety provisions shall be brought tot he notice of all concerned by display on notice board at a prominent place at the work spot persons responsible for ensuring compliance with the safety code shall be named there in by the contractor.
- xiv) To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the contractor shall be open to inspections by the CONSULTANT or his representative and the inspecting officer as defined in the contractors labour regulation mentioned in thereafter these documents as annexure "A" of section IV.
- xv) Notwithstanding anything contained in conditions (i) to (xiv) above, the contractor shall remain liable to comply with the provisions of all acts, rules, regulations and bylaws for the time being in force in India and applicable in this matter.

FOOTWEAR

The contractor shall at his own expenses provide footwear for all labour engaged on concrete mixing work and all other types of work involving the use of tar, cement etc. to the satisfaction of the CONSULTANT or his representative, and on his failure to do so, the OWNER shall be entitled to provide the same and recover the cost from the contractor.

LOCAL LABOUR

The contractor is encouraged for as possible to employ, in the execution of the contract qualified India citizens as workmen. Employment of expatriate personal is subject to the Indian laws and regulations in case the contractor wished to employ expatriate personnel in any particular trade or skill required to execute the contract, the OWNER will assist the contractor in obtaining permission for which the contractor shall submit requisite date.

71. SAFETY CODE

1.00 GENERAL RULES

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

1.1 Contractor's Barricades

- a) Contractor shall erect and maintain barricades required in connection with his operations to guard or protect.
 - i) Excavation
 - ii) Hoisting area
 - iii) Areas adjudged hazardous by consultant or OWNER's inspectors
 - iv) OWNER's existing property subject to damage by contractor's operations
 - v) Rail / road unloading spots
- b) Contractor's employees and those of his sub-contractors shall get themselves acquainted with OWNER's protective barricading and shall respect the provisions thereof.
- c) Barricades and hazardous areas adjacent to but not located in normal routes or travel shall be marked by red flashers/ lanterns at nights.

1.2 Care In Handling Inflammable Gas

The contractor has to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder/inflammable liquids / paints etc. as required under the law and /or as advised by the fire authorities of the OWNER.

1.3 Temporary Combustible Structures

Temporary combustible structures will not be built near or around work site.

1.4 Precautions against Fire

The contractor will have to provide fire extinguishers / fire buckets and drums at work site as recommended by engineer in charge. They will have to ensure all precautionary measures and cylinders / inflammable liquid / paints etc. as advised by engineer in charge. Temporary combustible structures will not be built near or around the work site.

1.5 EXPLOSIVES

Explosives shall not be stored or used on the work or on the site by the contractor without the permission of the engineer in charge in writing and then only in the manner and to the extent to which such permission is given. When explosive are required for the works they will be stored in a special magazine to be provided at the cost of the contractor in accordance with the license for the storage and the use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the contractor and the contractor shall indemnify the OWNER against any loss or damage resulting directly or indirectly there from.

2.00 MINES ACT

2.1 SAFETY CODE

The contractor shall at his own expense arrange for the safety provisions as required by the engineer in charge in respect of all labor directly employed for performance of the works and shall provide all facilities in connection therewith. In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, the engineer in charge shall be entitled to do so and recover the costs thereof from the contractor.

- 2.2 Failure to comply with safety code or the provisions relating to, report on accidents and to grant of maternity benefits to female workers shall make contractor liable to pay company Liquidated Damages an amount not exceeding Rs. 50 /- for each default or materially incorrect statement. The decision of the engineer in charge shall be final and binding and deductions for recovery of such liquidated damages may be from any amount payable to the contractor from all the provisions of the Mines Act-1952 or any statutory modifications or re-enactment thereof for the time being in force and any rules and regulations made there under in respect of all the persons employed by him under this contract and shall indemnify the OWNER from and against any claim under the mines act or the rules and regulation framed there under by or on behalf of any persons employed by him or otherwise.

3.00 PRESERVATION OF PEACE

The contractor shall take requisite precautions and use his best endeavor to prevent any riotous or unlawful behavior by or amongst his workmen and others employed on the works and for the preservation of peace and protection of the inhabitants and security of property in the neighborhood of the work. In the event of the OWNER requiring the maintenance of the work. In the event of the OWNER requiring the maintenance of the special police force in the vicinity of the site during the tenure of the works, the expenses thereof shall be borne by the contractor and if paid by the OWNER, shall be recoverable from the contractor.

4.00 OUTBREAK OF INFECTIOUS DISEASES

The contractor shall remove from his camp such labour and their families as refuse protective inoculation and vaccination when called upon to do so by the engineer in charge representatives. should cholera, plague or other infectious diseases break out, the contractor shall burn the huts, bedding, clothes and other belongings used by the infected parties and promptly erect new huts on healthy sites as required by the engineer in charge failing which within the time specified in the engineer requisition, the work may be done by the OWNER and the cost thereof recovered from the contractor.

5.00 USE OF INTOXICANTS

The unauthorized sale of spirits or other intoxicating beverages upon the work, in any of the buildings, encampments or tenements owned, occupied by or within the control of the contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.

6.00 SAFETY REGULATIONS

6.1 In respect of all labour, directly or indirectly employed in the WORK, the CONTRACTOR shall at his own expense arrange for all the safety provisions as per safety codes of CPWD, Indian Standard Institution, the Electricity Act, the Mines Act. Regulations, Rules and Orders and such other Acts as applicable.

6.2 Contractor shall maintain first aid facilities for his employees and those of his Sub-contractors.

7.00 WATCHING AND LIGHTING

The Contractor shall, in connections with the Works, provide and maintain at his own cost all lights , guards, fencing, markers and watching when and where necessary for the safety and convenience of the public and others.

8.00 In addition to the above, the Contractor shall abide by the safety code provision as per CPWD safety code and Indian Standard safety code framed from time to time.

SECTION - 4
CONTRACT DATA

CONTRACT DATA Clause Reference with respect to section 3		
Item marked "N/A" do not apply to this Contract.		
1.	The Employers is Name: The Chief Officer KHAMBHAT NAGARPALIKA KHAMBHAT Address: Three Darwaja At. Khambhat Dist: Anand Khambhat-388620 Phone (o) 2698-221300	[CL.1.1]
2.	The Engineer is	
	Name of Authorized Representative: Deputy Executive Engineer/City Engineer/ PWD Engineer of KHAMBHAT NAGARPALIKA KHAMBHAT .	
3.	The Defects Liability Period is 12 months from the date of completion.	[CL.1.1 & 33]
4.	The Start Date shall be 1st days for the date of issue of the Notice to proceed with the work.	[CL.1.1]
5.	The Intended Completion Date for the whole of the works is 04 Months after start of work with the following milestones:	[CL. 1.1, 17 & 2]
	Milestone dates: <u>Physical works to be completed Period from the start date</u> Milestone 1 i.e. 16 % 80 days. Milestone 2 i.e. 50 % 165 days. Milestone 3 i.e. 75 % 247 days. Milestone 4 i.e. 100 % 330 days.	[CL. 2.2 & 49.1]
6.	The Site is located at Khambhat City, Ta. Khambhat, Dist. Anand	[CL.1.1]
7.	The name and identification number of the Contract is:	[CL.1.1]
8.	The works consist of (Water Supply Work) with items as per B.O.Q. The works shall, inter alia, include the following, as Specified or as directed:	[CL.1.1]
	<p>(A) Building Works Site clearance; setting –out and layout, carried out survey work, Construction, furniture work, electrical work and five years of Operation & Maintenance, all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of “As-built” drawings and other related documents and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety.</p> <p>(B) Road Works Site clearance; setting – out and layout; widening of existing carriageway and strengthening including camber corrections; construction of new road/ Parallel service road; bituminous pavements remodeling/construction of Junctions, intersections, bus bays, lay-bays; supplying and placing of drainage Channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridge, approaches and other related stones; protective works for roads/bridge; all aspects of quality assurance of various components of the works; rectification of The defects in the completed works during the Defects Liability Period; submission of “As- built” drawings and any other related documents; and other item of work as may be required to be carried out for completing the work in accordance with the drawings and the provisions of the contract and to ensure safety.</p> <p>(C) Bridge Works provision of foundations, piers abutments and bearing; prestressed/reinforced cement concrete superstructure; wearing coat, hand railings, expansion joints, approach slabs, drainages spouts/ down take pipes, arrangements for fixing light posts, water mains, utilities etc.; provision of suitably designed protective works; providing wing/return walls; provision of road markings, road signs etc.; all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of “As-built” drawings and other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety</p> <p>(D) Other Items Any Other Items as required to fulfill all contractual obligations as per the Bid documents.</p>	

- | | | |
|----------------|---|-------------|
| 10. | The following documents also form part of the Contract:
_____As per clause 2-3_____ | [CL.2.3(9)] |
| 11. | The law which applies to the Contract is the law of Union of India | [CL.3.1] |
| 12. | The language of the Contract documents is English | [CL.3.1] |
| 13. | Limit of subcontracting ——— 25% of the Initial Contract Price | [CL.7.1] |
| 14. | The Schedule of Other Contractors | [CL.8] |
| 15. | The Schedule of Key Personnel As per Annex – II to Section I | [CL.9] |
| 16. | The minimum insurance cover for physical property, injury and death is Rs. 5 lakhs per occurrence with the number of occurrences limited to four. After each occurrence, the contractor will pay an additional premium necessary to make insurance valid for four occurrences always. | [CL.13] |
| 17. | Site Investigation report | [CL.14] |
| 18. | The Site Possession dates shall be | [CL.21] |
| 19. | The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance. | [CL. 27.1] |
| 20. | The period between program updates will be..... days. | [CL.27.3] |
| 21. | The amount to be withheld for late submission of an updated programme shall be Rs lakhs | [CL. 27.3] |
| 22. | The following events shall also be Compensation Events
Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document. | [CL. 44] |
| | (i) Removal of underground utilities detected subsequently | |
| | (ii) Significant changes in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation, | |
| | (iii) Removal of unsuitable material like marsh, debris dumps, etc. not caused by the contractor. | |

- (iv) Artesian conditions
- (v) Seepage, erosion landslide
- (vi) River training requiring protection of permanent work
- (vii) Presence of historical, archeological or religious structures, monuments interfering with the works
- (viii) Restriction of access to ground imposed by civil, judicial, or military authority

23. The currency of the Contract is Indian Rupees

[CL. 46]

24. **The formula (e) for adjustment of prices are as under:**

[CL.47]

- ~~If any of the commodities like Cement, Steel or Bitumen are not found applicable in a work, the weight component of that commodities (i.e. 'Cement' (Pc), 'Steel' (Ps) or 'Bitumen' (Pb) as indicated in SBD for the purpose of Price Adjustment) shall be clubbed with the weight component of 'Other Material' (Pm), such that the gross % weight of the components shall remain as 100%.~~

~~R = value of work as defined in Clause 47.1 of Conditions of Contract~~

Adjustment for labour component

- (i) ~~Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:~~

$$V_L = \frac{0.85 \times (P_L/100) \times R \times (L_i - L_0)}{L_0}$$

~~V_L = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour~~

~~L₀ = The consumer price index for industrial workers for the State on 28 days preceding the scheduled date of opening of technical Bids as published by Labour Bureau, Ministry of Labour, Government of India~~

~~L_i = The consumer price index for industrial workers for the State for the month under consideration as published by the Labour Bureau, Ministry of Labour, Government of India.~~

~~P_L = Percentage of labor component of the work.~~

Adjustment for cement component.

- (ii) ~~Prices adjustment for increase or decrease in the cost of cement procured by the contractor~~

$$V_c = \frac{0.85 \times (P_c/100) \times R \times (C_i - C_0)}{C_0}$$

~~V_c = Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement.~~

~~C₀ = The all India wholesale price index for Ordinary Portland Cement on 28 days preceding the scheduled date of opening of technical bid as published by the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

C_i = ~~The all India average wholesale price index for Ordinary Portland Cement for the month under consideration as published by Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

P_c = Percentage of cement component of the work

Adjustment for steel component

- (iii) — Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula

$$V_s = 0.85 \times (P_s/100) \times R \times (S_i - S_0)/S_0$$

V_s = ~~Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel~~

S_0 = ~~The all India wholesale price index for steel (Mild Steel - Long Products Rebars) on 28 days preceding the date of opening of Bids as published by the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

S_i = ~~The all India average wholesale price index for steel (Mild Steel - Long Products Rebars) for the month under consideration as published by Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.~~

P_s = Percentage of steel component of the work

Note : For the application of this clause, the index of **Mild Steel - Long products Rebars** has been chosen to represent the steel group.

Adjustments of bitumen component

- (iv) — Price adjustment for increase in the cost of bitumen shall be paid in accordance with the following formula

$$V_b = 0.85 \times (P_b/100) \times R \times (B_i - B_0)/B_0$$

V_b = ~~Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.~~

B_0 = ~~The official retail price of bitumen at the IOC depot at the nearest centre on the day 28 days prior to the scheduled date of opening of technical bid.~~

B_i = ~~The official retail price of bitumen of IOC depot at the nearest centre for the 15th day of the month under consideration.~~

P_b = Percentage of bitumen component of the work

Adjustment of POL (fuel and lubricant) component

- ~~(v) — Price adjustment for increase or decrease in cost of POL (fuel and lubricant) shall be paid in accordance with the following formula~~

$$V_f = 0.85 \times (P_f/100) \times R \times (F_i - F_0)/F_0$$

~~V_f = Increase or decrease in the cost of work during the month under consideration due to changes in rates for fuel and lubricants.~~

~~F₀ = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC at the nearest centre on the day 28 prior to the date of opening of Bids.~~

~~F_i = The official retail price of HSD at the existing consumer pumps of IOC at the nearest centre for the 15th day of the month of the under consideration.~~

~~P_f = Percentage of fuel and lubricants component of the work~~

~~Note: For the application of this clause, the price of High-Speed diesel Oil has been chosen to represent the fuel and lubricants group.~~

Adjustment for Construction Machinery

- ~~(vi) — Price adjustment for increase or decrease in the cost of plant and Machinery spare procured by the Contractor shall be paid in accordance with the following formula~~

$$V_p = 0.85 \times (P_p/100) \times R \times (P_i - P_0)/P_0$$

~~V_p = Increase or decrease in the cost of work during the month under consideration due to changes in rates for plant and machinery spares~~

~~P₀ = The all India wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P_i = The all India average wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P_p = Percentage of plant and machinery spares component of the work.~~

~~Note: For the application of this clause, index of Heavy Machinery and parts has been chosen to represent the Plant and Machinery Spares group~~

Adjustment of other materials Component

- (vii) ~~Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen and POL procured by the contractor shall be paid in accordance with the following formula~~

$$V_m = 0.85 \times (P_m/100) \times R \times (M_i - M_0)/M_0$$

~~V_m = Increase or decrease in the cost of work during the month under consideration due to change in rates for local materials other than cement, steel, bitumen and POL.~~

~~M_0 = The All India wholesale price index (all commodities) on 28 days preceding the scheduled date of opening of technical Bids, as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~M_i = The All India wholesale price index (all commodities) for the month under consideration as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

~~P_m = Percentage of local material components (other than cement, steel, bitumen and POL) of the work.~~

The following percentage will govern the price adjustment for the entire contract:

1. Labour	P_l%
2. Cement	P_c%
3. Steel	P_s%
4. Bitumen	P_b%
5. POL	P_f%
6. Plant & Machinery Spares	P_p%
7. Other Materials	P_m%
Total		100 %

25. The proportion of payments retained (retention money) shall be 6% {CL. 48} from each bill subject to a maximum of 5% of final contract price.
26. Amount of Liquidated damages for in completion of works
- For Whole of work {CL.49} delay (1/2000)th of the Initial contract price, rounded off to the nearest Thousand, per day. ~~For sectional Completion (wherever specified In item 6 of Contract data) (1/2000)th of initial contract price for #5 km Section, rounded off to the nearest thousand per day.~~

27. Maximum limit of liquidated damages For delay in completion work 10 percent of the Initial {CL. 49} Contract Price rounded off to the nearest thousand
- ~~28. Amount of Bonus for early completion~~ ~~Amount of bonus for early Completion of work shall be given as per CL.50 of Section 3~~
- ~~29. Maximum limit of bonus for early Completion of work~~ ~~5 percent of the Contract {CL. 50} Price~~
30. The amount of the advance payment are: {CL. 51 & 52}

#Nature of Advances

Amount (Rs.) Conditions to Be fulfilled

- | | | |
|-----|---|--|
| i | Mobilization 10% of the contract Price | On submission of unconditional Bank Guarantee. (To be drawn Before the end of 20% of the contract period). The contractor may furnish four bank guarantees of 2.5 % of each valid for the full period. |
| ii | Equipment 90% for new and 50% of depreciated value for old equipment. Total amount will be subject to a maximum of 5% of the Contract Price | After equipment is brought to site (provided the Engineer is satisfied That the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance |
| iii | Secured Advance for Non-persish able material Brought to site | Deleted |

(The advance payment will be paid to the Contractor no later than 28 days after fulfillment of the above conditions).

31. **Repayment of advance payment for mobilization and equipment** {CL. 51.3}
The advance loan shall be repaid with percentage deduction from the interim payments certified by the Engineer under the Contract. Deduction shall commence in the next Interim Payment Certificate following that in which the total of all such payments to the Contractor has reached not less than 20 percent of the Contract Price or 6 (six) months from the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 20 percent **(collectively for both Mobilization Advance and Equipment Advance)** of the amounts of all Interim Payment Certificate until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clause 17 and 28.
32. Deleted
33. The securities shall be for the following minimum amounts equivalent {CL. 52}
As a percentage of the Contract Price:
Performance Security for 5 percent of contract price plus Rs..... (to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5
The standard form of Performance security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.
34. The Schedule of Operating and maintenance Manuals.....N/A. {CL. 58}
35. The date by which “as– built” drawings (in scale as directed) in 2 sets {CL. 58} are required within 28 days of the issue of certificate of completion of the whole or section of the work, as the case may be.
36. The amount to be withheld for failing to supply “as built” drawings {CL. 58} by the Date required is Rs..... Lakhs.
37. The following events shall also be fundamentals breach of contract: {CL.59.2} “The Contractor has contravened Sub- clause 7.1 and Clause 9 of GCC”
38. The percentage to apply the value of the work not completed representing {Cl 60} the Employer’s additional cost for completing the Works shall be 20 per cent.

SECTION-5 TECHNICAL SPECIFICATION

GENERAL TECHNICAL SPECIFICATIONS

1.0 General:

All measurements shall be made in the metric system. Different items of work shall be measured in accordance with the procedures set forth in the relevant sections read in conjunction with General Conditions of Contract. The same shall not however apply in the case of lump-sum items. All measurements and computations unless otherwise indicated shall be carried nearest to the following limits :

- (i) length and breadth..... 10 mm
 - (ii) height, depth or thickness of earthwork, sub-base, bases, surfacing, and structural members5 mm
 - (iii) areas,0.01 Sq Metre
 - (iv) cubic contents..... 0.01 cubic metre.
- in recording dimensions of work the sequence of length, width and height or depth or thickness shall be followed.

2.0 Measurement of lead for Materials:

Where lead is specified in the contract for construction materials, the same shall be measured as described hereunder.

Lead shall be measured over the shortest practicable route and not the one actually taken and the decision of the Engineer-in-charge in this regard shall be taken as final. Distance upto and including 100 meters shall be measured in units of 50 metres, exceeding 100 metres but not exceeding 1 KM. in units of 100 metres and exceeding 1 km. in units of 500 metres. The half and greater than half of the units shall be reckoned as one and less than half of the units ignored. In this regard, the source of the material shall be divided into suitable blocks and for each block the distance from the centre of the block to the centre of placing pertaining to that block shall be taken as the lead distance.

3. Surface Regularity of Sub grade & Pavement Courses :

The surface regularity of completed sub-base courses and wearing surfaces in the longitudinal and transverse directions shall be within the tolerances indicated in Table below. The longitudinal profile shall be checked with a 3 metre long straight edge, at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a set of three camber boards at intervals of 10 metres.

PERMITTED TOLERANCES OF SURFACE REGULARITY FOR PAVEMENT COURSES

Sr. No	Type of Construction	Longitudinal Profile with 3 metre straight edge				Cross Profile	
		Maximum Permissible undulation in mm	Maximum number of undulation permitted in any 300m. length exceeding in mm.				Maximum permissible variation from specified profile camber template—mm
1	2	3	18	12	10	6	7
1	Earth Sub grade	36	30	-	-	-	15
2	Granular / lime / Cement Stabilised Sub – base.	23	-	30	-	-	12
3	Water Bound Macadam with nominal size metal (20-50) mm	18	-	-	30	-	8
4	Semi – Dense Carpet @	15	-	-	-	20	6

Notes:-

1 . These are for machine laid surfaces. If laid manually, due to unavoidable reason, tolerance upto 50 percent above these values in this column may be permitted. However, this relaxation does not apply to the values of maximum undulation for longitudinal and cross profiles mentioned in columns 3 and 8 in the table.

2. Surface evenness requirements in respect of both the longitudinal and cross profiles should be simultaneously satisfied.

3. **Rectification** : Where the surface irregularity of subgrade and the various pavement courses fall outside the specified tolerances, the contractor shall be liable to rectify these in the manner described below and to the satisfaction of the Engineer-in-charge at his own cost.

(i) **Subgrade** : Where the surface is high, it shall be trimmed and suitably compacted. Where the same is low, the deficiency shall be corrected by adding fresh material. The degree of compaction and the type of material to be used shall conform to the specified requirements.

(ii) **Granular/Sub-base** : Same as at (i) above except that the degree of compaction and the type of material to be used shall conform to the specified requirements.

(iii) **Lime/Cement stabilized soil sub-base** : For Lime/Cement treated materials where the surface is high, the same shall be suitably trimmed while taking care that the material below is not disturbed due to this operation. However, where the surface is low, the same shall be corrected as described herein below.

For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material is less than 2 hours, the surface shall be scarified to a depth of 50 mm, supplemented with freshly mixed material as necessary and recomposed to the relevant specification. When this time is more than 2 hours, the full depth of the layer shall be removed from the pavement and replaced with fresh material to specification. In either case, the area treated shall not be less than 5 metres long by 2 metres wide. This shall also apply to lime treated material except that the time criterion shall be 3 hours instead of 2 hours.

(iv) **Water Bound Macadam Base** : Where the surface is high or low, the top 75mm shall be scarified, reshaped with added material as necessary and recompacted. The area treated at a place shall not be less than 5 metres long and 2 metres wide.

(v) **Bituminous Constructions** : For bituminous constructions, other than wearing course, where the surface is low, the deficiency shall be corrected by adding fresh material and recompaction to specifications.

Where this surface is high, the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications. For wearing course, where the surface is high or low; the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications in all cases where the removal and replacement of a bituminous layer is involved, the area treated shall not be less than 5 metre long and not less than 1 lane wide.

4. Quality Control Tests During Construction :

The materials supplied and the works carried out by the Contractor shall conform to the enclosed relevant specifications. For ensuring the requisite quality of construction, the materials and works shall be subjected to quality control test as described hereinafter, by the Engineer-in-charge. The testing frequencies set forth are the desirable minimum and the Engineer-in-charge shall have the full authority to carry out test as frequently as he may deem necessary to satisfy that the materials at work comply with the appropriate specifications. Test procedures for the various quality control tests are indicated in the respective sections of the specifications or for certain tests within this section. Where no specific testing procedure is mentioned, the test shall be carried out as per prevalent accepted engineering practice to the directions of the Engineer-in-charge.

5. Tests on embankment for Embankment Construction :**5.1 Borrow Material:**

- (a) Sand Content (IS : 2720 Part IV)
Two test per 8000 Cubic Metres of soil.
- (b) Plasticity Test (IS : 2720 Part-V)
Each type to be tested. Two tests per 8000 Cubic Metres of soil.

- (c) Density test (IS : 2720 Part VII)
Each soil type to be tested. Two tests per 8000 Cubic Metres of soil.
- (d) Moisture Content Test (IS : 2720 Part-II)
One test for every 250 Cubic Metres of soil.

5.2 Compaction Control :

Control shall be exercised by taking at least one measurement of density for each 1000 square meters of compacted area, or closer as required to yield the minimum number of test results for evaluating day's work on statistical basis. The determination of density shall be in accordance with IS. : 2720 (Part XXVMI). Test locations shall be chosen only through random sampling techniques. Control shall not be based on the result of any one test but on the mean value of a set of 5-10 density determinations. The number of tests in one set of measurements shall be 5 as long as it is felt that sufficient control over borrow material and the method of compactions is being exercised. If considerable variations are observed between individual density results, the minimum number of tests in one set of measurement shall be increase to 10. The acceptance of work shall be subject to the condition that the mean dry density equals or exceeds the specified density and the standard deviation for any set of results is below 0.08 gm/cc. However for earthwork in shoulders and in top 500 mm portion of the embankment below the sub grade at least one density measurement shall be taken for every 500 square meters of the compacted area provided further that the number of the tests in each set-of measurement shall be at least 10. In other respects, the control shall be similar to that described earlier.

6. Following materials shall conform to the Indian Standards shown against them :

- (1)Cement.....
- (2)Sand for masonry.
- (3).....Sand for concrete.
- (4).....Coarse aggregate.
- (5).....Mild Steel...
- (6)High yield strength deformed bars
 - (a) Hot Rolled..... IS : 1139
 - (b) Cold Twisted..... IS : 1786

7. Barrel thickness of pipes of different class shall be as under :

Sr. No.	Internal Diameter of pipe in mm	Barrel thickness (in mm).		
		NP1	NP2	NP2
1	80	25	25	-
2	100	25	25	-
3	150	25	25	-
4	250	25	25	-
5	300	30	30	-
6	350	32	32	75
7	400	32	32	75
8	450	35	35	75
9	500	-	35	75
10	600	-	40	80
11	700	-	40	80
12	800	-	45	90
13	900	-	50	100
14	1000	-	55	100
15	1100	-	60	115
16	1200	-	65	115

DETAILED TECHNICAL SPECIFICATION

SCHEDULE-B1- Mechanical & Ancillary Works for Existing 11.00 MLD WTP at Head Water Works at Khambhat.

GENERAL DESCRIPTION OF DIFFERENT COMPONENTS TO BE EXECUTED FOR MECHANICAL AND ANCILLARY WORK INCLUDING INTERNAL DISTRIBUTION.

1 INLATE CHAMBER

Detention time : 1 Min. for ultimate flow as per data sheet Concept design provides tank required size

G.L. proposed : as shown in above table.

Dia of inlet pipe : As per design

1.2. RAW WATER CHANNEL WITH PARTIAL FLUME\FLOW MEASURING DEVICES

Velocity in the Raw : Not more than 0.60 m/sec.

Water channel

Length of channel : 6 to 8.0 M.

In concept design the Channel has been provided with required width in RCC.

PARSHALL FLUME:

Flow Measurement : A Partial flume having accurate flow measuring arrangement is to be provided in the raw water channel,. The water from the partial flume will be transmitted to a float chamber of size 1.00 M x 1.00 M x 1.00 M where a simple float operated flow measuring device will be fitted.

Throat width of flume : As per design.

1.3 ALUM DOSING TANKS.

Alum solution will be prepared in alum tanks located on the first floor of chemical house. Alum blocks would be store on Ground floor and alum will be lifted by a manually operated chain pulley block. Through mixing will be ensured by mechanical mixers. Water for the solution will be obtained from proposed overhead tank located near the chemical house. The alum solution prepared will be fed through a float operated constant head tank just upstream of the flash mixers. The flash mixing will be done by mechanical mixers in the flash-mixing chamber.

Alum dose : 30mg/liters (average)

No. of Tanks : 3 (Three)

Volume of tanks : As per design provided 3 Nos. tanks with 8 hr. Capacity

Dimensions of each tank : As per Tenderer's design. The tanks are installed in chemical house on first floor. The alum solution shall be administrated upstream of the flash mix through a constant head tank and flow meter shall be provided near the outlet of constant head alum tanks.

1.4. FLASH MIXING CHAMBERS:

One unit of full capacity to flash mixing chamber is proposed to be provided with motor driven mixers to ensure complete mixing of the alum dose in the raw water.

Design discharge	:	as shown in above table.
Detention time(Shaft Speed)	:	40 second
RPM of impeller	:	100 rpm
Ratio of Tank Height diameter	:	1:1 to 3:1
The usual ratio of impeller dia to tank dia 0.2 to 0.4		
Tank height to tank dia ration	:	1:1 to 3:1
Velocity of Gradient	:	300 Sec ⁻¹

1.5 CLARIFLOCCULATORS :

Water mixed with alum will flow in to flocculation zone of clariflocculator through suitable size DI-K9/CI pipe. A revolving plate type Flocculator is proposed with lower and upper plates revolving in opposite direction. This method creates turbulence and good flock formation is the result. The flocculated water than comes into clarifier zone where setting takes place. The settled sludge is moved to the central sludge withdrawal pit by the scraper attached to the bridge. The settled water after prolonged detention is then collected in the peripheral launder channel through square holes in its wall, it should be provided as stipulated in CPHEO Manual.

The sludge is periodically withdrawn through a telescopic sludge withdrawal valve and is let in to the plant drainage net work.

Inlet Pipe	:	Suitable size DI K9/CI pipe as per hydraulic design should be provided.
Central Shaft velocity of flow	:	0.8 m/Sec
Surface loading	:	Not more than 30 m ³ /m ² /day
Detention time of flocculate	:	30 minutes
Water Depth in the tank	:	As per Agency's design. 3.5 m minimum
Free Board	:	0.30 mt.
Velocity of flow	:	0.20 to 0.40 m/sec.
Dia of Tank	:	30 to 40 Mt. Maximum

Total area of paddles	:	15 to 25% paddles of cross sectional area of tank Design of Paddles shall be given as per W.S.CPHEEO/1991 Volume.
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DI K9 /CI pipeline connecting
from flash mixer to
Clariflocculator

up to central way	:	0.60 m/sec.
Power consumption	:	As per manual
G(Velocity Gradient)	:	10 to 75 Sec.-1
Range of GT	:	104 to 105
Outlet velocity to clarifier	:	0.20 to 0.30 m/sec.
Detention time of clarifier	:	2 hours and 30 minutes.
Velocity of water in outlet conduit	:	Not more than 00.35 mt'/sec.
Surface loading	:	35 Cum/m ² /day
Weir loading up to	:	300 m ³ /m ² /day.
Depth of clarifier	:	3.5 mt minimum
Tip velocity of scraper	:	≤0.3m/min
Bed slope	:	1:10
Scraper velocity	:	One revolution in 45 to 80 minutes.
Sludge outlet pie	:	as per design DI-K9./CI flanged pipes up to sludge chamber and RCC NP ₂ up to natural drain of length 500 m.
Launder Area	:	If provided inside the clarifier shall be subtracted to have net clarifier area.

Wall between flocculator and clarifier shall be of RCC sludge recycling has not been envisaged. Adequate peripheral walk away with railing is to be provided for movement of personnel. The Half round bridge shall be of sturdy construction anticorrosive painted, with chequered plate walkway for full width. The current system is to have rail and rotating wheels. 20% additional depth for the storage of sludge shall be considered for the design. Necessary bypass line from clariflocculator to clear water sump shall be provided.

20 % Sludge depth at the Flocculator (minimum) is to be provided.

Note :-

- (1) Setting tank/clarifier should be capable of giving settled water having turbidity not exceeding 20NTU (monsoon season) and preferably less than 10NTU.
- (2) Circular clariflocculator maximum up to 35m dia is to reduce wind effect.
- (3) Sludge disposal line should be provided from the clariflocculator to sludge chamber, the minimum size of chamber should be (1mX1m).
- (4) If launder provided inside the clariflocculator, the area of launder should be added in finding out final area of clariflocculator.
- (5) Plant larger than 1000 m³/hr capacity provided two clariflocculator to restrict the diameter maximum up to 35M.

1.6 FILTERS :

In view of their performance and ease in operation and maintenance, variable declining rate filters are preferred over conventional rapid sand filters with constant rate of flow. The problem with the filter is rate of flow controllers. These outlet controls are a constant cause of trouble line filter operation and hence the declining rate filters are preferred.

The filter water under drainage system is made up of main central DI K9 pipe with connecting laterals. For backwash purpose air scouring is envisaged. Back wash water is to be obtained from Sump located in campus area.

Rate of filtration	:	4.8 m ³ /m ² /hr(i.e.80 LPM/m ²)
Back wash rate	:	36 m ³ /m ² /hr (600LPM/m ²) for a period of 10minutes.
Air scour rate	:	45 m ³ /hr.to 50 m ³ /hr. for s period of 5 minutes at 0.35 kg/cm ² .
Dia of wash water main:		As per design.
Dia of scour Main		

:

As per design DI K9 pipe with branches

Water tank	:	A back wash water tank should be provided on chemical house / filter gallery. It must be able to back wash for minimum 10 minutes at the rate of 600 LPM/m ² for minimum 2 units. Add 12000 liters for office laboratory use. The back wash head should be 9 to 10 m from bottom of tank to under drain of filter with necessary sluice valve.
Bye pass	:	Provided by pass arrangement for Raw Water and settled water by pass for filter shall be provided by DI K9 pipeline. Necessary DI K9 pipe from filter to clear water sump shall be provides in length of 10 m & dia shall be as per design.

The standard rate of

filtration shall be adopted: 4.8 m³/m²/hr(i.e.80 LPM/m²)

The minimum filter box depth shall be between 3.5 M to 4.0M including free board.

The number of filter beds may be calculated on the basis of following empirical formula.

Arrangement for wash

$$\text{Where } N = \text{No. of beds.} \quad 2 N = Q/4.69$$

Q = Rate of filtration in m³/hr.

- However, minimum 2 Nos. of beds shall be provided.
- The entire area of filtration bed may be normally sub divided into smaller units each having individual area of about 20 to 30 m². Beds are provided in even numbers only minimum No. of basis-2.
- The length/width ratio of filter bed shall be 1.25 to 1.33 to economies the under drain system.
- Sufficient residual head of filtered water sump should be available as per CPHEEO manual. The location of filtered water sump is shown in contour map.
- Filter Bed depth : 3.3 to 3.5 meter with free board
- Air Scour rate : 45 m³/hr/m²(750 lpm/sqm) for a period of 5 minutes at pressure of 3.5 Kg/Sq.Cm

- Velocity in wash water main from ESR : 2.5 m/sec
- Filtered water turbidity : Not more than 1 NTU (i.e. 1 NTU maximum)
- Minimum water depth on sand : 2.0 m
- The layer of sand is usually 70 cms.(minimum)
- The sand depth shall be checked with help of following formula
- $(Qd^3h)l = B \times 29323$
- $Q = m^3/m^2/hr$
- $D =$ Sand size in mm
- $L =$ Depth of bed in m.
- $H =$ Terminal loss of head in m.
- $B =$ Break through index 4×10^{-4} to 6×10^{-3} (Assume 4×10^{-4})

The free board shall be at least 30 cms

The depth of water over sand top shall be minimum 2 m (Without free board).

For free falling rectangular through the discharge capacity Q in m^3/s may be computed from the formula.

$$Q = 1.376 bh^{3/2}$$

$Q =$ flow in m^3/Sec .

$B =$ Width or through in m. $H =$ Water depth in m.

In the design of under drain system following criteria shall be adopted.

Area of orifices : 0.3% filter bed area.

Area of laterals : 2 x Area of Orifices.

Area of Manifold : 1.5 x Area of laterals.

The perforations vary from 5 to 12 mm. In diameter and should be staggered at a slight angle to the vertical axis of pipe.

Necessary backwash arrangement shall be provided to maintained 10 to 12 m water column pressure above the under drains lines with provision of sluice valve and throttling valve as per the requirement.

Manifold lines shall be of DI-K7/CI pipe or to provide RCC channel.

The laterals shall be of PVC pipes of suitable size and pressure.

The inlet and outlet control arrangement to RSF shall be designed to permit 100% over load for emergency occasion.

Shape, size and quality of filter sand shall satisfy the following norms.

- (a) Sand shall be of hard and resistant Quartz or quartzite and free of clay fine particles soft grains and dirt of every description.
- (b) Effective size shall be 0.45 to 0.70 mm.
- (c) Ignition loss should not exceed 0.7 percent by weight.
- (d) Uniformity coefficient shall not be more than 1.7 nor less than 1.3.
- (e) Soluble fraction in hydrochloric acid shall not 5% weight.
- (f) Silica content should be not less than 90%

(g) Specific gravity shall be in the range between 2.55 to 2.65.

(h) Wearing loss shall not exceed 3%.

IS:8419(Part-1)1977 entitled filtration media sand and gravel may be referred for details.

The source is surface source of Mahi Canal and bringing water to H/W site by Rising main of required size as per data sheet DI-K7/CI pipe(O.D.)

All the laterals in the filtration unit of WTP shall be of PVC 10 kg/cm²

The contractor can also give alternate design for filters by using Trapezoidal V-Wire screens as under drain system.

Note:-

Capacity of wash water tank depends on size of bed and hence the same shall be fixed considering back wash for minimum 10 minutes at the rate of 600 lpm for minimum two units plus 12000 liters for water supply to office and laboratory use. The back wash tank should give 9 (minimum) meter head at under drain from bottom of tank.

1.7 DISINFECTION :

Both pre and post chlorinating pressure feed type and gravity feed type respectively is recommended to achieve standard of residual chlorine in the treated water. The dose required is 3mg/ltr. For post chlorination and 5 mg/ltr. For pre chlorination. As the disinfection is of prime importance 100% standby is provided for pre and post chlorination. Adequate storage capacity will be provided for storing Toners (excluding bottles in use) chlorine cylinders at one place and chlorine toners shall be provided by the contractor after all type of testing required for storage of chlorine gas.

1.8 CHEMICAL HOUSE & ADMINISTRATIVE BUILDING :

A ground plus one store structure adjoining to filter house is proposed to be provided store areas for storing.

Chemicals, alum dosing tanks, chlorine cylinders, chlorinators, office laboratory toilet block and control panel having construction area of 120 m² for ground floor and 85 m² for first floor. A 1000 liter PVC tank shall be provided on toilet blocks and latrines with necessary pipes and valves. A provision for storage of chlorine cylinder having 30 m² area with facility of 3 MT gantry girder with chain pulley block system shall be made.

1.9 BYE PASS AND OTHER ANCILLARY WORKS :

To enable maintenance cleaning of all water carrying pertaining structure it is proposed to provide by passes as under: CI/DI-K9 flange pipes or arrangement of channels shall be made in the bye pass arrangement from Stilling Chamber to Filter Bed and from Clariflocculator to clear water Sump. No Bye pass from Stilling Chamber to clear water sump shall be made.

Separate system for carrying water from latrine and toilet is provided with disposal in septic tanks with absorption trench. For 10 persons requirement septic tank shall be provided as per its latest IS.

All connecting lines are to be designed with 20% over loading.

RECIRCULATION:-

It shall be generally avoided for below 20MLD Capacity as it increase in maintenance cost and permanently overload the plants.

The above criteria for convention all water treatment plant are finalized, the same should be now adopted for all future conventional water treatment plant. The criteria should not be changed in the tender or during pre-bid without prior consultation of design circle.

1.10. PIPE LINE :

The design criteria for all pipe lines is as under:

- (i) Pipeline from distribution box
Chamber to clear water sump
as a direct bypass with
design flow (+20% over load)
capacity with necessary valves
and chamber. : As per design CI /DI K7pipe.
- (ii) Pure water pipe line from filter
house and to pure water sump : As per design suitable
size of CI/DI K7pipe.
- (iii) By pass to clariflocculator : As per design suitable
size of CI /DI K7pipe.
- (iv) By pass to filter : As per design CI /DI K7pipe.
- (iv) Back wash water main from wash : As per design CI /DI K7pipe
water tank to filter back wash tank with sluice valve and throttling on chemical house to filters. valve
requirement
- (vi) Disposal of wash water in to
natural drain : As per design CI/DI K7 flange pipe or required
length up to sludge outlet chamber, may be
provided from sludge chamber to natural drain
suitable size R.C.C. N.P₂ pipe of 500 mt.
Length to be provided and laid.

Re-circulation of wash water is hereby deleted.

The Agency has to provide 10.00 mts. Length of pipeline from the Filter Plant boundary up to clear water sump. If the distance of CWS is more than 10 mts. Length from the boundary of the Filter Plant, then the Department wills bear/provide the pipeline for the length beyond 10 mts.

1.11 ELECTRICAL INSTALLATIONS:

Main control center for controlling operation of all motors in treatment works is provided in chemical house, suitable control and interlocking facilities shall be provided with local push button (ON-OFF) station for controlling, the drives locally, The chlorination room has weather proof and corrosion proof lighting fittings.

The internal electrical point wiring shall be concealed in PVC conduits.

From the main control center 3 phase 4 wire 415 volts supply shall be made available to the derived through armored Aluminum conductor PVC cables of adequate rating. The meter control centers would house the starting/stopping equipment and indicating instruments. For drives up to 7.50 H.P. D.O.L. starter shall be used. For drives above 7.50 HP and below 20 HP star delta starters shall be used.

1.12 HYDRAULIC CAPACITY OF WORKS:

The design flow is as per data sheet adequate free boards are required to be provided to enable 20% overloading of the plant. It is, clarified that except for filters, all conveyance pipes channels are to be designed for 120% of design discharge. In case of filters to cater for high rate filtration at a later date, the pipes channels under drainage system etc. to be designed for 100% overload for emergency occasion.

Tenderers are requested to note that the plant is to be designed for round the clock operation. For back wash water, a elevated water tank is to be constructed by department at the location shown in layout plan which shall not include in this scope of work of this tender.

Civil work, the scope of the work shall include supply delivery, erection and commissioning of all mechanical and electrical equipment for ;

1. CI/DI-K7 pipe line from water intake chamber to the clear water sump as a direct by pass with as per data sheet carrying capacity including necessary valves and necessary appencies.
2. Water intake chamber of 1 minute storage capacity of as per data sheet with 20% overloading.
3. Raw water channel with flow measuring devices and partial flume minimum 10m length with as per data sheet capacity 20% overloading one number from water intake chamber to flash mixer.
4. Flash mixing chambers for as per data sheet capacity plus 20% overloading one number(Detention period 40 seconds).
5. DI-K9/CI pipe line from flash mixer to the clariflocculator of as per data sheet capacity with 20% overload including necessary valve s and other appencies.
6. Clariflocculator of as per data sheet capacity with sludge bypass arrangement up to sludge chamber. Detention period of classifier – 2 hours and 30 minutes. Also RCC NP2 pipeline from sludge chamber to the natural drain minimum 500 m. length and 2.00 MLD carrying capacity including necessary valve and other appencies and chamber.
7. RCC channel of as per data sheet capacity from clariflocculator to filter plant.
8. Complete filter plant of rapid sand filter with wash water recalculation works in parallel with common filtered water gallery to as per data sheet capacity (declined rate filter) including all controlling devices (minimum 2 beds)
9. Chemical house and administrative building with 120 m² area of Ground floor 105 m² area of first floor with alum closing tank and dosing devices
10. Wash water DI-K9/CI pipeline from filter to wastage water sump-1 No including necessary valves and other appencies.
11. Re circulation of wash water is hereby deleted from the scope of work for the capacity below and up to 1000 Cu.M/hour. However, for Filter Plants having capacity of more than 1000 Cu.M./ hour, the Recirculation of wash water is kept in the scope of the work necessary arrangement shall be made..
12. Pure water DI-K9/CI pipeline as per data sheet capacity from filter house to the clear water sump including necessary valves and other required appencies.

13. Bypass line-from clariflocculator by pass DI-K9/CI pipeline of required size to enable maintenance and clearing of clariflocculator also filter bypass line of required size including necessary valves and other required Appurtenances.
14. Back wash water DI-K9/CI from suitable size from proposed back wash tank to filtration bed including necessary sluice valve and throttling valves.
15. All materials should be provided as per relevant IS standard.
16. All pipes shall be provided as per relevant IS standard with flanged end except sludge drain pipe. Sludge drain pipe should be RCC NP2 pipe.
17. All pipes valves machinery and electrical and mechanical equipments which requires for this work shall be inspected and certified by third party inspection authority as decided by Nagar Sevasadan Inspection charges will be reimbursed as per rate contract for accepted material by the department
18. Only duly inspected and accepted and certified material shall be brought on site.
19. The trial run-operation of the plant under actual working condition will be a period of 3 month from the date of completion of all civil. Mechanical, electrical and laboratory construction and erection of all equipment The completion test shall be taken at the design flow plus 20 % overload. The training of the Nagar Sevasadan Staff/Officers shall be during the 3 months trial run of the Filter Plant.
20. The contractor shall employ the required Engineer, Chemist, Technical staff, skilled labors, unskilled labors etc. for the maintenance and repairs and renovation, instruction and advise testing of raw water and treated water quality during the 3 month period of trial run and commissioning.
21. Water and electricity required for the construction and erection of works will be arranged by the contractor at his own cost. If water/ power is available with the department and if the same can be spared to the Agency for construction, then the Department shall charge Rs. 4.00 per 1000 liters for the water supplied to the Agency and Rs. Rs.6.00 per Unit of power supplied to the Agency. This shall be entirely to the discretion of the Board but not binding on the Board.
22. Chlorine store room for one month storage with necessary all required arrangement like platform, gentry weight measure devices, chain pulley block of 1 MT capacity etc.

1.13 WORKS ENVISAGED IN THE TENDER :

The envisaged scheme of the specified works has been highlighted under design parameters with sufficient detail to illustrate the conceptual arrangement The details given there in are for guidance of tenders. The contractor shall submit his lay out and schematic diagram.

1.14 RAW WATER QUALITY:

The River Mahi will be main source of supply throughout the year. The quantities of water from river was analyzed and found quite good. However it is expected that such quantities may not prevail at other times particularly during the monsoon. The analysis results available so far are submitted as under.

Parameters	Range	
Turbidity (NTU) monsoon)	5 to 500(Max 2000	during
Manganese (as Colour(Hazen Units)	Not Available	
Test and odor		
PH		

Total dissolved solids(mg/l)
 Total hardness as CaCO₃(mg/l)
 Chlorides (as Cl) (mg/l)
 Sulphates (as SO₄) (mg/l)
 Fluorides (as F) (mg/l)
 Nitrates (as NO₃) (mg/l)
 Calcium (as Ca)
 Magnesium (as Mg) (mg/l)
 Iron (as Fe) (mgMn) (mg/l)
 MPN (Fecal Coli form) per 100 ml
 MPN (Coli form organisDI-K9/Cl) per 100 ml
 Total Alkalinity (as CaCO₃) (mg/l)

1.15 SETTLED WATER SUPPLY:

The settled water quality will normally be up to following standard.

Turbidity	:	Not exceeding 10 NTU.
Suspended solids	:	Not exceeding 8 mg/l.

In extreme conditions during monsoon when the raw water turbidity changes rapidly which may be around about 2000 NTU the above figures may in practice may exceeds, depending upon the speed or response of operators making adjustment in alum dosage. The purpose of testing however, the filters should receive above quality of settled water.

1.16 TREATMENT PLANT PROCESS:

It should be ensured by intending tenderers that the scheme of treatment is designed to give adequate operational flexibility. During the works performance test and trials, the contractor will be required to demonstrate and optimize performance abilities of the works.

1.17 GUARANTEE OF FINAL TREATED WATER:

The table-1 gives Indian standard and international standard of drinking water.

TABLE - 1

Sr.	Parameter	Indian Standards	
		Acceptable	Cause for rejection
1	Turbidity (NTU)	2	10
2	COLOUR (On pt.Co-Scale)	5.00	25.0
3	Taste	Unobjectionable	Unobjectionable
4	Odour	Unobjectionable	Unobjectionable
5	PH	7.00	< 6.50 & > 9.00
6	Total dissolved solids (mg/l)	500.00	1500.00
7	Total hardness (mg/l as CaCO ₃)	200.00	600.00
8	Chlorides (Kg/l as Cl)	200.00	1000.00
9	Sulphate (mg/l as SO ₄)	200.00	400.00
10	Fluorides (mg/l as F)	1.5	> 1.5
11	Nitrates (mg/l as NO ₃)	45.00	45.00
12	Calcium	75.00	200.00
13	Magnesium (mg/l as Mg ⁺⁺)	30.00	150.00
		If there are 250 mg/l of sulphate mg.content can be increased to 125mg/l	
14	Iron (mg/l as Fe)	0.100	1.000
15	Manganese mg/l as Mn.	0.050	0.500
16	Copper(mg/l as Cu.)	0.050	1.500
17	Zinc(mg/l as Zn)	5.000	15.000
		Acceptable	Cause for rejection
18	Phenolic (mg/l as phenol)	0.001	0.002
19	Anionic detergents (mg/l as MBAS)	0.200	1.000
20	Mineral oil (mg/l)	-	-
21	Arsenic mg/l as)	0.050	0.050
22	Cadmium (mg/l as Cd)	0.010	0.010
23	Chromium (mg/l as Cr)	0.50	0.50
24	Cyanides	0.040	0.0050
25	Lead (mg/l as Pb)	0.100	0.100
26	Selenium (mg/l as Se)	0.10	0.10
27	Mercury (Total)(mg/l as mg)	0.001	0.001
28	Molecular aromatic hydrocarbons (PHA mg/l)	0.200	0.200
29	Gross alpha Activity	3	3
30	Gross Beta activity(Bq/l)	30.00	30.00
31	E.-coli count	0	0
32	Coliform organisms (per 1000 ml)	0	10
		Should not be detected in any 2 consecutive sample	

SOURCE:

- 1) Manual on water supply and treatment "Central Public Health and Environmental Engineering Organization, Ministry of Works and Housing, New Delhi-1979.
- 2) CPHEO Manual 1991 Addition, the criteria should be provided.
- 3) International standard for drinking water world health organization Geneva, 1971 (3rd Edition).

1.10 TREATED WATER QUALITY:

1.10.1 In general the treated water from the plant shall be consistently as per the following standards.

Colour (on pt.Ce.Scale)	:	Not exceeding 5.
Turbidity	:	Less than 2 NTU
Suspended solids Mg/l	:	Not exceeding 1
Taste	:	Unobjectionable
Odor	:	Unobjectionable
Coli form organisms	:	Absent
Free chlorine mg/l		
After 30 min. contact	:	Not less than 0.4.

1.10.2. TESTING:

During trials however, the turbidity to be achieved, should be less than 1.00 NTU since the plant designed for this requirement will be able to produce water of acceptable standard even if adequate operating condition cannot be guaranteed continuously. The contractor shall at his own cost undertake the necessary sampling and testing to prove that the treated water conforms to the foregoing standards. If the tests show that the water quality has not been reached to specified levels, the contractor shall submit his proposals for meeting guarantee requirements to the Engineer. The contractor shall have to carry out at his cost whatever measures. Such as improvements. Additions, alternative or additions to the plant and equipment (Civil, electrical, mechanical works) that are required to be taken to achieve specified water quality. No charge will be levied to the contractor for water used during testing However. Energy charges will be charged at actualizes.

All bidders are requested to furnish hydraulic design calculations along with technical bid white submitting the tender.

Signature of Contractor

**Chief Officer
Nagar Seva Sadan
Khambhat**

SECTION- 2 G E N E R A L

2.1 NATURE AND THE PURPOSE OF THE WORKS:

The owner is to **Mechanical & Ancillary Works for Existing 11.00 MLD WTP at Head Water Works at Khambhat.** works located at Antalia head Water works BILIMORA, situated at local area, Dist. NAVSARI, in the State of Gujarat, India. The design capacity of the work is as per data sheet. The plant shall be constructed in the land provided by the local body. The treated water is intended for distribution to the BILIMORA town covered under the project.

2.2 ACCESS TO SITE:

Accesses to the works are within the Gujarat state.

2.3 EXTENT OF THE WORKS:

The work shall comprise the following:

2.3.1 DETERMINATION:

The work of design and determination to the Engineer's satisfaction and within the specified criteria and parameters of the most suitable and economic means of treating raw water at rate of as per data sheet. The work shall include the determination of at least -

- (i) The chemical and physical treatment process required to produce potable water conforming with the quality set out in clause 2.6.2 and required to separate out waste product. **The water quality leaving the works shall be guaranteed by the contractor.**
- (ii) The exact form, dimensions and water surface levels of all tanks, chambers, conduits, dust, pipes, hoppers etc. which are required for the complete treatment process.
- (iii) The machinery equipment, electrical apparatus, instruments, controls, monitoring and quality controls required for the complete treatment process and associated pumping plant.
- (iv) The dimensions and levels of all pipes and channels required for the transfer of raw water, water under treatment, treated water, chemical solutions, waste waters, waste products sludge's and over flows within the works.
- (v) The arrangement for the receipt, storage and handling of the chemicals required for the treatment process including preparation, fixing and the exact form, number and size of daily stock containers, and the machinery, pipes and equipment, and the control and the metering, conveyance, application and injection and mixing into the process of the chemicals, including the machinery, tanks and arrangements necessary to optimize the physical and chemical treatment process.
- (vi) The equipment required to remove sludge and other wastes, chemicals, products or by products from the works or the water being treated.
- (vii) The instrumentation and arrangements required for the control of the treatment process and the measurement of the pressures, flow rates & other qualities of the water being treated.
- (viii) A suitable arrangement of alarm indicators to indicate mal-functioning of any part of the treatment works.

- (ix) The arrangements required to monitor the water quality from the dam, throughout the treatment process and within the distribution system.
- (x) The spare parts, tools, equipment, materials, and procedures required to maintain the process plant and installations, and the arrangements required on site to implement and operate a preventive maintenance system for the works both during and after the expiry of the maintenance period.

2.3.2 SUPPLY:

The supply of the plant necessary to carry out the materials and the treatment determined under clause 1.3.1 and within the specified design criteria and parameters.

The Plant shall include the supply of the items and the work required for at least :

- (i) The reception and control of pumped raw water flows at the works inlet and the flow handling, control of the water within the process.
- (ii) Clariflocculation.
- (iii) Back wash waste water arrangement.
- (iv) Disinfections.
- (v) Metering of flows.
- (vi) Waste disposal.
- (vii) Chemical reception, storage & application.
- (viii) Sampling, monitoring, quality control and laboratory furnishings and equipments.
- (ix) Testing and commissioning.
- (x) Supply service water.
- (xi) Painting and protection of the process plant and equipment.
- (xii) Provision of spare parts and the establishment of a preventive maintenance system. Spare parts for equipment of India and foreign make shall be for 24 and 48 months requirements respectively.
- (xiii) Supervision of operation and maintenance of the works for continuous 1 months trial run period following the first commissioning period. The word “supply” (or provide) as contained in this specification shall include the manufacture, insurance, purchase and acquisition of the plant, testing before dispatch, packaging and protection, delivery to site, storage on site and erection and installation, painting, testing when construction, erected and installed, commissioning and providing all skilled and unskilled personnel, together with all the tackle, tools, power light, transport and other items or supplies necessary for the complete installation and the execution of the work required and the supervision of the work.

The contractor shall include the supply of all inter-connecting pipe work, valves, fittings, hardware fixing etc. which are required in advance for building into structure.

2.3.3 COMMISSIONING OF THE WORKS:

The trial run and operation of the plant under actual working conditions will be for a period of four 1 months from the date of completion. The commissioning and maintenance period shall includes at least one rainy season and after passing over rainy season trial and obtaining required standard results during the above trial rainy season is compulsory. In case of scarcity year the trials may be taken in next rainy season. The completion test shall taken over the design flow plus 20% overload.

2.3.4 PROVISION OF DOCUMENT:

The provision of at least following should be made by the contractor in the scope of his design

- (i) All drawings and designs, including structural design and other detailing of the civil Engineering and the building works necessary for the operation, support and protection of the plant.
- (ii) Process diagrams, electrical wiring diagrams cable diagrams and instrumentation diagrams for the works.
- (iii) Five copies of an instrumentation manual for the plant in English containing complete description of all items and advice and instructions for their operation, setting and use, their maintenance and overhaul.
- (iv) One set of dyeline transparencies (on plastic film) and three sets of linen prints of record drawings showing the general & detailed arrangement of the completed treatment works.
- (v) Sets of strongly bound loose leaf record books containing operating log sheets in duplicate (Providing one tear off and one carbon copy) sufficient for four years records, printed on a form be approved by the Engineer.
- (vi) A works maintenance schedule, work cards and complete spare parts documentation for the plant.
- (vii) Any other documents, drawings and notices required for implied by this specification or necessary for the satisfactory construction, erection, commissioning, testing and operation of the plant.

2.4 DESIGN OF THE WORKS :

The contractor shall be entirely responsible for the detailed design of the treatment works including civil and structural design for the duties specified to achieve the water quality standard specified in clause 2.6.2 **In addition, he shall provide with his tender detailed drawings as specified showing the arrangement of the plant and equipment offered.** The design flow rates shall be as sent in clause 2.5 Design standards shall accord with the best modern practices and shall facilitate satisfactory operation, inspection, maintenance and lubrication of the work. The process, the plant or any item of equipment may be of the contractor's standard design only providing that it is generally in accordance with the specification in intent and purpose.

2.4.1 INDIAN DESIGN MANUAL :

The contractor's attention is directed to current Indian Design codes of practice & the Manual on water supply & treatment, latest Edition 1991 prepared by the Export Committee & published by the Ministry of Works and Housing, New Delhi, India. The contractor should refer the CPHEEO Manual 1991 edition, criteria prevail.

2.4.2 CONCEPTUAL DESIGN :

The specification sets out the design criteria, which the contractor shall adopt for the works and includes a conceptual design of the works which tendering contractors should consider as setting out the basis of the requirement. Tenders are required to adhere to the general type of unit process specified for the works but are at liberty to offer their own particular version of the process or the equipment to meet the specified performance. The requirement for the main process & auxiliary installation is set out in order to ensure that all

tenders provide the minimum of facilities required in the works & to ensure that tenders are competing on the same basis, with provision to enable any one tendered to offer the owner the benefit of this own particulars experience as applied to the conventional treatment process envisaged.

Provision is made to enable tenderers to submit their own competitive offer should they consider that they have a particular appropriate & well proven unit (process which could be advantageous to the owner).

The envisaged scheme of the works is set out in the specification.

2.5 WORKS FLOW RATES:

The flow rates are given in this specification for the works are the nominal output ratings which shall be referred to as through puts. During the design supply, erection, testing and commissioning of the works the contractor shall adopt the following flow rates.

- i) All hydraulic structures as per data sheet.
- ii) All transmission systems that is pipes, channels, wires etc. with 20% over loads.

2.6 WATER QUALITY:

As an essential & integral part of the contract, the contractor shall guarantee, as set out in the form of tender, to design, supply & set to operate chemical, physical and bacteriological treatment process of the raw water.

2.6.1 RAW WATER QUALITY:

The River water quality has been sampled and analyzed. **Mahi River** will be main source of supply to the proposed plant. The summary of the results of analysis are given.

The contractor's attention is particularly drawn to the seasonal variation in water quality and the occasional peaks of turbidity & suspended solids concentration.

2.6.2 REQUIRED TREATED WATER QUALITY:

The treated water from the plant shall be consistently reliable with a demons ratable quality standard not less than :

- i) The acceptable water quality standard prepared by the Indian Expert Committee and as set out in the 'Manual on Water Supply & Treatment, second edition 1977 (an extract from this standard is given in Section-1 , Page No.)'.
 - A. A physical and chemical standard for 95% of all samples taken
 - Color : Not greater than 5 Hazen units
 - Turbidity : Not greater than 2 N.T.U
 - Suspended Solids : Not greater than 1.0 mg/l
 - Aluminum (As al) : Not greater than 0.15 mg/l.
 - Taste : Unobjectionable up to a temp. of 65 °C
 - Odour : Unobjectionable up to a temp. of 65 °C
 - Free chlorine : Not less than 0.4mg/l after 30 min. contact.
 - Appearance : Clear and sparkling.
 - B. Bacteriological (and disinfections) for all samples taken (100% occasions). No Coli form organism shall be detectable in 100 ml. samples following post chlorination for 30 effective minutes in a contact tank with a final free chlorine residual of 0.4 mg/l. The minimum residual shall only apply if laboratory tests show it to be possible to achieve this level.
 - C. STABILITY:
Water to be non-aggressive to the pump steel and cast iron pipe work within the treated water distribution system.

The Contractor shall at his own cost undertake the necessary sampling and testing to prove that the treated water conform to the foregoing requirements. After consultation with the contractor, the sampling procedure shall be as directed by the Engineer prior to the commencement of the commissioning of the works, should the contractor have any particular requirements regarding the sampling points, intervals and procedures he should set them out clearly in his tender submission.

SECTION - 3

DOCUMENTATION REQUIREMENTS

3.1 OBLIGATION TO PROVIDE DOCUMENTATION

The contractor shall, as an integral part of the contract, **supply detailed documentation & working drawings of the process and the equipment to be** supplied by him and to provide the Engineer with copies as soon as practicable and at least within the specified periods and further to provide and assist the Engineer or the owner with any design calculations, other information or data relating to problem arising from the design or supply of the process or the mechanicals or electrical plant. The contractor shall supply all the documentation & drawings tested or implied in the section or elsewhere in the specification.

Approval by the Engineer or his representative of the contractor's design, drawings, calculations, or equipment shall not relieve the contractor of any of his contractual responsibility or obligations. All drawings should be invariably signed by the contractor and design Engineer.

3.2 FORMAT LANGUAGE AND UNITS:

The language on all documents shall be in English. Units of measurement in the documents, on the drawings & the submissions shall be in (S.I) metric units Tenderer's specification shall include a comprehensive discussion on and justification of the equipment offered, its suitability and performance and purpose. For some specific reason if the contractor wishes to omit any specified items of plant or if the plant offered does not comply with the specified requirements of design or construction, special departures from this specification may be permitted provided it is included in the contractor's tender submission and in this instance the contractor's tender submission and in this instance the contractor shall fully justify the departure quoting the relevant clause in each case. maker's standard general specifications may be submitted in regard thereto, but such specifications will not be accepted as justification or in lieu of the schedule above mentioned in respect of any departures from this specification.

Unless specifically mentioned in the contractor's TENDER SPECIFICATION, items of plant and equipment omitted in the Tenderer's specification but required contractor at his own expense.

If any item so omitted is subsequently shown during the testing or commissioning or operation of the works to be required for satisfactory operation or paper or to the metric All size (560 x 810 mm) and shall be titled, cross referenced and fully explanatory with the contractor's name, date, scales etc. Additionally each drawing shall contain the following title at the bottom of right hand corner :

WATER TREATMENT PLANT

Each drawing shall contain a space within a title strip for recording revisions and a space for the Engineer's approval (a blank rectangle 120 mm x 50 mm).

3.3 TENDER DETAILS:

The description of the plant and equipment required for each of the processes as shown in the schedule of prices, is in outline and intended only to provide information on the cost of individual sections and processes. The contractor shall submit the following:

3.3.1 TENDERER'S SPECIFICATIONS :

The contractor shall submit with his tender, detailed and substantial specification in triplicate giving full particulars of the various parts of the proposed process and the plant.

The particulars there given together with this specification will be binding upon the contractor and must not be departed performance the contractor shall provide the item or rectify the deficiency at his own expense.

The tenderers specification shall be fully comprehensive and shall describe and specify in full the treatment process and each individual item of plant and equipment offered. It shall state the function of each unit, the duty required, describe the ability of the unit of satisfy the requirement, the materials of construction and the speeds, powers, quality, finished etc. and performance met. It shall include the electrical plant, the cabling and instrumentation.

The surface loading, capacities, velocities, throughout rates, inflow rates, outgoing rates, levels, power, rating, voltages, currents, dia-meters and specified as appropriate for each unit of the process and each item of mechanical electrical plant.

3.3.2 CALCULATIONS:

Triplicate copies of chemical,. process and hydraulic calculations for the plant shall be submitted with the tender. They shall fully embrace the range of flow rates & raw water conditions that are likely to occur on site. Pumping plant calculations required shall include the pumping curves, the system curves, section conditions viscosities etc. Pipe head loss calculations shall include consideration of the hydraulic energy losses in bends, fittings, exists, entries etc. & shall account for conditions both when the pipes are in new & in old condition.

3.3.3 SCHEDULE FOR PLANT:

The contractor shall prepare and submit with his tender a comprehensive set of performance, technical and cost schedule.

Performance schedules shall give all pertinent operational data for each assembly of plant i.e. Flash Mixer, clarification plant,

Filter installation, Chemical Dosing and/or any alternative units offered. Individual data shall also be provided in the technical schedules for all major plant i.e. pumps, Air blowers, Dosing pumps, and any such equipment, cost schedules shall be given in the Bill of Quantities."

A schedule showing the manufacturers of the each component shall also be provided.

3.3.4 TENDER DRAWING:

The contractor shall submit with his tender quadruplicate sets of drawings, which shall include:

- (I) Plants showing the layout of the treatment works to suitable metric scales and drawings to show the arrangement and working details of all the process, electrical mechanical plant and equipment offered. (Contractors are also invited to include general artist's impression of the works if they consider it would assist the owner in appraising their offer.)
- (II) A schematic line diagram of the complete works including all chambers, structures, tanks, pumps, pipelines, valves, standby equipment control lines. The diagrams shall embrace chemical feeds, flushing line, drains, sample points, Dosing points, and give all capacities and diameters.
- (III) **Hydraulic gradients through the works showing the design hydraulic level at the peak design flow rates. :**
Reference shall be made on the drawings to the source of the various losses contributing to the fall in hydraulic level throughout the plant.
- (IV) Plants and sectional elevations showing the access headroom, loadings, forces to be resisted and erection clearances required for and around the various items of plant that are proposed for installation in the works. They shall show the General Arrangement and details of all channels, ducts, storage tanks, loading ramps, conveyors, cable ducts and the size and position of all openings, support plinth, pipe work runs, ducts drainage.
- (V) General Electrical Cable diagrams and instrumentation drawings.
- (VI) Plans and sectional elevations , design, criteria and any other information necessary for detailed calculations of Civil and structural design.

3.3.5 DETAIL DRAWINGS:

Within two months of the date of acceptance of the tender, the contractor shall submit to the Engineer Ten copies of a set of drawings repeating the information given in the tender drawings incorporating any modifications approved by the Engineer in charge and completing the detailed civil design and constructing drawings for the works. The details drawings shall include at least

- The final dimensions and location of all box outs opening, plinths, fixings, fittings, flanges, mounting step ladders etc.
- The final dimensions and exact location of all the item sof plant.
- (Panels, pumps, mixers, valves, motor control centers, distribution boards etc).
- Details of internal and external surface finishers, protective coating and linings.
- Final electrical diagrams cable runs, lighting arrangements, instrumentation and power points.
- The final working drawings to proceed with the civil construction work.

3.3.6 COMPONENT AND SPARE DRAWINGS:

Prior to the delivery of any item of plant of equipment to the treatment works, the contractor shall in triplicate submit to the Engineer for approval accurately detailed mechanical and electrical drawings, relating, thereto together with spare parts, tests references, drawings etc. for the plant.

All the drawings of contractor used on site for erection, installation or construction of the works shall be submitted (Three copies) to the Engineer for approval. Any corrections

required by the Engineer shall be incorporated as amendments. No drawings or amended drawings shall be used in any workshop, factory or for any other purpose unless the latest amendment has received the Engineer's approval.

3.3.7 CONSTRUCTION DRAWINGS:

Before the commencement of the Civil Engineering construction the contractor shall supply the Engineer with three sets of paper prints of the contractor's final drawings for the works in order that they can be examined. Following final approval by the Engineer the contractor shall supply the Engineer with a further five sets of line prints of the drawings.

3.3.8 MANUALS:

The contractor shall deliver to the Engineer duplicate losses leaf copies of draft operational and maintenance manuals for the plant prior to its delivery to site. The manuals shall full and clearly set out the contractor own recommendations and instructions for the satisfactory operation and maintenance of the plant or equipment as applied to the Concerned Treatment Plant.

The test or accompanying diagrams shall be in addition shown the electrical wiring, handling and erecting instructions. Draft manual shall, during the testing and commissioning of the works, be carefully checked by the contractor and updated and modified during the testing and commissioning periods to ensure that it is fully descriptive and applicable to the final process plant as installed and as found to be have under operational condition.

No section of the works will be certified by the Engineer as complete unless this requirement has been met. The draft manual shall be in English and may be included manufacturer standard literature but the contractor shall fully supplement the literature by his own descriptive text explanations and drawings.

Five copies of the final approval manual for the works shall be submitted to the Engineer prior to the commencement of the maintenance period. They shall be security bound in A-4 size losses leaf binders. Clearly titled, indexed and cross referenced. The final manuals shall incorporate, instructions, recommendations and advance for the operations of the entire process covering the full range of raw water conditions.

If during the maintenance period, the Engineer finds that the manual requires modification or enlargement as a result of subsequent operational and maintenance experience in the works, the contractor shall provide approved modifications for manual. The Manual shall include for the mechanical and electrical plant, procedures for at least:

- Lubrication, checking, calibration and adjustment of each item.
- Attention at weekly, monthly or other intervals to ensure reliable trouble free operation.
- Complete overhaul, dismantling and reassembly, testing and re commissioning.
- The identification and selection of suitable lubricants, standardized throughout the works identifying various Indian manufacturer's suitable equivalents.
- Fault finding.
- Mixing adjusting and monitoring of chemical solutions and accurate dosing of chemicals in to the works process.
- Clearance the works, the plant and its components.
- Maintenance of protective coatings.
- Maintenance, works, performances and treated water quality.

- Monitoring of water quality throughout the works including sampling techniques, laboratory and reporting procedures.

3.4 MAINTENANCE SCHEME

The operation and maintenance instruction manual shall be supplemented by the supply of a comprehensive planned yearly maintenance programme for the water work operational mechanical and electrical maintenance staff. A wall chart or charts shall be provided covering a period of two year with colored markers. It shall have vertical divisions in weeks and horizontal divisions for each item for mechanical and electrical plant. The charts should give information regarding various continuous and day-to-day operations such as adjustment of alum dose through Jar Test results, back wash cycle for filters, adjustment of chlorine dose, and step by step account of plant start up and shut down procedures, etc.

The maintenance scheme shall be to the approval of the Engineer and shall be provided complete at the time of the handing over of the works. It shall have sufficient space for expansion if required to include any further routine work directed by the Engineer or advised by the Training Officer as a result of his experience at the time.

3.5 OPERATING LOG SHEETS:

Record books shall be handed over to the Engineer in an approved form before the completion of the initial commissioning period in the works.

3.6 RECORD DRAWINGS:

The record drawings shall be handed over to the Engineer on the date of the handing over the works. The record drawings shall be on best quality tracing paper (preferably on polyesters tracing papers). An amount of 0.5% (one half percent) will be kept in deposit from each bill till the completion of the entire work and will be released after the record drawings are submitted and approved by the Engineer-in-charge.

After award of contract the hydraulic as well as structural design submitted by contractor should be submitted within 1 month to Local Body through Chief Officer for scrutiny and approval from the Competent Authority. Only after approval of design execution of work should be taken up. After scrutinized the design by Competent Authority if there is any discrepancy of remarks raised by the Competent Authority than it should be compiled by contractor within 10 days after issuing the letter from Competent Authority.

SECTION -4

INLET WORKS

4.1 WORKS TO BE INCLUDED:

THE WORKS TO BE INCLUDED IN THIS SECTION SHALL COMPRISE AT LEAST THE FOLLOWING:

- A chamber in the inlet works structure to receive the incoming raw water.
- The flash mixing chambers for intimate powered disposal of the coagulant chemical (Aluminum Sulphate solution).
- An elevated channel to measure the inlet flows to the works in corporation a flume approach section and energy recovery transition.
- A float operated rate of flow indicator.
- Over flows features for operational purpose.
- In inlet works, i) Water intake chamber& ii) flush mixer should be included.

4.2 BRIEF DESCRIPTION OF THE WORKS:

Tendering contractor's attention is drawn to the drawings illustrating the conceptual design of this section of the works. The inlet works shall be arranged in reinforced concrete.

The inlet works arrangements adopted in the conceptual design consist of Water intake chamber attached with one number of flash mixer with full capacity and mixing arrangement for sufficient disposal of coagulant in the body of water flows. The flash mixer is connected to the raw water channel by adjustable weir. The raw water channels accommodate a measuring flume. Approach section and energy recovery transition and finally connected to a clarification works with by-pass arrangements to permit the inlet flows to filtration works by-passing the clarification works.

4.3 GENERAL DESIGN CRITERIA:

The inlet works shall be designed to :

- Pass and measure flow rates up to as per data sheet. for a normal throughout (Ultimate) and all transmission system like channels, pipes etc. up to amount for over loading to the extent of 20% on ultimate flow.
- Chemically coagulate the flows up to as per data sheet.
- Achieve the optimum powered flash mixing required for treatment for inlet flows at normal through of as per data sheet.

4.4 EXTENT OF WORKS PROVIDED:

Under this control, the complete inlet works shall be provided, including supplying all mechanical and electrical plant required gravity flow arrangement of total inlet works flows to existing water intake chamber.

4.5 INLET PIPE LINES CONNECTION AND INLET CHANNEL:

The inlet pipe shall be as per design mm. in diameter (O.D.) commencing with a connection to owner's existing pipe diameter. The contractor shall also supply and install a sluice valve for control of inlet flows on this pipeline. The inlet pipe will discharge water in water intake chamber to be designed and constructed as per detail given in data sheet.

4.6 WATER INTAKE CHAMBER:

The water intake chamber shall be provided as per design. The water intake chamber shall have a detention time of 1 minute of design flow. It shall be also designed for back wash water & 20% overload..

4.7 FLASH MIXER :

The conceptual design adopts water intake chamber and One no. flash mixer as a combined unit. The water intake chamber shall perform function of receiving inlet flows and also to serve as an water intake chamber for flash mixers. The exit from flash mixer shall be into the measuring flume. The flash mixing chamber shall be one in number each provided with full capacity for a throughout rate of design flow. The minimum detention time for flash mixers shall be 40 seconds and shall have a sufficient volumetric capacity. It shall be circular in plan.

The flash mixing structure shall accommodate and provide the arrangements necessary to receive the raw water from the water intake chamber at a throughout of design flow. Dose aluminum Sulphate solution and immediately and violently disperse the solution throughout the bulk of the water in a flash mixing chamber. The arrangement shall include a weir inlet at upper level to receive raw water flows from water intake chamber, inter-connection with flash mixing chambers. Tendering contractors, may if they consider necessary or essential, submit alternative design nearest to the flow adopted in the conceptual design.

The conceptual design provides one flash mixing chambers of full capacity with submerged mixers, shaft driven from turbulent energy into the water at an anticipated rate of KWH. Each unit operating single shall given reduced but effective mixing. Tendering contractors shall justify any departure from this rate. Aluminum Sulphate solution shall be dosed immediately adjacent to the flash mixing devices. Dosing shall preferable by extended transparent pipeline up to roof slab-level of flash mixing chambers to enable visual inspection of the does rate to be made.

The contractor shall supply the mixing machines which shall be first class water works standards with a design life of 20 years. They shall be top entry mixing units safely supported at slab level from a cross and beam arrangement above the mixing chamber. The mixing turbine shall be of four bladed axial flow type located at one third the chamber depth (Above floor level).

The drive shaft and turbine bladed shall be manufactured in stainless steel. The shafts shall be not less than 200 mm. dia meter or as per Contractor's own design The mixing speed shall be 100 R.P.M. The driving motor shall be connected to the shaft through a direct-coupled worm reduction gearbox reducing the speed from either 970 or 1400 R.P.M. The shaft shall be detachable above water level by means of steel coupling with stainless steel bolts. The contractor shall take considerable care in his mixer design and installation detailing into ensure that there is no possibility of oil or grease leakage from the machine findings its way to the flash mixing chamber. The machine shall be provided with lifting eyes to facilities its withdrawal. The flash mixing chamber shall be internally fitted with suitably arranged baffles or fins to achieve optimization of mixing with rapid mixer and to minimize swirl in the chamber. Baffles or fins shall be constructed in reinforced concrete.

4.8 ELEVATED CHANNEL WITH MEASURING FLUME :

The elevated channel shall convey and measure at the inlet works flows from the flash mixing chambers. The approach channel shall be straight, rectangular, fully accessible, hydraulically open and of around 1.0 m. breadth. The length being defined as the distance between the downstream edge of the second flash mixing diameter and the tapping point for measurement of the flume head. The flume section shall be symmetrical and rectangular, throated with two side contractions to produce a par shall flume design. It shall be in accordance with designs suggested in the "Manual

on sewerage and sewage treatment” of CENTRAL P.H. and Environment Engineering Organization, Ministry of Works and Housing, New Delhi.

Measuring accuracy of the completed installation shall be within 5% for the throughput of design flow L/Sec. and it shall register flows accurately up to 20% more than design flow

The contractor shall pay particular attention to the operating tail water depths, to surface finishers and the tolerances required by his design. The head on the flume shall be measured via tapping pipe at channel invert level, located for enough upstream to be clear of the flume sections draw down but near enough to the flume to ensure minimum energy loss of the flume contraction. The pipe shall feed an adjacent float chamber, 1.00 m. x 1.00 mt. in plan with invert level below the flume throat floor. The float chamber shall be laid to fall to a 100 mm. diameter drainage outlet. A 200 mm. dia. Hand operated flanged valve shall be provided on the float chamber inlet and an 100 mm. valve on the outlet drainage pipes. The valves shall be readily accessible and convenient to operate.

4.9 RATE OF FLOW INDICATOR:

A float operated of flow instrument with indicator shall be provided and mounted within a pedestal type cabinet over one half of the float chamber.

4.10 CLARIFIER FEED FLOW :

The design rate of flow for clarifier shall design LPS. The clarifier feed pipe shall be of suitable diameter with a controlling sluice valve.

4.11 CLARIFIER BY PASS:

The clarifier by-pass shall be suitable diameter pipeline with a sluice valve that shall convey water from the inlet works, partial flume or rectangular weir to the common settled water influent channel for filtration.

The by-pass shall be designed for an operational capacity of

Design flow. with a peak capacity of 20% over load design capacity L/sec.

4.12 ARRANGEMENT AND ACCESS AROUND INLET WORKS :

The inlet works shall be designed with operational convenience and shaft safety in mind. Elevated walk ways shall be arranged for ease of pedestrian access around the mixing chamber to the mixing equipment motor and gear box along one side of the elevated channel and around all head stocks, controls etc. Chambers shall be arranged for ease of internal access and visual inspection of all flow and processes. Full triple rail hand railing will be arranged around all elevated walk ways in this section of the works.

Access and inspection paths within the walks ways shall be covered with open means. Flooring pedestrian walkways shall be minimum 1.0 m. broad. An access stair way shall be provided to ground level from the walkways. Access to internal chambers or channels greater than 1.2 m. deep shall be by step irons but step iron shall not in the flume section.

SECTION - 5

CLARIFLOCCULATION WORKS

5.1 WORKS TO BE INCLUDED :

The works which are to be included by the contractor this section of the treatment process shall comprise at least the following :

- The design and necessary arrangement for the “Clariflocculator” to flocculate, settle and decant the coagulated water from the inlet works.
- The design and necessary arrangement for the control removal by gravity of the settled sludge from the clariflocculator and the waste product.
- The design and necessary arrangement to drain down the clarifiers and provide a facility to scour the sludge withdrawal, under higher head.
- The design and necessary arrangement for the uniform collection of settled water from the clariflocculator and its delivery to the filter battery for filtration.
- The supply and installation of clariflocculator.

5.2 GENERAL DESIGN CRITERIA AND PERFORMANCE

GUARANTEE :

The clarification works shall be designed to :-

- Continually clarify the water for filtration and meet the performance standards with a unit flow rate of design flow as per data sheet during monsoon period and during commissioning period fair weather trials, clarify higher rates of flow.
- Efficient removal of waste products from the process with minimum water loss.
- The contractor shall guarantee that following chemical coagulation for the monsoon quality raw water, the water leaving the sedimentation tank shall comply with the following 95% occasions.

Turbidity	: Not greater than 10 NTU
Suspended	: Not greater than 10 Mg/l. solids.
Total aluminum	: Not greater than 0.5 mg/l depending on the laboratory treatment tests.

The test results indicating non-achievement of water quality shall make modifications in mechanical or electrical or chemical works in order to achieve the specified quality to the entire satisfaction of the Engineer.

SECTION - 6

FILTRATION WORKS.

6.1 WORKS TO BE INCLUDED :

The works to be included by the contractor in this section of the treatment process shall comprise of at least the following :

- The design and necessary arrangements for variable decline rate filtration of the works flows in a filter battery comprising of two identical filter units.
- The design and necessary arrangements to distribute the flow (from either the flash mixers or the clarifiers proposed) between the filters, cleans, the filters, removing the back wash water and collect the filtrate flow for final disinfections.
- The design and necessary arrangement to construct the filtration works.
- The design and layouts for administrative purposes for the filter house and machinery shall attached with the filter battery.
- The supply of two filters with filtering media and the necessary machinery and equipment required for the filters.

6.2 BRIEF DESCRIPTION OF THE WORKS:

The filter battery shall be constructed in reinforced concrete, boxes, shall be covered rectangular in plan arranged in a single row with common influent channel and a common filtered water channel and pipe gallery on one side of the filter controls. The filter to back wash waste water channel, shall be arranged below filter influent channel, and suitable piping for eventual disposal. The filters shall be arranged for convenience of operation and maintenance, minimization of hydraulic losses and the optimization of performance in terms of quantity and quality of treated water.

6.3 GENERAL DESIGN CRITERIA AND FILTER TYPE:

The filtration works shall be designed to receive the works flows from the inlet works during the fair season and achieve the specified treated water quality with works throughout rate of design flow as per data sheet .

- To receive the settled water from the clarification works either existing or proposed and achieve the specified water quality with a works throughout rate of design flow as per data sheet.

The average filtration rate shall be $4.8 \text{ m}^3/\text{m}^2/\text{hour}$. The filtration rate shall be calculated by dividing the unit flow per filter ($\text{m}^3/\text{hr.}$) by the net unit media plan area (in m^2). Based on the above, the conceptual design adopts. Tendering contractors should note that they are at liberty to reduce the filtration rate during fair season up to what they deem fit.

Each filter unit shall contain a single sized silica sand bed. (Effective size in the region of 0.60 mm. uniformity Co-efficient 1.5 and depth not less than 0.75 mt.) carried on a gravel media of about 0.40 m. layer thickness for piped under drain system or on a suspended floor fitted with along stemmed plastic nozzles. They shall be designed for cleaning with the reverse flow of air followed for by a water wash at a sufficient rate to fluidize and expand the bed, detach and remove the filter burden without assistance of surface wash. Declining rate filters shall be adopted with split flow arrangement from a common settled water influent channels, and outlet arrangements by a weir in the inspection chamber with its crest at 0.10 m. above the top of sand bed, and then the spillage point and conveyed to the pure water sump through req. length DI-K9/CI pipe of adequate diameter.

The rapid sand declined rate filter shall be designed for an average filtration rate of $4.8 \text{ m}^3/\text{m}^2/\text{hr}$. with a flow range of $9.6 \text{ m}^3/\text{m}^2/\text{hr}$. at the beginning of filter run to $2.4 \text{ m}^3/\text{m}^2/\text{hr}$. before washing the filters. The abnormally high filtration rates immediately after the backwash shall be avoided by manual operation of pure water outlet valves in the filter gallery. The filtration works shall be designed for a water column of minimum 2.0 m. (without free board) above the top of sand bed, with a provisions for increase in water column to a height of 2.25 m. above the top of sand bed. A suitably designed orifice with an arrangement to measure the different head across it and hence the rate of flow on each of the outlets shall be provided. Filter shall be cleaned on time basis. The back wash rates for air and water shall be as per hydraulic design or CPHEO W.S. Manual, 1991. An air wash causing a loosening of filter media, shall be followed by a water wash.

Tendering contract should bear in mind that percentage of back wash to throughout is an important item in evaluation of bids. The quantity of wash water used should not exceed 2% of the total of the water filtered. No continuous filter run shall be less than 23.5 hours and 95% of all continuous filter run shall achieve 36 hours when the clarifiers are in operation.

Filter outlets weirs shall be located in the inspection chamber with their crests at 0.10 m. above the top of filter media and they shall discharge into a common reinforced concrete filtered water collection channel.

The filters shall be divided into the two identical balanced sections with a central filter feed/back wash collecting gullet, which it turn shall receive back wash waste water from a pair of waste water troughs constructed for each section and separate cleaning ports. Filter control valves shall be manuals operated from head stocks.

6.3.1 PERMITTED VARIATION IN THE FILTRATION WORKS :

The specified filter type has been selected for its simplicity of operation, ease of maintenance (over and under floors) its reliability and its inherent resistance to operation upset.

Tendering contractors may offer their own particular or "Nearest" version of the filter type envisage. No tender will be considered which does not include a filtration process bases on the specified number of units of at least the specified size and the filter type with either suspended floors or piped under drain system, single sized filtering media and separate air and water wash facilities. However, the tendering contractors shall note that a variable head declining rate filtration type shall be offered by them as a part of the basic tender,

6.3.2 ALTERNATIVE FILTER ARRANGEMENT :

TENDERING contractors may, if they so wish, submit another filter design and arrangement as a second ALTERNATIVE OFFER. Contractor should note however the preference given to separate air and water wash systems ease of maintenance and the advantages of a single sized media filter bed and a variable head declining rate filtration type.

Alternative systems which may not be favorably considered would include

- An excessive No. of filter units or more than one filter stream.
- Multi media units (Anthracite, pumice, crushed coconut shell).
- Complete control system.
- Regarding rate of flow controllers and rate setters, slow devices etc.
- Cleaning or flushing with jets or spray systems
- Automatic self cleaning systems

ALTERNATIVE WHICH MAY BE OFFERED INCLUDE :

- Slight variation in the number of filter units.
- Piped (And at least partially accessible).
- Variation in media size with corresponding adjustment of sand depth.

6.4 EXTENT OF WORKS :

Under this contract, the contractor shall supply required filter units and shall all the machinery. Equipment required for all the filter units.

Contractors design and installation shall be such as to enable the filter battery to filter water at a rate of design flow as per data sheet. In the event of conversion into dual media, filters at a later date, for this the shell design all the transmission system pertaining to filtration works, that is settled water channel, pure water channel, pure water gravity drain, all of the under drain system for throughout put rate of . i.e. double the rate of design flow rate. contractor's designs shall also be such as to enable the filter battery to be linearly extended at a later date with the minimum of interference to the works.

6.5 FILTER FEED :

Inlet flows to the filters shall be distributed along the length of the filter battery externally arranged in a reinforced concrete settled water common influent channel with a suitable arrangements of the enable the incoming flows to be divided equally between the two filters say an adjustable weir plate. Channels and associated chamber floors shall be given slope towards the drains and drainage valves. They if necessary, shall be fitted with to stop or step irons for internal access.

6.6 FILTER MEDIA :

Filtration shall be by gravity through a bed of hard gained silica (Quartz) sand of minimum thickness 70 cm. Filter sand shall be of effective size 0.60 mm and uniformity co-efficient of 1.50.

The sand depth shall be checked with the help of following formula

$$Qd^3h/1 = B \times 29323$$

Q = m³/m²/hr./gpm/sft.
d = sand size in cm.
h = Terminal loss of head in m.
L = Depth of bed in m.
B = Break through index bent
4 x 10⁻⁴ to 6 x 10⁻³
Assume 4 x 10⁻⁴

6.7 FILTER SUPPORT :

Filter sand shall rest on a gravel bed of not less than 0.40 m. thickness in the event of piped under drain system, or any directly on the suspended floor in case of nuzzled under drain system to suit a particular design.

6.8 FILTER SAND :

Filter sand shall be of hard and resistant quarts or quartzite and free of clay, mica, shale, dirt, loam organic impurities, later soluble iron and manganese. Effective size shall be 0.45 to 0.70 mm. Uniformity coefficient shall not be more than 108 not less than 1.3. The weight loss or contact with N hydrochloric acid shall not exceed than 5% weight after 24 hours. Ignition loss should not exceed 0.7 percent by weight. The friability weight loss after mixing for 15 minutes (750 strokes) shall be less than 10% and for 30 minutes (1500 strokes) shall be less than 20%.

The specific gravity of the sand shall be in the range of 2.55 to 2.65 silica content should not be less than 90% wiring loss should not exceed 3% IS 8419 (Part-I) 1947 entitled filtration media. Sand and gravel may be referred for other details.

6.8.1 FILTER MEDIA AND CHARGING :

The contractor shall supply the filter media for the works and shall submit with his tender details of the source from which the proposed to draw his supplies of filter sand and verify that sufficient quantities of satisfactory filter sand can be obtained, packed stored on site and the filter shells charged in accordance with his work programme. 6.8.1 Within the two months of the date of acceptance of tender, the contractor shall submit to the Engineer to 20 Kg. representative samples of the filter sand and also a sample of supporting media.) one of which will be tested. When the sand is found to be confirming to the above requirements of the contractor, which he shall submit with his tender, the second sample shall be retained by the Engineer and the contractor will then be given permission to place an order for his supplies.

Prior to packing, all filter sand, shall be washed, heat dried and sieved to conform the specified grading and tested. Separate test certificates (In triplicate) shall be provided to the Engineer for each 20 cubic meters of media so supplied.

Packing shall be in suitable approved double or triple bags to protect the media from spillage or contamination.

Any sand or media delivered losses or found to be split or open bags shall be rejected on site. Storage on site shall be only in an approved. Pre designed area, well drained and free of mud and silt. Following installation and satisfactory testing of all the filter floors and when the Engineer is satisfied that the installations are complete.

The contractor will be given written permission to commence filling the filters. The contractor will set out and indicate and the methods of filling the media in his tender submission and specification. Filter media shall be carefully placed and not charged by dropping, dumping, machine handling or any other method which in the opinion of the Engineer will be determined to the floor media, nozzles/drains to or sealants.

In each filter, two adjacent valves shall be charged simultaneously.

Following the initial charging the filter shall be washed by the contractor. Filter beds, designed for expansion during, cleaning shall be skimmed prior to disinfections and commissioning of the works.

6.9 FILTER FLOOR :

In the conceptual design, piped under drain system has been adopted. In the event of adopting similar system, the contractor shall provide reinforced concrete flooring with slots in each section of filter, to accommodate manifold or he may provide concrete channel in each section, to collect and convey pure water back wash water and air from/ to under drain laterals. If the tendering contractor wishes to adopt nozzles and suspended floor arrangement the filter media shall be supported by a suspended floor, fitted with long stemmed plastic floor nozzle and designed to pass the air and water required for the reserve flow cleaning and to exclude the media from the filter base and outlet systems

The filter shall be manufactured in pre cast concrete segments with accurately screwed thread plastic nozzles fixing sleeves.

Nozzles shall be evenly spread over the full floor area with a concentration of at least 50 per m. During installation of any floor all nozzle socket shall be plugged until nozzle fitting commences.

The contractor shall at the time of tendering provide the following:

- For suspended floors :
- A detailed specification of the calculations for his proposed filter floor, its nozzles, the floor seals between slabs and around the perimeter.
- The tolerances required for the support beams and walls, and tolerance for the slabs and the finished floor.
- For piped under drains.
Complete hydraulic calculations for laterals, orifices, and manifolds, and the tolerance ratios of their area with filter area also be the inter-relations of the areas of all the components of under-drain system.
- The Contractor shall clearly indicate at the tender stage the arrangements he proposed to connect the laterals with the manifold and back wash water and air arrangements.

6.10 FILTER BASE :

In case of suspended floors, the filter base shall be designed for access below the filter floor and the central trough. It shall be arranged to ensure free passage of the filtrate to the outlet pipe work, equal division of air and wash water between the filter half and designed to achieve a level air scour fusion and uniform distribution of air along the length and breadth of the filter, regardless of the size and position of the floor supports.

6.11 FILTER CLEANING :

Filter cleaning shall be (upward) reverse flows of air and water, systems employing separate air and water washing are envisaged.

The air supply be taken from one of the two lobe type roots type air blowers and the water supply from the wash water tank to be constructed on top of the chemical house under the scope of this tender.

The free air flow rate shall be 45 m.³/hr. to 50 m.³/hr. for a duration of 5 minutes. The wash water flow rate shall be 36 M/hr. (600 LPM/M²) for a duration of 10 minutes.

6.11.1 CLEANING AND SEQUENCE :

The contractor shall fully justify in his tender submission. The filter cleaning system for the contractor's particular version of the conceptual design.

The contractor shall include consideration of water loss, design sequence and timings, raise rates, the water temperatures, surface, travel distance for wash water, ease of operation, timings and durations of the wash period etc.

Following criteria shall be adopted in the designing under drain system.

Area of orifices	=	0.3% of filter bed area.
Area of laterals	=	2% area of orifices.
Area of manifold	=	1.5 x area of laterals.

The perforation vary from 5 to 12 mm in diameter and should be staged at a straight angle to the vertical axes of pipe.

6.11.2 WASTE WATER TRAVEL DISTANCE :

The Contractor shall, as far as possible to suit his own design, limit the horizontal distance of travel of wash water across the bed surface to the wash water cross troughs.

6.11.3 WASTAGE OF THE FIRST FILTRATE :

Systems employing the wastage of the first filtrate shall not be offered.

6.11.4 FILTERING TO WASTE :

The contractor shall provide the facility for the entire works output to be filtered to waste during the testing, commissioning or subsequent operation of the works.

6.12. OUTLET CHAMBER :

Each compartment of every filter adjacent to filtrate outlet chamber constructed in reinforced concrete with a weir 0.10 m. above the sand bed top into an inspection chamber connected to the common filter water collection channel. The minimum chamber capacity shall be 30 m³. The chamber shall be covered with sheet glasses fixed in a removal wooden frame.

The flooring for inspection chamber shall be in white glazed tiles. The walls of the inspection chamber shall be covered with white glazed tiles for full height.

6.13 HEAD LOSS/BACK PRESSURE GAUGES:

Each filter be provided with two head loss/back pressure gauges, one mounted in the filter house at upper gallery level, and the other (a manometer) in the pipe gallery. Both shall indicate the water pressure across the filter during normal operation.

6.13.1 GAUGE :

The Kirloskar mounted gauge shall be of the float operated type with a 150 mm. diameter indicator, a geared drive to a cable drum, 100 mm. dia meter copper flat, 1 mm. diameter stainless steel wire woven cable and counter weight. The float tube shall be connected to the filtered water outlet port casting by a 12.5 mm. dia meter valve and copper tube. It shall terminate at its lower end in a blank flange to enable the float to be removed if necessary and shall be fitted with a 25 mm. dia drain valve.

The gauge dial shall have two scales in opposite directions :

Alternative arrangement to the above may be offered provided they are of simple reliable construction and could readily be attained.

6.13.2 MANOMETER :

Filter manometers to serve as stand by head loss gauges shall be well mounted in the lower filter pipe gallery.

6.14. FILTER CONTROLS :

In an attempt to minimize mechanization, the conceptual design adopts manually operated filters. All filters inlet and outlet flows shall preferably be manually controlled by head stock operated sluice valves or penstocks. Head stocks at upper filter gallery or walkway wheel valve shall be provided at each filter for the following controls :

- Filter inlet.
- Filtered water outlet 2 Nos.
- Air inlet
- Wash water inlet
- Wash water outlet.

Knocked or angled spindle extensions shall be avoided.

6.15 FILTER PORTS :

To limit the head loss arising from friction, turbulence and velocity heads, the following upper limits of velocity shall preferably apply :

Filter Inlet	:	1.0 m/Sec.
Filtrate outlet	:	1.3 m/Sec.
Wash water inlet	:	2.5 m/Sec.
Wash water outlet	:	2.0 m/Sec.
Air inlet	:	25.0 m/sec.

6.16 FILTER GALLERY AND FILTER MACHINERY HALL PIPE WORKS :

General :

Filter gallery water carrying pipe work shall be in either steel or cast iron with flanged connections, with a provision of detachable flanged couplings to facilitate maintenance of valves and fittings. The filter gallery and machinery shall pipe work shall be arranged for easy operation, access for maintenance and to minimize undesirable head losses in the works.

6.16.1 AIR MAINS :

The Contractor shall feed air to the filter through a steel header, at a high level within the pipe gallery. Individual filter section suppliers from the air header shall be in flanged steel pipe work but the filter entry pot shall be a cast iron flanged piece, with integral puddle which shall incorporate a siphon and valve to exclude reverse water flows to the blowers.

6.16.2 WASH WATER MAIN :

Wash water supply pipe work shall form the Back Wash Water Tank. Velocity in the header shall be designed to account for head losses arising in the future development & preferably shall not exceed 2.0 m./Sec.

6.16.3 WASTE WATER COLLECTION & DISPOSAL :

The filter back wash waste from each filter shall be collected in a common waste water channel connected in drainage system which is a part 2 parcel of filtration works. Care should be taken while designing the outflows about uniform collection sludge / muddy water as otherwise sludge pockets are likely to remain which will eventually clot the pipeline.

The final disposal leads to the natural drain passing near by and all required piping, channel is to be designed and provided and constructed by the agency at his on cost up to 500 m length.

6.16.4 LATERAL LENGTH:

The length of lateral on each side of manifold shall not be more than 16 times the diameter of laterals.

SECTION – 7

CHEMICAL WORKS

7.1.1 PROVISION FOR WORKS :

Sufficient chemical apparatus and facilities shall be provided by the contractor under his contract to meet flow rates of proposed works for post chlorination and flow rates of the proposed works that is 110 lit./Sec. Flow for chemical coagulation. The mixing, metering, dosing and treatment arrangements provided shall be accurate and reliable at flow rates specified herein.

7.1.2 CHEMICALS TO BE DOSED :

The contractor shall provide facilities for the reception, handing, mixing, storage, and accurate dispensing of appropriate quantities of the following chemicals :

- Aluminum Sulphate in liquid.
- Lump or pebbled form.
- Chlorine from 950 Kg. drums M.S.(toners).

Tendering contractors shall note that no coagulant aids or other enhancing chemicals will be permitted in the works during the contract period.

7.1.3 AVAILABILITY STRENGTH AND PURITY OF CHEMICALS :

The Contractor shall be deemed to have satisfied himself as to the availability, purity, strength & suitability of all the chemicals to be used in the works and shall accordingly include consideration of the chemicals strengths available when calculating his dose rates and capacities and shall arrange his and other apparatus to exclude deleterious matter from the water being treated.

7.1.4 CHEMICAL CALCULATIONS :

The contractor shall submit with his tender a comprehensive set of calculations for his problems. He shall include chemical calculations as well as those pertaining to solution concentrations, flow rates etc.

7.1.5 ARRANGEMENT OF THE WORKS :

The conceptual arrangement of the works is shown and the envisaged scheme accommodates the solution tanks, dosing tanks, laboratory, office canteen and toilet blocks on the upper floor and storage on ground floor, chlorine cylinder storage, chlorinator room, control panel room and first aid on the ground floor of the chemical house. The more essential chemical tanks, dosing and metering arrangements on the upper floor of chemical house are located high enough to enable gravity flow of aluminum Sulphate solution (alum) to the inlet works.

7.1.6 CHEMICAL STORAGE :

In principle the site will be developed to provide chemical storage of the following :-

Alum : Storage for three months at the average "Monsoon" season rate of consumption.

Chlorine: Storage for three months stock of full containers sufficient to meet the average monsoon rate of consumption, plus further space for duty standby and empty containers.

7.1.7 HANDLING OF RAW CHEMICALS :

In this arrangements the contractor shall consider the routine handling and transport of the raw chemicals. Handling of toners by hot crane 3 T capacity with gantry shall be mechanized for chlorine and initially by hand for alum and by chain pulley block or mono-rail arrangement for lifting the solid alum from ground floor storage to the alum tanks at upper floor.

7.2 ALUMINIUM SULPHATE (DESIGN CRITERIA) :

The contractor shall provide sufficient aluminum Sulphate (alum) initially to meet his performance guarantees and to enable a continued dose rate of at least 30 mg/l. to be applied into design flow rate. for a 8 hour shift stock of 5% alum solution (which has a composition of at least 16% aluminum sulphate). The dosing point of alum shall carefully selected in conjunction with the flush mixing chambers.

Gravity flow metering shall be adopted and consequently the shift stock tanks shall be situated in the upper floor of the chemicals house with one constant head tank and one solution flow meter feeding dosing line.

The conceptual arrangement is shown on the drawing and tendering contractor shall fully discuss the suitability of their own arrangement of the outlined design with their tender submission. Tenderer shall not recommend dry feeders as an alternative.

7.2.1 STOCK TANK FLOW METER :

The tendering contractor shall supply a digital integrating flow meter calibrated in liters fitted on a common riser. Read out shall be digital. The meter shall be accurate, with appropriate mechanism.

7.2.2 STOCK TANKS (ALUM TANKS) :

The contractor shall provide two elevated stock tanks sized in accordance with his calculations for the specified dose rate and concentration.

Each tank shall be approximately square in plan with a working depth of 0.8 m. and a maximum depth of 1.00 m. from the tank base to overflow level.

The tank shall be lined with 3 coats of bituminous paint by the contractor and supplied complete with the following facilities :-

- i) The specified service water supply.
- ii) An overhead central vertical axial flow mixing machine to disperse the concentrated liquor and the top up waters.
- iii) A wooden calibrated dip-stick.
- iv) A "slight tube" or "Float and stick" depth indicator with celebrations.
- v) A low level drawn, high level overflow and 150 mm. above the base draw off leading through flanged valving and a strainer to the constant head tank.
- vi) A sample tap for specific gravity determinations.

7.2.3 ALUM SOLUTION MIXERS :

The contractor shall supply 2 alum solution mixers for the alum tanks. Considering average 30 mg./l. alum dose for 12 hours requirement.

Each mixer shall be mounted on an overhead concrete assessable slab and fitted with a 1.5 KWH. 3 Phase motor running at not more than 1500 R.P.M. a reduction gear box and a 50 mm dia stainless steel shaft and a stainless steel axial flow turbine. The shaft speed shall not exceed 150 R.P.M.

7.2.4 CONSTANT HEAD TANKS AND DOSERS:

The contractor shall supply two purpose made constant head tank to feed the gravity dozer. The tank shall be so valves that it can be fed from by one of the 3 Alum tanks. In the conceptual design, however, a common feeder connected with all the 3 stock tanks means of separate valves on each strainer, feeds the constant head tank from where alum solution.

The tank shall include the following facilities:

- i) Stainless steel inlet valve with plastic float.
- ii) A strained and valve outlet.
- iii) In overflow and a drain.

7.2.5 GRAVITY FLOW METERS:

The contractor shall supply one directed reading gravity solution flow meter of the variable type. The meter shall have:

- i) A minimum diameter of 50 mm.
- ii) A maximum internal head loss of 300 mm. under the worst design conditions.
- iii) + 2% accuracy.
- iv) An anti-corrosive type float.
- v) A bore silicate glass tube set in a welded stainless steel frame fitted with P.V.C. flanged ends.

7.2.6 DOSING ARRANGEMENTS:

From the flow meter the contractor shall provide a transparent and flexible dosing line to his dosing point in the works inlet. Dosing shall be at a low level in the flash mixing chambers.

7.3 CHLORINE (DESIGN CRITERIA):

The contractor shall provide sufficient chlorination capacity to enable the works operational staff to maintain a free chlorine residual of 1.0 mg/l leaving the treated water tank at any time of six month period.

The contractor shall take into account that pre chlorination pressure feed type is essential as an algaecide, considering the qualities of raw water and also to enhance treatment or improve dicer section and to maximize the bacteriological and viral kill. The Contractor shall provide min. 3 nos. of chlorine toners for pre chlorination. Gaseous Chlorine shall be drawn from a chlorine drum of 950 Kg. (Tone).

The chlorine drum store shall have a peak capacity for seating 10 drums. The drum store shall have over-head traveling lifting beams. It should be noted carefully that the cost of 3 filled chlorine toners is to be included in their cost by contractor (2 on line and 1 in store).

The contractor shall provide minimum 3 nos. of Chlorine toner for gravity type chlorinators for post chlorination to pure water flows, along with solutionizer gas cylinder controls and injection mechanism, including the process water provision.

Dosing lines from the Chlorination shall run in duplicate the filtered water collection channel.

7.3.1 CHLORINE DEMAND AND ANTICIPATED DOSE RATES:

The conceptual design based on raw water characteristics adopts the following rates of dosing :

Pre chlorination	:	5 mg/l maximum
Gravity feed type	:	3 mg/l average.
Post chlorination	:	3 mg/l maximum
Gravity feed type	:	2 mg/l average.

The contractors shall supply the chlorinators of the capacities shown below, based on the rates of dosing set out herein.

Pre-chlorination	:	Gravity feed type.
Propose system	:	Chlorination plants 6 kg/hr capacity with pups, piping, valves including toner 3nos.
Post chlorination	:	Gravity feed type.
Proposed system	:	Chlorination plants 4 kg/hr capacity including piping, valves and toner 3 nos.

Note : 100% standby capacity - for post chlorination should be provided.

7.3.2 CHLORINE DRUMS:

The Chlorine tonners shall be supplied by Contractor and same should be filled by contractor at the time of 1st supply.

The drums shall each have a normal capacity of 950 Kg. liquid chlorine available above 1 bar pressure. They shall be standard Indian manufacturers without fusible plugs and shall be of the type manufactured to the design approved by M/s Imperial chemical Industries. Each drum shall be fitted with ringed or removable protective valve cap. The drums shall be painted yellows with black concave ends and shall have the words "Liquid Chlorine" with the gross and net weight stenciled on the side in Kg. size and capacity with his tender, shown on the drawings with two rows of 3 drums cradles providing space for stock containers. Drums in storage section shall be at sufficient distance from one another for ease in handling.

To handle the drums to contractor shall provide an overhead traveling gantry arrangement with rails brought out of the building to lift the drums directly from the truck. The gantry arrangement shall be with manually operated hoisting and bi-directional hand chain operated travel.

The gantry shall have an operational design capacity of at least 3 tones be provided with safety type of hook, a drum lifting beam, an intermediate drum weighing machine and an manually hoist control pendant.

The contractor shall arrange the layout the store ceiling height and be elevation of the gantry arrangements to permit any drum to be lifted from any credit or plinth for transfer to any location within reach of the gantry or the loading vehicle. All drum impositions shall be served by a gantry and the clearance shall be such as to enable the drums to be loaded in a standard vehicle with the weighing machine attached and at least 70 mm. clearances between the drum in transit and the top of any drums already in position on the vehicle. The doorways shall be to outside area and shall be detailed as outward opening. Sufficient numbers of ventilators should be provided at floor level. The rooms should be moisture proof.

7.3.3 LIFTING BEAM:

The contractor shall supply a purpose made rigid chlorine drum lifting beam for use with gantry hoist. The beam shall have a central lifting eye, rotating shrivel and have hinged steel hooks designed to accurately and safely hold the end drum runs.

7.3.4 WEIGHING MACHINE:

The drum weighing machine shall be of the platform with level type 1 No. with 1500 Kg. capacity full scale deflection and one no. of a 2000 Kg. safe working load capacity dial type machine with platform. The machine hook attachment shall be fitted with a safety type catch.

7.3.5 GAS LEAKAGE DETECTION:

Automatic gas leakage detectors are not required to be provided. The contractor shall however, provide four ammonia bottles with elaborating wicks and shall instruct the staff on their use.

One emergency drum leakage repair kit type - B shall be provided.

7.3.6 FORCED VENTILATION :

The contractor shall provide forced ventilation equipment in the chlorine store and chlorination room which shall be manually controlled by external switches outside the rooms at each door way. The ventilation systems to be provided shall have a capacity of 15 air changes per hour upon operation of any one switch for the store and chlorine rooms and shall extract air at ground level outside the buildings.

The contractor shall provide all the purpose made ducts and outlets required.

The ventilation fans and blowers shall either be inward blowing at high level (with non-dosing vents at low level) or shall be outward blowing at low level and if the latter option is selected by the contractor the machines shall be suitable for use in a damp chlorines atmosphere. At the very least they shall be carry were external constructions with glazed clay blades.

▪ CHLORINATORS :

Each of the two gas metering chlorinators of requirement and types set out vide clause No. 7.3.1 shall have the following facilities.

- (a) Manual adjustment of dose rate.
- (b) Substantially liner scale.
- (c) Internal gas inlet pressure reducing valve.
- (d) Safely vent to be pipes to external atmosphere.

(e) Pressure / Vacuum relief valve.

The chlorinator shall be arranged in a separate moisture proof chlorine room. The chlorine room shall be accommodated in connection with chlorine drum storage on the ground floor of chemical house and arranged for a separate access from outside of the chemical house. The contractor shall provide an air-tight glazed partition or window in the chlorinator room to enable the staff to inspect the dose rates without entering the room.

Adequate externally switched lighting shall be provided and detailed by the contractor on his drawings.

Apart from the chlorinators no other equipment shall be accommodated in the chlorine room. Door-ways to the room shall be shown as outward opening and preferably to the building exterior.

7.3.7 CHLORINE GAS PIPE WORK VALVES AND PRESSURE GAUGES :

The contractor shall include suitable pressure reducing valves to limit the pressure delivered to 2 bars.

The standards required for the pipes and fittings shall be :

- i) Pipe work chlorine gas shall be mild steel seamless to B.S. 3602 C.D.S or H.F.S or electrical resistance welded pipe to B.S.3602.
- ii) Pipe couplings shall be with British standard H flanges (Front and back welded) using ring joints tagged, made of 1/16 thickness compressed asbestos fiber (CAF BS 2815 Grade-B).
- iii) Valves shall be of the globe type with forged steel bodies model metal spindles and valve heads with malleable cast iron valve seats Glad packing shall be of Teflon.

7.3.8 OPERATING WATER :

The contractor shall draw his water supplies from the back wash water tank and need not provide any facility for feeding the chlorinators from other source.

7.3.9 DOSING LINE :

Dosing line shall be provided for post chlorination points for the proposed system.

7.3.10 DOSING POINTS :

The exact dosing points for post in chlorination are as below :

Post chlorination proposed sys. : Pure water channel in the filter house.

Pre chlorination Proposed Sys. : Raw water intake chamber.

7.3.11 SAFETY EQUIPMENT AND STANDARDS :

- i) Two Nos. canister type respirators with full-face coverage masks suitable for chlorine gaseous atmosphere.
- ii) Ten spare canisters for the respirators.
- iii) Two sets of self contained compressed air breathing apparatus complete with working and two spare air cylinders.
- iv) Two external wall mounted glass fronted cabinets for the breathing apparatus.
- v) A facility to recharge the compressed air cylinder or from a self contained machine.

SECTION – 8

WORKS ANCILLARIES

8.1 GENERAL REQUIREMENT FOR WORKS ANCILLARIES :

In addition to the mainstream treatment process works the contractor shall provide (design and sump all the other facilities, services and ancillary works required for necessary on site to support or complement the treatment process and to provide a complete reliable and operable treatment works in accordance with the intent and spirit of the specifications.

Tendering contractors shall include all the ancillary equipment and facilities specified herein as the minimum requirement. Should the contractor consider the specified minimum facilities are insufficient, he shall provide any additional items of plant or ancillary works that he consider necessary. Should the contractor consider certain items specified would serve to use or function his own design, he may omit them, provided he makes specific mention of them in his tender submission, fully discusses the matter and presents a reasoned argument for the commission or reduction in the minimum specified requirement. The relevant clauses shall be quoted in submission. The contractor's tender submission shall be deemed to include all the ancillaries for his own designs and this specification.

8.2 PROCESS SAMPLING POINTS :

The contractor shall provide sampling points generously throughout the works to permit proper and adequate monitoring of the treatment process chemical solutions, chemical design and the works performance.

Samples shall be locally obtainable at appropriate points in the process and taken to the works laboratory quality monitoring instruments.

8.2.1 LOCATION OF HAND SAMPLING POINTS :

Hand sample shall be made available from at least the following points :

- i) Incoming raw water.
- ii) Pre chlorinated water prior to addition of the coagulant.
- iii) Coagulated water in the measuring flume.
- iv) Flocculating water in the measuring flume.
- v) Combined supply to the filters.
- vi) Filtered water from each filter.
- vii) Filtered water prior to chlorination.
- viii) Filtered water immediately after chlorination.
- ix) Final treated water existing upon from the chlorine contact tank.
- x) Supply in each of the outlet mains leaving the works.

8.3 HAND SAMPLING POINTS :

Hand sampling shall be (as appropriate) by disposing tanks, channels, chamber etc. or by piped supply to conveniently positioned bib taps. The contractor shall ensure that his arrangements permit ready access to all the required sample points and handholds are appropriately provided for the sampling throughout the works. Sampling apparatus, containers, etc. are to be provided by the contractor with the laboratory equipment. Sample pipe work shall be in H.D.P.E bib taps in brass with cruciform handles and each sample arranged to enable a liter sample to be taken within one minute. A brass drainage tundish at least 0.02 m² square shall be positioned 400 mm. under each tap and its drain piped to waste.

Sample taps shall generally be about 1 M. above floor or access level and be identified by an adjacent wall mounted notice 30 mm x 150 mm. (block lettering on a white background).

8.4 QUALITY CONTROL MONITORING INSTRUMENTS :

The contractor shall provide sufficient permanently installed quality control monitoring instruments on line type to enable the works operators to monitor the performance and sufficiency of the treatment processes.

The quality control monitoring instruments shall be of simple mechanical type.

To monitor the process, at least following shall be provided and located in the laboratory situated on the upper floor of the chemical house.

- i) Raw water prior to chemical dosing -
 - pH indicating meter.
 - Turbidity indicating meter.
- ii) Incoming water to the filter battery -
 - pH indicating meter
 - Turbidity indicating meter.
- iii) Filtered water prior to the addition of chlorine -
 - Turbidity indicating meter.
 - Turbidity record on a strip chart.
- iv) Final treated water leveling the contract tank.
 - pH indicating meter.
 - Chlorine residual indicating meter.

8.4.1 TURBIDITY METER :

SPECIFICATION :

Range	:	From 0 to 500 NTU in four decades. Range of 1,10,100 and 500 NTU .
Accuracy	:	+/_ 1% of full scale in 10 and 100 NTU range. +/_ 2% of full scale in 1 and 500 NTU range.
Drift	:	
Oscillation	:	0.02 NTU due to particle movement.
Supply	:	230 V AC + 10% at 50 Hz.
Power	:	
Consumption	:	25 VA approx. (*Subject to accuracy of calibration standards).

8.4.2 ACCESSORIES :

- i) Box containing 4 Nos. of matched flat bottom test tube of size 23 x 80 mm.
- ii) Cell raised for 0.500 NTU range.
- iii) Light shield.

8.4.3 CHLOROSCOPE :

SPECIFICATIONS :

- (1) Range : 01, 0.2, 0.5, 1.0, 1.5 and 2.0 ppm.
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8.4.4 PH - METER :

- 1) Specification :
 - P.H. Range : 0 to 14 pH
 - Mill Voltage : 0 to ++ 199 MV
 - Temporary Range : 0 to 100 degrees C.
 - Resolution P.H. : 0.1 P.H.
 - Mill volt : 1.0 MV
 - Temperature : 0.2 degree C.
 - Repeatability : + 0.01 PH + 1 DIGIT
+ 1.0 mv + 1 digit
+ 0.2 degree C + 1 digit.
 - Stability : 0.01 PH as per hour.
 - Standardization : + 1 PH approx.
 - Range.
 - Display : 7 digit 7 segment
: LeDs (e for temp. and 4 for PH)
with auto polarity and decimal
point Mode annunciation by LED.
 - Power Supply : 230 VAC + 10% 3- HZ
 - Accessories : Electrode
Electrode stand
Instruction Manual.

8.5 MAIN LINE FLOW :

The requirement in the works shall include the following main monitor :

- Main - Line flow
- Local rate of flow measurement at the inlet works flume.

8.5.1 CHEMICAL TANKS :

Chemical solution tanks levels :

- Local calibrated indication only on the depth of chemical stock tanks by glass tubes or float and level stick devices, as appropriate.

8.5.2 OTHER MEASUREMENTS :

Time in the chemical house and the filter gallery transmission of each water rate to the filter gallery. Filter air scour pressure.

Depth of chemical stock tanks by glass tubes or float and level stick devices, as appropriate.

8.6 WORKS MINIC DIAGRAM :

The contractor shall provide a minic diagram of the process and pumping installations for display in the office located on the upper floor of chemical house. The diagram shall be wall mounted and at least two meters long and one meter high. It shall be manufactured in rear engraved perplex and arranged and coloured to illustrate a schematic of the main flows and processes in the treatment plant. The contractor's proposal shall be submitted with this tender and the final design shall be submitted to the Engineer for approval prior to manufacture.

8.6.1 NOTICE BOARD :

The contractor shall provide a wall mounted notice board in the chemical house and filter gallery to enable current operational data on the works to be displayed. The board shall be 3 m² in area and suitable for the display of colored plug in lettering and numerals on a white perforated background. Sufficient colour lettering and numerals shall be provided in 4 distinct colour to enables shall be provided in 4 distinct colour to enable the board to be completely filled in any two of the four colours.

The board and lettering shall be of standard Indian manufacture.

8.6.2 WORKS PLAQUE :

The contractor shall allow in his tender for all provision of a solid cast bronze wall plaque which shall be "unveiled" at an opening ceremony following the commissioning of the works.

The plaque shall be manufactured to a design to be provided by the Engineer. It shall be not more than 500 x 1000 mm. area, 10 mm thick with raised lettering commemorating the occasion.

8.6.3 CONTRACTORS NAME PLATE :

The contractor may, if he so wishes, erect his own name plate in the works. The plate shall not exceed 400 mm x 600 mm. The design inscription and location of the plate shall be to the approval of the Engineer.

8.7 SERVICE WATER AND PRESSURISED SUPPLY :

Pumped and gravity service water systems shall be provided by the contractor to enable a supply of chemical solutions, cleaning the works, housing down external and internal structures, chambers and channels, flushing chemical feed pipes, domestic supply and any other purpose required by the contractor's design.

8.7.1 CHEMICAL HOUSE SERVICE WATER :

The Contractor shall arrange for pressure water supply to chemical house, by tapping the wash water line, what conveys pressure water from the back wash water reservoir on top of chemical house. This wash water line is to be supplied by the Contractor and is included in the filtration works. Pipes work fittings etc. shall provided by the contractor to ensure that adequate supplies are available for the works and that any two stock tanks can be filled with water within 20 minutes.

8.8 WASTE DISPOSAL :

The Contractor shall arrange the works and shall made provision for the removal of all waste products by gravity flow from the various units to the through sludge collection chamber to be provided by the contractor outside the campus. Waste waters shall be removed from site in a closed conduit generally. Waste disposal shall be by gravity and it ground level do not permit contractor has to provide waste disposal pump and dispose the same by pumping nr. nala at his own cost. Particular attention shall be paid to facilitate cleaning of alum tanks, channels etc.

8.8.1 INTER CONNECTING PIPE WORK AND DRAINS :

The Contractor shall provide all the inter-connecting pipe work required in the works to provide a complete operable works. He shall include in his supply the waste water discharge main connected with all the branches provided to collect and dispose the waste products from the works finally leading to final sludge collection chamber. Tendering contractors shall specify the rate of flow, falls, diameters and levels of all drains leading from any part of the works arranged by them in order to suit their own design. These details together with complete calculations shall be included in the tender submission. The contractor shall indicate at the time of tendering the location and required capacity of all drainage points which he requires for the satisfactory operation of the works. The complete drainage requirement shall be finalized by the contractor within 4 months of the date of acceptance of the tender.

The materials to be adopted for piping shall be as below :

Inlet works clarifier feed pipes	C.I. LA Class pipes/DI-K9
Filter water main all by pass lines	C.I. LA Class pipes/DI-K9
Back wash water lines from proposed filtration works to drainage.	C.I. LA Class pipes/DI-K9
All drainage branches from the works to the sludge carrying main.	C.I. LA Class pipes/DI-K9
Sludge carrying main	C.I.Pipes under concrete floors.
Under drain laterals in filter boxes	PVC pipes.(10 kg/cm2)
Under drain manifold and piping in the pipe gallery of filtration works.	C.I. LA Class pipes/DI-K9

Service water distribution	G.I. Pipes.
Alum solution line	H.D.P.E. Pipes.

The contractor shall include all the jointing materials and test rings required for the installation and testing of any of the pipes works to be laid and shall specify the exact location of the line falls and levels required. Unless otherwise specified all inter connecting pipes work, underground pipe work and pipes to be built into structures shall be cast iron and where the built in pipe is through a water retaining concrete wall it shall incorporate an integral puddle flange.

8.8.2 CHEMICAL WASTE AND DRAINAGE FROM THE WORKS :

The drainage from all the works including chemical works, inlet works, clarification works and filtration works shall be collected and carried in a common drain carrying main leading to a natural stream through a sludge collection chamber.

The domestic sewage from the latrines and toilets in the chemical house, shall be collected separately, and treated in a septic tank, and the effluent shall be connected to the common carrying main.

The contractor shall arrange the work layout and details to enable any part of the works (Wet chambers channels, tanks, reservoirs etc.) to be gravity drained and arranged to empty out or drain down the contents within a reasonable period in all weathers.

8.9 GENERAL :

The contractor shall design provide and install at least following items set out herein :

- i) Process sampling points
 - ii) Quality control monitoring instruments.
 - iii) Flow and depth monitors.
 - iv) Works mimic diagram.
 - v) Notice Boards.
 - vi) Works plaque.
 - vii) Chemical house service water.
 - viii) Serviceable supply.
 - ix) High pressure water in case of tenders own design if required.
- Inter connecting pipe works which include by passes, from inlet works to proposed filtration works from proposed clarifier to existing filtration works (Filter influent channel) from existing common filter influent channels to proposed common filter influent channel, from proposed water intake chamber to existing water intake chamber. All the bye passes shall provide in C.I.L.A. Class Pipes.
- Drainage branches from each work, to chamber, tank, channel etc. to the common drainage line including providing common drainage lines and chambers.
 - Septic tank with soak pit to treat domestic waste including providing and connecting the effluent from the soak pit to the common drainage line.
- x) Disposal of liquid waste products from the works the natural stream through drainage collection chamber.

SECTION-9

ELECTRICAL POWER INSTALLATION

9.1 GENERAL:

Elaborate Laboratory shall have to be provided under the scope of works. For the proposed treatment works owner shall arrange 440 V power at a convenient point within the site.

Capacity, which will fulfill the present and proposed demand, is proposed under this head. Main power station for achieve the power from GEB located in layout plan. From main power station transformer onward works shall be carried out by contractor at his own cost. The works shall include.

9.2 SUPPLY TRANSFORMER & POWER CONTROL CENTRE:

An electrical power control centered sheet steel construction (Min 2.5 mm thick) comprising of three current transformers, one air circuit breaker with a symmetrical breaking current of 100 A. four outgoing feeder to various points volt meter, selector switch with ammeter, power factor meter, and three R, Y, B indicating lamps shall be provided.

- i) Motor control center - 1
- ii) Motor control centre - 2
- iii) Lighting panels
- iv) Capacitor feeder.

9.3 MOTOR CONTROL CENTRE-1: (RECIRCULATION PUMP & AIR BLOWERS)

The control center shall be of sheet steel construction (2 mm thick) and shall comprise of one, incoming switch fuse unit rated at 500 V/100 A with fuse element 80-A. Five outgoing lines with one spare rated at 500 V-32-A with a switch fuse unit, fuse element rated at 25-A six outgoing lines with one spare, rated at 500-V-16A. With a switch fuse unit, fuse element rated at 500 V/32-A, with switch fuse unit, fuse element rated at 20-A.

This shall also comprise of appropriate rated outgoing lines, one timer, three over load relays, one single phase preventer, three indicating R, Y, B lamps.

Each of the units getting fudged from MCC-1 with a power requirement less than 7.5 HP shall. be provided with local push button (ON-OFF) controls and the ones with a power requirements more than '7.5 HP, up to 20 HP shall be provided with Star-Delta Starters.

9.4 MOTOR CONTROL CENTRE-2 (MIXERS, CLARIFIER BRIDGE, FLOCULATOR DRIVES SLUDGE SCRAPER ETC.)

This shall beef sheet steel construction 12 mm thick) and shall comprise of one switch/fuse unit rated at 500 V/250-A, fuse element 200)-A on the incoming feeder four going lines with one spare and with switch/fuse unit on each of the lines, rated at 500/V 100-A, fuse element 50-A one timer three overload relays, one single phase preventer, push buttons for start, stop, reset, three R, Y, B, indicating lamps, one local remote switch.

Each of the above feeders shall have an Ammeter selector switch and an ammeter connection through current transformer, autotransformers and contactors indicating lamps (Start, stop, and trip).

9.5 MAIN LIGHTING BOARD:

One of the feeders from PCC shall supply power to the main lighting board with a switch fuse unit 500 V/100-A, and an energy meter. Supply for four sub-lighting distribution boards shall be obtained from the main lighting board, where from supply shall be made available from required out door and in plant lighting through appropriate cabling, with convenience on-off switches.

9.6 CAPACITOR FEEDER:

A feeder from power control center to the capacitor shall be provided with switch fuse unit 500-A/150-A with fuse element 100-A switch shall control for sub feeders with switch fuse units 500-A/32-A with fuse element 25-A.

9.7 OTHER REQUIREMENTS:

All the electrical equipment shall be suitable for the following site conditions.

Attitude Less than 200 M

Ambient temperature 60 degree C.

Voltage variation 1+/- 6%

Frequency variation 1+/- 3%

Necessary protective devices to cope up with the above condition shall be provided.

9.8 POINT WIPING & CABLING:

The internal electrical point wiring shall be either of not dipped galvanized or PVC.

All other cables shall be armored aluminum conductor PVC sheathed and shall be adequately rated. The chlorination room shall have vapor proof and corrosion proof lighting fittings.

9.9 LIGHTING LEVELS:

(A) Within filter Plant

It includes 15 AMP light point - 5 nos.

(a) Tube light point including cost of tube light - 30 Nos.

(b) Fan point incl. Cost of fan ISI mark - 10 Nos.

(c) Bulbs point incl. Cost of bulb - 40 Nos.

(d) Sodium lamp with weather shed post cable switch etc. - 5 Nos.

(e) Flood light 500 watt - 1 No. & 200 Watt- 4 Nos.

(B) Outside plant on plant building 500 volts Sodium Vapors lamps with weather proof fixture - 5 Nos.

SECTION -10

MATERIALS & WORKMANSHIP

10.1 INTRODUCTION :

This part of the specification sets out the general standards of the materials, workmanship and plant design to be supplied by the Contractor and mention of any specific materials or plant does not necessarily imply that such is indulged in the works.

The Engineer shall have power to reject defective parts of parts thereof, which do not comply with the specifications. The contractor at his cost shall replace such parts.

COMPLIANCE WITH STANDARDS :

Where reference is made in this specification to a standard or code of practice issued by the Indian Standard Institution or the British Standard Institution or their equivalent, this shall be deemed to refer to any of the standard or organization referred to in this specification.

Only standards amended to date shall be for reference and where it is not specifically stated, the works 'or equipment' shall apply.

10.2 CEMENT SPECIFICATION P CHEMICAL REQUIREMENTS

10.2.1 ORDINARY PORTLAND CEMENT :

When tested in accordance with the methods give in IS 4032-1968 low heat Portland cement shall comply with the following requirements to its chemical composition.

The percentage of lime after deduction of that necessary to combine with the sulfuric acid hydride percent shall be :

Not more $2.4 (\text{SiO}_2) + (1.2 \text{ Al}_2\text{O}_3) + 0.65 (\text{Fe}_2\text{O}_3)$

Not less than $1.9 (\text{SiO}_2 + 1.2 \text{ Al}_2\text{O}_3) + 0.65 \text{ Fe}_2\text{O}_3$

Note :

Each symbol brackets refers to the percentage (by mass of total cement) of the oxide excluding any contained in the insoluble residue referred to at Sr. No. (iii) of Table-I.

10.2.2 In all other respects low heat Portland cement shall comply with the requirements specified at Sr. No. (ii), (iii), (iv), (v) and (vi) in Table -I.

11. GENERAL SPECIFICATIONS

INSTRUCTIONS

The electrical installation shall comply wherever applicable with current codes and standards of Indian Standards institute IS-732-1968 IS Guide for electrical layout in residential buildings.

QUALITY AND WORKMANSHIP :

All the materials, fittings, used in the electrical installations shall conform to the Indian Standard Specification wherever these exist. In the case of materials for which Indian Standard Specifications do not exist, samples shall be submitted for the Engineer's approval.

11.22 ELECTRIC MOTORS:

Squirrel cage induction motors suitable for 425 V+ 6% phase 50 Hertz + 3% A.C. supply shall be provided. All motor shall be totally enclosed, fan cooled, capable of running continuously at a brake horse power not less than 10% in excess of that absorbed by the plant under any operation conditions.

Ambient Temperature	50 ⁰ C
Insulation	All motors shall be insulated with Class-B insulation's.
Enclosure	Enclosure for indoor use shall be pun and for outdoors use IP 55 as per IS:4691.
Cooling	Cooling shall be ICO 141 as per IS:6362
Bearings	Bearings shall be plain or roller type. Bearing number shall be punched on the nameplate of each motor.
Terminal Box	Terminal box shall be suitable for aluminum cable and can be rotated in 90 ⁰ .

11.23 MOTOR CONTROL CENTRE :

M.C.C. shall be free standing, single, front non-drought compartmentalized. Similar to Semen's CI sheet CI portion shall be given decreasing, defusing phophating and passivation treatment followed by 2 coats staved primer and 2 coats of final paint staved enamel M.C.C. enclosure shall be IP 42.

BUSBARS :

Electrolytic copper bus bars of a rating 50 mm x 6 mm ! phase and 25 mm x 3 mm / Natural shall be provided. Bus bars shall be supported by cast raisin insulators. Porcelain insulators are not acceptable. The Mechanical and electric strength of bus bars, connections and supports shall be able to withstand the worst conditions of electrical short circuits, bus bars shall be housed in a top bush or chamber of the M.C.B. and shall be wrapped with colour coated polyester taps. A earth bush of 25 mm x 3 mm shall be provided at the bottom of the M.C.C.

SWITCHGEAR :

All the switcher components shall be either Simmons/Larsen and Turbo Culture Hammer E.E. make only. All switches shall be interlocked with the door. Such the door cannot be opened while the switches are in "NO" position. Terminals shall be of Elemex make.

WIRING :

Inter panel wiring shall be done with 650/1100 V grade P.V.C. insulated copper wire only. Minimum size of power wire shall be 4 sq. mm and control wire 2.5 sq.mm.

20% spare feeders of starter 1 No. feeder for lighting and 1 No. feeder for welding shall be provided.

11.24 CAPACITORS:

Motor shall is necessary be provided with separate capacitors to correct the power factor of the machine to 0.90 lagging or above. Unless otherwise specified all capacitors shall be of the sealed unit pattern, comprising paper, foil or plastic film impregnated with oil or synthetic electrolyte. Capacitors shall comprise assembly of units mounted on frames with suitable trucking screening inter-connections or shall be housed in ventilated sheet steel enclosures. In either case capacitors shall be complete with all necessary inter-connections, discharge devices, protective fuses and terminals for the connections of a 3-core supply cable. A removable underlined cable gland plate shall be provided.

11.25 CABLES:

All power and control cable shall be 650/1100 grade PVC insulated, round wire/flat wire armored PVC overall sheathed as per IS 1554 minimum size conductor for power and control cable shall be 2.5 sq.mm copper. Cables for motor rates below 7.5 H.P. shall be provided with 6 sq.mm. aluminum conductor contractor shall offer cables after considering debating factor like ambient temperature, grouping, factor etc. Cable shall be of CCI/ICCI/Asian Cable/Fort glisters make only.

11.26 LIGHT FIXTURES :

All equipment rated 220 V above shall be earthen with copper wire/strips at a minimum two places and equipment rates below 220 V shall be earthen at one place. An earthing loop shall be provided and connected to main earthing grid. Also minimum two earth pits shall be provided. Earthing for lighting arrestor shall be provided separately.

11.27 INSTALLATION METHODS:**(A) GENERAL**

All cables where required to be run on walls ceilings or other building structure shall unless so otherwise agreed by the Engineer be secured on tray or enclosed in conduit or trucking.

Every cable whether in or out of sight shall be neatly run vertically, horizontally or parallel to adjacent walls, beams or structural members. Where the building structures incorporate purpose built covered duct/trench systems for main cables, heavy cables may be laid on the floors of such trances but shall power cables, control protection and instrumentation cables shall be segregated and installed on tray work or otherwise secured to the walls of the trenches. Where the structures incorporate general service deducts/trenches containing pipe work, chemical and other services all cabling shall be segregated from other service and run on the trench walls. Throughout the

installation due regard shall be paid to the spacing of cabling maintain current ratings, to prevent interference between power and signal cables and to avoid unnecessary crossovers.

All cabling throughout the installation shall be fixed with purpose-designed clamps, clots or saddles. Saddles for small power and control cables may be fabricated from PVC covered metal strapping. Self-locking plastic buckle clips and strapping shall not be used.

(B) TRAY :

Cable trays shall be of perforated Mild Steel with formed flanges and PVC sheathed throughout or approved rigid plastic. Where steel trays are not end shaped on site out edges shall be painted with at least two coats of polyurethane based painted. Where steel trays are not end shaped on site out edges shall be painted with at least two coats of polyurethane based paint. All boles for fixing cables clips, rocks, trays, cleats, and appliances to the building structure shall be made neatly with a rotary drill, not of the percussion type. A simple shot cartridge tool may be used only at the discretion of the Engineer. Any damage caused by the Contractor to surface shall be made good by the contractor to the satisfaction of the Engineer.

(C) CONDUIT :

All circuit shall be either hot dipped galvanized or rigid PVC Stove enameled conduit shall not be used without the written permission of the Engineer Conduit shall be run on the surface or sunk as specified, be neatly arranged and ways shall be provided for additional conduits at all distribution boards. The sizes of conduit used shall be determined by the number of cables to be drawn in as scheduled in the I.E. regulations or as specified for a particular position but in no case shall conduit smaller than 20 mm dia meter be used. Sunk and concealed conduit systems shall support fittings independently or any false coiling. The conduits shall be screwed into spout outlets of conduit boxes or where fixed to boxes drilled with properly sized clearance holes they shall be secured by means of sockets and hexagon bushes. All threads shall be cut clean and all burs shall be recovering with a reamer.

All bends and sets shall be formed in the conduit itself, factory mead bands not being installed without the written permission of the Engineer. The radius of beans shall not be less than that given in I.E. Regulations.

Standard junction or adaptable boxes shall be provided at all junctions and at sharp changes of direction in addition to any other special position where they are called for by the Engineer on site. Steel or malleable cast iron inspection couplers may be used in long run to facilitate drawing in cables. Particular care must be tank to ensure that no water is allowed to enter the conduit at any time and all conduits shall be arranged with adequate ventilation and drainage where necessary as directed by the Engineer. In accessible junction boxes will not be allowed. Only continuous lengths buried conduit shall be installed between boxes, no joining boxes being allowed in the floor screws. Conduits crossing expansion joints shall be fitted with couplings of approved manufacture with an earthling clip at each side of the coupling, connected by correct size of tinned copper standard wire. The ends of conduits laid or set in formwork prior to converting shall be temporarily sealed off with a coupler and a solid brass plug.

Fixing to surfaces of walls shall be by means of spacer bar sad secure be fixed with screws Where conduits are concealed or laid in constructional floors, they shall be held in position with substantial fixings of a make and pattern to be approved by Engineer. They are to be of the

screwed pattern and stove enameled black inside and out, except where used in conjunction with galvanized conduit, where they shall be galvanized by the hot process. All conduit fittings not carrying accessories shall be supplied with flat covers fixed in position with round head brass or related screws. Rubber gaskets being utilized where galvanized conduit is specified.

Adopter boxes shall be constructed of minimum 2.6 mm sheet steel or best quality cast iron finished as previously detailed for conduit boxes & sized to prevent the undue packing of cables in them. Whether proof boxes & accessories shall be used outdoors, where agreed on site by the Engineer or where indicated on the specifications and drawings.

Conduit shall be installed such as to permit complete requiring without the need to remove false ceilings or carry buildings work. Cables for drawing into conduit shall be single core PVC insulated, non-sheeted, 1000 V grade & shall be colored to indicate phase and neutral carried in accordance with the i.e. Regulations, care is to be tank in the number of cables in conduit and in no case shall conduit enclose more cables than set out in the i.e. Regulations. No single conduit serving a single-phase socket outlet lighting point or switch shall contain more than one phase.

Wiring shall be carried out on the looping in system & no joints other than at looping in points will be allowed.

Junction adopter boxes shall be made from galvanized steel or rigid PVC as appropriate to the type of installation & be provided with gasket flat covers secured with brass or plates screws.

IDENTIFICATION :

Each & Every cable shall be permanently identified at each by its cable number as shown on the cable schedule. Cable markets shall comprise semi-rigid blade PVC carryover strip & small axially by means of two PVC covered aluminum strips (Beta strip) with buckles.

Cable makers shall also be installed at entry and exist points of buried ducts, exists from buildings & in such other positions as are necessary to identify & trace the route of any cable. All power cable shall be connecting phase sequence & phase colour coding is preserved throughout the system. All such cables shall be identified with phase colors for 3 & 4 wire system and red and, black for single phase.

On rotating plant where to achieve the required direction of rotation it is not possible to connect the phase cores to the appropriately identified terminals then special core ferrules shall be fixated to identify each core with the terminal to which it is finally connected. In addition, control cables shall have individual cores identified by means of suitable permanent ferrules hearing the same numbers at both ends. Core identification shall occur at every point of termination using an approved system of ferrule market. At these points of interconnection between wiring ferrule shall be provided on each wire. The change on numbering shall be shown on the wiring diagrams of the equipment on which the care made. Where the termination of control cable cores or the supervision of termination of cores is specified as being the responsibility and contractor, the terminations of certain control and instrumentation cable, any necessary temporary means of more identification shall be agreed with that contractor.

ELECTRICAL INSTALLATION RECORD DRAWINGS :

Approved drawings of the installation shall if necessary be modified or updated during the progress of the installation and shall form the basis of the record drawings for the complete installation. Record drawings for cabling and earthing installation shall include route drawings block diagram and cable schedules. Within buildings record cable route drawing shall show to scale the location of all items of electrical plant, the route & method of installation of all cables, e.g. Ontario. In trench on hangers, induct, conduit etc. External cables route drawings shall show.

- i) The route of the buried cable
- ii) The depth of lying including any deviation to avoid local observations encountered during installation.
- iii) Positions of joints, test terminal points, dropouts etc, located from market posits of another agreed key point.
- iv) Distances of cable runs from pipe runs so far other buried services.
- v) Position of earth electrodes, earth rods disconnecting chamber and interconnecting earth straps.

SOCKET OUTLETS :

A) WIRING :

Unless otherwise specified wiring shall be carried out in PVC cable minimum conductor size of 2.5 mm carried in truckling and/o; conduit throughout.

B) FITTINGS :

Socket Outlets shall be connected in a 15A man system or shall be sputa feeds. All socket outlets shall be of me shuttered type and shall accept two pole and earn flat on plugs and have switches with a dolly type ever either fully recesses or having a raised surround to prevent inadvertent operation. They shall be of a metal clad type with Matt chrome finished cover plates and be flush mounted unless fitted decoratively finished walls or pillars where surface mounting will be accepted. Mounting boxes shall be steel incorporating an earthing terminal and shall accommodate conduit entry for flush mounting or surface mounting.

SECTION- 12

INSTRUMENTATION AND CONTROL

12.1 GENERAL :

The following parameters are to be monitored on sample-to-sample basis in the plant laboratory ;

- a) Quantity of water.
- b) Quality of water.
- c) Head loss through the system.
- d) Quantity of chemicals.

The contractors are requested to note that instrumentation and control system shall be so designed, manufactured and installed as to ensure the highest standard of operational reliability. The contractor may be required to produce proof of reliability in past operation or in type testing. All instruments are to be simple and sturdy. Maintenance shall be facilitated by designing the instrumentation and control system to use the smallest number of different designs or instruments and components. All measuring instruments shall be installed in accordance with the recommendation or instruction of the instrument manufacturer for the particular application.

The contractor shall give the details of instruments offered for monitoring and control of the entire plant including control panel details.

12.2 QUANTITY OF WATER :

Direct dial reading flow meter shall be installed at the works inlet. The indication is to be monitored to the filter control room where a similar on line shall be provided. Direct or dial-reading flow meters shall also be installed at the outlets of individual filter beds. The range of the flow meter at the inlet shall be between 0 to 500 liters/Sec. and for individual filters the range shall be determined by the meters and the format for maintaining the record shall be detailed out in the instruction Manual. Reliable electronic digital type instruments may be offered in lieu.

12.3 QUALITY OF WATER :

The following parameters are to be monitored in the plant laboratory ;

Raw Water	:	Turbidity
		pH
Settled Water	:	Turbidity
		pH
		Total aluminum as Al(mg/l)
		Free residual chlorine.

In order to collect samples for testing necessary piping from the collection points to the laboratory shall be laid. so that all samples can be collected in the laboratory itself. The various collection points are specified in section 8.2.1.

All the chemical equipment's and apparatus shall be provided as specified in the section No.8 works ancillaries and section No.10 works laboratory.

SECTION - 12

TESTING COMMISSIONING AND MAINTENANCE

12.1 INSPECTION AND TEST AT MANUFACTURER'S PREMISES :

SHOP TEST :

All times the plant shall be liable to inspection and testing before dispatch at the manufacturer's premises or workshop to see that they confirm with the specifications. The relevant test certificate shall accompany the supply.

Some of the equipment may have to be tested when installed in position as may be deemed necessary or required by the Engineer or his representative who reserves the right to be present in all testing, whether conducted at the manufacturer's workshop or at site.

No materials shall be delivered to the site without inspection having been carried out or waived in writing by the Engineer or his representative to participate in testing. For plant commissioning, tests and trial runs, schedules suggested and agreed upon by the Engineer shall be followed.

12.2 TESTING OF THE PLANT - GENERAL :

The Contractor shall carry out all tests in plant and shall supply two copies of all tests results to the Engineer or his representative. All tests shall be to the approval of the Engineer or his representative who if necessary may require the tests to be repeated, postponed, or modified as may be necessary to ensure that all items of the plant conform with the contract. The Engineer's representative shall be permitted to inspect the plant, which is undergoing tests, and may he conduct the test on the plant. A reasonable notice shall be given by the contractor of his intention to conduct the plant test so as to enable the Engineer's representative to make arrangements for the supply of water or chemicals or power, etc. for any testing. After delivery or after testing, any item of the plant fails to achieve its intended duty or otherwise proves defective, it shall be modified or altered, and retested and reinserted as required by the Engineer or his representative.

12.3 PROTECTION OF PLANT :

Factory finished plant shall be adequately protected during transport and installation against damage to finished surfaces, fitted components etc. The contractor shall make good to the satisfaction of the Engineer any deterioration of the protective coating, erection, commissioning etc. until the plant is taken over. Finish painting of the plant site shall be carried out the plant has been taken over.

12.4 ERECTION AND TESTING :

12.4.1 ERECTION STAFF :

The contractor shall provide at least one approved Senior Engineer speaking working Erector to supervise the erection of plant in contract and to act as the contractor's representative. In case of a foreign firm based overseas the contractor's representative shall be thoroughly conversant with the manufacturer's plant and equipment, and its erection.

The contractor shall also provide sufficient erectors skilled in mechanical electrical and instrumental engineering, with such skilled, semi-skilled, and unskilled labour as are necessary to ensure completion of the various section of the contract in the time required.

The contractor shall not remove any supervisory staff or labour from the site without prior approval of the Engineer's representative. The contractor should make every effort to phase civil works so that sections of the works are substantially completed to a stage where erection can commence, to suit the program.

The contractor shall be responsible for setting all the plant, equipment and pipe work to the line and level required.

After erection of any item of plant and its associated equipment has been completed it shall be offered to the Engineer's representative may require the tests on completion to be conducted according to the availability of water, chemicals, power, etc. and also to the state of readiness of other items of plant essential to the commissioning of the work. Until such times as the equipment of materials installed and erected under the contract is finally accepted by the Engineer is keeping with the terms and conditions of this contract and associated specifications, the responsibility operation of the same shall be required to service the equipment and during start-up render such assistance as may be necessary or required for by the Engineer.

Where the equipment has not been supplied by the Contractor, the manufacturer's recommendations for installation of the same shall be strictly adhered to and any defects developing due to faulty installations and/or erection during start-up or during a period of one year from the date of final acceptance shall be rectified, remedied or made good by the contractor at his own expense.

The Contractor shall check all items of electrical plant for correct chasing and insulation resistance. Motors and control equipment shall be dried out and checks to the insulation resistance shall be carried out at regular intervals.

12.5 TESTS ON PIPE WORK, VALVES, ETC.

The contractor shall carry out the final tests on all pipe work, valves fittings etc. as per specifications. Any defect found there in shall be repaired immediately. The contractor shall also carry out all other tests required either by himself and/or the Engineer to approve the plant, and to comply with the control systems and processes, all plumps, all motors, gantry cranes and hoists, air compressors/blowers instruments, chemical metering devices, feeders, gauges and all components of the plant over the full range of operating conditions.

At the commencement of the commissioning of the plant, the same shall be put into operation under manual control and subsequently any automatic control equipment shall be completed, tested and brought into operation. During commissioning, the contractor shall supply all labour to supervise, operate, keep in operation, adjust, test, service, repair and to do all things necessary to keep the plant running along with the chemicals and power whether it is operation on water only with output to waste or with chlorine into supply. This shall include for the provision of such labour on a 24-hour a day basis during the testing periods and for such other periods of continuous operation as the Engineer's representative may consider necessary.

The commissioning of all plant shall be completed during the commissioning and trial run period of 1 month. The tendering contractor should note that the commissioning period might be extended by the Engineer if this proves necessary.

The contractor will bear necessary expenditure for commissioning and trial run period of three months. However, the bulk water will be supplied for the commissioning of the works free of cost. The contractor shall maintain, on site, a record book in English of all tests carried out and will hand over a certified copy of the same to the Engineer at the time of completion of the works.

12.6 DISINFECTION OF THE PLANT :

Prior to commissioning the component of the works, the contractor shall disinfect that particular section. He shall disinfect the entire work such as tanks, pipes, channels, etc. with water containing 50 mg/l of chlorine to the satisfaction of the Engineer, In case any part of the work requires to be retested or contamination may have taken place due to some reason or the other, the contractor shall report the process at his own expenses.

12.7 COMMISSIONING AND TESTING INCLUDING TRIAL RUN FOR THREE MONTH :

A month prior to the start of commissioning, the contractor shall submit to the Engineer's representative, after consultation with in a programme for the period of commissioning and tests. Commissioning shall commence after, all plant has been inspected to the satisfaction of the Engineer's representative.

During the Commissioning period, the contractor shall employ a commissioning representative who shall be a qualified Engineer or Chemist and who shall instruct the Engineer's staff if all aspects of the operating procedure.

12.8 TESTING ON COMPLETION :

Commissioning tests which shall be deemed to be the "Tests on completion" shall be of 8 consecutive days during four should be provision of water fail or other matters interfere outside the contractor's control, for such number of broken days as the Engineer's representative may commence till the previously mentioned tests and inspections have been completed to the satisfaction of the Engineer's representative.

The timing of the Commissioning tests will depend on the progress made on other contractors, the ability of the Engineer to arrange for the required flow of water through the works and may be carried out at any time during the commissioning at the direction of the Engineer.

The contractor shall allow for commissioning tests to be conducted at any time during commissioning without extra charge under the contract. The tests of completion shall show that the plant can fulfill all the mechanical, electrical and process requirements of the specifications.

12.9 TAKING OVER THE PLANT :

Following final inspection and when the Engineer is satisfied that the entire works have been completely constructed, supplied, erected, tested, commissioned and painted, all incomplete operable and reliable order, and when all specified test certificate documents and memos are supplied, the Engineer will issue a "Taking over" certificate, until such certificate is issued the contractor shall be responsible for making good any damage occasioned to the plant, however caused.

A taking over certificate defines the start of the maintenance period but its issue does not relieve the contractor of these obligations to complete commissioning.

12.10 MAINTENANCE PERIOD AND THE CONTRACTORS OBLIGATIONS :

The contractor shall employ the required Engineer, Chemist, Technical Staff, skilled labour, unskilled labour etc. for the maintenance and repairs, renovation, instruction and advise testing of raw water and treated water quality during the maintenance period on the basis of 24 hours operation and maintenance for a period of 3 months period of trial run and commissioning.

During the 3 months of trial run and maintenance the department will supply only the water. All other costs for material establishment and security cost will be borne by the contractor.

12.11 COMMISSIONING AND TRIAL RUN PERIOD OF THREE MONTH AND CONTRACTORS OBLIGATIONS :

- a) Supply the labour, materials power and plant for all routine maintenance and renovation of the work.
- b) Provide a scheme of training Gujarat Water Supply and Sewerage Board operators during running maintenance.
- c) Instruction to Gujarat Water Supply and Sewerage Board, operators in the maintenance and renovation of the work.
- d) Advice on the operating of the works.
- e) Carry out maintenance repairs of defects immediately.

During the period running maintenance (Trial Run) the working hours of the contractor shall be 24 hours daily.

The Contractor shall include in his tender (a) for work during working hours as designated above and (b) for any work of maintenance, repair, adjustment or testing outside such hours as called for by the Engineer. In the event of any emergency arising the contractor shall place his services and labour unreservedly at the disposal of the Gujarat Water Supply and Sewerage Board at any time.

12.12 INSTRUCTION MANUALS :

Accompanying the delivery of all major items of plant to site, the contractor shall deliver draft operation and maintenance manuals in duplicate applying to the plant. The manuals shall be accompanied by wiring and erection diagrams which show the plant is to be erected, how it operates, and how it may be maintained. A collection of manufacture's descriptive leaflets will not be acceptable in satisfaction of this clause.

During erection, commissioning and testing, the draft operation and maintenance manuals and diagrams are to be checked against the plant and amended as necessary to relate accurately to the plant as installed.

Certificates of taking over of plant will not be issued until such time as the requirements of the two preceding paragraphs above have, in the opinion of the Engineer or his representative been adequately fulfilled.

Twenty copies of the amended and corrected manuals and drawings relating to each item of the plant (16 in English and 4 in Gujarati) shall be printed on A4 size sheets and bound in suitable loose-leaf binders and provided at the commencement of the period of running maintenance.

12.13 TRAINING OF PERSONNEL :

The contractor shall arrange for training of the personnel in charge of the O&M of the plant throughout the trial run period of (1) month. There shall be a continuous training period, the contractor shall provide a work training office whose sole duties shall be to advise the O&M personnel on the operation and maintenance of the treatment process and to instruct, on a full time basis. The aforesaid personnel on the operation and maintenance of the work, the mechanical, the electrical and chemical plant and the instruments and systems at the cost of the agency.

SECTION - 13

CIVIL WORKS

This part of the specifications cover the following :

- a) Special conditions for Civil works.
- b) Description of the works.
- c) Specifications.

13.1 SPECIAL CONDITIONS FOR CIVIL WORKS:

13.1.1 SCOPE:

The scope of work for the tendered under the contract for civil works shall include all civil construction works like excavations, foundations, buildings, trenches, all water retaining structures including those of classifier, filters, storage tanks, chemical house together with ducts, piping etc. Works such as access roads, boundary wall are also included in this contract. The limits of contract shall be the same as shown in the drawings enclosed with the tender documents.

13.1.2 DESIGN AND CONSTRUCTION:

The contractor shall design and construct all civil works in accordance with the standard specifications under "C" of the section. The Contractor can offer any standard construction methods except where specific requirements mentioned hereafter. The plant layout is already shown in the tender drawings. The contractor is free to alter the layout but they shall have to accommodate it within the specified boundaries. The shape of the various structures and elevations shall be such as to give a neat and pleasant appearance to the plant.

Suitable arrangements shall be made to collect and removes sludge and wash water from Tube Settler to waste water collection chamber, which shall be provided with constant bleeding arrangement.

The disposal of sludge from chamber through common carrying main up to existing and mud well is within the scope of this tender.

The Tube and angles for sludge collection and flocculator shall be designed and fabricated from best quality; painted suitably and render the member non-corrosive. The bottom slope of sedimentation basin shall not be flatter than 1:2. The works shall conform to the specification set out in section No.5.

13.2.4 FILTRATION WORKS:

The civil works to be included by the contractor for this work shall consist and include but not be limited to the following and shall conform to the specifications set out in section No.6.

- (A) Common influent channel or settled water channels connected with the launders covers in the clarification works to supply the settled water to the filter battery or coagulated water from the proposed inlet channels in the event of by-pass.
- (B) Filter beds and control sluice valves, gallery filter unit, pure water channel, back wash pipe inspection water channel.

The filter beds shall be rectangular in plan, the filtration work shall be covered by R.C.C. slab and no opening to sky structures shall be provided in the filtration works. The gallery housing shall be providing with suitable number of doors opening out towards the walkways. Suitable number of windows with clear glass panels shall be provided including sufficient number of ventilators to allow sufficient air and light in the pipe gallery and the operating platform. Opening left in the operation platform to inspect the filter operation in the filter boxes shall be provided with hand railing as specified elsewhere. Also sufficient space shall be provided in the pipe gallery for a person to move equipment outlet system shall be constructed as specified. All structural parts constructed in R.C.C. in M-200 including gutters, channels, wells, weir projections shall be plastered with cement mortar (1:2), 20mm thickness using water proofing compound on water face and shall be finished cement mortar (1:2) on the face away from water walkway of minimum 1.0 m. which shall be provided with hand railing as specified elsewhere on one side or on either side as per necessity.

After filtered water leaves the filter beds through the under drains it shall flow in the common pure water channel, connected to inspection chambers of each bed.

An inspection chamber shall be constructed, where walls and floor etc. shall be lined with glazed tiles (white) at the outlet of each filter bed. The structure housing the valve galleries channels etc. shall be constructed in M-200 Mix of R.C.C. frame and with R.C.C. walls, R.C.C. wall properly plastered with cement mortared on both faces. The roof shall of R.C.C. slab and floors at all levels shall be of R.C.C. slabs. The flooring on this operation platform shall be provided with marble mosaic tiles. The filtered water channel shall be connected by a filtered water conduit to a proposed clear water sump, which is included in this contract.

CHEMICAL WORKS:

Adjacent to the inlet works as shown in the layout plan two storied chemical house shall be provided. The chemical house shall have sufficient space for unloading, wide corridor, office space, toilet, canteen, laboratory, control panel room, alum storage tanks and dosing equipment, chlorine cylinder storage and chlorinate room and laboratory. The specification set out in section No.7,8 and 10. The flooring shall be in Marble mosaic tiles, suitable teak wood doors and windows shall be provided. There shall be rolling shutters in alum storage room and chlorine cylinder storage rooms with a provision of the monorails in the alum house and entry with two-way displacement. In the chlorine cylinder storage room suitable ramps shall be provided.

Necessary arrangements shall be made for the mechanical gantry and also for the installation of manually operated gentry, as specified and the hoist and the weigh bridge as per specified R.C.C. staircase with railing on both sides shall be provided for access to the first floor of the chemical house, marble mosaic step tiles shall be provided for step treated and marble mosaic plain tiles for risers. The chemical house shall have separate chlorine cylinder storage room to accommodate 10 cylinders and a separate chlorine room to accommodate four chlorinates and cylinders online. Each chlorine cylinder shall be supported on properly shaped concrete pedestal.

The clearance shall be adequate, between the floor levels and the roof, for the operation of 3 tone overhead gantry. The doors and windows shall be Aluminum and glass panel etc. In addition to normal ventilation, ventilators and exhaust fans shall be provided for chlorine room.

The handling of the chlorine cylinders shall be kept to a minimum. As such the gantry grinders shall be taken outside the buildings, to lift the cylinders directly from the trunk and place them in their position. The gantries and hoisting arrangements shall be designed for at least 3 tones load capacity and capable of motion in longitudinal lateral and vertical directions to handle the cylinders right from the lorry to the ultimate location of the cylinders. The layout shall facilitate each lorry movements. The doors of chlorine house shall be outside opening and shall not have locking arrangement from inside.

The cabinets containing special safety approval shall have glass doors and sides so that the approval is available to operator and these shall be located at easily accessible place, so as no loss of time during emergency.

13.2.5 ANCILLARY WORKS:

The specifications set out herein shall be read in continuation with those under section 8 and section No. 10.

- (a) The laboratory and office shall be accommodated on the upper floor of chemical house. The location of the laboratory unit is of prime importance. The piping, plumbing, furniture and fixtures etc. shall be carried out in conformity with specifications set out in section No.8 and 10. The office room of area shown in drawings shall be provided on the first floor or chemical house provided with necessary furniture racks, steel cupboards, etc. The flooring, in the office room shall be in colored Vitrified tiles, with light shade and fixed in with cement mortar (1:2) A sanitary block consisting of one bathroom, one hand basin with total area not less than 11 M2 including internal passage, shall be provided. The mirrors of good quality shall be provided with towel railing, liquid soap holder with glass container etc. of approved make. The flooring in WC urinals, bathrooms toilets shall be in white glazed tiles dado up to 1.20 m. height. The flooring to passages shall be of marble mosaic. The piping of water supply is in GI and all fittings fixtures like taps shall be in brass with chromium plating except the tap on wash hand basins. For wash hand basins capstan hand screw down pillar taps shall be provided in the bathrooms and toilet room. Flushing cisterns of adequate capacity with 32mm steel tubing for flushing shall be provided for WCs. Indian type squatting shall be provided in WC and toilet, lipid urinals (with integral flush pipe) shall be provided adjacent to toilet block. The WC pans urinals etc. shall be of standard make as specified. The underground drainage shall consist of 100mm and 150mm stoneware pipes bends, gully sewer traps laid to slope with inspection chambers, manholes, etc. all as specified. A septic tank with a soak pit for 20 persons capacity shall be provide.

ELEVATION & ARCHITECTURE:

The treatment plant building shall have good aesthetic and imposing elevation and architecture. The tendering contractor shall therefore, enclose details of the elevation of the building along with their offer. The elevation has to be approved by the Engineer or his representative. RCC fins, windows, boxes, pebble dash/roughcast plaster, Grills should be proposed.

GENERAL TREATMENT:

The external focus of the super structure shall be furnished with cement plant of quality and shade approved by the Engineer. All internal faces shall be treated with oil bound distempers and ceiling shall be applied with white wash.

The roof slab shall be provided with five-course water proofing treatment as specified. All the edges of chajjas, weathers heads canopies and slab projections shall be provided with thwarting or drip moulding.

ELECTRIC WORKS:

The schedule of price for civil works shall include provision for the cost electrical wiring installation including necessary materials such as cables, conduits, triple pole and double pole switch fuse units, cut out, one way switches, switch-boxes.

Cables, laying materials, socket outlets, bulb fluorescent tube holders, motor starters, water tight specials, flood light fittings, etc. the work shall conform to IS:732(163) code of practice for electrical wiring installation IS:4648(1969) (Guide for electrical out in residential building) Indian Electricity Act 1910, and Indian Electricity Rules 1856 suitable for 3 phase 440 volts A. C. supply and it shall comprise of the following and in general shall conform to specification set out elsewhere in the volume.

RECEIPTION & DISTRIBUTION OF MAIN SUPPLY:

There shall be a miniature circuit breaker mounted on a distribution metal clad with board panel duly wired and with push bar arrangements for proper distribution of power and lighting, supply for motors and illumination and complete with motor starters of switches, cut outs, fuses etc. The starter should be of a reputed make (L&T, Culter Hammer or equal and approved).

This item may not be included if it is already included under supply of mechanical equipment.

WIRING:

It shall conform in general to specification set out elsewhere in this volume, it shall consist of PVC insulated cables in resized conduits complete with all accessories.

SMALL WIRING:

Wiring shall be carried out in a neat and systematic manner and securely fixed by insulated or other approved methods. The wire shall not be joined or broken in to between terminal points.

FUSES & LINKS:

These shall conform in general to specifications set out elsewhere in this volume. Fuses carrier and solid link carrier and bases shall be made of plastic moulded insulating materials of an approved make, ceramic material will not be accepted. All accessible line connection shall be efficiently shrouded and it shall be possible to change fuses with the circuit alive.

An adequate number of spare fuses, earthlings, for each rating shall be supplied, fitted clips, inside the panel.

LIVER OF ILLUMINATION INSIDE ALL BUILDINGS:

It shall be 100-point minimum. Provision of one 500 watt weather proof flood light at the top of highest building shall be extra. Similarly waterproof fitting inside each inspection chamber of pure water channel in filter house shall be provided. Outside the building suitable level of illuminations at suitable points as per national building code shall be provided.

LIGHT FITTING & ACCESSORIES:

A switch shall be provided adjacent to normal entrance to any areas for control of light point. Ceiling rose for points, 3 pins. 5 Amps. Socket outlet shall be provide in all light a fan circuit along with controlling switches lamp holders with break if of approved shape and designs conforming to IS:1258 shall be provided for the illumination points. Suitable space shall be provided over the circuit and sub-circuit board for fan regulators.

1. Fluorescent tube light shall be provided over every filter bed.
2. Fluorescent tube lights shall also be provided under every beam, however the general level of illumination may be kept at 100 lux minimums as specified above.
3. A good weatherproof floodlight of 200 W shall be provided, over each filter bed. The wiring for such floodlights shall be with cables, through underground conduits.
4. Suitable number of fans shall be provided in the filter control building, office-cum-laboratory, stone room etc.

13.3 SPECIFICATION (CIVIL WORKS) MATERIAL & WORKMANSHIP:**GENERAL REQUIREMENTS:**

The item 'Material' shall mean all materials and article of every kind whether raw, processed or manufactured and equipment and plant of every kind to be supplied by the contractor is for incorporation in the works.

Except as may be otherwise specified for particular parts of the work, the provisions of clauses in 'Materials and workmanship' shall apply to materials and workmanship for any part of the works. All materials shall be new and of the kinds and quantities described in the contract and shall be at least equal to approved samples. As soon as practicable after receiving the order to, commence the works, the contractor shall inform the Engineer of the names of the suppliers from whom he proposes to obtain any materials but the shall not place any order without the approval of the Engineer which may be withheld until samples have been submitted and satisfactorily tested. The contractor shall keep the Engineer informed of orders for and delivery dates of all materials.

13.3.1 SAMPLLES & TESTS AND MATERIALS:

The contractor shall submit samples of such materials as may be required by the Engineer and shall carry out the specified tests and directed by the Engineer at the site, at the supplier's premises or at a laboratory approved by the Engineer. Samples shall be submitted and tests shall be carried out sufficiently early to enable further samples to be submitted and tested if required by the Engineer. The contractor shall give the Engineer at least seven days notice in writing of the date of which any of the materials will be ready for testing, or inspection at the suppliers premises, or at a laboratory approved by the Engineer and unless the Engineer shall attend at the appointed place within the said seven days the tests may proceed in his absence. Provided that the contractor shall in any case submit to the Engineer within seven days of every test such number of certified copies (Not exceeding six) of the test readings as the Engineer may require. Approval by the Engineer as to the placing of orders materials or as to samples or tests shall not prejudice any of the Engineer power. Under the provisions of contract the provision of this clause shall also apply to material supplied by any nominated sub-contractor.

STANDARD:

Materials and workmanship shall comply with the relevant specifications. All materials used in the permanent works shall be of the best quality of the kind and to the approval of the Engineer. Any

materials or workmanship not covered by the above specifications of Gujarat Water Supply & Sewerage Board shall comply with the relevant Indian Standard (with up to date amendments) current at the thirty-first days of December of the year proceeding the Tender date, unless more recent amendment is specified hereinafter or with requirement is specified authoritative standard approved by the Engineer which shall not be exceeding in the opinion of the Engineer than the corresponding standard quoted herein.

13.3.2 BASIC MATERIALS:

CEMENT:

All cement to be used in the works shall be ordinary Portland cement complying with IS:269. The contractor will procure the quantity of cement required for the works.

SAND FOR USE OF MASONRY WORK & IN PLASTER:

Sand to be used for use in masonry and in plaster shall conform to specification for Building and House Drainage.

COARSE AGGREGATE FOR CONCRETEWORK:

For manufacture of concrete (ordinary with nominal mix or controlled concrete specification by strength) the coarse aggregate shall be as obtained from the crushed stone (machine broken) bromide grit shall not be used. The coarse aggregate shall be of hard strong durable stone and generally comply with the requirements of specification of IS building code and explanatory notes for building and house drainage. Absorbent coarse aggregate shall not be used. The aggregate shall be free from laminations and free from clay films and other adherent coatings.

They shall contain no harmful material to affect adversely the strength or durability of the concrete or in the case of reinforced concrete to attack the reinforcement. Any aggregate, which are not perfectly clean, shall be washed in clean fresh water to the satisfaction of the Engineer. The maximum quantities of deleterious materials in the aggregates, as determined in accordance with IS:2386 (Part II) 'methods of test for aggregates for concrete shall not exceed the limits given in Table I of C-282'. Unless otherwise stated all coarse aggregate in reinforced concrete shall be graded aggregate of 20mm nominal size.

BUILDING BRICKS:

Specifications for building bricks shall be as described in specification of IS building code and explanatory notes building and house drainage.

WATER FOR CONCRETE OR MORTAR:

Water for mixing concrete or mortar and for curing must be clean and free from saline or deleterious materials and must be fit for human consumption. Such water shall generally comply with the requirements of clause 4.3 of IS:456-1946.

13.3.3 STEEL:

Structural steel shall conform to IS "Structural" steel (standard quality) at IS-226 Structural Steel (Fusion welding quality) steel reinforcement bars concrete shall be rounded bars, unless otherwise specified and shall comply with grade mild steel as per IS-432 'Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement' or comply with for steel as per IS-1786 "Cold Twisted Steel Bars" for concrete reinforcement

or medium tensile steel and high yield strength steel deformed bars for concrete shall be square or along mesh of hard drawn steel wire, electrical resistance welded and shall conform with IS 1566 for use in reinforced concrete.

LINE:

Specifications for line, building and house drainage.

TIMBER:

Specifications for line, shall be as per specification of explanatory notes for building and house drainage.

PLYWOOD:

Specification shall be as per specifications of explanatory notes for building and house drainage.

PAINTS:

Specification for line, shall be as per specifications of notes for building and house drainage.

BUILDING HARDWARE:

Specifications for line, shall be as per specification and explanatory notes for building and house drainage.

13.3.4 SITE CLEARANCE & DRESSING OF SITE:

The work on site clearance and dressing of site shall be done in accordance with specification explanatory notes for building and house drainage.

Surface dressing shall be measured in square meters. Unless otherwise specified in the bill of quantities no separate payment shall be made for dressing within 10 meters distance on all sides of the structures. This shall deemed to be included in the items of contract.

No payment shall be made for the clearance of site except for uprooting of big trees and dismantling of existing structures and its removal, which shall be paid separately as per provision of the contract.

DISPOSAL OF MATERIALS:

All requirements herein for the disposal by the Contractor of materials arising from the site clearance or from excavation are the property of Nagar Sevasadan's, Government of Gujarat and shall be disposed of, or preserved and deposited as directed by the Engineer.

EXCESS EXCAVATION TO BE MADE GOOD:

The Contractor at his own expenses, shall if directed remove from the site all materials resulting from excess excavation and shall make good the same with such kind of fill, materials or in such class of concrete as may be reasonably required by the Engineer having regard to the circumstances.

SITE CLEARANCE GENERAL:

All areas of the site marked on the drawing for clearance of from which materials is to be excavated or upon which filling is to be deposited shall be cleared to the extent required by the Engineer of all buildings, wall gate, fences and other structures and obstructions and/or all bushes. Hedges trees stumps roots and other vegetation except for preservation materials so cleared shall so as far as suitable be preserved and stacked for further use but shall otherwise be burnt to ash or disposed off at the site as directed by the Engineer.

TREES:

As directed by the Engineer, trees shall be uprooted or cut down as near to the ground levels as possible branches and fallings shall be removed and burnt to ashes or disposed off at the site. Useful timber shall remain the property of the Government of Gujarat and shall be cut in to suitable length and transported at the Government stores (at site as per direction of the Engineer).

STEMPS:

Stumps and roots whether existing or remaining after tree falling shall be uprooted where directed by the Engineer, be grabbed out and disposed off the site. The resulting hole shall be filled with approved materials deposited in 225mm layer and completed to the same dry density as the adjoining soil.

FORESTRY REGULATIONS:

The Contractor shall familiarize himself with all local rules and regulations governing land clearance including the special requirements for forestry areas and shall carry out his work in strict compliance with all such requirements.

DEMOLITION:

Demolition of all structures, obstructions above and below ground level shall be carried out to extend the sufficient to permit the completion of all works as indicated. Care should be taken not to damage existing sewers, pipes, conduits, cables and rails that must be pipes conduits. Cables and rails which must be kept in service and not be demolished all materials from demolition are the property of Nagar Sevasadan. they shall be removed from the site and stacked as directed by the Engineer.

13.3.5 EARTH WORK IN EXCAVATION:

The work on earthwork in excavation shall be done in accordance with specification ULB. Before the surface of any part of the site is disturbed or the works thereon are begun, the Contractor shall take and record levels of any such part, in the manner specified as agreed with the Engineer, in the presence of the Engineer and such levels when agreed by him shall form the basis of measurements.

BLASTING:

The work of new treatment plant is in close proximity with existing Machhu - I dam hence blasting is prohibited.

EXCESS EXCAVATION TO BE MADE GOOD:

The Contractor at his own expenses, shall if directed, remove from the site all materials resulting from excess excavation and shall make good the same with such kind of fill

materials or in such class of concrete as may be reasonably required by the Engineer having regard to the circumstances.

EARTH WORK IN EXCAVATION (GENERAL):

The whole of the excavation in foundation trenches in any materials met onsite i.e. soil, gravel, rock old foundation etc. of work shall be carried out to the widths, lengths indicated on the drawings or such other dimensions as may be directed in writing by the Engineer. Excavated materials shall be deposited away from the edge of excavation as directed by the Engineer. The Contractor may carry out these excavations by any method (except blasting of rock) he consider most suitable subject to any stipulations contained in the contract.

SHORING:

The Contractor shall provide to the satisfaction of the Engineer, all the timbering or other approved supports and shall shore the sides of excavations in such a way as will be sufficient to secure them from falling and to prevent any movement.

DEWATERING:

The Contractor shall provide for the purpose of excavation under water, all the necessary dewatering equipment, like well point system pumps, pipes, conduits etc. and make necessary arrangements for proper drainage of the pumped water from such system and its easy disposal of water to other areas. The Contractor shall engage the dewatering equipment in such a way that the excavated pit should always remain dry while the excavation and concrete work up to ground floor level are going on. The dewatering process shall be carried out till the concrete in works as mentioned above has set sufficiently and as directed by the Engineer.

REMOVAL OF SURPLUS EARTH:

The surplus excavated materials shall be removed to a distance of 200m from the site as directed by the Engineer. Refer to ULB standard specifications.

13.3.6 EARTH WORK IN FILLING:

Earth used for filling in trenches, sides of foundation and under floors, etc. shall be free from stone, shingle or boulder not larger than 75 mm in any direction, salts, organic or other foreign matter.

Normally excavated earth from same area shall be used for filling. However if such earth contains deleterious material, salt-peter etc. the same shall not be used. All clods of earth shall be broken or removed.

COMPACTION:

The space all around the foundations, pipes, and drains in trenches shall be cleared of all debris, brickbats etc. The filling shall be done in layers not exceeding 15 cm. Each layer. Each layer shall be compacted in such a way so as to achieve a minimum 95% of maximum laboratory dry density as obtained by proctor.

Compaction equipment as per IS:2720 (Para VII). Each layer shall be laid only after the preceding layer is ensured about its Compaction as per above and to the satisfaction of

the Engineer. Earth shall be crammed with iron hammer where feasible and with the butt ends of crow bars where rammed cannot be used.

Special care shall be taken that no damage is caused to the pipes, drains and masonry in the trenches below.

FILLING UNDER FLOORS:

In case of filling under floor, the finished level or filling shall be kept to slope, intended to be given to the floor. In case of filling with sand, the sand to be used, shall be clean and free from dust, organic and foreign matter and corresponding to grading zone IV as specified in specification No. IS building code for Building and House Drainage. Sand filling shall be done in a manner similar to earth filling in plinth as specified above except that consolidation shall be done by flooding with water. The surface of the consolidated sand shall be dressed to required level and slope.

ITEM NO.1:

Providing, installing & commissioning Alum stirres with motor (1 H.P), gear arrangement & electrical cable connections, control panels etc (size as per design) Alum Stirrer

Specification for Providing, Installing & Commissioning Alum Stirrer with Motor, Gear Arrangement, Electrical Connections and Control Panel

1. Scope of Work

The work shall consist of providing, installing, testing and commissioning a complete Alum Stirrer system for preparation and mixing of alum solution in water treatment applications. The scope includes supply of stirrer assembly, electric motor, reduction gearbox, shaft, impeller, mounting frame, electrical wiring, control panel, accessories, erection, testing and commissioning complete in all respects as per approved design, drawings and directions of the Engineer-in-Charge.

2. Material and Construction

Stirrer Assembly

- The stirrer shall be designed for continuous operation in alum solution tanks.
- The agitator shall consist of a vertical shaft with suitable impeller/blades for effective mixing of alum solution.
- Shaft and impeller shall be fabricated from SS-304 or SS-316 grade stainless steel as specified.
- The shaft shall be adequately sized to withstand torsional and bending stresses during operation.
- Impeller design shall ensure uniform mixing without excessive vibration.

Drive Unit

- The stirrer shall be driven through a 1 HP, 415 V, 3 Phase, 50 Hz TEFC squirrel cage induction motor conforming to relevant IS standards.
- Motor shall be of minimum IE2 efficiency class and suitable for continuous duty (S1).
- Motor protection shall be IP55 or higher.
- A suitable reduction gearbox of helical/worm type shall be provided to achieve the required agitator speed as per design.
- Gearbox shall be factory lubricated and designed for continuous operation.

Mounting Arrangement

- Suitable MS fabricated mounting frame/base plate shall be provided for supporting the motor, gearbox and agitator assembly.
- All MS components shall be cleaned, primed and painted with one coat of zinc-rich primer and two coats of synthetic enamel paint.
- Necessary nuts, bolts, anchor fasteners and anti-vibration pads shall be included.

3. Electrical Works

- Supply and installation of all power and control wiring from local control panel to motor using suitable size copper conductor PVC/XLPE insulated cables.
- Cables shall be laid through PVC conduit/GI pipe/cable tray as required.

- Suitable brass cable glands, lugs, ferrules and termination accessories shall be provided.
- Earthing of motor, gearbox frame and control panel shall be carried out with GI/Copper earth conductor as per IS requirements.

4. Control Panel

- Weatherproof floor/wall mounted control panel fabricated from CRCA sheet steel.
- The panel shall include:
 - TP MCB/MCCB incomer.
 - DOL starter or suitable motor starter.
 - Contactor and thermal overload relay.
 - Start/Stop push buttons.
 - Auto/Manual selector switch (if specified).
 - Indicating lamps for Power ON, Motor ON and Trip.
 - Voltmeter, Ammeter and selector switches as required.
 - Terminal blocks, wiring and accessories.
- Panel shall be powder coated and suitable for operation on 415 V, 3 Phase supply.

5. Installation

- The stirrer assembly shall be erected in position over the alum solution tank as per approved drawings.
- Alignment of motor, gearbox and shaft shall be checked and corrected before commissioning.
- All rotating parts shall be properly guarded for operator safety.
- Necessary lifting, handling and installation equipment shall be arranged by the contractor.

6. Testing and Commissioning

- Insulation resistance and continuity tests shall be carried out for motor and cables.
- Trial run shall be conducted for a minimum period of 8 hours or as directed.
- The stirrer shall operate smoothly without abnormal vibration, noise or overheating.
- Mixing performance shall be demonstrated to the satisfaction of the Engineer-in-Charge.
- All defects noticed during testing shall be rectified without additional cost.

7. Workmanship

- Installation shall be carried out by skilled personnel experienced in mechanical and electrical works.
- All components shall be installed strictly in accordance with manufacturer's recommendations and approved drawings.
- Finished installation shall be neat, safe and capable of continuous trouble-free operation.

8. Mode of Measurement

As Per Schedule-B

ITEM NO.2:

Providing and fixing Manometer of Approved make

1. Scope of Work

The work shall comprise providing, supplying, fixing, testing and commissioning of Manometer of approved make for measurement of pressure, vacuum, differential pressure, or liquid level as required at site. The work shall include all accessories, fittings, mounting arrangements, tubing, valves, supports and connections necessary for proper functioning and accurate measurement, complete as directed by the Engineer-in-Charge.

2. Material Requirements

- The manometer shall be of approved make and suitable for the intended application and operating conditions.
- The instrument shall be accurately calibrated and supplied with a manufacturer's test certificate.
- The body shall be fabricated from corrosion-resistant material suitable for the service environment.
- The scale shall be clearly graduated and permanently marked in appropriate engineering units such as mmWC, mbar, kg/cm², Pa, or as specified.
- Transparent tube type manometers shall be manufactured from high-quality acrylic, polycarbonate, borosilicate glass, or equivalent material resistant to breakage and chemical attack.
- Differential pressure manometers shall be complete with suitable indicating fluid where required.
- All wetted parts shall be compatible with the fluid being measured.

3. Installation

- The manometer shall be installed at the locations shown on drawings or as directed by the Engineer-in-Charge.
- Suitable mounting brackets, clamps, supports, screws, anchor fasteners and accessories shall be provided for rigid and vibration-free installation.
- Necessary isolating valves, cocks, tubing, nipples, unions and fittings shall be supplied and installed as required.
- Connections shall be leak-proof and capable of withstanding the operating pressure.
- The instrument shall be mounted in a position that permits easy reading, operation and maintenance.

4. Testing and Commissioning

- The manometer shall be checked for correct installation, calibration and operation after installation.
- All pressure connections shall be tested for leakage.
- Readings shall be verified against standard test equipment where required.
- The instrument shall operate smoothly and accurately throughout the specified measuring range.

5. Workmanship

- Installation shall be carried out by skilled personnel in accordance with manufacturer's recommendations and relevant standards.
- Care shall be taken to prevent damage to the instrument during transportation, handling and installation.

- All exposed metal parts shall be suitably protected against corrosion.

6. Mode of Measurement

- **As Per Schedule-B**

ITEM NO.3:

Providing and Fixing LOH indicator of approved make

1. Scope of Work

The work shall consist of providing, supplying, installing, testing and commissioning of LOH (Level Over Head) Indicator of approved make for continuous monitoring and indication of water level in overhead tanks, clear water reservoirs, underground sumps or other storage tanks. The work shall include all sensors, transmitters, display units, interconnecting cables, mounting accessories, electrical connections and all allied works required for complete and satisfactory operation as directed by the Engineer-in-Charge.

2. Material and Equipment

Level Indicator Unit

The LOH Indicator shall be of approved make and suitable for the specified tank depth and operating conditions.

The system shall provide clear and continuous indication of water level in percentage, meters, or level segments through LED/LCD display.

The display unit shall be housed in a robust dust and moisture-resistant enclosure suitable for indoor installation.

The indicator shall operate on 230V AC, 50 Hz power supply or as specified by the manufacturer.

Level Sensing Arrangement

The level sensing system may consist of conductive probes, float sensors, hydrostatic sensors, ultrasonic sensors, or other approved technology suitable for the application.

All sensing elements shall be corrosion-resistant and suitable for continuous immersion in water.

Necessary probe holders, sensor supports, cables and accessories shall be included.

Cables and Accessories

Interconnecting cables shall be PVC/XLPE insulated copper conductor cables of suitable size.

Necessary PVC conduits, GI pipes, cable trays, glands, lugs, ferrules and termination accessories shall be provided.

Suitable mounting brackets, clamps, screws, fasteners and supports shall be included.

3. Installation

The level sensor assembly shall be installed in the tank at the designated location to ensure accurate level measurement.

The display unit shall be mounted at the pump room, control room or other approved location.

All wiring shall be neatly routed and adequately protected against mechanical damage and environmental exposure.

Electrical connections shall be properly terminated and insulated.

Earthing shall be provided wherever required as per relevant standards.

4. Testing and Commissioning

The complete system shall be tested after installation for proper functioning and accuracy.

The level indication shall correspond correctly with actual water levels in the tank.

All display segments, indicators, alarms (if provided) and control functions shall be checked.

The system shall be commissioned only after satisfactory performance during testing.

5. Workmanship

Installation shall be carried out by skilled technicians in accordance with the manufacturer's recommendations and approved drawings.

All components shall be securely mounted and protected from vibration, moisture and accidental damage.

The completed installation shall be neat, safe and fully operational.

6. Mode of Measurement

As Per Schedule-B

ITEM NO.4:

Providing Manually Operated 6.0m Lift Chain pulley block with tripple gear arrangement, lifting hook, load chain & locking device with necessary mounting girder/ structure, spur gear travelling trolley & all accessories. 2 tonne Capacity.

ITEM NO.5:

Providing Supplying 500 Kg capacity weighing machine at destination

1. Scope of Work

The work shall consist of providing, supplying, transporting and delivering a 500 kg capacity weighing machine of approved make and model at the designated site/store as directed by the Engineer-in-Charge.

The weighing machine shall be complete with all standard accessories and ready for use.

2. Technical Requirements

- The weighing machine shall be electronic platform type or equivalent approved type suitable for industrial, commercial or utility applications.
- Maximum weighing capacity shall be 500 kg.
- Minimum accuracy shall conform to applicable standards and manufacturer's specifications.
- The machine shall be fitted with a clear digital LED/LCD display indicating weight in kilograms.
- The platform shall be fabricated from heavy-duty mild steel with anti-corrosive coating or stainless steel as specified.

- The platform size shall be suitable for handling bulk materials and shall be as per manufacturer's standard design or as approved.
- The load cell shall be of high-precision strain gauge type with overload protection.
- The weighing machine shall have tare, zero, hold and calibration functions.
- The equipment shall operate on 230V AC supply with rechargeable battery backup facility.
- The weighing machine shall conform to relevant Indian Standards and Legal Metrology requirements wherever applicable.

3. Construction Features

- Sturdy and rigid platform construction capable of withstanding continuous usage.
- Non-slip platform surface.
- Corrosion-resistant finish suitable for indoor or semi-outdoor use.
- Heavy-duty load cells with stable and accurate performance.
- Digital display unit mounted in a protected enclosure.
- Necessary connecting cables and standard accessories shall be supplied.

4. Inspection and Testing

- The weighing machine shall be factory tested before dispatch.
- Calibration certificate and manufacturer's test certificate shall be supplied wherever applicable.
- The equipment shall be inspected for physical damage, proper operation and accuracy at the time of delivery.
- Demonstration of operation and functional testing shall be carried out if required by the Engineer-in-Charge.

5. Delivery

- The weighing machine shall be properly packed to prevent damage during transportation.
- Transportation, loading, unloading and delivery at the specified destination shall be included in the scope.
- Any damage during transit shall be made good by the supplier at no extra cost.

6. Workmanship and Warranty

- The equipment shall be new, unused and of latest manufacture.
- All components shall be free from manufacturing defects.
- The supplier shall provide the manufacturer's standard warranty against defects in material and workmanship.

7. Mode of Measurement

- Measurement shall be made on Number (Nos.) basis for each 500 kg capacity weighing machine supplied and delivered at the designated destination.

ITEM NO.6:

Providing, Supplying & Installing Vacum Control Direct wall mounted gas chlorinator including necessary fittings, installation and commissioning of plant including Clamp, copper pipe, ferule filter & control valve with injector. --do-- for 10 KG Capacity (Cabinete type).

1. Scope of Work

The work shall consist of providing, supplying, installing, testing and commissioning a Vacuum Control Direct Wall Mounted Gas Chlorinator (Cabinet Type) of 10 kg/hr capacity for chlorination of water, complete with all accessories, safety devices, mounting arrangements, interconnecting piping, electrical connections and allied works required for satisfactory operation of the system. The work shall be carried out as per approved drawings, manufacturer's recommendations and directions of the Engineer-in-Charge.

2. General Requirements

- The chlorinator shall operate on the vacuum-feed principle, ensuring safe and reliable chlorine gas dosing.
- The equipment shall be suitable for continuous operation in water treatment and disinfection applications.
- The chlorinator shall be of proven design and manufactured by an approved and reputed manufacturer.
- The complete system shall be supplied as a factory-assembled unit and tested before dispatch.

3. Chlorinator Assembly

- Capacity: 10 kg of chlorine gas per hour.
- Type: Vacuum Control Direct Wall Mounted Cabinet Type.
- The chlorinator shall maintain accurate chlorine dosing over the entire operating range.
- The dosing rate shall be adjustable from minimum to maximum capacity through a calibrated control valve.
- The chlorinator body and wetted components shall be manufactured from corrosion-resistant materials suitable for chlorine service.
- The unit shall include vacuum regulator, flow control assembly, rate meter, gas filter, differential regulating valve and all internal components necessary for proper operation.

4. Cabinet

- The chlorinator shall be housed in a robust cabinet enclosure suitable for wall mounting.
- Cabinet shall be fabricated from corrosion-resistant material such as FRP, PVC, powder-coated metal or equivalent approved material.
- Doors shall be lockable and provide easy access for operation and maintenance.
- The enclosure shall provide protection against dust, moisture and accidental damage.

5. Injector and Vacuum System

- A chlorine gas injector (ejector) shall be provided to create the necessary vacuum for chlorine gas feeding.
- Injector shall be designed to operate efficiently under specified water pressure and flow conditions.

- Injector body and wetted parts shall be resistant to chlorine corrosion.
- Necessary non-return arrangements and vacuum safety features shall be incorporated.

6. Accessories and Fittings

The item shall include supply and installation of the following accessories as required:

- Vacuum regulator assembly.
- Chlorine gas filter.
- Rate control valve.
- Rotameter/rate meter assembly.
- Injector (ejector).
- Copper tubing of suitable diameter and thickness.
- Chlorine-resistant flexible connections.
- Clamps, ferrules, unions and connectors.
- Isolation valves and control valves.
- Mounting brackets and supports.
- Gaskets, sealing materials and fastening hardware.
- Safety vent and associated fittings wherever required.
- All interconnecting pipes, fittings and accessories necessary for complete operation.

7. Installation

- The chlorinator shall be mounted securely on a wall or support structure as approved.
- Copper tubing and fittings shall be installed neatly with proper supports and protection.
- All gas and vacuum connections shall be leak-proof and tested before commissioning.
- The injector shall be installed and connected to the water line in accordance with manufacturer's recommendations.
- Necessary civil supports, drilling, anchoring and fixing required for installation shall be included.

8. Testing and Commissioning

- The complete system shall be tested for mechanical integrity, vacuum performance and chlorine dosing accuracy.
- Leak testing of all chlorine gas connections shall be carried out using approved methods.
- Calibration and adjustment of dosing rate shall be performed.
- Trial operation shall be conducted to demonstrate satisfactory performance under operating conditions.
- The contractor shall provide operational training to the owner's personnel if required.

9. Safety Requirements

- The vacuum-operated system shall automatically stop chlorine gas flow in case of vacuum failure.
- All chlorine-contact components shall be suitable for chlorine service and resistant to corrosion.
- Safety instructions and operating manuals shall be supplied with the equipment.
- The installation shall comply with applicable safety standards and manufacturer guidelines for chlorine handling systems.

10. Workmanship

- Installation shall be carried out by qualified personnel experienced in chlorination systems.
- All equipment shall be installed in accordance with approved drawings and manufacturer's recommendations.
- The completed installation shall be neat, secure, leak-proof and fully operational.

11. Mode of Measurement

As Per Schedule-B

ITEM NO.7:

Providing and Supplying Chlorine gas cylinder empty of required capacity with necessary explosive certificate including all taxes. Chlorine cylinders 100 Kg.

ITEM NO.8:

Providing & Supplying the filter sand of specified effective size (0.45 to 0.70mm) and uniformly coefficient (not more than 1.7, nor less than 1.3) and laying over gravel support confirming to IS : 8491 (I) - 77 in filter bed of required depth as per design and drawing.

1. Scope of Work

The work shall consist of providing, supplying, transporting, handling, spreading and laying filter sand of specified effective size ranging from 0.45 mm to 0.70 mm with Uniformity Coefficient (UC) not more than 1.7 and not less than 1.3, over the prepared gravel support in filter beds of water treatment plants. The work shall be carried out in accordance with IS: 8491 (Part I) – 1977 and as per approved design, drawings and directions of the Engineer-in-Charge.

2. Materials

Filter Sand

- The filter sand shall be hard, durable, clean, dense and free from clay, silt, organic matter, mica, shale, soft particles, salts and other deleterious substances.
- The sand shall be obtained from approved sources and shall conform to the requirements of IS: 8491 (Part I) – 1977 and subsequent amendments.
- Effective Size (ES) shall be between 0.45 mm and 0.70 mm.
- Uniformity Coefficient (UC) shall be not less than 1.3 and not more than 1.7.
- The silica content shall be high and the material shall be resistant to abrasion and chemical deterioration.
- Sand shall be thoroughly washed and graded before laying.

Supporting Gravel

- The filter sand shall be laid over the prepared graded gravel support already provided or specified in the design.
- Gravel shall be clean, hard and properly graded as per approved drawings and relevant standards.

3. Preparation of Filter Bed

- Before laying the filter sand, the filter floor, nozzles, strainers and gravel support system shall be thoroughly inspected and cleaned.
- The gravel support shall be leveled and arranged in proper graded layers as shown in the approved drawings.
- Care shall be taken to avoid disturbance of the gravel layers during placement of filter sand.

4. Laying of Filter Sand

- The filter sand shall be carefully placed over the gravel support to the specified depth and level as indicated in the design drawings.
- Placement shall be carried out uniformly over the entire filter area without segregation of particle sizes.
- The sand bed shall be leveled accurately to achieve uniform thickness throughout the filter bed.
- Necessary precautions shall be taken to prevent contamination during transportation, handling and laying.
- Any damaged, contaminated or segregated material shall be removed and replaced at no extra cost.

5. Testing and Quality Control

- Representative samples of filter sand shall be tested for effective size, uniformity coefficient and cleanliness before approval.
- The Engineer-in-Charge may require sieve analysis and other tests to verify compliance with IS specifications.
- Only approved material conforming to specified requirements shall be permitted for use.

6. Workmanship

- All work shall be executed by skilled personnel experienced in filter media installation.
- The filter media shall be placed carefully to avoid damage to underdrain systems, nozzles and gravel support layers.
- The completed filter bed shall present a uniform, clean and level surface ready for commissioning.

7. Mode of Measurement

As Per Schedule-B

ITEM NO.9:

Providing and supplying gravels of different size as per design and drawing and laying in layers in filter beds.

1. Scope of Work

The work shall consist of providing, supplying, transporting, handling, screening, washing and laying graded gravel of different sizes in filter beds as per approved design, drawings and directions of the Engineer-in-Charge. The gravel shall be laid in specified layers over the filter floor and under-drainage system to form the supporting media for the filter sand bed, complete in all respects.

2. Materials

Filter Gravel

- The gravel shall consist of hard, durable, dense and rounded or sub-rounded particles obtained from approved sources.
- The material shall be free from clay, silt, loam, organic matter, shale, soft stones, mica, salts and other deleterious substances.
- Gravel shall conform to the requirements of IS: 8419 / IS: 8491 (latest revision) and relevant water treatment plant specifications.
- The gravel shall be thoroughly washed and screened before laying.
- The material shall be chemically inert and resistant to abrasion and deterioration under operating conditions.

3. Grading Requirements

- Gravel shall be supplied in the specified grades and sizes as indicated in the approved design and drawings.
- The supporting media shall generally consist of multiple graded layers arranged from coarser material at the bottom to finer material at the top beneath the filter sand.
- The thickness of each layer and particle size range shall be as specified in the design drawings.
- Each grade shall be stored separately and protected from contamination prior to laying.

4. Preparation of Filter Bed

- The filter floor, under-drain system, nozzles, strainers and supporting structure shall be thoroughly cleaned before placement of gravel.
- Any debris, loose material or foreign matter shall be removed from the filter bed area.
- The under-drain system shall be inspected and approved before commencement of gravel laying.

5. Laying of Gravel

- Gravel shall be carefully placed in successive layers of specified size and thickness without disturbing the underlying under-drain system.
- Each layer shall be spread uniformly over the entire filter area and leveled to the required thickness.
- Care shall be taken to prevent intermixing of different gravel grades during placement.
- The top surface of each layer shall be brought to a true and even level before placing the next layer.
- The completed gravel bed shall conform to the levels and thicknesses shown in the approved drawings.

6. Testing and Quality Control

- Representative samples of gravel shall be tested for size grading, cleanliness and quality before use.
- Sieve analysis may be carried out as directed by the Engineer-in-Charge to verify compliance with the specified grading.
- Only approved material meeting the specified requirements shall be accepted.

7. Workmanship

- The work shall be executed by skilled personnel experienced in water treatment plant filter media installation.
- Adequate care shall be exercised to avoid damage to nozzles, strainers, under-drain pipes and filter floor components.
- The completed gravel support bed shall be clean, uniformly graded and ready for placement of filter sand.

8. Mode of Measurement

As Per Schedule-B

ITEM NO.10:

Providing fabricating and fixing /installing C.I. gates of size as per design with operating handle etc.

1. Scope of Work

The work shall consist of providing, fabricating, supplying, transporting, erecting, fixing, testing and commissioning Cast Iron (C.I.) Gates of sizes as per approved design and drawings, complete with operating handle, spindle, guides, seating arrangement, anchor fasteners, lifting mechanism and all accessories required for satisfactory operation. The work shall be executed in accordance with approved drawings and the directions of the Engineer-in-Charge.

2. Materials

Cast Iron Gate

- The gate frame and shutter shall be manufactured from high-quality close-grained cast iron conforming to relevant IS specifications.
- Castings shall be sound, free from blow holes, cracks, shrinkage defects, warping and other imperfections.
- All machined surfaces shall be smooth and accurately finished to ensure proper seating and watertight operation.
- The gate shall be designed to withstand the specified hydrostatic pressure and operating conditions.

Frame and Guides

- The gate frame shall be rigidly constructed and designed for secure anchoring to concrete or masonry structures.
- Guide channels shall ensure smooth movement of the gate without binding or excessive wear.
- All contact surfaces shall be accurately machined to provide effective sealing.

Spindle and Operating Mechanism

- The operating spindle shall be of stainless steel or high-tensile steel as specified in the design.
- The spindle shall be threaded and machined accurately for smooth operation.

- Suitable thrust arrangement, guide brackets and supporting mechanisms shall be provided.
- The operating handle shall be of cast iron, mild steel or other approved material and designed for easy manual operation.
- Where specified, extension spindle, floor stand, pedestal or wall bracket shall be provided.

3. Fabrication

- Fabrication shall be carried out strictly in accordance with approved drawings and manufacturer's recommendations.
- All machining, drilling and fitting shall be performed accurately to ensure proper alignment and operation.
- Components shall be assembled and checked in the workshop before dispatch wherever practicable.

4. Surface Protection

- All cast iron surfaces shall be thoroughly cleaned and treated before application of protective coatings.
- Unless otherwise specified, all exposed surfaces shall receive one coat of approved metal primer followed by two coats of epoxy, bituminous or synthetic enamel paint suitable for submerged and corrosive service conditions.
- Stainless steel components shall be passivated where required.

5. Installation

- The gate frame shall be installed in true line and level at the locations shown on the drawings.
- Anchor bolts, holdfasts and grouting materials shall be provided and fixed securely.
- Alignment of the gate frame, shutter and spindle shall be checked before final fixing.
- The operating mechanism shall be installed to ensure smooth opening and closing of the gate.
- Necessary scaffolding, lifting equipment and temporary supports shall be provided during installation.

6. Testing and Commissioning

- The installed gate shall be tested for smooth operation throughout its full travel.
- Seating surfaces shall be checked for leakage under operating conditions.
- Any defects in alignment, operation or sealing shall be rectified at no additional cost.
- Trial operation shall be conducted to the satisfaction of the Engineer-in-Charge.

7. Workmanship

- All work shall be executed by skilled personnel experienced in fabrication and installation of water control gates.
- The completed installation shall be rigid, properly aligned, watertight and capable of long-term operation with minimal maintenance.
- Care shall be taken to avoid damage to adjacent structures and embedded components.

8. Mode of Measurement

As Per Schedule-B

ITEM NO.11:

Providing and applying 3 LPE Coating outside 3 layers polyethylene (LPE) coating with required tk. As per DIN_30670 or its latest revision or amendment and detail specifications with necessary material & Labour and Equipments etc. outside of MS Pipes.

1. Scope of Work

The work shall consist of providing all materials, labour, equipment, plant, consumables and accessories for surface preparation and application of External 3-Layer Polyethylene (3LPE) Coating of specified thickness on Mild Steel (M.S.) pipes, including inspection, testing and repair of coating defects, complete in accordance with DIN 30670 or its latest revision/amendment and as directed by the Engineer-in-Charge.

2. General Requirements

- The coating system shall be factory-applied or site-applied where specified and shall provide long-term protection against corrosion and soil aggressiveness.
- The complete coating system shall conform to the requirements of DIN 30670, relevant international standards and approved project specifications.
- The coating thickness shall be as specified in the design, tender specifications or approved drawings.

3. Surface Preparation

- Pipe surfaces shall be thoroughly cleaned of oil, grease, dirt, rust, mill scale and other contaminants.
- Abrasive blast cleaning shall be carried out to achieve a minimum surface cleanliness of Sa 2½ in accordance with ISO 8501-1 or equivalent standard.
- The blast profile shall be suitable for proper adhesion of the coating system.
- Coating application shall commence immediately after surface preparation to prevent flash rusting.

4. Three-Layer Coating System

The coating system shall comprise the following layers:

(A) Fusion Bonded Epoxy (FBE) Primer Layer

- A uniform layer of fusion bonded epoxy powder shall be applied on the preheated pipe surface.
- The epoxy layer shall provide excellent adhesion and corrosion protection.
- Thickness shall be as specified in DIN 30670 and approved coating procedure.

(B) Copolymer Adhesive Layer

- A compatible adhesive copolymer layer shall be applied over the epoxy coating.
- The adhesive layer shall ensure a strong bond between the epoxy primer and polyethylene topcoat.
- Thickness shall conform to the approved coating specification.

(C) Polyethylene Outer Layer

- A high-density polyethylene (HDPE) outer protective layer shall be extruded over the adhesive layer.

- The polyethylene layer shall provide mechanical protection, impact resistance and long-term corrosion resistance.
- Total coating thickness shall be as specified for the pipe diameter and service conditions.

5. Coating Thickness

- The overall coating thickness shall be as specified in the approved drawings and project specifications.
- Thickness measurements shall be taken at regular intervals and shall comply with the requirements of DIN 30670.
- Any area not meeting the minimum specified thickness shall be repaired or recoated.

6. Inspection and Testing

The following tests shall be carried out:

- Visual inspection of coated surface.
- Coating thickness measurement.
- Holiday detection (spark testing).
- Adhesion testing.
- Impact resistance testing.
- Peel strength testing where required.
- Any additional tests specified in DIN 30670 or project specifications.

Defective areas identified during inspection shall be repaired using approved repair materials and procedures.

7. Handling and Protection

- Coated pipes shall be handled using non-abrasive slings, padded hooks or approved lifting devices.
- Dragging of coated pipes on the ground shall not be permitted.
- Coated surfaces shall be protected from mechanical damage during transportation, storage and installation.

8. Workmanship

- Coating operations shall be carried out by experienced personnel using approved equipment and procedures.
- Environmental conditions during coating application shall comply with the coating manufacturer's recommendations.
- The finished coating shall be smooth, continuous, free from pinholes, blisters, cracks, wrinkles and other defects.

9. Mode of Measurement

As Per Schedule-B

ITEM NO.12:

Providing, installing & commissioning Air agitation system including Blowers (40 HP), piping and valve arrangement etc, as per design. FOR ALL BEDS.

1. Scope of Work

The work shall consist of providing, supplying, installing, testing and commissioning a complete Air Agitation System for filter bed cleaning and agitation, including 40 HP blowers, air distribution piping network, valves, manifolds, fittings, supports, electrical connections, control arrangements and all accessories required for efficient operation of the system for all filter beds, complete as per approved design, drawings and directions of the Engineer-in-Charge.

2. General Requirements

- The air agitation system shall be designed to provide uniform air distribution throughout the filter bed area for effective backwashing and agitation of filter media.
- The system shall be suitable for continuous and intermittent operation under water treatment plant conditions.
- All equipment shall be new, of approved make and designed for reliable operation with minimum maintenance.

3. Air Blowers

- The system shall include centrifugal/positive displacement air blowers of 40 HP capacity or as specified in the approved design.
- Blowers shall be capable of delivering the required airflow and pressure for simultaneous or individual operation of filter beds as per design requirements.
- The blower casing shall be fabricated from cast iron, fabricated steel or other approved material.
- Impellers/rotors shall be dynamically balanced to ensure vibration-free operation.
- Blowers shall be complete with:
 - Electric motor.
 - Flexible coupling and coupling guard.
 - Common base frame.
 - Anti-vibration pads.
 - Air intake filter/silencer.
 - Discharge silencer where required.
 - Pressure gauge and safety devices.
 - Lubrication system and accessories.

4. Electric Motor

- Motors shall be squirrel cage induction type suitable for operation on 415 V, 3 Phase, 50 Hz AC supply.
- Motor rating shall be 40 HP or as required by the blower manufacturer.
- Motors shall conform to relevant IS standards and shall be suitable for continuous duty (S1).
- Degree of protection shall be minimum IP55 and insulation class shall be Class F or better.

5. Air Distribution Piping System

- Air piping shall be of M.S., G.I., DI or other approved material as specified in the design.
- The piping network shall include:
 - Main air header.
 - Branch pipelines.
 - Distribution manifolds.
 - Air laterals and connections to filter beds.
- Pipes and fittings shall be designed to withstand operating pressure with adequate safety margin.
- All piping shall be properly aligned, supported and anchored.

6. Valves and Accessories

- The system shall include all valves required for operation and isolation, such as:
 - Butterfly valves.
 - Gate valves.
 - Non-return valves.
 - Air release valves.
 - Balancing valves.
 - Isolation valves.
- Valves shall be of suitable pressure rating and approved make.
- Necessary flanges, gaskets, nuts, bolts, expansion joints and dismantling joints shall be provided.

7. Supports and Structural Works

- Pipe supports, clamps, hangers, brackets and structural members required for installation shall be provided.
- All fabricated steel components shall receive one coat of approved primer and two coats of protective paint unless otherwise specified.
- Foundation bolts, grouting and fixing arrangements shall be included.

8. Electrical Works

- Electrical connections from control panel to blower motors shall be provided using suitable size copper conductor cables.
- Necessary cable trays, conduits, glands, lugs and termination accessories shall be included.
- Proper earthing of motors, blower frames and control panels shall be provided.
- Starter panel/control panel with protection devices shall be supplied where included in the design.

9. Installation

- Blowers shall be installed on properly prepared foundations and aligned accurately.
- Piping shall be installed in true line and level with leak-proof joints.
- All rotating equipment shall be fitted with safety guards.
- Installation shall be carried out as per manufacturer's recommendations and approved drawings.

10. Testing and Commissioning

- Blowers shall be tested for airflow, pressure, vibration and noise levels.
- The complete piping network shall be pressure tested for leakage.

- Air distribution uniformity across all filter beds shall be verified.
- Trial operation shall be carried out under actual operating conditions.
- The system shall be commissioned only after satisfactory performance is demonstrated.

11. Workmanship

- The work shall be executed by skilled and experienced personnel.
- All equipment shall be installed neatly, securely and in proper alignment.
- The completed system shall operate smoothly without excessive vibration, leakage or abnormal noise.

12. Mode of Measurement

As Per Schedule-B

ITEM NO.13:

Cement plaster 20 mm thick in C.M. 1:2 using water proofing compound of approved quality including finishing etc. complete.

1.0. Materials

- 1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-13.

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling and soffits of stairs plaster which shall be independent of the walls.

2.2. Preparation of back ground :

- 2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the readers if left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

- 2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

- 2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

- 2.2.4. For external plaster, the pestring operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the

building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2:3. Application of plaster :

- 2.3.1.** The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.
- 2.3.2.** Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.3.3.** In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.
- 2.3.4.** Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags oh the outside of the plaster and keeping them wet.

2.3.5. The plastering work shall be in single coat on fair side of brick / concrete walls for interior plastering up to floor two level, finished even and smooth in **C.M. 1:4**.

2.3.6 The coat of cement and fine sand mortar of proportion 1:1 (1.5 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.

2.3.7. In any continuous face of wall the finishing treatment should be carried out continuously and day lo day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions

The smooth concrete shall be suitably say read to provide necessary bond before plastering.

2.3.8. **Curing :** All the plaster work shall be kept damp continuously for a period 7 days.

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.

3.3. Thickness of the plaster shall be exclusive of he thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum **15 mm** at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt each and no addition shall be made for reveals, jambs, soffits, sils etc. of these openings, for finish to plaster around ends of joints, beams posts etc.

(b) Deduction for openings exceeding 0.5 sq.mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for ravel, jambs, soffits, sills etc. of

these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

- 3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9. In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 3.10. The payment shall be made extra for this work over and above the plaster work
- 3.11. The rate shall be for a unit or 1 Kg of water proofing materials used in 1 bag of weighing 50 Kg. cement used extra over the rate of plastering work.
- 3.12. The rate shall be for a unit of **One sq. meter**.

ITEM NO.14:

Finishing wall with water proofing cement paint of on wall surfaces (Three coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.

1.0. Materials

1.1. The water shall conform to M-1. Cement water proofing paint shall conform to I.S. 5410-1969.

2.0. Workmanship

2.1. Scaffolding : The relevant, specifications of item No. 18.11 shall be followed.

2.2. Preparation of surface :

The relevant specifications of item No. 18.11 shall be followed except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

2.3. Preparation of paint: Portland cement paint shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brush able consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, The manufacturer's instructions shall Site followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use.

2.4. Application of Paint:

2.4.1. No painting shall be done when the paint is-likely to be exposed to a temperature of below 70 c within 48 hours after application.

2.4.2. When weather conditions are such as to cause be carried out in the shadow as far as possible. This helps

the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. For undecorated surfaces, the surface shall be treated with minimum two coats of water proof cement paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the proceeding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the proceeding coat shall be slightly moistened before applying the subsequent coat.

2.4.5. The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops etc.

2.4.6. The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessively heavy brush marks. The lamps shall be brushed out.

2.4.7. Water proof cement paint shall not be applied on surface already treated with white wash, colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

2.5. Curing : Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the point has hardened so as not be damaged by the sprinkling of water say about 12 hours after the application.

3.0. Mode of measurement & payment

3.1. All the work shall be measured in the decimal system as under:

(a) Dimensions shall be measured to the nearest 0.01 m.

(b) Area in individual item shall be worked out to the nearest 0.01 sq.m.

All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 sq mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.0. sq. mt. each in area, deductions and additions shall be made as under.

3.2. No deductions shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 sq mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts etc.

3.3. No deductions for openings exceeding 0.5 sq.mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition will be made for reveals, jambs, soffits etc. of these openings :

(a) When both the faces of walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other side. Where width of reveals on both faces of wall are equal, deduction of .50% of area of opening on each face shall be made from total area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.

3..4 In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.

3.5. No deductions shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.

3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas:

(a) Corrugated steel sheets..... 14%

(b) Corrugated A.C. sheets..... 20%

- (c) Semi corrugated A.C. Sheets..... 10%
- (d) Nainital pattern roof (Plain sheeting sheets)..... 10%
- (e) Naintial pattern roof (with corrugated sheets)..... 25%

3.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area.

3.8. The rate shall include the cost of ail materials, labour, scaffolding, protective measures etc. involved in all the operations described above.

3.9. The rate shall be for a unit of One sq. meter.

ITEM NO.15:

Excavation for foundation in sand, gravel, clay soft soils and murrum etc. including shoring, strutting dewatering as necessary and disposing of the excavated stuff as directed. Depth upto 3.0 M. and up to any lead.

1.0. General

1.1. Any soil which generally yields to the application of pickaxes and shovels, phawaras rakes or any such ordinary excavating implement or organic soil, gravel silt, sand turf loam, clay, peat etc., fall under this category

2.0. Clearing the site

2.1. The site on which the structure is to be built shall be cleared, and all obstructions loose stone, materials and rubbish of all kind bush wood and trees shall be remove! as directed The materials so obtained shall be property of the Government and shall be conveyed und stacked as directed within any lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt

2.2. The rate of side clearance is deemed to be included in the rate of earth work for which no extra will be paid.

3.0. Setting out

After clearing the site the centre lines will be given, by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all 'parts of the work. Contractor shall supply labours materials, etc. required for setting out the reference marks and bench 'marks and shall maintain them as long as required and directed.

4.0. Excavation

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately it not specified. The bottom of the excavated area shall be leveled both longitudinally and transversely as directed by removing and watering as required No. earth filling will be allowed for brining it to level If by mistake or any excavation is made deeper or wider than, that shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up to 3.0 m depth shall be measured under this item.

5.0. Disposal of the excavated stuff

5.1. The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

5.2. The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with any lead and all lift.

6.0. Mode of measurements & payment

6.1. The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

6.2. The rate shall be for a unit of one cubic meter

ITEM NO.16:

Dewatering by pumping set of required capacity including temporary platform carting pumping at site and fixing the same in position including all accessories, and fuel and labour etc. complete.

1. Scope of Work

The work shall consist of providing, installing, operating and maintaining pumping arrangements for dewatering of excavations, trenches, pits, foundations, wells, chambers, sumps or other work areas, including deployment of pumping sets of required capacity, construction of temporary platforms, laying of delivery arrangements, operation, maintenance and removal after completion of work. The item shall include all labour, fuel, equipment, accessories and incidental works necessary for keeping the work area reasonably dry during execution of the works.

2. Equipment

- Dewatering shall be carried out using diesel engine/electric motor operated centrifugal pumps, submersible pumps, sludge pumps or other approved pumping equipment of suitable capacity.
- Pumping equipment shall be capable of handling the anticipated inflow of water and maintaining the work area in a dry and workable condition.
- Adequate standby pumps shall be arranged whenever directed by the Engineer-in-Charge.
- All pumps shall be maintained in good operating condition throughout the execution period.

3. Temporary Installation

- The contractor shall provide and erect temporary platforms, supports, foundations or staging required for safe and efficient installation of pumping equipment.
- Necessary suction pipes, delivery pipes, hoses, strainers, foot valves, bends, couplings, clamps and fittings shall be provided.
- Delivery arrangements shall be made to discharge water to approved locations without causing erosion, flooding, nuisance or damage to adjoining properties, roads, utilities or structures.

4. Dewatering Operations

- Dewatering shall commence whenever water accumulation interferes with construction activities and shall continue until the work can proceed safely and satisfactorily.
- Water shall be continuously removed to maintain a reasonably dry working surface.
- The contractor shall take all necessary precautions to prevent collapse of excavation sides, undermining of structures and disturbance of foundation strata due to dewatering operations.
- Pumped water shall not be allowed to re-enter the excavation area.

5. Labour and Consumables

- The item shall include all operators, helpers, watchmen and supervisory staff required for operation and maintenance of the pumping system.
- Fuel, lubricants, power consumption, consumable materials and routine maintenance of equipment shall be included in the rate.
- Any breakdowns shall be attended promptly and alternative arrangements made to avoid interruption of work.

6. Safety Requirements

- Pumps, cables, hoses and associated equipment shall be installed and operated in a safe manner.
- Electrical installations shall be properly insulated and earthed.
- Suitable barricading, warning signs and safety measures shall be provided where necessary.
- The contractor shall ensure that dewatering activities do not adversely affect adjacent structures, roads, utilities or existing services.

7. Workmanship

- Dewatering operations shall be carried out by experienced personnel using suitable equipment and methods.
- The system shall be maintained in efficient working condition throughout the period of operation.
- Upon completion of work, all temporary installations shall be dismantled and the site restored to its original condition.

8. Mode of Measurement

As Per Schedule-B

SCHEDULE-B2: REPLACEMENT OF EXISTING 300, 250, 200 & 150MM DIA PIPES AT EXISTING 11.00 MLD WTP AT KHAMBHAT HEAD WATER WORKS

ITEM NO.1:

Providing and supplying D. I. K-9 D/F grade pipes for following nominal bore diameter with internal cement mortar lining including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS 8329-2000). 300mm Dia Pipes.

OR

ITEM NO.1.1:

150mm Dia

DUCTILE IRON PIPES:

Note: Wherever International Standards or Indian standards / specifications are mentioned, their equivalent or higher standards / specifications are also acceptable

Supply and Delivery of Ductile Iron Pipe as per IS: 8329-2000 or its latest revision or amendments if any including jointing material as EPDM ring as per IS 5382-1985 and ISO: 4633-1996 or its latest revision or amendments if any.

Standards

The following standards, specifications and codes are part of this specification. In all cases, the latest revision of the including all applicable official amendments and revisions shall be referred to. In case of discrepancy between this specification and those referred to herein, this specification shall govern.

1. ISO: 10803-1997 Design method for ductile iron pipes
2. IS: 8329-2000 Centrifugally Cast (spun) ductile iron pressure pipes for water, gas and sewage
3. ISO: 2531-1991 Ductile iron pipes, fittings and accessories for pressure pipelines.
4. ISO: 4179-1985 ductile iron pipes for pressure and non pressure-Centrifugal cement mortar lining - General requirements.
5. IS: 8112 Specification for 43 Grade ordinary Portland cement.
6. BS: 3416 Bitumen based coatings for cold application, suitable for use in contact with potable water.
7. ISO: 8179-1995 ductile iron pipes-External coating-Part-1 Metallic Zinc with finishing layer.
8. IS: 638 Sheet rubber jointing and rubber insertion jointing.
9. ISO: 4633-1996 Rubber seals-Joint rings.
10. IS: 5382-1985 Specification for Rubber sealing rings for gas mains, water mains and sewers.
11. AWWA C600 Installation of ductile iron water mains and their appurtenances.

1 Internal Diameter:

The nominal values of the internal diameters of pipe, expressed in millimeters are approximately equal to the number indicating their nominal sizes DN.

2 Length: The working length of socket and spigot pipes shall be 5 m, 5.5 m, or 6 meters.

3 Thickness:

The wall thickness of pipe 'e' in mm shall be calculated as a function of nominal diameter by the following equation with minimum of 5 mm.

$$e = K (0.5 + 0.001 \text{ DN})$$

Where: e = wall thickness in mm, DN = the nominal diameter, K = the whole number coefficient

4 EPDM Rubber Gasket:

Rubber Gasket shall be suitably for Push-on-Joint.

The spigot ends shall be suitably chamfered or rounded off to facilitate smooth entry of pipe in the socket fitted with the rubber gasket
Rubber Gasket shall confirm to IS 5382-1985 and ISO: 4633-1996 its latest revision or amendments if any.

5 Sampling Criteria:

Sampling criteria for various tests, unless specified in IS 8329-2000, shall be as laid down in IS 11606. Mechanical test, Brunel hardness test, Hydrostatic test etc are shall be as per IS 8329-2000

6 Tolerances on External Diameter:

The nominal external diameter (DE) of the spigot end of socket and spigot pipes and when circumferentially using a diameter tape measured shall confirm to the requirements specified as follow. The positive tolerance is +1 mm and applies to all thickness classes of pipes. The maximum negative tolerance of the external diameter is specified as follow:

DN	Nominal	Positive Tolerance	Negative Tolerance
80	98	+1	-2.2
100	118	+1	-2.8
125	144	+1	-2.8
150	170	+1	-2.9
200	222	+1	-3.0
250	274	+1	-3.1
300	326	+1	-3.3
350	378	+1	-3.4
400	429	+1	-3.5
450	480	+1	-3.6
500	532	+1	-3.8
600	635	+1	-4.0

7 Tolerance on Ovality:

Pipes shall be as far as possible circular internally and externally. The tolerance for out-of-roundness of the socket and spigot ends is given below:

Nominal Diameter in mm	Allowable Difference Between Minor Axis and DE in mm
80 to 300	1.0
350 to 600	1.75
700	2.0
750 to 800	2.4
900 to 1000	3.5

8 Tolerance in thickness

The tolerance on wall thickness (e) and the flange thickness (b) of the pipes shall be as below:

Dimensions	Tolerance in mm
Wall thickness (e)	- (1.3 + 0.001 DN)(1)

Flange thickness (b)	+ (2+0.05b) & - (2+0.05b)
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9 Coating

Pipe shall be delivered internally and externally coated.

External Coating:

Pipe shall be metallic zinc coated and after that it shall be given a finishing layer of bituminous paint as per IS - 8329-2000

Zinc coating shall comply with IS: 8329/EN 545/ ISO 8179. Only molten zinc spray coating shall be acceptable. The average mass of sprayed metal shall not be less than 130 g/sq.m with a local minimum of 110 g/sq.m.

Bitumen overcoat shall be of normal thickness of 70 microns unless otherwise specified. It shall be a cold applied compound complying with the requirements of BS 3416 Type II suitable for tropical climates factory applied preferably through an automatic process.

Damaged areas of coating shall be repainted on site after removing any remaining loose coating and wire brushing any rusted areas of pipe.

Internal lining:

Internally pipe shall be Portland cement mortar lined (as per IS - 8329-2000). The mortar shall contain by mass at least one part of cement to 3.5 part of sand. All pipes and fittings shall be internally lined with cement mortar using high speed centrifugal process in accordance with IWO 4179/IS 8329. Cement mortar lining shall be applied at the pipe manufacturing shop in conformity with the aforesaid standards. No admixtures in the mortar shall be used without the approval of the Engineer. The quantity to cement proportion of sand if justified by the sieve analysis. Pipe lining shall be inspected on site and any damage or defective areas shall be made good to the satisfaction of the Engineer. Lining shall be uniform in thickness all along the pipe. The minimum thickness of factory applied cement mortar lining shall be as per IS: 8329 Annex-B or ISO 4179. This is given below.

Nominal Pipe Size (mm)	Nominal lining thickness (mm)
Up to 300	3
350-600	5
700-1200	6
1400-2000	9

10 Joint

Jointing of DI pipes and fittings shall be push-on type

Push-on-joints

The Contractor shall source the push-on-joint gaskets only from the pipe manufactures. In turn the pipe manufacturer shall supply at least 10% additional quantity of gaskets over and above the requirement to the Contractor at no extra cost.

The gasket used for joints shall be suitable for natural and purified water conveyance. In jointing DI pipes and fittings, the Contractor shall take into account the manufacturer's recommendations as to the methods and equipment's to be used in assembling the joints. In particular the Contractor shall ensure that the spigot end of the pipe to be jointed is smooth and has been properly chamfered, so that once the rubber ring is correctly positioned before the joint is made, does not get damaged by friction or sharp edges of the spigot Chamfer. The rubber rings and the recommend lubricant shall be obtained only through the pipe manufacturer.

Rubber ring bundles from every lot shall carry with them manufacturers test certificate for the following mechanical properties.

1. Hardness
2. Tensile strength
3. Compression set
4. Accelerated again test

5. Water absorption test
6. Stress relaxation test

Rubber rings shall be clearly labeled in bundles to indicate the type of ring, the type of joint, the size of the pipe with which they are to be used, the manufacturer's name and trade mark, the month and year of manufacture and the shelf life.

11 Testing of Pipe:

The main test among others to be conducted shall be as per IS: 8329-2000 or with its latest revision/amendments.

[A] Mechanical Tests

Mechanical tests shall be carried out during manufacture of pipes as specified in the Standards. The frequency and sampling of tests for each batch of pipes shall be in accordance with IS 11606-1986. The test results so obtained for all the pipes and fittings of different sizes shall be submitted to Engineer. The method for tensile tests and the minimum tensile strength requirement for pipes and fittings shall be as per IS: 8329/EN 545 for pipes and IS: 9523/EN 545 for fittings.

[B] Brunel Hardness Test

For checking the Brinell hardness the test shall be carried out on the test ring or bars cut from the pipes used for the ring test and tensile test in accordance with IS:1500. The test shall comply with the requirements specified in IS: 1500/ISO 6506.

[C] Re-tests

If any test piece representing a lot fails in the first instance, two additional tests shall be made on test pieces selected from two other pipes from the same lot. If both the test results satisfy the specified requirements the lot shall be accepted. Should either of these additional test pieces fail to pass the test, the lot shall be liable for rejection.

- [d]** For hydrostatic test at works, the pipes and fittings shall be kept under test pressure as specified in the standard for a period of minimum 15 seconds during which the pipes shall be struck moderately with a 700 g hammer for confirmation of satisfactory sound. They shall withstand the pressure test without showing any leakage, sweating or other defect of any kind. The hydrostatic test shall be conducted before surface coating and lining.

- 12. Price Variation:** This shall be as per 'Price Variation clause' given in the volume.

13 Quality Assurance

The manufacturer shall have a laid down Quality Assurance Plan for the manufacture of the products offered which shall be submitted along with the tenders.

14 Mode of measurement and payments

The payment shall be as per payment schedule.

ITEM NO.2:

Providing and supplying D. I. K-9 grade pipes for following nominal bore diameter with internal cement mortar lining including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS 8329-2000). 200mm Dia Pipes.

OR

ITEM NO.2.1:

250mm Dia.

DUCTILE IRON PIPES:

Note: Wherever International Standards or Indian standards / specifications are mentioned, their equivalent or higher standards / specifications are also acceptable

Supply and Delivery of Ductile Iron Pipe as per IS: 8329-2000 or its latest revision or amendments if any including jointing material as EPDM ring as per IS 5382-1985 and ISO: 4633-1996 or its latest revision or amendments if any.

Standards

The following standards, specifications and codes are part of this specification. In all cases, the latest revision of the including all applicable official amendments and revisions shall be referred to. In case of discrepancy between this specification and those referred to herein, this specification shall govern.

10. ISO: 10803-1997 Design method for ductile iron pipes
11. IS: 8329-2000 Centrifugally Cast (spun) ductile iron pressure pipes for water, gas and sewage
12. ISO: 2531-1991 Ductile iron pipes, fittings and accessories for pressure pipelines.
13. ISO: 4179-1985 ductile iron pipes for pressure and non pressure-Centrifugal cement mortar lining - General requirements.
14. IS: 8112 Specification for 43 Grade ordinary Portland cement.
15. BS: 3416 Bitumen based coatings for cold application, suitable for use in contact with potable water.
16. ISO: 8179-1995 ductile iron pipes-External coating-Part-1 Metallic Zinc with finishing layer.
17. IS: 638 Sheet rubber jointing and rubber insertion jointing.
18. ISO: 4633-1996 Rubber seals-Joint rings.
10. IS: 5382-1985 Specification for Rubber sealing rings for gas mains, water mains and sewers.
11. AWWA C600 Installation of ductile iron water mains and their appurtenances.

1 Internal Diameter:

The nominal values of the internal diameters of pipe, expressed in millimeters are approximately equal to the number indicating their nominal sizes DN.

2 Length: The working length of socket and spigot pipes shall be 5 m, 5.5 m, or 6 meters.

3 Thickness:

The wall thickness of pipe 'e' in mm shall be calculated as a function of nominal diameter by the following equation with minimum of 5 mm.

$$e = K (0.5 + 0.001 DN)$$

Where: e = wall thickness in mm, DN = the nominal diameter, K = the whole number coefficient

4 EPDM Rubber Gasket:

Rubber Gasket shall be suitably for Push-on-Joint.

The spigot ends shall be suitably chamfered or rounded off to facilitate smooth entry of pipe in the socket fitted with the rubber gasket

Rubber Gasket shall confirm to IS 5382-1985 and ISO: 4633-1996 its latest revision or amendments if any.

5 Sampling Criteria:

Sampling criteria for various tests, unless specified in IS 8329-2000, shall be as laid down in IS 11606. Mechanical test, Brunel hardness test, Hydrostatic test etc are shall be as per IS 8329-2000

6 Tolerances on External Diameter:

The nominal external diameter (DE) of the spigot end of socket and spigot pipes and when circumferentially using a diameter tape measured shall confirm to the requirements specified as follow. The positive tolerance is +1 mm and applies to all thickness classes of pipes. The maximum negative tolerance of the external diameter is specified as follow:

DN	Nominal	Positive Tolerance	Negative Tolerance
80	98	+1	-2.2
100	118	+1	-2.8
125	144	+1	-2.8
150	170	+1	-2.9
200	222	+1	-3.0
250	274	+1	-3.1
300	326	+1	-3.3
350	378	+1	-3.4
400	429	+1	-3.5
450	480	+1	-3.6
500	532	+1	-3.8
600	635	+1	-4.0

7 Tolerance on Ovality:

Pipes shall be as far as possible circular internally and externally. The tolerance for out-of-roundness of the socket and spigot ends is given below:

Nominal Diameter in mm	Allowable Difference Between Minor Axis and DE in mm
80 to 300	1.0
350 to 600	1.75
700	2.0
750 to 800	2.4
900 to 1000	3.5

8 Tolerance in thickness

The tolerance on wall thickness (e) and the flange thickness (b) of the pipes shall be as below:

Dimensions	Tolerance in mm
Wall thickness (e)	- (1.3 + 0.001 DN)(1)
Flange thickness (b)	+ (2+0.05b) & - (2+0.05b)

9 Coating

Pipe shall be delivered internally and externally coated.

External Coating:

Pipe shall be metallic zinc coated and after that it shall be given a finishing layer of bituminous paint as per IS - 8329-2000

Zinc coating shall comply with IS: 8329/EN 545/ ISO 8179. Only molten zinc spray coating shall be acceptable. The average mass of sprayed metal shall not be less than 130 g/sq.m with a local

minimum of 110 g/sq.m.

Bitumen overcoat shall be of normal thickness of 70 microns unless otherwise specified. It shall be a cold applied compound complying with the requirements of BS 3416 Type II suitable for tropical climates factory applied preferably through an automatic process.

Damaged areas of coating shall be repainted on site after removing any remaining loose coating and wire brushing any rusted areas of pipe.

Internal lining:

Internally pipe shall be Portland cement mortar lined (as per IS - 8329-2000). The mortar shall contain by mass at least one part of cement to 3.5 part of sand. All pipes and fittings shall be internally lined with cement mortar using high speed centrifugal process in accordance with IWO 4179/IS 8329. Cement mortar lining shall be applied at the pipe manufacturing shop in conformity with the aforesaid standards. No admixtures in the mortar shall be used without the approval of the Engineer. The quantity to cement proportion of sand if justified by the sieve analysis. Pipe lining shall be inspected on site and any damage or defective areas shall be made good to the satisfaction of the Engineer. Lining shall be uniform in thickness all along the pipe. The minimum thickness of factory applied cement mortar lining shall be as per IS: 8329 Annex-B or ISO 4179. This is given below.

Nominal Pipe Size (mm)	Nominal lining thickness (mm)
Up to 300	3
350-600	5
700-1200	6
1400-2000	9

10 Joint

Jointing of DI pipes and fittings shall be push-on type

Push-on-joints

The Contractor shall source the push-on-joint gaskets only from the pipe manufactures. In turn the pipe manufacturer shall supply at least 10% additional quantity of gaskets over and above the requirement to the Contractor at no extra cost.

The gasket used for joints shall be suitable for natural and purified water conveyance. In jointing DI pipes and fittings, the Contractor shall take into account the manufacturer's recommendations as to the methods and equipment's to be used in assembling the joints. In particular the Contractor shall ensure that the spigot end of the pipe to be jointed is smooth and has been properly chamfered, so that once the rubber ring is correctly positioned before the joint is made, does not get damaged by friction or sharp edges of the spigot Chamfer. The rubber rings and the recommend lubricant shall be obtained only through the pipe manufacturer.

Rubber ring bundles form every lot shall carry with them manufacturers test certificate for the following mechanical properties.

7. Hardness
8. Tensile strength
9. Compression set
10. Accelerated again test
11. Water absorption test
12. Stress relaxation test

Rubber rings shall be clearly labeled in bundles to indicate the type of ring, the type of joint, the size of the pipe with which they are to be used, the manufacturer's name and trade mark, the month and year of manufacture and the shelf life.

11 Testing of Pipe:

The main test among others to be conducted shall be as per IS: 8329-2000 or with its latest revision/amendments.

[A] Mechanical Tests

Mechanical tests shall be carried out during manufacture of pipes as specified in the Standards. The frequency and sampling of tests for each batch of pipes shall be in accordance with IS 11606-1986. The test results so obtained for all the pipes and fittings of different sizes shall be submitted to Engineer. The method for tensile tests and the minimum tensile strength requirement for pipes and fittings shall be as per IS: 8329/EN 545 for pipes and IS: 9523/EN 545 for fittings.

[B] Brunel Hardness Test

For checking the Brinell hardness the test shall be carried out on the test ring or bars cut from the pipes used for the ring test and tensile test in accordance with IS:1500. The test shall comply with the requirements specified in IS: 1500/ISO 6506.

[C] Re-tests

If any test piece representing a lot fails in the first instance, two additional tests shall be made on test pieces selected from two other pipes from the same lot. If both the test results satisfy the specified requirements the lot shall be accepted. Should either of these additional test pieces fail to pass the test, the lot shall be liable for rejection.

- [d]** For hydrostatic test at works, the pipes and fittings shall be kept under test pressure as specified in the standard for a period of minimum 15 seconds during which the pipes shall be struck moderately with a 700 g hammer for confirmation of satisfactory sound. They shall withstand the pressure test without showing any leakage, sweating or other defect of any kind. The hydrostatic test shall be conducted before surface coating and lining.

12. **Price Variation:** This shall be as per 'Price Variation clause' given in the volume.

13 Quality Assurance

The manufacturer shall have a laid down Quality Assurance Plan for the manufacture of the products offered which shall be submitted along with the tenders.

14 Mode of measurement and payments

The payment shall be as per payment schedule.

ITEM NO.3:

Manufacture, Supply & Delivery of Electric Resistance Welded (Up to 400mm)/ Submerged Arc Welded (Above 400mm) M.S.Pipe having beveled ends plate or coil conforming to IS-3589-2001 or its latest revision/ ammendment for following thickness outside diameter at GWSSB store or site anywhere in Gujarat State including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading conveyance to Departmental stores, stacking etc. all complete. I/S Solvent free Liquid Epoxy Lining (406 micron) + O/S 3 LPE Coated M. S. Pipe. for 219mm Dia 6.3mm Thick.

M.S PIPES

General Specification including Manufacturing , Welding, laying & Jointing are as per the Details Standard Specification kept on Page- 146 to 199.

General technical specifications:

1.0 SCOPE OF CONTRACT :

The contract shall be covering manufacturing supplying and delivering of :

Submerged Arc welded Hot finished ERW/EFW/SAW mild steel Beveled pipes bearing with ISI marked confirming to IS:3589-1991. Out side coated with best quality Bitumeneus paint having bevelved ends.

2.0 STANDARDS :

The mild steel pipes to be manufactured supplied and delivered under the scope of this contract shall be

manufactured in accordance and confirming to IS:3589-1991. Submerged Arc welded Hot finished ERW/EFW/SAW mild steel Beveled pipes bearing with ISI marked confirming to IS:3589-1991 Out side coated with best quality Bitumins paint.

3.1 MANUFACTURING

The mild steel pipes shall be manufactured from H.R. skelps/coils conforming to IS-10748. The pipes are to be fabricated as per terms and conditions as laid down in IS-3589/1991. The pipe shall be manufactured from Fe 410/330 grade steel. All pipes shall be with ISI mark.

3.2 WALL THICKNESS

The wall thickness of pipes shall be as specified in IS:3589/1991 & as specified in item without any minus tolerance.

3.3 PIPE ENDS

The pipe shall have beveled ends beveled to an angle of 30 ± 50 measured from a line drawn perpendicular to the axis of the pipes. The roof face shall be 1.6 ± 0.8 mm. The root face of the bevel may be prepared by hand finishing if required.

3.4 LENGTH OF PIPES

The random length pipes shall be in 4 to 7 meter up to size 406.4 mm OD and above 406.4 mm OD 6 to 12 meter.

3.5 STRAIGHTNESS OF PIPES

Finished pipes shall not deviate from straightness by more than 0.2% of the total length checking for straightness shall be carried out using as taut string or wire from end to end along the side of the pipe top measure, the greatest deviation.

3.6 TESTING OF PIPES

The main test among others to be conducted shall be as per IS:3589-1991 or with its latest revision/amendments.

3.7 SAMPLING OF PIPES

The sampling of pipes shall be as in IS:4711-1974.

3.8 CONDITION OF SUPPLY

The pipes without lining & with lining shall be as per specification of the shall be coated with best quality of bituminous paint.

3.9 OTHER TOLERANCES

As per IS:3589-1991 with latest revision/amendment (Except for wall thickness.)

3.10 M.S. pipes shall be welded either longitudinally or spirally.

1.0 TENDER PRICE :

The tender price shall include all labour, material and machinery cost necessitated to be utilized for;

- a) Proper manufacturing of the M.S. Pipes, with outside coating with best quality bituminous paint.
- b) All test required to be undertaken at manufacturer's premises.
- c) Transportation of the pipe by Road services with all the covers duly and appropriately insured.

Delivery of pipes with proper loading, unloading, stacking at store as indicated by Engineer-in-charge.

2.0 DELIVERY SCHEDULE:

Shall be as per General Terms and Conditions of the contract.

2.1 MARKING :

The methods of marking all the pipes to be delivered under scope of contract shall ensure that all the information will remain legible even after transportation, storage in open space etc. In general the legible and marking upon the goods shall indicate the followings :

- i) ISI certification mark on each pipe.
- ii) Manufacturer's brand name and/or trade mark.
- iii) Purchaser's mark as "Khambhat Nagarpalika" be painted/stenciled.
- iv) Diameter and specified wall thickness.
- v) Pipe designation (e.g. Fe-330/410) as per tender item.
- vi) Any other important matter that the manufacturer deems fit to be inscribed.

8.2 The supplier shall also produce in addition to manufacturer's test certificate as mentioned in Para 8.1 above, person/agency appointed by Engineer/ or Board for the same purpose.

6.1 The materials shall always be packed separately dispatched from manufacturer's works with adequate protective measures to prevent damages and deterioration while in transport or stored at any place. The packing shall always be so neat and tidy that may withstand any robust and rough handling.

6.2 The supplier shall use proper handling instruments/equipment's and shall follow to a suitable method of handling of pipes as may be approved by Engineer, while unloading and stacking material in the stores.

7.0 WORKMANSHIP:

ALL PIPES WITHOUT LINING SHALL BE FINISHED AND WHEN VISUALLY INSPECTED SHALL BE FREE FROM DEFECTS SUCH AS CRACKS, SURFACE FLOWS, LAMINATIONS ETC.

8.0 test certificate:

8.1 The supplier shall always provide manufacturer's test certificate in accordance with every batch/lot of goods so manufactured and supplied.

9.0 PAYMENT

Payment shall be made on Rmt. basis as per relevant item (Dia & grade) as mentioned in schedule 'B'

ITEM NO.4:

Manufacture, Supply & Delivery of Ductile Iron Flange socket spigot bends, tees, reducers or any other specials as per BS-EN-545/1995 Class-A series K12 suitable for use with D.I. Pipes manufactured as per IS:8329/1994 delivery of specials is to be made to GWSSB store or site of works any where in Gujarat including all taxes, loading, unloading, carting, stacking, insurance, inspection charges, octroi etc. complete. With external bitumen & zinc coating & internal cement mortar lining. Socket & Spigot type. From 80mm to 300mm Dia.

DI Specials with all types of diameters suitable of K-7 grade pipes with inner cement mortar lining. The necessary DI Specials required during the lowering & lying of Ductile Iron Pipe shall be supplied by the agency and shall be as per standard specification. And per IS specification.

It shall be of best quality as per requirement Rate shall be including loading, unloading, carting, insurance and labor charge etc. complete.

The payment shall be made on kg. Basis.

Technical Specification for Double Chamber Restrained Joints Ductile Iron (DI) Pipes

Restrained joints DI pipes and fittings shall be utilized where pipelines have DI Fittings (such as bends, Tees, reducers etc.), needs to crossroads through existing ducts or in areas with restricted accessibility or in case of heavy thrust forces or as directed by engineer – in- charge. The use of concrete anchor/thrust blocks shall be submit with his bid, the full details of the type of restrained joint propose to use.

The manufacturer will have to demonstrate the allowable operating pressure of the proposed restrained joints by type test duly approved by third party inspection agency such as Bureau VERITAS India / Italy, BSI UK or DVGW Germany. The allowable operating pressure & permissible angular deflection for various size range shall be as mentioned given below:

DN	DE, mm	Allowable operating Pressure * (PFA), bar	Allowable Angular Deflection,(Degree)
100	118	40	5
150	170	40	5
200	222	40	4
250	274	40	4
300	326	40	4
350	378	40	3
400	429	40	3
500	532	40	3
600	635	40	2
700	738	25	1.5
800	842	25	1.5
900	945	25	1.5
1000	1048	25	1.5
1100	1152	25	1
1200	1255	25	1

Calculation of the number of pipe lengths with restrained joint required, shall be as per the manufacture's recommendation and shall be subject to Engineer- in- Charge approval.

Restrained joints shall be designed to resist the axial thrust forces maintain flexibility and angular deflection mentioned in the above Table. Restrained joints shall be designed in accordance with ISO 10804. The thrust resisting mechanism shall be separated from the sealing action of the gasket and shall not be in contact with portable water in the pipeline.

The Double chamber restrained DI Pipes and Fitting shall be supplied with internal OPC lining and external zinc coating with finish layer of Blue Epoxy conforming to IS 8329:2000/IS 9523:2000 with latest amendment.

M. S. SPECIALS:

Scope shall include providing, fabricating, testing and installing M. S. Specials suitable to

M. S. pipes, valves and other fittings from steel plates. MS Specials shall be confirming to IS 7322 / IS 1538 dimensionally. MS specials and fittings shall be fabricated at site of work tested to specified test pressure and including providing flanges required, painting inside zinc epoxy coating and outside anti corrosive red primer, coated with three coats of anti-corrosive water

proof paint including freight, loading, unloading, carting, stacking as directed, and including all taxes, insurance etc. The sizes and types of specials shall be as per requirements taking into consideration in tender items like pumps, sluice valves, non-return valves, scour valves, expansion joints, dismantling joints etc.

The work of connecting shall be carried out as per instruction of Engineer- in Charge,
Any damage during the connecting work and fixing shall be rectified by the contractor without any extra cost. All tools & plants required shall be brought by contractor.

Payment shall be made KG basis of complete Item.

Scope of Work:

The scope of work includes the manufacture, supply, and delivery of Ductile Iron Flange Socket Spigot Bends, Tees, Reducers, or any other specials as per BS-EN-545/1995 Class-A series K12, suitable for use with D.I. Pipes manufactured as per IS:8329/1994.

The pipes shall have a diameter of 300 mm or above.

The delivery is to be made to the Gujarat Water Supply and Sewerage Board (departmental) store or the designated site of works anywhere in Gujarat State.

Technical Requirements:

Material Specifications (IS Codes):

The Ductile Iron (DI) specials shall conform to BS-EN-545/1995 Class-A series K12. The D.I. Pipes used in manufacturing the specials shall comply with IS:8329/1994.

Pipe Diameter:

Diameter of D.I. Specials: 300 mm or above.

Dimensions and Tolerances (As per Drawings):

All dimensions, tolerances, and specifications shall adhere strictly to the provided drawings and relevant standards.

Coating:

Internally and externally coat with suitable lining and coating materials as per the relevant standards.

Quality Control:

Maintain a quality control system to ensure conformity with the specified standards.

Delivery Terms:

Delivery Location:

The delivery of the D.I. Specials shall be made to the Khambhat Nagarpalika (departmental) store or the designated site of works anywhere in Gujarat State as per the instructions of the purchaser.

Inclusions:

The quoted price should be all-inclusive, covering all costs related to manufacturing, supply, and delivery. This includes but is not limited to taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, carting, stacking, etc.

Inspection and Testing:

Purchaser's Right:

The purchaser reserves the right to inspect and test the supplied D.I. Specials to ensure compliance with the specified standards.

Testing Facilities (IS Codes):

The manufacturer shall provide access to testing facilities and necessary documentation as required by the purchaser for verification of compliance.

Warranty: Warranty Period:

- The tenderer shall provide a warranty period during which any defects or non-conformities shall be rectified by the supplier at no additional cost to the purchaser.
- Payment Terms:
- The payment shall be as per payment schedule.

ITEM NO.4.1:

Flange Ended Specials - 80 to 300mm Dia.

D.I Specials

Supply of DI Specials with ISI Mark conforming to IS 9523/2000 suitable for jointing 80mm to 900mm dia DI Pipes. The pipes and fittings shall be coated for rust prevention as described below:

(i) External Coating

Bituminous paint as per Annexure 'C' of IS 8329-2000 / IS 9523-2000

(ii) Internal Lining

Portland cement (with or without additives) mortar as per Annexure - 'B' of IS 329-2000 / IS 9523-2000

(iii) Provision of Thrust Pad - (from DN 80 to DN 100):

Thrust pad has to be provided on bends of 90 & 45 deg. for sizes 80 & 100. Bends face the maximum surge pressure in any pipeline and tend to turn when pressure is applied. The thrust pad provides more surface area for the thrust block (made of concrete) to grip the fitting.

(iv) Provision of Lifting Loops

Lifting loops have to be provided on fittings from DN 400 & above this enables easy lifting of the fitting from the truck to the trench. These loops have been computer aligned & placed at the "centre of gravity" point(s) of each fitting. During lifting the fitting remains stationary (does not oscillate) also enabling alignment (which is critical for higher dia fittings) with the pipe during placement of fitting in the trench.

(v) Provision of Side Lugs

Each socket fitting is to be provided with two side lugs. This lug is available across all sizes and all type of socket fittings. This enables fastening of wire rope & offers a firm grip for pulling machines while laying and jointing. This can be used to either push the pipe on the fitting or the fitting on the pipe. Without the lugs, the wire rope tied on the socket mouth tends to slip because of lack of any firm support. While the provision of side lugs speeds up laying & jointing considerably, many contractors use a crowbar with the lug to keep the fitting firmly in place while jointing

MODE OF MEASUREMENT AND PAYMENT

The payment shall be made Kg. Basis of Ductile Iron Flange socket spigot bends, tees, reducers or any other specials.

ITEM NO.5:

Providing and supplying ISI mark CI D/F Sluice valves, butterfly valves & Reflux valves of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. Sluice valves as per IS - 780 & 2906 / 1984. Sluice Valve ISI Mark only. PN-1.6 With hand/wheel cap operated (Alt-1 type long body). 200mm Dia Sluice Valve.

OR

ITEM NO.5.1:

150mm Dia Sluice Valve

- The nominal size shall refer to the nominal bore at any point, shall not be less than the nominal size required.

Sluice valve as per I.S: 780 & 2906/1984

1.0 GENERAL

The contractor shall be covering manufacturing, supplying and delivery of:

Sluice valve conforming to IS: 2906-1984 & IS: 780-1984 or its latest revision (Specification for sluice valves (50 to 900 mm size) with ISI certification

2.0 STANDARDS

The C.I. sluice valves to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance with and conforming to Indian standard specifications as given below: with ISI certification mark on each sluice valves.

3.0 TEMPERATURE VARIATION

All sluice valves manufactured, supplied and delivered shall be subjected to drinking water under variable temperature condition ranging from 4^o to 45^o C.

4.0 MARKING

The legible and in deniable marking upon each valve shall indicate the following:

- (1) ISI certification mark on each sluice valve only.
- (2) Manufacture's brand name and/or trade mark.
- (3) Size of valve and nominal pressure of valve.
- (4) Serial number of cast.

(5) Serial number in punch

(6) Where a valve has been tested for only open and test, it should be marked '0' distinctly and permanently.

(7) Any other important matter that the manufacturer deems fit to be inscribed embossed.

5.0 TEST CERTIFICATE

5.1 The contractor shall always provide manufacture's test certificate in accordance with every batch/ lot as valves so manufactured and supplied.

5.2 The contractor shall also produce, in addition to manufacture's test certificate the inspection certificate issued by the authorized person /agency appointed by local body for the same purpose.

6.0 NOMINAL PRESSURE

6.1 Sluice valves shall be designed by nominal pressure (PN) defined as the maximum permissible gauge working pressure in Mpa as "PN-II" (Mpa= 10 kgf/m² approx)

7.0 MATERIAL:

7.1 The materials for the different component parts of the sluice valve shall confirm to requirements given in Table

Materials for components parts of sluice valve

Sr. No	Component	Material	Ref.to	Grade of designation
1	Body, bonnet wedge stuffing box, gland thrust plate, cap.	Grey cast iron	210-FG 1978(1)	
2	Steam	High tensile brass	320-1962(2)	Ally 1 of 2
3	Wedge nut	Leaded tin bronze	318-1962(3)	2
4	Body seat ring, wedge facing ring	Leaded tin bronze	318-1962(3)	2
5	Bolts	Carbon steel	1367-1967(4)	Class 4.6
6	Nuts	Carbon steel	1367-1967(4)	Class 4
7	Bonnet gasket	Compressed fiber Board	2712-1971(5)	C
8	Gland packing	Jute & hemp	5414-1969(6)	--

(1) Specification for grey iron castings (third revision).

(2) Specification for high tensile brass rods and sections (revised).

(3) Specification for leaded tin bronze ingots and casting (revised).

- (4) Specification for technical supply condition threaded fasteners (first revision)
- (5) Specification for compressed asbestos fiber jointing (first revision)
- (6) Specification for glan packing, jute and hemp.

8.0 MANUFACTURE

Sluice valve bodies for 80 mm to 900 mm size valves shall be provided with double flanged ends connection.

9.0 FLANGES

The flanges and their dimensions of drilling

shall be in accordance with part IV and VI of I.S. 1538 (Part I to XXII) 1976 (Specification for cast Iron fittings for pressure pipes for water gas and sewage) or its latest revision.

10.0 MODE OF MEASUREMENT AND PAYMENT

Measurement shall be paid on number basis as per relevant dia of the item in schedule B of the tender and as per payment schedule.

ITEM NO.6:

'Excavation for pipe line trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. In all sort of soil and soft murrum. Upto 1.50 Mt. Depth. For CC 1:2:4 or Asphalt Road.

1.0 General

- 1.1 The excavation for trenches will generally, refers to open excavation for trenches in wet / dry conditions for pipe laying work.

2.0 Clearing of Sites:

- 2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.
- 2.2 The products of the clearing to restacked in such a place and in such a manner, as directed by the engineer in charge.
- 2.3 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well watered, well rammed leveled off, as may be directed.
- 2.4 The agency has to obtain necessary permission for diverting the traffic or public as per requirement from competent authority for carrying out the work.

3.0 Setting Out:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labour materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

4.0 Excavation

- 4.1 The excavation for the pipe trenches shall also include removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose of various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to the angle of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, ramming etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts including loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such changes in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to be laid until Engineer has approved the depth and dimensions of trenches, level and measurements.

Excavation by the Use of Explosives

Unless otherwise stated herein, I.S. Specification "IS: 4081: Safety Code for Blasting and IS 3764-1966 safety code of Excavation works and related Drilling Operations" shall be followed. As far as possible all blasting shall be completed prior to commencement of construction. At all stages of excavation, precautions shall be taken to preserve the rock below and beyond the lines specified for the excavation, in the soundest possible condition. The quantity and strength of explosives used shall be such as will neither damage nor crack the rock outside the limits of excavation. All precautions, as directed by Employer's Representative, shall be taken during the blasting operations and care shall be taken that no damage is caused to adjoining buildings or structures as a result of blasting operations. In case of damage to permanent or temporary structures, Contractor shall repair the same to the satisfaction of Employer's Representative at his cost. As excavation approaches its final lines and levels, the depth of the charge holes and amount of explosives used shall be progressively and suitably reduced.

The contractor shall obtain a valid Blasting License from the authorities concerned. No explosive shall be brought near the work in excess of quantity required for a particular amount of firing to be done; and surplus left after filling the holes shall be removed to the magazine. The magazine shall be built as a way as possible from the area to be blasted. Employer's Representative's prior approval shall be taken for the location proposed for the magazine.

In no case shall blasting be allowed closer than 30 meters to any structure or to locations where concrete has just been placed. In the latter case the concrete must be at least 7 days old. Blasting for excavation in hard rock will only be allowed if permitted by competent authority otherwise shall be done with chiseling only.

For blasting operations, the following points shall be observed.

- i) Contractor shall employ a competent and experienced supervisor and licensed blaster in-charge of each set of operation, which shall be held personally responsible to ensure that all safety regulations are carried out.
- ii) Before any blasting is carried out, Contractor shall intimate Employer's Representative and obtain his approval in writing for resorting to such operations. He shall intimate the hours of firing charges, the nature of explosive to be used and the precautions taken for ensuring safety.
- iii) Contractor shall ensure that all workmen and the personnel at site are excluded from an area within 200 m radius from the firing point, at least 15 minutes before firing time by sounding warning whistle. The area shall also be given a warning by sounding a distinguishing whistle.
- iv) The blasting of rock near any existing buildings, equipments or any other property shall be done under cover and Contractor has to make all such necessary muffling arrangements. Covering may preferably be done by MS plates with adequate dead weight over them. Blasting shall be done with small charges only and where directed by Employer's Representative; a trench shall have to be cut by chiseling prior to the blasting operation, separating the area under blasting from the existing structures.
- v) The firing shall be supervised by a Supervisor and not more than 6 (six) holes at a time shall be set off successively. If the blasts do not tally with the number fired, the misfired holes shall be carefully located after half an hour and when located, shall be exploded by drilling a fresh hole along the misfired hole (but not nearer than 600 mm from it) and by exploding a new charge.
- vi) A wooden tamping rod with a flat end shall be used to push cartridges home and metal rod or hammer shall not be permitted. The charges shall be placed firmly into place and not rammed or pounded. After a hole is filled to the required depth, the balance of the hole shall be filled with stemming, which may consist of sand or stone dust or similar inert material.
- vii) Contractor shall preferably detonate the explosives electrically.
- viii) The explosives shall be exploded by means of a primer, which shall be fired by detonating a fuse instantaneous detonator (F.I.D) or other approved cables. The detonators with F.I.D. shall be connected by special nippers.
- ix) In dry weather and normal dry excavation, ordinary low explosive gunpowder may be used. In damp rock, high explosive like gelatin with detonator and fuse wire may be used. Underwater or for excavation in rock with substantial accumulated seepage electric detonation shall be used.
- x) Holes for charging explosives shall be drilled with pneumatic drills, the drilling pattern being so planned that rock pieces after blasting will be suitable for handling without secondary blasting.
- xi) When excavation has almost reached the desired level, hand trimming shall have to be done for dressing the surface to the desired level.
- xii) Any rock excavation beyond an over break limit of 75 mm shall be filled up as instructed by Employer's Representative, with concrete of strength not less than M10. Stopping in rock excavation shall be done by hand trimming.
- xiii) Contractor shall be responsible for any accident to workmen, public or Employer's property due to blasting operations. Contractor shall also be responsible for strict observance of rules, laid by Inspector of explosives, or any other Authority duly constituted under the

State and / or Union Government as applicable at the place of excavation.

Stripping Loose Rock

All loose boulders, detached rocks partially and other loose material which might move therewith not directly in the excavation but so close to the area to be excavated as to be liable, in the opinion of Employer's Representative, to fall or otherwise endanger the workmen, equipment, or the work shall be stripped off and removed from the area of the excavation. The method used shall be such as not to render unstable or unsafe the portion, which was originally sound and safe.

Any material not requiring removal in order to complete the permanent works, but which, in the opinion of Employer's Representative, is likely to become loose or unstable later, shall also be promptly and satisfactorily removed.

Classification of Strata:

The decision regarding, classification of strata shall rest with the Engineer in charge and his decision shall be final and binding to the contractor.

All the materials encountered in the excavation shall be classified as under:-

Ordinary soil and soft murrum:

These will include all materials of an earthy or sandy nature, which can be easily ploughed or small shingle, and gravel, which can be easily removed.

Hard murrum:

This shall include all kinds of disintegrated rock or shale or inundated clay which can be removed with a shovel without difficulty and which do not require blasting.

Soft rock:

This shall includes all materials which is rock or hard conglomerate, all decomposed and weathered rock, highly fissured rock old masonry and also soft rock boulders bigger than 1/2 cubic meter and other varieties of rock. Which do not require blasting and which can be removed with the pie crowbars wedges and hammer.

Hard rock:

This shall include rocks, occurring in masses, which could best be removed by chiseling.

5.0 Shoring and Strutting:

5.1 Shoring & strutting if required shall have to be carried out by the contractor, for which any extra charge will not be paid.

5.2 During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra cost.

6.0 Protection

6.1 The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done. Sufficient care and protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

7.0 The excavation in all sorts of soil, hard murram, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

8.0 Disposal of Excavated Stuff

8.1 No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the owner. The rate of excavation includes sorting out of useful materials and stacking them separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any way shall be disposed off as directed by the Engineer from the outer edge of trench.

8.2 The site should be cleared off on completion of work.

9.0 Additional Requirements

9.1 At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate include for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slope the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rods without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case (i.e. before testing) for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary and directed by the Engineer-in-charge, the contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide diversion when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of road.

9.2 The contractor shall break the road surface by chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge. The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

10.0 Measurement and Payment

10.1 Payment shall be made as per actual work done. On cu mt. unit bases

10.2 The rate for the item of excavation shall include the following unless and otherwise mentioned.

- (a) Clearing of site
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.

- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during progress of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soak pits Septic Tank etc. if damaged by contractor without extra payment.
- (j) Clearing the site on completion of works directed by the Engineer.

ITEM NO.7:

'Refilling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within a radius of 3 km.

□ REFILLING OF TRENCHES:

□ On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the Contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of Trench Excavation and the Contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the Contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling of trenches. The excavated material nearest to the trench shall be used filling. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. Filling shall be carried out simultaneously on both sides of the pipes so that unequal pressure does not occur. Walking or working on the completed pipeline unless the trench has been filled to height of at least 30cm over the top of the pipe except as may be necessary for tamping etc., during backfilling work.

The remaining portion of the trench may be filled in with a mixture of hard and soft material free from boulders and clods of earth larger than 150mm in size if sufficient quantity of good earth and murrum are not available. The trench shall be refilled so as to build up to the original ground level, keeping due allowance for subsequent settlement likely to take place. The top 300mm layer or fertile agricultural soil shall be kept aside during excavation and shall be laid in layers near ground level during refilling.

- To prevent buckling of pipe shell of diameters 1200mm and above, pipes shall be strutted from inside while the work of refilling is in progress, for which no separate payment shall be made.
- Strutting shall be done by means of strong spiders having at least 6 arms which shall be sufficiently stiff to resist all deformation. Spiders shall be provided at a maximum interval of 2m & shall be welded in such a way that internal coating does not get burnt.
- The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be for filling and in which portion of the site and in what manner it shall be so used.
- If any material remains as surplus it shall be disposed of as directed by the Engineer, which includes loading, unloading, transporting and spreading as directed within all lead. If the Contractor fails to remove

the earth from site within 7 days after the period specified in a written notice, the Engineer may arrange to carry out such work at the Contractor's risk and cost or may impose such fine for such omission as he may deem fit. Particular care shall be taken to keep the trench dry during the entire refilling operation.

□ If suitable material for refilling is not available for excavation the Contractor shall bring earth, murrum of approved quality as directed by the Engineer.

□ No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval of the Engineer has been obtained.

□ Subsidence in filling in : Should any subsidence take place either in the filling of the trenches or near about it during the maintenance period of 24 months from the completion of the Contract Works, the Contractor shall make good the same at his own cost or the Engineer may without notice to the Contractor, make good the same in any way and with any material that he may think proper, at the expense of the Contractor. The Engineer may also, if he anticipates occurrence of any subsidence, employ persons to give him timely notice of the necessity of making good the same, and the expenses on this account shall be charged to the Contractor.

□ Filling in trenches

□ Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipe and drains have been tested and passed. The backfilling material shall be properly consolidated taking due care so that no damage is caused to the pipes.

□ Where the trenches are excavated in soil, the filling from the bottom of the trench to the level of the center line of the pipe shall be done by hand compaction with selected approved earth in layers not exceeding 8 cm; backfilling above the level of the center line of the pipes shall be done with selected earth by hand compaction, or other approved means in layers not exceeding 15 cm.

□ In case of excavation of trenches in rock, the filling up to a level 30 cm above the top of the pipe shall be done with fine materials such as earth, murrum, etc. The filling up to the level of the centerline of the pipe shall be done by hand compaction in layers not exceeding 8 cm whereas the filling above the centerline of the pipe shall be done by hand compaction or approved means in layers not exceeding 15 cm. The filling from a level 30 cm above the top of the pipe to the top of the trench shall be done by hand or other approved mechanical methods with broken rock filling of size not exceeding 15 cm mixed with fine material as available to fill up the voids.

□ Filling of the trenches shall be carried out simultaneously on both sides of the pipe to avoid unequal pressure on the pipe.

□ **Mode of Measurement & Payment & as per BOQ.**

ITEM NO.8:

'Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work

1.0. Workmanship

1.1. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand shall be done in reverse order to the one in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demolition.

1.3. Necessary propping, shoring and under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.

1.5. Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.

1.6. All materials obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.

1.7. Any serviceable materials, obtained during dismantling or demolition shall be separated out and stacked properly as directed with all lead and lift. All unserviceable materials, rubbish etc., shall be stacked as directed' by the Engineer-in-charge.

1.8. On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.

2.0. Mode of measurements and payment

2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

2.2. All work shall be measured in decimal system as fixed in its place subject to the following limits; unless otherwise stated hereinafter : (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Area shall be worked out to the nearest 0.01 sq. mt.(c) Cubical contents shall be worked out to the nearest 0.01 Cu.m.

2.3. The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or portions where considered necessary.

2.4. The rate shall be for a unit of one cubic meter.

ITEM NO.9:

Lowering, laying and jointing C. I. S & S Spun pipes suitable for Tyton joints / Mortar lined D. I. Pipes of various classes with CI / MS specials of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including hydraulic testing etc. comp. 200mm Dia.

OR

ITEM NO.9.1:

250mm Dia Pipes

GENERAL:

The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.

□ The trenches shall be well leveled so that pipes are laid evenly among them. The pipes shall be fixed within two rubber rings to be supplied by department at the place shown in schedule A, if directed by the Engineer-in-charge or mentioned in item of schedule B. The specification for titan joints i.e. Rubber Rings shall be as per details specification material section.

□ The contractor shall make his own arrangement for obtaining permission for storing & stacking of pipes etc. from land boards whether they are Government, Municipal Local Bodies or Private land owner.

□ Every pipes before lowering into the trenches shall be got checked and thoroughly cleaned and the beds of the trenches shall be properly graded and leveled as required on the line, without any claim for extra cost whether it is required. The pipe shall be carefully lowered into the trenches with the help of a suitable type of chain pulley blocks, which shall first be approved by the Engineer-in-Charge. Each pipe shall be properly jacked and the spigot perfectly fixed into the socket. No jointing operation shall be started unless the gradients levels are approved by the Engineer in- Charge or his representatives.

□ The pipes shall be laid complete in centerline ranged accurately by means of a string attached to both marked center of site rails and no deviation shall be permissible without the permission of Engineer-in-Charge. The pipe shall be laid in reasonably dry trenches and no circumstances on slushy bedding.

□ The pipes shall be brushed before lowering any laying or remove any soil or dirt etc. that may have accumulated.

□ The inside socket and outside of the spigot-shall be carefully cleaned. The pipe shall be lowered carefully with socket and toward and the flow of water or up till or as directed and spigot and should be carefully inserted into the socket and the space shall be filled with the joint.

□ The excavation for trenches shall be done before laying of the pipes as per required depth and width so that adequate space can be made available for joint.

□ The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.

□ Before laying the pipes it shall be brushed throughout length so that the dust and soil can be removed.

□ Reducer bends tees, and adopter etc. to be supplied by the contractor as per requirement.

□ All the specials such as bends, tees, reducer, etc. shall be fixed as per instruction of engineer-in-charge in the pipeline.

□ The pipe shall be hydraulically tested during the testing no leakage shall be observed. If, leakage observed, it shall be set rightly by the contractor at his own cost as per the instruction of engineer-in-charge. The payment shall be as per payment schedule.

□ **DI Specials & Fittings**

□ Manufacture, Supply & Delivery of Ductile Iron (DI) Specials & Fittings as per IS:9523/2000 and its latest amendments, Class-K12 with suitable Flange Drilling dimensions per PN-10/PN-16 suitable for the use with DI Pipes manufactured as per IS:8329/2000 with its latest amendments.

□ DI Specials and Fittings are to be only used for the jointing with DI pipes. DI Double Socket Tee with Flange Branch (DSTFB) of suitable size must be used as Air Valve Tee for the connection of Air Valve with DI Pipe.

□ The DI Specials and Fittings shall be preferably manufactured and supplied by the same pipe manufacturer &/or its subsidiary company, having valid BIS Licence, to ensure the quality and compatibility of Ductile Iron (DI) Pipes with DI Specials and Fittings for the better pipeline performance.

□ In case the same DI pipe manufacturer does not manufacture and supply DI Specials and Fittings, DI Special and Fittings must be procured from any of DI pipe manufacturer, having valid BIS Licence, to ensure the best DI quality product for DI Specials and Fittings.

QAP approval and Inspection is to be ensured by the concerned Khambhat Engineer

Engineer and Third Party Inspection Agency like DI Pipes. The rates of DI Specials and Fittings shall be of FOR site including loading, unloading, carting, insurance and labour charge etc. Complete.

□ TESTING OF WATER PIPES:

□ After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section.

□ (b) 30m whichever is less without showing any leakage or sweating anywhere in the pipes joints specials valves etc. if any defect are found the contractor shall be made good the same at his own cost.

□ Any leaking joints shall be made good and above test pressure in to be lowered gradually after satisfactory test is & over.

Khambhat Nagarpalika will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

□ The hydraulic test shall be given again if considered necessary by the Executive Engineer or his representative to show that no further leakages or sweating is there. The contractor shall have to make necessary arrangements for water testing as well as plugging the opening of pipes etc. as directed without claiming any extra cost. The pipelines shall be kept filled with water for a work lines shall be kept filled with water for a week or till it is situated for testing is done.

□ If the pipe lines are laid in detached sanctioned & not in continuous length due to any reasons such as non-availability of specials or due to obstacle etc. The contractor shall see that no end of pipes length is kept open-ends are immediately covered up either by suitable blank flange or cap slug or by means of double layer gunny bags clothes tied properly by mild steel wire without any claim for extra-cost.

□ The rate shall be per meter of pipe line laid including all specials and fitting jointly etc. Cutting and waste shall not be paid separately. The length shall be measured not on the straight line and curves along the center line over the pipe and specials correct up to 1 cm.

□ **METHOD OF MEASUREMENT OF PIPES:**

□ The measurement shall be recorded in running meter of pipe length laid along centre line or axis of pipe line including tees, enlarges, reducers and bends correct up to 0.01M. length. No payment shall be made for overlaps etc. The payment shall be paid after completion of whole item as mentioned in price bid on Running Meter basis.

Payment shall be as per payment schedule And as per BOQ.

ITEM NO.10:

Providing and making flanged joints to flanged DI / C.I. pipes of all classes / specials etc. including cost of all jointing materials rubber packing, nut bolts, including lowering laying jointing labour hydraulic testing etc. complete. 300mm Dia Pipe.

OR

ITEM NO.10.1:

150mm Dia Pipes

Scope of Work

The work shall consist of providing and making flanged joints for 500 mm diameter Ductile Iron (DI) / Cast Iron (CI) pipes, fittings, valves, and specials of all classes, including supplying all jointing materials, assembling, aligning, bolting, testing, and commissioning complete as directed by the Engineer-in-Charge.

Materials

The contractor shall supply and use:

- Approved quality rubber insertion packing/gaskets suitable for potable water applications.
- Mild steel/high tensile steel nuts, bolts, and washers of required size and length, galvanized or otherwise specified.
- Jointing compound, lubricants, anti-corrosive coating on exposed bolts and nuts, and all other consumables required for proper jointing.
- Any temporary supports, packing materials, and accessories necessary for completing the work.

Execution

1. Check and clean the flange faces thoroughly before jointing.
2. Ensure proper alignment of pipes, fittings, valves, and specials to avoid stress on the flanged joints.
3. Position the rubber gasket centrally between the flange faces without folds or damage.
4. Insert bolts and nuts correctly and tighten them uniformly in a criss-cross sequence to obtain even pressure on the gasket.
5. Lower, place, and align the pipes/specials carefully using suitable lifting equipment wherever required.
6. Complete all jointing work with skilled labour and proper tools to achieve a leak-proof connection.

7. Carry out hydraulic testing of the completed pipeline section at the specified test pressure or as directed by the Engineer-in-Charge.
8. Rectify any leakage or defects observed during testing at no extra cost.
9. Complete all works necessary for commissioning and satisfactory operation of the pipeline.

Testing

- All flanged joints shall be subjected to hydraulic pressure testing along with the pipeline section.
- The joints shall remain watertight under the specified test pressure.
- Any defective gasket, bolt, nut, or joint shall be replaced and retested without additional payment.

Measurement

As Per Schedule-B

ITEM NO.11:

'Lowering, laying, jointing & welding in position to correct line & level M.S. Pipe with outside 3 LPE coating & inside solvent free liquid epoxy lining on pedestal or chairs upon prepared formation or prepared bedding in trenches the rates include conveyance from store to site of work loading, unloading, heat shrink sleeve jointing hydrotesting etc. complete.

GENERAL:

The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.

The trenches shall be well leveled so that pipes are laid evenly among them. The pipes shall be fixed within two rubber rings to be supplied by department at the place shown in schedule A, if directed by the Engineer- in-charge or mentioned in item of schedule B. The specification for titan joints i.e. Rubber Rings shall be as per details specification material section.

The contractor shall make his own arrangement for obtaining permission for storing & stacking of pipes etc. from land boards whether they are Government, Municipal Local Bodies or Private land owner.

Every pipes before lowering into the trenches shall be got checked and thoroughly cleaned and the beds of the trenches shall be properly graded and leveled as required on the line, without any claim for extra cost whether it is required. The pipe shall be carefully lowered into the trenches with the help of a suitable type of chain pulley blocks, which shall first be approved by the Engineer-in-Charge. Each pipe shall be properly jacked

and the spigot perfectly fixed into the socket. No jointing operation shall be started unless the gradients levels are approved by the Engineer-in-Charge or his representatives.

The pipes shall be laid complete in centerline ranged accurately by means of a string attached to both marked center of site rails and no deviation shall be permissible without the permission of Engineer-in-Charge. The pipe shall be laid in reasonably dry trenches and no circumstances on slushy bedding.

The pipes shall be brushed before lowering any laying or remove any soil or dirt etc. that may have accumulated.

The inside socket and outside of the spigot-shall be carefully cleaned. The pipe shall be lowered carefully with socket and toward and the flow of water or up till or as directed and spigot and should be carefully inserted into the socket and the space shall be filled with the joint.

Payment shall be as per payment schedule

TESTING OF WATER PIPES:

After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section. (b) 30m whichever is less without showing any leakage or sweating anywhere in the pipes joints specials valves etc. if any defect are found the contractor shall be made good the same at his own cost.

Any leaking joints shall be made good and above test pressure in to be lowered gradually after satisfactory test is & over. Khambhat Nagarpalika will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

The hydraulic test shall be given again if considered necessary by the Executive Engineer or his representative to show that no further leakages or sweating is there. The contractor shall have to make necessary arrangements for water testing as well as plugging the opening of pipes etc. as directed without claiming any extra cost. The pipelines shall be kept filled with water for a work lines shall be kept filled with water for a week or till it is situated for testing is done.

If the pipe lines are laid in detached sanctioned & not in continuous length due to any reasons such as non availability of specials or due to obstacle etc. The contractor shall see that no end of pipes length is kept open- ends are immediately covered up either by suitable blank flange or cap slug or by means of double layer gunny bags clothes tied properly by mild steel wire without any claim for extra-cost.

The rate shall be per meter of pipe line laid including all specials and fitting jointly etc. Cutting and waste shall not be paid separately. The length shall be measured not on the straight line and curves along the center line over the pipe and specials correct up to 1 cm. Payment of untested section shall be made at 70% of the tendered rate. Remaining payment shall be made on giving satisfactory hydraulic test by the contractor. Payment for untested pipeline shall be made for maximum length of 1 km. in each size of pipeline.

Payment shall be as per payment schedule

ITEM NO.12:

'Lowering, laying and jointing in position following C. I. / D/F Reflux valves, Butterfly valves, Sluice valves and Air valves including cost of all labour, jointing material, including nut bolts and giving satisfactory hydraulic testing, etc. complete. 200mm Dia Sluice Valve.

Or

ITEM NO.12.1:

150mm Dia Sluice Valve

JOINTING MATERIAL

- 1.1 The contractor shall provide all necessary jointing materials such as nuts bolts, rubber packing white zinc jute lead wool C. I. tailpiece etc.
- 1.2 All tools and plant required for installation of sluice valve shall be provided by the contractor.
- 1.3 All jointing materials shall be approved from the engineer-in-charge before use
- 1.4 The nut and bolts shall conform to Item No MSP-19 of specification of materials.
- 1.5 The rubber packing shall conform all specifications as narrated in Item No MSP-20 of specifications of materials.

2.0 INSTALLATION

- 2.1 The sluice valve/ butterfly valve shall be lowered in to the trench carefully, so that no part is damaged during lowering operation.
- 2.2 If necessary tailpieces shall be fitted with sluice valve first outside the trench and then lowered in to the trench.
- 2.3 The rubber packing shall be three ply and of approved thickness. The packing shall be of full diameter of the flange with necessary holes and the sluice/butterfly valve bore. It shall be even at both the inner and outer edges.
- 2.4 The flange faces thoroughly greased.
- 2.5 If flange faces are not free, the contractor shall use thin fibers of lead wool.
- 2.6 After placing the packing, nuts and bolts shall be inserted and tightened to make the joint.
- 2.7 The valve shall be tightly closed when being installed to prevent any foreign materials from getting in between the working parts of the valve.
- 2.8 Each flange bolt shall be tightened a little at a time taking care to tighten diametrically opposite bolts alternatively.
- 2.9 The sluice valve/butterfly valve shall be installed in such a way that its Spindle shall remain in truly vertical position.
- 2.10 The other end of tailpiece shall be fitted with pipes so that continuous lines can work.
- 2.11 Extra excavation required for facility of lowering and fixing sluice valve shall not be paid for.

3.0 TESTING

- 3.1 After installation of sluice valve/ butterfly valve the same is tested to 1 1/2 times of its test pressure.
- 3.2 The joints sluice valve/butterfly valve shall withstand the test pressure of pipelines.

3.3 Defects noticed during test and operation of sluice valve shall be rectified by the contractor at his own cost without any extra claim to the entire satisfaction of the Engineer-in-charge.

4.0 MODE OF MEASUREMENT AND PAYMENT

Measurement shall be paid on number basis as per relevant dia. of the item as per BOQ

ITEM NO.13:

Providing, Supplying and Delivery of CI Manhole frame and cover incl. all taxes, loading, unloading and carting up to departmental stores etc. comp. Size 1.5m. x 1.5m. heavy duty - 15 ton capacity. All Type. CI Manhole Frame & Cover.

1 GENERAL

- 1.1 Precast RCC Manhole Frame & cover shall be as per IS: 12592 (part – I & II). The M.H. Frame & Cover shall be of Heavy duty of Grade designation HD- 20 – Rectangular in shape with clear opening of Manhole.

2 MATERIALS

- 2.1 Materials such as cement, aggregate, water, reinforcement shall be of standard as prescribed in the material part. Other materials to be used for Frame & Cover shall be as under:

2.1 CONCRETE:

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing, etc.(IS: 456 – 1978). The minimum cement content in the concrete shall be 360 Kg/m³ with a maximum water content ratio of 0.45. Concrete weaker than grade M 30 shall not be used. Compaction of concrete shall be done by table machine vibration.

3 STEEL FIBERS:

The diameter/equivalent diameter of steel fibers shall not be greater than 0.75 mm. The aspect ratio of the fibers shall be in the range of 50 to 80. The minimum volume of fibers, where used, shall be 0.5 percent of the volume of the concrete.

4 ADDITIVES OR ADMIXTURES:

Additives or admixtures may be added either as additives to the cement during manufacture, or as admixtures to the concrete mix. Additives or admixtures used for covers may be:

- a) Accelerating, water-reducing and air-entraining admixtures confirming to IS: 9103- 1979.
- b) Coloring pigments
- c) Fly ash confirming to IS: 3812-1981
- d) Water proofing agents conforming to IS: 2645-1975.

5 DIMENSIONS AND TOLERANCES:

- 5.1 Length, breadth and diameter of precast concrete manhole covers shall be such that the maximum clearance at top between the cover & frame of corresponding grade and shape shall be 5 mm. The top surface of frame & cover is in level within a tolerance of ± 5 mm.

6 MANUFACTURE:

6.1 MIXING

Concrete shall be mixed in a mechanical mixer. Mixing shall be continued until there is a uniform distribution of the material and the mass is uniform in colour and consistency.

6.2 Placing of reinforcement, compaction of concrete, curing, edge protection and finishing shall be attended as per IS: 12592. Edge Protection & Finishing shall be provided as per relevant IS.

7 LIFTING HOOKS:

7.1 The minimum diameter of mild steel rod used as lifting device shall be 16 mm for heavy duty covers. The lifting device shall be protected from corrosion by hot dip galvanizing or any other suitable means approved by the purchaser or shall be made of naturally corrosion resistant metal rods.

8 PHYSICAL REQUIREMENTS:

8.1 All the frame & covers shall be sound and shall be free from cracks & other defects, which interferes with the proper placing of the units or impair the strength or performance of the units. Minor chippings resulting from the customary methods of handling and transportation shall not be deemed ground for rejection.

9 MARKING:

Each Cover shall have following marking:

- a) Date of manufacture
- b) Grade Designation
- c) ISI mark
- d) as specified - Identification mark

10 TESTING

Frame & covers will be tested at factory by owner / consultant & accepted goods shall be procured on site of work.

11 PAYEMENT

The rate shall be paid on number basis for set of Frame & Cover.

ITEM NO.14:

Providing and cast in situ C.C. in grade M-30 proportions of ingredients as per mix design by weigh batching using granite, quartzite trap metal of size 12 mm to 20 mm and or 6 mm to 12 mm including scaffolding centering formwork, needle vibrated consolidation, curing and hydraulic testing etc. complete (excluding cost of reinforcement) with centering and shuttering/ deshuttering etc. comp. up to 6 meter height / depth Av. G.L. for all water retaining structures.

General:

The work shall consist of producing, transporting, placing and compacting of structural concrete including fixing formwork and temporary works etc. and incidental construction in accordance with these Specifications and in conformity with the lines, grades and dimensions, as per description of item or as directed by the Engineer.

Concrete Grade & Mix Design:

Grade: M-20 (Nominal Mix)

Nominal Proportion (for reference): 1:1.5:3 (Cement: Sand: Coarse Aggregate) as per IS 456:2000, Table 9 or as per approved mix design.

Method of Batching: Weigh batching (not volume batching)

Water-Cement Ratio: As per mix design, not exceeding 0.55

Slump: As per structural requirement (generally 75–100 mm for normal RCC)

Materials:

Cement: Ordinary Portland Cement (OPC) 43/53 grade, conforming to IS: 8112 / IS: 12269.

Fine Aggregate: Clean, well-graded river sand conforming to IS:383.

Coarse Aggregate:

Quartzite trap metal, angular, machine crushed, free of deleterious materials.

Graded size 12 mm to 20 mm and/or 6 mm to 12 mm as per IS:383.

Water: Clean, potable water free from organic impurities and harmful salts.

Waterproofing Compound: Integral waterproofing compound conforming to IS: 2645.

Formwork & Centering:

Centering and shuttering shall be rigid, true to line and level, and adequately supported.

Materials: Steel plates/plywood formwork or equivalent.

Deshuttering/Stripping Time:

Vertical surfaces (columns, walls): Min 24 hours

Slabs (props left under): 3–7 days as per span

Beams: 7 days (sides), 14 days (bottom with props)

Formwork shall not be removed without approval of Engineer-in-Charge.

Workmanship & Quality Control

Fine aggregate shall be clean, hard, coarse sand. It shall be free from dust and such other substances.

The sand be got approved by the Engineer-in-charge.

All materials shall be stored as to prevent their deterioration or intrusion of their quality and fitness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by the Engineer-in-charge shall not be used in the works.

Cement shall be stored above the ground level in perfectly dry and water tight sheds. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock-piles sufficiently away from the each other to prevent intermixing the materials.

The water for mixing shall be potable water to satisfaction of the Engineer-in-charge. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the job.

For all work concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate show complete coating of mortar containing its proportionate

amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

The method of transporting and placing concrete shall be approved by the Engineer-in-charge. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes places. All form work and reinforcement contained in it shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer-in-charge. Concreting being given, it shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly design agitators, operating continuously, when this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise agreed to be the Engineer-in-charge, concrete shall be deposited in horizontal required. The first troweling operation can start after the about 30 minutes after the final floating operation & surface is sufficiently dry. This pass is to be made using low speed & minimum blade angle. Please also use the lower speed when troweling near the channels, from the edges, obstacles layers to neither a compacted depth of nor more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.

Unless otherwise agreed to by the Engineer-in-charge concrete shall not be dropped into place from a height exceeding 2 metres. When trucking or chutes are used they shall be kept clean and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept, clean, thoroughly wetted and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the well surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness, and shall be well rammed against old work particular attention being given to corners and close spots.

Curing

Concrete has to be protected from rapid drying which may result in cracking. Curing can be done by ponding, covering with plastic sheet or gunny bags. In any method, the surface should be always kept wet with water, Curing can also be done by application of curing compound. Curing must be done for at least 7 days

The average strength of the group of cubes cast for each day shall not be less than the specified works cube-strength. 20 per cent of the cubes cast for each day may have values less than the specified strength, provided the lowest value is not less than 85 per cent of the specified strength.

R.C.C. work shall have exposed concrete surface. Centering design and its erection shall approved by he Engineer-in-charge. One carpenter with helper will invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited over reinforcement laid in position. For access to different parts, suitable mobile platforms shall provide so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, Kapchi or metal pieces shall not be used for this purpose. Concreting of important structural members shall always be done in the presence and under the supervision of departmental person not below the rarik of Assistant Engineer / Additional Assistant Engineer Overseer or as instructed by the Engineer-in-charge. After removal of form work checks that concrete produced is of good quality. Plastering shall not be allowed to the expressed faces of concrete.

All necessary labour, materials equipment, etc., for sampling, preparing test cubes, curing etc., shall be provided by the Contractor. Testing of the materials and concrete may be arranged by the Engineer-in-charge in an approved laboratory at the cost of the contractor.

METHOD OF PAYMENT MEASUREMENT

Payment shall be made based on cubic meter basis

ITEM NO.15:

Supplying, cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reserviors/structures only including lift up to 6 meter height or depth below G.L. for all diameters. Do-CRS steel all diameter Fe 500grade confirming to relevant I.S.

Materials:

1.0 T.M.T. shall conform to IS 1786-FE415 Mild steel binding wires shall conform.

2.0 Workmanship:

2.1 The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

2.2. Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concerting

2.3. Reinforcing steel shall conform accurately to the given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed using a proper bar bender operated by hand or power to attain proper radius of bends, Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be at least fur times the diameter of the round bar and the length of straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not found and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

- 2.4. All the reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and by using stay blocks or metal chair spacers metal hangers supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during converting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall no extend to the surface of concrete except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not allowed . pieces or broken stone or brick and wooden blocks shall not be sued. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed shall be maintained in a condition until complete embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement concrete already placed. To prevent reinforcement from corrosion concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.
- 2.5. Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm, in such manner that they do not slip over each other at the time of fixing and concerning.
- 2.6. As far as possible bars of full length shall be used. In case this is not possible overlapping of bars shall not touch each other but be kept apart by 25 mm. Or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them. Where not feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted light. The overlaps shall be staggered for different bears and located at points along the span where neither shear nor bending movement is maximum.
- 2.7. Wherever indicated on the drawings or desired by the Engineer – in- charge bars shall be joined by couplings, which shall have a cross section sufficient to transit the full stress of bars. The ends of the bars that are joined by coupling shall be aspect for sufficient length that the effective cross section at the base of threads is not less than normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to IS 226.
- 2.8. When permitted or specified on the drawings joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel I will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric are welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned property. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and to the foreign matter before welding. Only complete welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

3.0 Mode of Measurement and Payment:

The rate shall be paid as per payment schedule.

ITEM NO.16:

Labour charges for repairing leakage in CI/DI pipeline of following diameter at different places including necessary excavation manually or by machinery, removing of mud, dewatering, cleaning of pipe, cutting of pipe, Jointing & repairing using CID joints including CID joints, rubber rings, nut bolts, hiring excavator, Hydra/ Crane, dewatering machine, fuel, operator etc. complete. (including cost of jointing material but excluding cost of pipe). 300mm Dia Pipe.

OR

ITEM NO.16.1:

150mm Dia Pipe

Detailed Technical Specification as per Directed By engineer in charge.

1.0 The work inclusive of excavation, cutting of pipe, dewatering, refilling, jointing of pipe with all jointing materials such as nuts, bolts, rubber packing, washers, led, jute etc. wherever is required for completion connection job work of new pipe line with existing pipe line.

2.0 The work inclusive protection of existing service connection, telephone connection, electric cable, drainage line etc. during the connection work. If any service connection shall be damaged during the work, the contractor fully responsible for this damages.

3.0 The payment shall be paid after completion of item as mentioned in price bid and as per schedule of price of this tender.

ITEM NO.17:

Removing of existing pipeline incl. removal of specials, valves jointing material including carting and stacking of removed material from site of work to the department store as directed excl. excavation and refilling. For 300mm Dia DI Pipes.

OR

ITEM NO.17.1:

150mm Dia DI Pipes

Technical Specification

Removing Existing 300 mm Diameter Ductile Iron (DI) Pipeline Including Specials and Valves

Scope of Work

The work shall consist of carefully dismantling and removing the existing 300 mm diameter Ductile Iron (DI) pipeline, including all associated specials, valves, fittings, jointing materials, nuts, bolts, rubber gaskets, and appurtenances as directed by the Engineer-in-Charge. The item shall include handling, loading, transportation, unloading, stacking, and safe custody of salvaged materials at the departmental store or designated location.

Materials

No new material shall be supplied under this item. All removed materials shall remain the property of the department unless otherwise directed.

Method of Execution

The pipeline shall be exposed through separate excavation work (excavation and refilling are excluded from this item).

The contractor shall disconnect the pipeline from the existing network after ensuring isolation of the line and obtaining necessary permissions.

All joints, including push-on joints, flanged joints, mechanical joints, and other connections, shall be carefully dismantled without causing damage to reusable pipes, specials, valves, and fittings.

Specials such as bends, tees, reducers, collars, adaptors, sluice valves, butterfly valves, air valves, scour valves, and other appurtenances encountered in the line shall be removed carefully.

Jointing materials including rubber rings, gaskets, nuts, bolts, and other accessories shall also be removed and collected separately.

The removed DI pipes shall be lifted, cleaned of adhering earth and debris, and stacked systematically to avoid damage.

All salvaged materials shall be loaded, transported, unloaded, and stacked at the departmental store or location specified by the Engineer-in-Charge.

Any material damaged due to careless handling by the contractor shall be repaired or replaced at the contractor's cost.

Necessary tools, tackles, lifting equipment, labour, barricading, safety measures, and incidental works required for execution shall be included in the rate.

Workmanship

Removal operations shall be carried out in a manner that minimizes damage to reusable materials.

Adequate precautions shall be taken to protect adjacent utilities, structures, and services.

The site shall be kept clean during and after completion of dismantling operations.

Safety procedures shall be strictly followed throughout the work.

Mode of Measurement

Measurement shall be made in running metres (RM) of 300 mm diameter DI pipeline removed.

ITEM NO.18:

Providing laying and jointing in true line and level 25mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two meter C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

1.0. Materials

1.1. The pipes shall be standard I.S.I. mark U.P.V.C. pipe (SCH-40) for cold water of specified dia.

1.2. The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge. Necessary accessories with inner/ outer brass thread shall be used as required and instruction by Engineer in charge.

2.0. Workmanship

2.1. Cutting, Laying & Jointing

- 2.1.1.** When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.
- 2.1.2.** The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3.** In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter. Jointing shall be carried out with proper chemical adhesive material and allow to dry.
- 2.1.4.** Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing concealed to wall, ceiling & floors.

- 2.2.1.** In case of fixing concealed cement point to walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed inducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is peasant through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.
- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling

with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

2.3.1. After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.

2.3.2. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

3.1. The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.

3.2. The length shall be measured on running meter basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to wall, ceiling. floors etc shall be measured and paid under this item.

3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.

(i) Dimension shall be measured to the nearest 0 01 meter.

(ii) Area shall be worked out to the nearest 0.01 sq. meter.

3.4. All measurements of cutting shall unless otherwise stated by held to include the consequent waste.

3.5. In case of fitting of unequal bore, the targets bore shall be measured for the test.

3.6. Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested an carrying out the tests.

3.7. The rate includes U.P.V.C. pipe (SCH-40) with screwed socket joints to gather with all fittings (such as bends, sockets springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.

3.8. The rate shall be for a unit of one running meter.

SCHEDULE FOR TESTING OF MATERIALS

For ensuring quality control and workmanship, various tests prescribed below for materials shall Be taken at periodical intervals as stipulated below.

Sr. No.	Brief Description of Materials to be tested (2)	Qty. of Materials (3)	Prescription of test which shall be carried	Frequency @ which test shall be carried out	Total No. of Test to be taken.
1	25 to 90 H. B.Metal 40 to 63 H. B.Metal 40 to 50 M. C.Metal 20 to 50 M. C.Metal Kapachi		- Gradation Test - Impact Value - Flakiness Index - Water absorption test - Sp. gravity	1 to 100 Cmt. - 1 Test 100 to 500 Cmt. - 3 Test 500 to 1500 Cmt. - 5 Test 1500 to 5000 Cmt. - 7 Test	
2	Grit		- Stripping Value, gradation, Water absorption, Sp. gravity	One test per work	
3	Murum		- P. I. Value - C.B.R.	One test per work	
4	Quarry spall		- C.B.R. - Gradation	One test per work	
5	Asphalt		- Penetration Test as per Specification	Tanker Test 1 1 2to15 2 16to50 3	
6	Tack Coat		- Binder temperature for application - Rate of spread of binder	Irregular close in intervals Two test per day.	
7	Carpet & Seal coat mix		- Grading - temperature of binder in boiler, aggregates in the dryer and mix at the time of laying and rolling (Binder content vide 45 IMD 2172) Rate of Spreaded mix materials.	One test on individual constituents and mixed aggregates from the dryer for each 100 tons of mix subject to minimum of Two tests per plant per day. One Test for each 100 tons of mix subjects to mini. of Two per day plant. Regular control through checks on layer thickness.	
8	Bricks		- Water absorption - Effloresce - Size - Compressive Strength	1 Test @ 50,000 Bricks	
9	Cement		Consistency - Compressive Strength - Initial & Final setting time - Fineness - Soundness - Specific Gravity - Chemical analysis	1 Test / 50 M.T. 2 Tests / 100 M.T. 3 Tests / 200 M.T. 4 Tests / 400 M.T. 5 Tests / 500 M.T. 6 Tests / 600 M.T.	
10	Steel (TMT / M.S.)		- Tensile strength - Yield Stress - Elongation - Size - Bend - Rebend	1 Test / 40 M.T. 1 Test / 40 M.T. 1 Test / 40 M.T. 1 Test / 40 M.T. 1 Test / 20 M.T. 1 Test / 20 M.T.	
11	C.C. Cube in M-150 M-200, M-250,		- Compressive Strength	1 to 5 C.mt. -1 Set 6 to 15 C.mt. 2 Sets 16 to 20 C.mt. - 3 Sets 20 to 50 C.mt. - 4 Sets	

	M-300, M-350 Grade			51 above - 4 One additional sample for each 100 C.mt. / or.	
12	Coarse Sand		C.B.R., silt content, sieve analysis	One Test per work	
13	Sand (For concrete work)		<ul style="list-style-type: none"> - Specific Gravity - Alkali Reactivity - Petrography Exa. - Gradation - Silt Content - Water absorption test 	2 Tests per season or change of river	
14	Crushed stone Aggregate (For concrete work)		<ul style="list-style-type: none"> - Gradation - Water absorption - Impact Value - Abrasion Value - Soundness Test 	1 Sample / 150 Cum. or 2 Sample / Season each source.	
15	Water for all item pertaining to water		<ul style="list-style-type: none"> - Portability - Salinity - Chemical analysis 	One sample for each source of supply	
16	Earthwork for Embankment		<ul style="list-style-type: none"> - Sand content - Atterberg's limit - Density test - Moisture content - C.B.R. 	2 Test / 8000 Cum 2 Test / 8000 Cum 2 Test / 8000 Cum 1 Test / 250 Cum. 1 Test / work	
17	Cement concrete		- Mix design	One time test for each concrete grade beyond M-200	

LIST OF REGISTERS TO BE MAINTAINED AT SITE

ANNEXURE – 1

**FOLLOWING DOCUMENTS/REGISTERS TO BE MAINTAINED AT SITE FOR ENSURING PROPER
QUALITY CONTROL OF WORK IN PROGRESS.**

1. A complete set of Contract Documents
2. A Complete set of drawings (tender drawings and Good for Execution Drawings)
3. A complete set of change in specification or scope if any and approval thereof.
4. Master Test Register for Material for field Test.
 - i) Lab Report
 - ii) Lab/Field Test.
5. Register for bricks testing. Lab/Field
6. Concrete Pouring Card
7. Bitumen Test Register
8. Paint Register
9. Empty Bags Of Cement Shall Be Deposited On Monthly Basis At Store Of Khambhat Nagarpalika Khambhat And Same Shall Be Recorded In Store Register For Cement.
10. Register for approval of samples for various materials.
11. Site Order Book.
12. Register showing defects noticed during execution of work and compliance reports.
13. Hindrance Register

APPROVED LIST OF MATERIALS
LIST OF APPROVED MAKE / MANUFACTURER/ BRAND OF MATERIALS FOR CIVIL
ITEMS

The following are approved brand makes/manufacture's makes listed below. In case it is established that material as listed below is not available in the market, approved equivalent material and finished of anyother specialized brand names/ manufacturer's makes may be used as per approval of Architect.

Material certificate: Material tests as required by the Engineer, if any, shall be carried out by the Contractor from the approved laboratories and the tests reports shall be submitted in the required formats before use of such material. The Engineer shall have the right to reject any material or work, if he finds that the quality of material used/intended to be used and work are not satisfactory. The Contractor shall make good such defective material or the works at his own cost (within the contract price) and without causing any delay to the completion time as specified in the TENDER.

No	Item	Approved make
1	Cement	Ambuja, Ultratech, JK Laxmi, Jaypee, Sanghi, Siddhee, ACC or approve by Architect/EIC
2	White Cement	Birla, J.K
3	Sand	Locally available & as approved sample
4	Aggregates	Vadagam or approved by Client
5	Bricks	As per approved sample by Client
6	Reinforcement bar/TMT Bars	Sail ,Tata, Rinl, Jindal , Vizag , GUJ NRE, Kamdhenu, National Electotherm, ASR Thermax, Gallant, Sanghi, Friends, Vinayak, Varsana, Utkarsh, Aditya, Grace, God
7	Structural steel	Sail ,Tata, Rinl, Jindal, Essar, Vizag, Asian, Appolo
8	Paver blocks	Vyara, Super, Sona tiles, Asian or equivalent
9	Shuttering plywood	Kitply, Anchor, Green, Pragati or equivalent
10	Anti-termite treatment	Pest control India, Bayer-Premise, Rallis India-Termex, Item Secure
11	Waterproofing compound	Pidilite, Sikka, Balendura, Fosroc, Kerakoll, BASF, Sunanda Chemical
12	Weather sealant	Kerakoll, Down corning, Fosroc, Sikka, Dr. Fixit(Pidilite), Bostik, Wacker
13	Joint Filler / silicon paint	Wacker, Dowcorning, Sika, Chokshi, Saudal.
14	Tile adhesive	Saint gobain - Weber, Balendura , Kerakoll, Pidilite , Roff , Myk Laticrete
15	Epoxy grouting	Myk Laticrete, Dubond, Kerakoll, Bal Endura, Fosroc ,Saint Gobain –Weber, Pidilite
16	Paint, primer	Jotun, Asian, Berger, Nerolac, Indigo, ICI
17	Putty	Birla , Berger, Asian
18	Polish	MRF, Asian, ICI, Taralac
19	Water stops	Arti Cables, Fixopan

20	Granite	As per approved sample
21	Vitrified tiles/ Glazed tiles/ Ceramic tiles	Varmora, Sunheart, Nitco, Kajaria, Somany, Asian, Simpolo, Motto, Silon, Johnson
22	Glass Mosaic	Pavit, Italia, Bissaza , Piccolo
23	Auto sensor Door	Dorma, Geze , Ozone
24	Glass door hardware & fittings	Dorma, Geze, Haffle, Enox, Kitch
25	Door Window & Furniture Hardware	Kitch, EPPW, Dorma, Palladium, Ozon, Magnum, Yale.
26	Adhesives	Fevicol, Kitcol, Araldite, BAL.
27	Anchor fastener / bolts	Hilti. Fischer, Mungo
28	Linseed oil	Saffola
29	Floor spring	Ozone, Everite, Hemco, Godrej, Hyper, Starling, Dorma , Enox
30	Door closer	Godrej, Dorma, Enox , Efficient Gadget, Yale
31	Locks	Godrej, Dorset, Yale, EPPW, Dorma, Kitch.
32	Glass	Modiguard, Saint-Gobain, Asahi, HNG
33	Wood	Teak, Sal sycamore, Merandi
34	Flush door- decorative / non decorative	Greenly-door, century- door, Archidply - door, Eurodoor, Nippon, Duro
35	MS Rolling shutter	Sarvottam, Suryoday, Gandhi, Sagar
36	Ply (BWP - IS 710 & BWR 303)	Green ply, Euro ply, Nippon, Duro, Century, Silicon(evoke)
37	Laminate	Greenlam, Century, Merino, Euro, Royal touch, Formica, Nippon
38	Veneer	Greenlam, Century ply, Euro ply, Timex, Natural Decowood
39	MDF	Nuwood ,Maftalal, Duratuff
40	Prelam particle board	Novapan, Bhutan. (exterior grade only)
41	Cement bonded particle board	NCL (Bison board), Everest (Eternite), Shera
42	Compact sheet	Vir, Bloom, Formica.
43	Aluminium heavy duty section	Jindal, Domal series, Hindalco, Banco, Gujarat Extrusion
44	Sanitary vessels	Kohler, Jaquar, Hindware, Cera, Parryware , Johnson
45	Sanitary accessories	Kohler, Jaquar, Hindware, Cera, Parryware, Johnson
46	Hand drayer	Euronics , Cera, Jaquar
47	Toilet Cubical	Marino, Greenlam, Matalium, T-Line
48	CPVC & UPVC , PVC pipe	Prince, Supreme, Astral, Finolex, Ashirvad flow guard,
49	Polycarbonate sheet	Makrolon, Lexan, Bayer, Dunpalon, Sabic, Coxwell
50	Anchor fastener and bolts	Hilti, Fischer
51	Gypsum board false ceiling	Saint gobain, USG Boral, Ecotone, Hilux
52	Grid ceiling	Aerolite, Saint gobain, Armstrong, Anutone
53	Accoustic Ceiling	Armstrong , Anutone , Aerolite, Saint gobain
54	Metal ceiling	Metalium , Supersill , USG Boral, Aerolite

55	ACP	Aludecor, Alucobond, Alston, Alstrong, Eurobond , VIVA
56	Acoustic paneling	Artois, Ecotone, Aerolite
57	Glass film	3M, Avery , Garvey,
58	Modular Glass Partition	Sonic, Kubik, Otic , Ozone
59	Carpet flooring	Welspun, Unitex, Ecosoft,Tarkett Flotex, SolarbriteRosetta, Dubond Sorona
60	Wooden flooring	Vista, Pergo , Armstrong, Mikasa, Ecosoft, Quick step
61	Roller blinds	Vista, Hunterdouglas, Ferrari
62	Hardware & fittings	Hettich, Haffle, Enox, Ebco, kitch
63	Aluminium profile handles & frames	Olive, Hettich, Haffle, Enox, Ebco, kitch
64	Door hardware & accessories	Geze ,Haffle, Enox, Dorma, Kitch, Ozone, kitch
65	PVC edge beading	Rehau , Dolken
66	Furniture	Monarch, Amardeep , HOFF, Godrej , Wipro
67	Glass wool/ synthwool	Rockwool, Twiga , Aco sonic
68	Compactor	Kompress , Wipro , Godrej , HOFF
69	Artificial stone	Emcer , Kalinga, CMC, AGL , Johnson
70	Vinyl	Welspun , Solarbrite , Tarkett, Unitex, Responsive, LG
71	Window locks cum handle	Alualpha, Giessee or equivalent.
72	Filler rubber of glass panel	EPDM quality only
73	Wool felt/weather strip	Anand, red-diplex ltd or equivalent
74	Rust Remover	Feovert (Krishna Conchem), Roff Rust Clear (Pidilite Industries)
75	Polymer bonding agent	Monobond (Krishna Conchem), Roff Bond Repair (Pidilite Industries)
76	Non-shrink grout	Polygrout -HS (Krishna Conchem), Roff Grout GP (Pidilite Industries)
77	Super plasticizer for jacketing	Supercon-100 (Krishna Conchem), RoffPlast 330 /Concrete Master
78	Rebar and Anchor Fasteners	Hilti or Fischer OR Mungo.
79	Acrylic SBR base bonding agent	Mono-bond SBR (Krishna Conchem), CICO, BASF, Pidilite
80	Epoxy Bonding	EPI bond 21 LP (Krishna Conchem), Roff ConcreteBond (Pidilite)
81	Modular Kitchen	Timbor Home, Tiara furniture system, Godrej interio
82	PVC Sleeve	Supreme / Astral / Prince
83	Expansion Board	Capcell HD Board
84	Expansion Joint	Pidilite / Roof/Laticreteor mentioned in BOQ
85	Expansion Joint System	3R as per Item description
86	Water Proofing	BASf/ Fosroc / Sika or mentioned in BOQ
87	Overdeck Insulation	BASf/ Fosroc / Sika or mentioned in BOQ
88	PVC spacer	BAL Endura / Kerakoll / BASF
89	PVC Flooring	Armstrong, Gerflor, Tarkett

90	Self Levelling Chemicals	Ardex / BASF / Cico / Sika
91	Anti-bacterial Paint	Sikka / Liquid Plastic/SSK/Viessmann/artilin / BASF /Huntsman
92	Galvalume roofing sheet	Jindal,Mansha,Eashar
93	Pre coated Sheet	J.S.Eng., Fielders, Rama, Shree Precoated, S.Kumar
94	Floor stamping	Ultratech, Vyara, Flexstone or Equivalent
95	WPC door	Alstone , Flexibond or equivalent
96	Roofing shingles	Saint Gobain , Malarkey , Technonicol , Docke or equivalent
97	Fiber Cement sheet board	Ecopro, Everest , Shera , CK Birla Group
98	Roof Gutter	Saint Gobain , Malarkey , Technonicol or equivalent

PLUMBING MAKE LIST

Sr.No.	Item	Approved Make
1.	SWR PVC PIPE & FITTINGS 6 KG CM ² ; FITTINGS : 6 KG CM ²	ASTRAL / SUPREME/PRINCE/FINOLEX
2.	ECO. DRAIN PIPE & FITTINGS	SUPREME/ ASTRAL
3.	GULLY TRAP	GIRCO / TIRUMALA / SONIA/ SUPREME/ASTRAL
4.	STONE WARE PIPES FOR INTERNAL UNDER GROUND DRAIN PIPE	GIRCO / TIRUMALA / SONIA
5.	RCC HUME PIPES EXTERNAL MAINUNDER GROUND PIPE	INDIAN HUME PIPE / PRANALI
6.	M.S/G.I. PIPES FOR WATER SUPPLY	TATA / JINDAL/ SWASTIK
7.	ASTM/CPVC PIPE & FITTINGS FORWATER SUPPLY	ASTRAL / SUPREME/ASHIRWAD / FINOLEX
8.	COMPOSITE PLUMBING PIPE & COMPOSITE FITTINGS	KITEC OR EQ
9.	G.I. PIPES FITTINGS WATER SUPPLY	DRP-M / R-BRAND / ZOLOTO
10.	GI TO GI JOINTS	CHAMPION / EQUIVALENT
11.	SOLVENT CEMENT	SUPREME / KISSAN / FINOLEX
12.	BALL VALVES	LEADER / ZOLOTO / AUDCO
13.	WHEEL VALVES	LEADER / ZOLOTO/AUDCO
14.	DCV / NRV	ZOLOTO/SPIREX/AUDCO
15.	TAR	SHALIBIND / TIKIBOND-BS
16.	SELF PRIMING SEWAGE PUMPS	HBD / GRUNDFOS
17.	VALVES	AUDCO/ZOLOTO / R.B. / KBL / KSB
18.	PUMPS	KIRLOSKAR / GRUNDFOSS/XYLEM
19.	STARTER	SIEMENS / L&T
20.	PRESSURE GAUGE	BELLS / H GURU
21.	BOTTLE TRAP & WASTE COUPLING	JAQUAR / HINDWARE/KOHLER
22.	DEWATERING PUMPS	GROUNDFOSS/KIRLOSKAR/ KSB
23.	HYDROPNEUMATIC SYSTEM	GRUNDFOSS OR EQUIVALENT
24.	EOT CRANE WITH HOIST	INDEF / ELECTROMECH / SAFEX / WH-BRADY / EQUIVALENT
25.	METALLIC BELLOWS	BELLOW FLEX / PRICISION / DHRUV / B.D.ENGR.
26.	ELECTRIC GEYSER	A-O SMITH/ RACOLD/SPHERHOT
27.	HOT WATER GENERATOR	THERMAX/A.O.SMITH / KEPL OR EQUIVALNET

No	Item	Approved Make
LT PANELS,LT CABLES SWITCHGEAR & ACCESSORIES		
1	ENCLOSURE MANUFACTURER	ACTIVE ENGINEERS, ELMEX, AD ENTERPRISE, ACCESS CONTROL PANELS.
2	MCB/ELCB/RCCB/ELMCB	LEGRAND, ABB,HAGER,SCHNEIDER,C&S, L&T,SEIMENS
3	MCCB/ACB	LEGRAND, ABB, SCHNEIDER,SIEMENS,L&T
4	DISTRIBUTION BOX	LEGRAND, ABB,HAGER,SCHNEIDER,C&S, L&T,SEIMENS
5	CHANGEOVER SWITCH	HH ELECON,L&T, ABB, HPL,C&S
6	CAPACITOR	L&T, EPCOS,CONZERV,DATAR,POWERMATRIX,ABB
7	PUSH BUTTON	SIEMENS,ABB,L&T,SCHNEIDER
8	INDICATING LIGHT	SIEMENS,ABB,L&T
9	TIMERS	L&T,SIEMENS,ABB,CONZERV
10	SELECTOR SWITCH	L&T,SEIMENS,KAYCEE
11	AUTOMATIC TRANSFER SWITCH	L&T,HPL,CUMMINS,HAVELLS
12	CTs	KAPPA,L&T,AREVA,MAXWELL
13	PTs	KAPPA,L&T,AREVA,MAXWELL
14	CONNECTORS	L&T, SCHINDER,SEIMENS,ABB
15	PROTECTION RELAY	AREVA,L&T,ABB,SEIMENS
16	ANALOG/DIGITAL METER/LOAD MANAGER/MFM	CONSERV,L&T,SCHNEIDER/ABB/HPL
17	IRON CLAD SWITCH WITH REWIREABLE FUSE/SFU	KEW, TRISHUL,SUPER,C&S
18	METALCLAD SWITCH WITH REWIREABLEFUSE/SF U	HAVELLS, KEW,C&S, INDOASIAN
19	MAIN LT CABLE	AVOCAB,FINOLEX,PRIMECAB,POLYCAB,DIA MOND POWER,RRCABLE,HAVELLS
20	CABLE GLANDS	COMET, HMI, DOWELLS, SIEMENS,CROMPTON,HEX
21	CABLE LUGS	DOWELLS,JOHNSON,HEX

22	BUSDUCT	L&T,SCHNEIDER,C&S,SEIMENS,LEGRAND
INTERNAL WIRING, FIXTURES & ACCESSORIES		
1	RIGID FR PVC CONDUIT	NIHIR,PRECISION,POLYCAB,BEC, Power Flow
2	ACCESSORIES OF CONDUIT	NIHIR,PRECISION,POLYCAB,BEC
3	COPPER FLEXIBLE WIRES	AVOCAB,FINOLEX,POLYCAB,RRCABLE,HAVELLS ,Caliplast
4	TISSINO TYPE SWITCHES & SOCKETS	POINTER-TRUMP, SSK-TOPLINE PC, ANCHOR-PENTA CHEERY
5	MODULAR TYPE SWITCHES & SOCKETS	LEGRAND-MYRIUS, MK-WRAP ROUND, ANCHOR-WOODS,HAVELLS-CRABTREE-ATHENA
6	PVC TAPE	STEEL GRIP,ANCHOR
7	M.S. CONDUIT	BEC,AKG,STEEL CRAFT
8	LIGHT FIXTURES & LAMPS	OSRAM, XAL WIPRO, PHILIPHS, NIRVANA, GE, CG, , JAQUAR ,ENDO , TISVA ,LT
9	CEILING FAN & EXHAUST FAN	USHA,CG,ORIENT,HAVELLS
10	CALL BELL	ANCHOR/ORPAT/MAX
11	WATER COOLER	VOLTAS,USHA,BLUESTAR
12	GEYSER	RECOLD,HAVELLS,BAJAJ,SPHEREHOT
13	MOTOR PUMP SET	CROMPTON,AMRUT,KSB,UNEEL,KIRLOSKAR
CABLE TRAY, RACEWAY & ACCESSORIES		
1	CABLE TRAY	INDIANA,RUSHABH,PROFAB
2	ALUMINIUM FLOOR RACEWAY	MK OR APPROVED BY CONSULTANTS
3	GI FLOOR RACEWAY	MK OR APPROVED BY CONSULTANTS
4	PVC WALL RACEWAY	MK, PROFAB,LEGRAND
UPS & INVERTER		
1	UPS	NUMERIC,EATON,APC, BPE
2	INVERTER	SUVIK,SUKAM,MEGATECH
3	SMF BATTERY	PANASONIC,EXIDE,GLOBAL (YUASA)
4	RACK	FABRICATED
STREETLIGHT POLES, FIXTURES & ACCESSORIES		
1	GI POLES	FABRICATED
2	MS POLES	FABRICATED
3	SMC PRESS MOULDED JUNCTION BOX	SYNTEX OR AS APPROVED BY CONSULTANTS

LIGHTNING PROTECTION & EARTHING SYSTEM		
1	AIR TERMINAL	MAP, LPI, INDESCO
2	SUPPORTING GAYED MAST	MAP, LPI, INDESCO

3	LIGHTNING STROKE RECORDER	MAP, LPI, INDESCO
4	COPPER BONDED ROD & CHEMICAL COMPOUND	MAP, LPI, INDESCO
5	ELECTROLYTIC/CHEMICAL EARTHING KIT	GRESLO, GALAXY EARTHING
ELV SYSTEM & ACCESSORIES		
1	FIRE ALARM PANEL & DISPLAY PANEL	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
2	REPEATER PANEL	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
3	ADDRESSABLE & CONVENTIONAL SMOKE DETECTORS	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
4	INTELLIGENT SMOKE & HEAT DETECTORS	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
5	ADDRESSABLE & CONVENTIONAL HEAT DETECTORS	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
6	ADDRESSABLE & CONVENTIONAL BEAM DETECTORS	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
7	FAULT ISOLATOR	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
8	RESPONSE INDICATOR	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
9	MANUAL CALL POINT	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
10	ADDRESSABLE HOOTER	ESSER, EDWARD, NOTIFIER, SIEMENS, GST
11	FIRE CABLE	RRCABLE, FINOLEX, DELTON, POLYCAB, AVOCAB, Caliplast
12	RJ-45 SOCKET OUTLET (COMPUTER & TELEPHONE)	LEGRAND-MYRIUS, MK-WRAP ROUND, ANCHOR-WOODS, HAVELLS-CRABTREE-ATHENA, PLEXONICS, AECONNECT
13	RJ-11 TELEPHONE SOCKET	LEGRAND-MYRIUS, MK-WRAP ROUND, ANCHOR-WOODS, HAVELLS-CRABTREE-ATHENA, PLEXONICS
14	CAT-6 CABLE	TYCO ELE(AMP), SCHINDER ELE.(DIGILINK), R&M, SYSTIMAX, MOLEX, PLEXONICS, AECONNECT

15	CAT-6E CABLE	TYCO ELE(AMP), SCHINDER ELE.(DIGILINK), R&M,SYSTIMAX,MOLEX, PLEXONICS, AECONNECT
16	TELEPHONE TAG BOX	KRONE
17	TELEPHONE PAIR WIRE	RRCABLE, FINOLEX,DELTON,POLYCAB
18	NETWORK SWITCH	CISCO,HP, PLEXONICS, , D LINK, AECONNECT, NETGEAR
19	ETHERNET SWITCH	CISCO,HP, PLEXONICS , D LINK, , AECONNECT, NETGEAR
20	PATCH CORDS	CISCO,HP, PLEXONICS , D LINK , , AECONNECT, NETGEAR
21	U RACKS	VERO PRESIDENT,VALRACK,SPIDER OR APPROVED BY CONSULTANTS, AECONNECT
22	PUSH BUTTON PHONE	PANASONIC,BEETEL,SONY OR APPROVED BY CONSULTANTS,PRAMODA
23	PROGRAM PHONE	PANASONIC,BEETEL,SONY OR APPROVED BY CONSULTANTS,MAT RIX
24	AMPLIFIER (POWER & BOOSTER)	JBL, AUDIOQUEST,BOSCH,AVTRON
25	AUDIO MIXER	JBL, AUDIOQUEST,BOSCH, AVTRON
26	CD/DVD/FM PLAYER	JBL, AUDIOQUEST,BOSCH, SONY, AVTRON
27	MICROPHONE	JBL, AUDIOQUEST,BOSCH, AVTRON
28	MULTIPLEXER	JBL, AUDIOQUEST,BOSCH, AVTRON
29	CEILING AND WALL SPEAKER	JBL, AUDIOQUEST,BOSCH, AVTRON
30	GOOSENECK MIC	JBL, AUDIOQUEST,BOSCH, AVTRON
31	WIRELESS MIC	JBL, AUDIOQUEST,BOSCH, BEYERDYNAMIC
32	STAND MIC	JBL, AUDIOQUEST,BOSCH
33	SPEAKER CABLE	RRCABLE, FINOLEX,DELTON,POLYCAB,CALIPLAST
34	2 MP HD IR VERIFOCAI CAMERA	AVTRON,HONEYWELL,SONY, SCHNEIDER (PELCO), HIKVISION, CPPLUS

35	2 MP FIX DOME CAMERA	AVTRON,HONEYWELL,SONY, SCHNEIDER (PELCO), HIKVISION, CPPLUS
36	DOME CAMERA	AVTRON,HONEYWELL,SONY, SCHNEIDER (PELCO), HIKVISION, CPPLUS
37	DIGITAL VIDEO RECORDER	AVTRON,HONEYWELL,SONY, SCHNEIDER (PELCO), HIKVISION, CPPLUS
38	NETWORK VIDEO RECORDER	AVTRON,HONEYWELL,SONY, SCHNEIDER (PELCO), HIKVISION, CPPLUS
39	LED/LCD DISPLAY UNIT	SONY, SAMSUNG,PANASONIC,LG

Sr. No.	Description	Make
1	VRF	DAIKIN, O GENERAL, HITACHI, MITSUBISHI, BLUESTAR / TOSHIBA
2	Treated Fresh Air Unit	Zeco / Citizen / Ethos
3	Dx Type Condensing Unit	DAIKIN, O GENERAL, HITACHI, MITSUBISHI, BLUESTAR / TOSHIBA
4	Ventilation Fan	Kruger/Nicotra/System Air
5	Grills/ Jet Nozzel	Caryaire /System Air /Ruskin Titus
6	Nitrile Insulation	K Flex/ Armacell /Areoflex
7	Copper pipes	Maxflow / Mandev
8	Drain Pipe	Prince/Finolex/ Astral
9	GI Sheet	Jindal/Tata
10	Electrical Cables	Polycab/Finolex Eq Approve

Only above said material is to be used as per Schedule “B”

Notes:

The consultant / Nagarpalika reserves the right to select the manufacturers or approved make from the above list and also to make changes (add or delete names of other makes) in this list during the execution of the contract,

Tenderers should quote rates of various items considering supply/ use of first preference make of material selected by him. Second preference make material would be accepted by the consultant if they are satisfied that first preference make material cannot be supplied/ used by Tenderers due to any specific reasons. However, the final decision for accepting second preference makes or accepting only first preference would be that of the consultant.

Note:

All the material/ makes listed above and other than as specified above shall be used after obtaining prior approval from the architect/ Eng. in charge equivalent material listed in complete tender document should only be used in case the specified material or not available the equivalent material should be used after obtaining prior approval from the architect/Eng-in-charge. Any extra item has to be approved in advance and then execute the same else university will not be liable for payment of such item. If any items are not included in the tender and need to do on site then contractor has to give RA (rate analysis) for the same.

TENDERER'S SEAL AND SIGNATURE.

SECTION - 6

FORM OF BID

FORM OF BID

Description of the Works:

BID

To :

Address :

1. We offer to execute the Works described above and remedy any defects therein in conformity with the conditions of Contract, specification, drawings, Bill of Quantities and Addenda for the sum (s) of

(-----)

2. We undertake, if our Bid is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works in the Contract within the time stated in the document.
3. We agree to abide by this Bid for the period of 120 Days from the date fixed for receiving the same, and it shall remain binding upon it and may be accepted at any time before the expiration of that period.
4. Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ----- day of ----- 20

Signature ----- in the capacity of -----

----- Duly authorized to sign bids for and on behalf of -----

(in block capitals or typed)

Address

Witness

Address

Occupation

SECTION - 7
BILL OF QUANTITIES

INDEX

BILL OF QUANTITIES

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1. BILL OF QUANTITIES Preamble to Price Schedules

NAME OF PROJECT: RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT... The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.

1. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
2. The rates and prices tendered in the priced Bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all constructional plant, layout, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract.
3. The rates and prices shall be quoted entirely in Indian Currency.
4. A rate or prices shall be entered against each item in the Bill Quantities, whether quantities are stated or not. The cost of Items against which Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities (in case of Item rate contract).
5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related items of Work.
6. General direction and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.
7. The method of completed work of payment shall be in accordance with the specification for Road and Bridge works. For building works specifications for building are to be followed.
8. Errors will be corrected by the Employer for any arithmetic errors pursuant to Clause 29 of the Instructions to Bidder.
9. Rock is defined as all materials which, in the opinion of the Engineer, required blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for its removal, and which cannot be extracted by ripping with a tractor of at least 150 kw with a single rear mounted heavy duty ripper.
10. Break Up Of Schedule Of Payment As per Schedule-B
11. The rates and prices shall be submitted in the electronic formats given by n-procure which is called Schedule B, rates and prices received in any other formats will be rejected and the Bids will be disqualified.
12. It will be entirely at the discretion of the Employer to accept or reject the bidder's proposal, without giving any reasons whatsoever and the bidder shall not be permitted to withdraw his bid on this account.

13. Price Schedule-A gives the Schedule showing approximately the materials to be free supplied from the by client.
14. In Schedule-B the Bidder shall quote prices for the items on lump sum / unit rate as called for against the BOQ item.
15. In Price Schedule-B, bidder shall quote his price for entire work. Prices quoted in Schedule-B only will be considered for price evaluation & shall form a part of the Contract Agreement.
16. In the Price Schedule-B bidder shall furnish breakup of his prices quoted in Price Schedule-B and shall be carried forward to Schedule-B for comparison and evaluation.
17. The total shall be carried forward to Schedule-B for comparison and evaluation.
18. Wherever for a particular item the quantities have been specified payment shall be on unit rate basis and unit variation in quantity will be paid with pro rata basis.
19. Each item is to be individually priced online and the amounts shall be added up to arrive at the "Total of each Price Schedule". No column in the Schedules of prices shall be left blank except where the item description requires the item to be priced on "as applicable" basis. The item shall not be priced if it is "not applicable" to the bidder's design, in which case the bidder shall add the words "NOT APPLICABLE". The wording in the item description is for subject matter guidance only; clause references are indicative only and all other relevant clauses shall also be referred to. The prices shall allow for all the works covered under the bid and all liabilities and contractual obligations whether separately specified or not. Items against which no prices are quoted shall not be separately paid for and the bidder shall be deemed to have covered the cost of execution of such items (according to the requirements of the bid document) in the prices quoted for other items.
20. Items not specifically listed in his Price Schedules, but required to be executed for satisfactory working/safety of the system as specified, will not be separately paid for by the Employer when executed and shall be deemed to be already covered by other items and rates listed in the price sheets No extra payment shall be given for any item which is required to complete and perform the project.
21. The total of the item prices in Price Schedule-B shall be equal to the price quoted by the bidder in Price Schedule B and shall be firm and fixed, during the pendency of the Contract. In case of any discrepancy noted in the various price schedules, those in Schedule B will be considered and binding on the Contractor. The prices in Price Schedule B of the successful bidder shall be corrected accordingly. Only Price Schedule-B after carried over and arithmetic corrections if any will be considered for financial evaluation of the bid.
22. Schedule 'D gives the basis of interim payment for construction of civil works.
23. The bidder shall be deemed to have allowed in his price for provision, maintenance and final removal of all temporary works of whatsoever nature required for construction including temporary bunds, diverting water, pumping, de-watering etc. for the proper execution of works. The rates shall also be deemed to include any works and setting out that may be required to be carried out for laying out of all the works involved.
24. Prices shall be filled online only.
25. The Price Schedules are to be read in conjunction with the Conditions of Contract, the Specifications and

other sections of these bid documents and these documents are to be taken as mutually explanatory of one another.

26. The bidder shall interpret the data furnished and carry out any additional survey work, or investigation work required at his own cost.
27. The prices quoted shall also include the cost of materials utilized for testing.
28. The bidder should acquaint himself with the site conditions including the access to Work site. The successful bidder shall have to make suitable access to work sites at his own cost. These accesses will be used by the other contractors working for Khambhat Nagarpalika.
29. The item descriptions in price schedule are for subject matter guidance only and the prices shall include all the equipment's / materials / accessories and services required as per the specifications. The bidder shall fill in the price schedule furnished.
30. General Conditions of Contract, Clause No. 1, and Security Deposit.
31. 1% of the value of work will be deducted from the Running bill against labour cess which is nonrefundable.
32. Third Party Inspection/CSC agency will be deployed by KHAMBHAT NAGARPALIKA and charges of the same will be borne by Bidder.
33. Any expenditure incurred by inspection/ CSC agency for the work misinformed by the contractor and charges of inspection/ CSC agency without any work due to misinformation shall be recovered from the contractor.
34. The prices shall be quoted inclusive all taxes, royalties and duties prevailing at the time of submission of the bids. Statutory variation if any during the currency of contract shall have to borne by the agency which shall be not be reimbursed.
35. The rates to be quoted by the contractor are inclusive of sales GST & all other taxes. No extra payment on this account will be made to the contractor.
36. The rates quoted shall be Inclusive of GST, and inclusive of all other taxes, duties which shall not be paid extra. While GST will be Payable for admissible part of actual work done at the approved tender rates and tender conditions of price variations. GST shall be paid as per prevailing rates at the time of payment. The TDS shall be deducted at source as per provision of IT rules and policy.
37. Goods and Service Tax (GST TDS) Amount as per Government Rules and Regulation will be Deducted from Contractors / Bidder Running Bill / Final Bill by Nagarpalika Stage / Bill Wise. (as per resolution GST/1017/1097/GST Cell dated 15/09/2018)
38. The Ministry of Finance and Company Affairs, Department of Revenue, Government of India has issued a notification No. 6/2007-Central Excise Circular No. 6/2007, dated 1th March 2007 regarding the Central Excise Duty Exemption. By this notification, the notification 659/50/2002 dated 6th September, 2002 has been amended and the earlier notification 26/2009 dated 4th December, 2009 has been amended and the Items of materials, instruments, apparatus and appliance, ancillary equipment's and their components/parts, etc. for setting up of Water Treatment Plants and the Pipes needed for delivery of water from its source to the Plant and from there to the Storage facility (as mentioned in notification No.6/2007) are exempted from Central Excise Duty subject to the Certification by the Collector/ District

Magistrate/ Deputy Commissioner of the District, regarding its use on such Projects. Necessary Project Authority Certificate shall be made available to the Contractor, as per the prevailing rules, to facilitate him to avail the benefit in terms of Exemption of Central Excise. (Circulars attached here with)

39. Royalties: The contractor shall be liable to pay the royalty of the quarried materials/ minerals used in the construction of works at the rates specified in the Narmada Water Resources, Water Supply & Kalpsar Dept. Resolution No. GEN-2010-595-(6)-M.I. Cell (K-1) Dt. 29-4-2011 (Gujarati Version Copy enclosed) and shall be recovered from the running bills of the work from time to time and remaining amount if any shall be recovered from the final bill before releasing the security deposit of the work. The contractor shall furnish the statement showing the quantity of quarried materials / minerals from whom purchased (with full address of the seller) and copies of the bills for purchase to the Executive Engineer of the in charge of the work. The contractor shall also furnished such additional information as regards royalty payment to the competent authority.
40. Agency shall have to take Insurance policy and intimate to Khambhat Nagarpalika along with the evidence within time limit. In case of noncompliance entire responsibility shall be rest with the agency and required amount shall be recovered from any due amount of the agency.
41. Khambhat Nagarpalika can recover penalty amount from the agency for not taking the insurance. Though the penalty amount is recovered, responsibility of the agency for taking insurance shall be continued and will not be escaped from the responsibility.
42. The contractor shall apply fair means of stock maintenance and shall adopt accounting standard as may be prescribed under GST Act as applicable in the state of Gujarat. For arriving at the difference in procurement prices due to introduction of GST it will be open for the Board to ask for original invoices, lorry receipt, weigh bridge slips, payment details and such other documents as may be required for the purpose.
- The claim of contractor regarding GST shall have to be backed by documentary evidence substantiating the actual payment of tax duly certified by the competent tax authority. The final decision regarding the quantum of claim amount to be recovered or reimbursed shall be of the competent authority and shall be binding on the contractor.
43. To facilitate bidder during the bidding stage, department has provided the indicative quantities in the minimum BOQ, which are meant to appraise the bidder about magnitude of the work and these are likely to vary on the basis of detailed survey and geotechnical investigation depending upon land/ ROU availability during execution and the contractor shall have no objection to such minor or major changes or deletion or addition of the item/ items. The sizing indicated in the drawing and minimum BOQ is binding to contractor and size smaller/ lower than this may not be permitted. However, in case higher/ larger size is required as per detailed survey and geotechnical investigation based detailed Design for execution, quantity variation beyond 10% on upward side will be adjusted on pro rata basis. Quantity variation on lower side will be adjusted, irrespective of the variation. This being turnkey tender, any item specifically not mentioned in the BOQ, but required for approval of the competent authority is deemed to be covered in the project. Payment towards various items indicated in minimum BOQ for shall be made on the prorata basis i.e. in case estimate is X and approved contract rate is Y, then ratio of X/Y would be applicable for making the payment towards the item executed. For the item indicated in the minimum BOQ is not executed by the contractor, payment shall not be made towards that particular item.

Signature of Contractor

CHIEF OFFICER
KHAMBHAT NAGARPALIKA KHAMBHAT

2. BID FORM

Bidders are required to fill up all the blank spaces in this Bid Form.

**To,
CHIEF OFFICER
KHAMBHAT NAGARPALIKA
KHAMBHAT**

Dear Sir,

SUB: : RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

1. Having visited the site and examined the Bid Documents, Drawings, Conditions of Contract, Specifications, Schedules, Annexure, Preamble to Price Schedules, Price Schedules etc. including Addenda / Amendments to the above, for the execution of the above Contract, we the undersigned offer to Design, Engineer, Procure, Construct, Complete, Commission, operate, maintain and Run the whole of the said works for 04 Months from the date of commissioning including defects liability period as given in Conditions of Contract and in conformity with the drawings, conditions of Contract, specifications, Preamble to Price Schedules, Price Schedules, Annexure, Bidding Documents, including Addenda Nos._____ (insert numbers) for Lump sum fixed price of Rs._____.

(Rupees_____) for Construction including free trial run for three months or such other sum as may be ascertained in accordance with the conditions.

2. I / We agree that

(a) If we fail to provide required facilities to the Employer's representative or any other person / Agency by the Employer to perform on his behalf for carrying out the inspection and testing of materials and workmanship.

Or

(b) If we incorporate into the Works, materials before they are tested and approved by the Engineer's representative

Or

(c) If we fail to deliver pure water of required quantity according to the conditions / stipulations of the Contract, the Engineer will be at liberty to take any action including termination of Contract and impose at his absolute discretion any penalties, and / or reject the work.

3. We undertake, if our Bid is accepted, to complete and deliver the works in accordance with the Contract within 04 Months, inclusive of monsoons, from the date or receipt of Letter of Acceptance issued to us by you.

4. We agree to abide by this Bid for a period of $120+45=165$ days from the last date of submission of bid and it shall remain binding upon us and may be accepted at any time before the

expiry of that period.

5. In the event of our Bid being accepted, we agree to enter into a formal Contract Agreement with you incorporating the conditions of Contract thereto annexed but until such agreement is prepared this Bid together with your written acceptance thereof shall constitute a binding Contract between us.

6. We agree, if our Bid is accepted, to furnish performance Security in the forms and of value specified in the General Conditions of Contract.

7. We have independently considered the amounts of liquidated damages shown in Appendix to Bid and agree that they represent a fair estimate of the damages likely to be suffered by you in the event of the work not being completed by us in time.

8. We understand that you are not bound to accept the lowest or any bid you may receive.

Dated this _____ day of _____ 20_____

(Signature) _____

(Name of the person) _____

(In the capacity of)

Company Seal _____(Name of firm)

Duly authorized to sign Bid for and on behalf of
(Fill in block capitals)

Witness:

Signature _____

Name _____

KHAMBHAT MUNICIPALITY, KHAMBHAT			
BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.			
GENERAL SUMMARY.			
Sr. No.	Description	Amount	
1	Mechanical & Ancillary Works for Existing 11.00 MLD WTP at Head Water Works at Khambhat.	Rs.	2023129.00
2	Replacement of Existing 300, 250, 200 & 150MM Dia Pipes at Existing 11.00 MLD WTP at Khambhat Head Water Works	Rs.	753757.00
	Total,Rs.		2776886.00
	Add 18% GST		499839.48
	Total Rs.		3276725.48
	Add 2% for Contengencies Charges		65534.51
	Add 1% for Quality Control		32767.25
	Total Rs.		3375027.24
	Say, Amount.		3375100.00
I / We am/are willing to carry out the work at _____ % above / below (percent should be written in figure and in words) of the estimated rates mentioned above. Amount of my/our tender works out as under.			
(In words) _____ percentage above / below the estimated rate.			
Estimated Amount put to tender		Rs.	3375100.00
Deduct _____ % below Rs.		Rs.	
Net Amount		Rs.	
(In words) _____			
Estimated Amount put to tender		Rs.	3375100.00
Add _____ % above Rs.		Rs.	
Total Amount		Rs.	
(In words) _____			
*(Please strike out whichever is not applicable)			
Note :1	All work shall be carried out as per Public Works Department Hand Book and other specifications of Division or as directed.		
Note :2	Rates quoted include clearance of site (prior commencement of work and its close) in all respects and hold good for work under.		
Note : 3	I/ We have read the conditions mentioned in this tender and agree to abide by the same.		
Note : 4	In all R.C.C. Items in Rate Analysis Standard Cement Consumption has been taken as per Govt. G.R.: PRC-10/2017 Cement Consumption/16/C Date:11/05/2017 as stated in S.O.R. therefore in R.C.C. items where there is a change as per actual mix design the cost of difference of cement consumption have been deducted from the rate of original item at the rate of input rate mentioned in all the tender.		

Signature of Contractor

President
Khambhat Nagarpalika
Khambhat

Chief Officer
Khambhat Nagarpalika
Khambhat

KHAMBHAT MUNICIPALITY, KHAMBHAT

Mechanical & Ancillary Works for Existing 11.00 MLD WTP at Head Water Works at Khambhat.

SCHEDULE-B1

Sr. No.	Description	Quantity	Total Rate	Per	Amount
1	Providing, installing & commissioning Alum stirres with motor (1 H.P), gear arrangement & electrical cable connections, control panels etc (size as per design) Alum Stirrer	2.00	22244.45	No.	44488.90
2	Providing and fixing Manometer of Approved make	1.00	24468.55	No.	24468.55
3	Providing and Fixing LOH indicator of approved make	1.00	4671.30	No.	4671.30
4	Providing Manually Operated 6.0m Lift Chain pulley block with tripple gear arrangement, lifting hook, load chain & locking device with necessary mounting girder/ structure, spur gear travelling trolley & all accessories. 2 tonne Capacity.	1.00	20010.00	set	20010.00
5	Providing Supplying 500 Kg capacity weighing machine at destination	1.00	11066.45	Set	11066.45
6	Providing, Supplying & Installing Vacum Control Direct wall mounted gas chlorinator including necessary fittings, installation and commissioning of plant including Clamp, copper pipe, ferule filter & control valve with injector. --do-- for 10 KG Capacity (Cabinete type).	2.00	293621.45	No.	587242.90
7	Providing and Supplying Chlorine gas cylinder empty of required capacity with necessary explosive certificate including all taxes. Chorine cylinders 100 Kg.	2.00	30986.75	No.	61973.50
8	Providing & Supplying the filter sand of specified effective size (0.45 to 0.70mm) and uniformly coefficient (not more than 1.7, nor less than 1.3) and laying over gravel support confirming to IS : 8491 (I) - 77 in filter bed of required depth as per design and drawing.	104.00	1468.55	Cmt.	152729.20
9	Providing and supplying gravels of different size as per design and drawing and laying in layers in filter beds.	104.00	1468.55	Cmt.	152729.20
10	Providing fabricating and fixing /installing C.I. gates of size as per design with operating handle etc.	900.00	94.30	Kg	84870.00

Sr. No.	Description	Quantity	Total Rate	Per	Amount
11	Providing and applying 3 LPE Coating outside 3 layers polyethylene (LPE) coating with required tk. As per DIN_30670 or its latest revision or amendment and detail specifications with necessary material & Labour and Equipments etc. outside of MS Pipes.	36.00	929.20	Smt	33451.20
12	Providing, installing & commissioning Air agitation system including Blowers (40 HP), piping and valve arrangement etc, as per design. FOR ALL BEDS.	1.00	397857.45	Smt	397857.45
13	Cement plaster 20 mm thick in C.M. 1:2 using water proofing compound of approved quality including finishing etc. complete.	1062.00	232.30	Smt	246702.60
14	Finishing wall with water proofing cement paint of on wall surfaces (Three coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.	1062.00	106.13	Smt	112710.06
15	Excavation for foundation in sand, gravel, clay soft soils and murrum etc. including shoring, strutting dewatering as necessary and disposing of the excavated stuff as directed. Depth upto 3.0 M. and upto any lead.	156.00	511.11	Smt	79733.16
16	Dewatering by pumping set of required capacity including temporary platform carting pumping at site and fixing the same in position including all accessories, and fuel and labour etc. complete.	400.00	21.06	HP/ Hr.	8424.00
Total, Rs.					2023128.47
Say, Rs.					2023129.00

KHAMBHAT MUNICIPALITY, KHAMBHAT

**Replacement of Existing 300, 250, 200 & 150MM Dia Pipes at Existing 11.00 MLD WTP at Khambhat Head
Water Works
SCHEDULE-B2**

SR. NO.	DESCRIPTION	QUANTITY	Total Rate	PER	AMOUNT Rs.
1	Providing and supplying D. I. K-9 D/F grade pipes for following nominal bore diameter with internal cement mortar lining including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS 8329-2000). 300mm Dia Pipes.	30.00	6546.00	Rmt.	196380.00
1.1	150mm Dia	20.00	2986.00	Rmt.	59720.00
2	Providing and supplying D. I. K-9 grade pipes for following nominal bore diameter with internal cement mortar lining including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS 8329-2000). 200mm Dia Pipes.	35.00	2239.00	Rmt.	78365.00
2.1	250mm Dia.	20.00	2998.00	Rmt.	59960.00
3.0	Manufacture, Supply & Delivery of Electric Resistance Welded (Up to 400mm)/ Submerged Arc Welded (Above 400mm) M.S.Pipe having beveled ends plate or coil conforming to IS-3589-2001 or its latest revision/ ammendment for following thickness outside diameter at GWSSB store or site anywhere in Gujarat State including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading conveyance to Departmental stores, stacking etc. all complete. I/S Solvent free Liquid Epoxy Lining (406 micron) + O/S 3 LPE Coated M. S. Pipe. for 219mm Dia 6.3mm Thick.	15.00	3099.00	Rmt.	46485.00
4	Manufacture, Supply & Delivery of Ductile Iron Flange socket spigot bends, tees, reducers or any other specials as per BS-EN-545/1995 Class-A series K12 suitable for use with D.I. Pipes manufactured as per IS:8329/1994 delivery of specials is to be made to GWSSB store or site of works any where in Gujarat including all taxes, loading, unloading, carting, stacking, insurance, inspection charges, octroi etc. complete. With external bitumen & zinc coating & internal cement mortar lining. Socket & Spigot type. From 80mm to 300mm Dia.	95.00	148.00	Kgs.	14060.00
4.1	Flange Ended Specials - 80 to 300mm Dia.	310.00	155.00	Kgs.	48050.00

SR. NO.	DESCRIPTION	QUANTITY	Total Rate	PER	AMOUNT Rs.
5	Providing and supplying ISI mark CI D/F Sluice valves, butterfly valves & Reflux valves of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. Sluice valves as per IS - 780 & 2906 / 1984. Sluice Valve ISI Mark only. PN-1.6 With hand/wheel cap operated (Alt-1 type long body). 200mm Dia Sluice Valve.	8.00	11063.00	Nos.	88504.00
5.1	150mm Dia Sluice Valve	2.00	6545.00	Nos.	13090.00
6	Excavation for pipe line trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. In all sort of soil and soft murrum. Upto 1.50 Mt. Depth. For CC 1:2:4 or Asphalt Road.	60.00	102.35	Cmt.	6141.00
7	Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km.	58.00	25.30	Cmt.	1467.40
8	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work	2.00	1082.34	Cmt.	2164.68
9	Lowering, laying and jointing C. I. S & S Spun pipes suitable for Tyton joints / Mortar lined D. I. Pipes of various classes with CI / MS specials of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including hydraulic testing etc. comp. 200mm Dia.	35.00	113.85	Joint	3984.75
9.1	250mm Dia Pipes	20.00	146.05	Joint	2921.00
10	Providing and making flanged joints to flanged DI / C.I. pipes of all classes / specials etc. including cost of all jointing materials rubber packing, nut bolts, including lowering laying jointing labour hydraulic testing etc. complete. 300mm Dia Pipe.	8.00	1406.45	Joint	11251.60
10.1	150mm Dia Pipes	2.00	702.65	Joint	1405.30
11	Lowering, laying, jointing & welding in position to correct line & level M.S. Pipe with outside 3 LPE coating & inside solvent free liquid epoxy lining on pedestal or chairs upon prepared formation or prepared bedding in trenches the rates include conveyance from store to site of work loading, unloading, heat shrink sleeve jointing hydrotesting etc. complete.	15.00	226.55	Rmt.	3398.25

SR. NO.	DESCRIPTION	QUANTITY	Total Rate	PER	AMOUNT Rs.
12	Lowering, laying and jointing in position following C. I. / D/F Reflux valves, Butterfly valves, Sluice valves and Air valves including cost of all labour, jointing material, including nut bolts and giving satisfactory hydraulic testing, etc. complete. 200mm Dia Sluice Valve.	8.00	2003.30	Nos	16026.40
12.1	150mm Dia Sluice Valve	2.00	672.75	Nos	1345.50
13	Providing, Supplying and Delivery of CI Manhole frame and cover incl. all taxes, loading, unloading and carting upto departmental stores etc. comp. Size 1.5m. x 1.5m. heavy duty - 15 ton capacity. All Type. CI Manhole Frame & Cover.	200.00	58.00	Kg.	11600.00
14	Providing and cast in situ C.C. in grade M-30 proportions of ingredients as per mix design by weigh batching using granite, quartzite trap metal of size 12 mm to 20 mm and or 6 mm to 12 mm including scaffolding centering formwork, needle vibrated consolidation, curing and hydraulic testing etc. complete (excluding cost of reinforcement) with centering and shuttering/ deshuttering etc. comp. up to 6 meter height / depth Av. G.L. for all water retaining structures.	2.00	9295.45	Cmt.	18590.90
15	Supplying, cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters. Do-CRS steel all diameter Fe 500grade confirming to relevant I.S.	0.40	90363.55	M.T.	36145.42
16	Labour charges for repairing leakage in CI/DI pipeline of following diameter at different places including necessary excavation manually or by machinery, removing of mud, dewatering, cleaning of pipe, cutting of pipe, Jointing & repairing using CID joints including CID joints, rubber rings, nut bolts, hiring excavator, Hydra/ Crane, dewatering machine, fuel, operator etc. complete. (including cost of jointing material but excluding cost of pipe). 300mm Dia Pipe.	4.00	5686.00	No.	22744.00
16.1	150mm Dia Pipe	2.00	2496.00	No.	4992.00
17	Removing of existing pipeline incl. removal of specials, valves jointing material including carting and stacking of removed material from site of work to the department store as directed excl. excavation and refilling. For 300mm Dia DI Pipes.	30.00	80.50	No.	2415.00
17.1	150mm Dia DI Pipes	20.00	35.65	No.	713.00

SR. NO.	DESCRIPTION	QUANTITY	Total Rate	PER	AMOUNT Rs.
18	Providing laying and jointing in true line and level 25mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.	20.00	91.83	No.	1836.60
					<hr/>
					Total, Rs. 753756.80
					Say, Rs. 753757.00

SECTION - 8

SECURITIES AND OTHER FORMS

BID SECURITY (BANK GUARANTEE)

WHEREAS, ----- (name of Bidder) (hereinafter called the "The Bidder") has submitted his bid Dated ----- (Date) for the construction of ----- (Name of Contractor hereinafter called "the Bid")

KNOW ALL PEOPLE by these presents that We ----- (name of Bank) of ----- (name of country) having our Registered office at ----- (hereinafter called "the bank") are bound unto ----- (name of Employer) (hereinafter called "The Employer") in the sum of ----- * for which payment well and truly to be made to the said Employer the Bank itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ----- day of ----- 20

THE CONDITIONS of these obligations are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

Or

(2) If the Bidder has been notified of the acceptance of his bid by the Employer during the period of Bid Validity:

- A Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or
- B. Fails or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders; or
- C. does not accept the correction of the Bid Price pursuant to Clause 27 (Correction of Errors)

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred conditions or conditions.

This Guarantee will remain in force up to and including the date----- **
days after the deadline for submission of Bids as such the deadline is stated in the
Instructions to Bidders or as it may be extended by the Employer, notice of which
extension (s) to the Bank is hereby waived. Any demand in respect of this
guarantee should reach the Bank not later than the above date

DATE -----

SIGNATURE-----

WITNESS -----

SEAL-----

(Signature, name and address)

* The Bidder should insert the amount of the guarantee in words and figures
denominated in Indian Rupees. This figure should be the same as shown in
Clause 16.1(Bid Security) of the Instructions to Bidders.

****45 days** after the **end of the validity period** of the Bid. Date should be inserted
by the Employer before the Bidding documents are issued.

PERFORMANCE SECURITY

TO,

----- (Name of Employer)
----- (Address of Employer)

WHEREAS ----- (name and address of Contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- to execute ----- (name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ----- (Amount of guarantee)* ----- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until 60 days from the date of expiring of the Defect Liabilities period.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

*An amount shall be inserted by the Guarantor, representing the percentage the Contract price specified in the Contract denominated in Indian Rupees.

ADDITIONAL PERFORMANCE SECURITY

[Clause 34.1. (A)]

TO,

----- (Name of Employer)

----- (Address of Employer)

WHEREAS ----- (Name and address of Contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. ----- Dates ----- to execute -----
----- (Name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of -----
(Amount of guarantee) ----- (in words), such sum being payable in Types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of -----
(Amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until **28 days** from the project completion date.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

BANK GUARANTEE FOR ADVANCE PAYMENT

TO,

----- (Name of Employer)

----- (Address of Employer)

----- (Name of Contractor)

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, -----
----- (name and address of Contractor) (hereinafter called "the Contractor") shall deposit with (name of Employer) a bank guarantee his proper and faithful performance under the said Clause of the Contract in an amount of ----- (amount of Guarantee)* -
----- in words).

We, the ----- (bank of financial institution), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to -----
(Name of Employer) on his first demand without whatsoever right of obligation on our part and without his first claim to the Contractor, in the amount not exceeding ---
----- (amount of guarantee)* ----- (in words)

We further agree that no change or addition to or other modifications of the terms of the Contractor or Works to be performed thereunder or of any of the Contract documents which may be made between ----- (name of Employer) and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modifications.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until ----- (name of employer) receives full repayment of the same amount from the contractor.

YOUR'S TRULY

Signature and Seal _____
Name of Bank/ Financial Institution _____
Address _____
Date _____

* An amount shall be inserted by that Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

Letter of Acceptance
(Letter head paper of the Employer)

_____ (date)

To,

_____ (Name and address of the Contractor)

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ (Name of the contract and identification number, as given in the Instructions to Bidders) for the Contract Price of Rupees _____ (_____) (amount in words and figures) as corrected and modified in accordance with the Instructions to Bidders* is hereby accepted by our agency.

You are requested to furnish performance security, in the form detailed in para 34.1 of ITB for an amount equivalent to Rs. _____. Within **10 days** of the receipt of this letter of acceptance up to beyond **60 days** from the date of expiry of defects Liability period i.e. up to _____ and the Additional Performance Security for an amount equivalent to Rs. _____ shall be valid beyond 28 (twenty-eight) days of Project Completion Date i.e. up to _____ and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours Faithfully

Authorized Signature
Name and title of Signatory
Name of Employer

* Delete "Corrected and" or and modified if only one of these actions applies. Delete as corrected and modified in accordance with the Instructions to Bidders, if corrections or modifications have not been affected.

Issue of Notice to proceed with the work

(Letterhead of the Employer)

----- (date)

To,

_____ (Name and address of the Contractor)

Dear Sirs,

Pursuant to your furnishing the requisite security in ITB Clause 34.1 and
signing of the Contract for the construction of _____

_____ at a bid Price of Rs.

_____.

You are hereby instructed to proceed with the execution of the said works in
accordance with the contract documents.

Yours faithfully

(Signature, name and title of signatory authorized
To sign on behalf of Employer)

AGREEMENT FORM

This agreement, made on the _____ day of _____ Between
_____ (name and address of Employer) (Hereinafter called "the
Employer) and _____ (name and address of
Contractor) hereinafter called "the Contractor" of the other part.

Whereas the Employer is desirous that the Contractor execute

Name and identification number of contract (hereinafter called "the works") and the
employer has accepted the Bid by the Contractor for the execution and completion of
such works and the remedying of any defects therein, at a cost of Rs.

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 construed as part of this Agreement.
2. In Consideration of the payment to be made by the Employer to the contractor as
hereinafter mentioned, the Contractor hereby covenants with the Employer to
executive and complete the works and remedy any defects therein in conformity
in all aspects with the provisions of the contracts.
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
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 ready and construed as
part of this Agreement viz
 - i) letter of Acceptance
 - ii) Notice to proceed with the works:
 - iii) Contractor's Bid

- iv) Conditions of contract: General and Special
- v) Contract Data
- vi) Additional conditions
- vii) Drawings
- viii) Bill of Quantities and
- ix) Any other documents listed in the Contract
data as forming part of the Contract.

In witness whereof the parties there to 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 _____

UNDERTAKING
(For Investment)

I, the undersigned do hereby undertake that our firm M/s
..... Would invest a minimum cash up
to **25 %** of the value of the work during implementation of the contract.

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

UNDERTAKING (For Validity)

I, the undersigned do hereby undertake that our firm M/s

.....

..... agree to abide by this bid for a period

.....

days

for date fixed for receiving the same and it shall be binding on us and may be
accepted at any time before the expiration of that period.

_____ (Signed
by an Authorized officer of the
firm)

Title of officer

Name of firm

DATE

(ON COMPANY'S LETTER HEAD)
LETTER OF SUBMISSION OF BID, ASSURANCE LETTER.

**To,
CHIEF OFFICER
KHAMBHAT NAGARPALIKA
KHAMBHAT.**

Respected Sir,

SUB: BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

1. With reference to the tender invited by you for the above mentioned work/s, I/We do hereby offer to perform, provide execute complete and maintain the work/s in conformity with the drawings, conditions of tender articles of agreement and conditions of contract, specifications, and bill of quantities for the sum of Total Quoted Amount at the rate quoted in the bill of quantities.
2. I / We have satisfied ourselves as to the location of site, examined the drawings and read of Articles of Agreement, conditions of tender, conditions of contract and specifications etc. and I/We understand that the works are to be completed within _____ calendar months. I/We agree to finish the whole of the works within _____ calendar months from the date of commencement of the work fully understanding that the time is the essence of the contract.
3. I/We will carry out various types of Pre and Post total station survey work in Connection with stipulated quantities in Schedule-B for smooth running of project and site layout management.
4. I/We will obtain at various locations for Deciding the Depth of Foundation and other criteria.
5. The Bidder/Contractor will have to Prepare Detailed Structure Design and Drawing on the Basis of Own Design for Component at his own Expanse According to Stages of Payment Given in Schedule-B, The Chief Officer Khambhat Nagarpalika, Khambhat , will not bare any Additional Expanse regarding the same.
6. We have independently considered the amount of liquidity damages as stated in the appendix and the general conditions of the contract and agree that it represents fair estimate of the loss likely to be suffered by THE CHIEF OFFICER KHAMBHAT NAGARPALIKA Khambhat in the event of the works not being completed by us in time.
7. If our tender is accepted, we will, when required, furnish the security deposit for the sum named in the appendix to the general conditions of the contract for the due performance of the contract.

8. We agree to abide by this tender for the period of Bid Validity from the Last date of Submission of tender, which may be extended further by mutual agreement. It shall remain binding upon us. If the tender is withdrawn by us, our earnest money will be forfeited.
9. Unless and until a formal agreement is prepared and executed this tender together with your written acceptance thereof shall constitute a binding contract between us.
10. We agree that at your sole discretion and without assigning any reason whatsoever, you reserve the right to accept and/or reject any or all tenders. The Chief Officer Khambhat Nagarpalika, does not bind itself to accept the lowest tender.

Date:
of the firm) Witness:

Yours faithfully,
(Signature of the Tenderer with the seal

1. **Signature :**
Name:
Address:

2. **Signature :**
Name:
Address:

SBD SECTION-9

DRAWING

SECTION - 10

DOCUMENTS TO BE FURNISHED BY BIDDER

NOTE: ALL SUPPORTING DOCUMENTS MUST BE FURNISHED BY BIDDER AS PER BID EVALUATION CRITERIA FOR THE PURPOSE OF REALIZATION OF DRAFT TENDER PAPER.

GENERAL INSTRUCTIONS TO BIDDERS

A. GENERAL

1. BID INVITATION:

The Khambhat Nagarpalika (hereinafter referred to as “the Employer”) invites competitive bids from all interested and eligible bidders for

Project Description:

RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021-2021-22,2022-23) UNTIED, TIED GRANT. .As per Appendix to bid details.

1.2 Scope of Bid:

The scope of work/services to be done / provided by the contractor under this bid will be as under:

1.2.3 Construction Scope:

As per Appendix to Bid details.

1.3 Time of Performance:

The successful bidder will be expected to complete the works within (time in months) as per time limit given in Appendix to Bid details from the date of issue of letter of acceptance.

1.4 Project Implementing Agency:

The “KHAMBHAT NAGARPALIKA” shall be the project-implementing agency. This contract shall be administered and managed by the KHAMBHAT. NAGARPALIKA as per given in Appendix to Bid details.

1.5 Allocation of Risk & Responsibilities:

1.5.1 Contractor:

The preliminary designs and details contained in the bid documents are based on limited and indicative field data as available with the Employer at the time of preparation of the bidding documents. Bidder shall be responsible to verify / examine / check and make his own assessment of the site, site data, soil data and the schematic details shown in the bid documents based on his own investigations and/or additional surveys, if required, at bidder's own cost.

- The contractor will be responsible to procure and supply equipment and materials like cement, steel, for construction of Above Mentioned Work etc. to be supplied by the bidder at his own cost and risk. These materials and equipment shall conform to the specification contained in this document and will be procured from the approved vendors listed in this document as a part of this tender document. Vendor list cannot be changed at post tender or post contract stage.
- The procurements shall be made from the vendors approved by the NAGARPALIKA and contained in the vendor list provided in this document. Such vendors shall have BIS mark and ISO 9002 certification wherever applicable contained in **Appendix 2** of this document.

- **If case of procurement of materials outside India, no exemption Certificate shall be granted for import duty or any other duties applicable thereto. Further, the quality standard of the materials shall be of ISO /country of origin standard and shall have to be equivalent or higher than relevant BIS standard.**
- The contractor will supply the goods, materials and equipments duly tested and certified by the manufacturer as per "Quality Assurance Plan" (QAP) provided by the bidder and approved by the employer and/or it's appointed third party inspection agency.
- The Contractor will undertake all soil & site investigations and other explorations at his cost as may be necessary for design of all civil structures etc, which is covered under the scope of this contract.
- The Contractor will have to design the civil works Mentioned Above etc. as per the relevant national and/or international standards & as per latest specification and c Khambhat of practice published by the Bureau of Indian standards and shall be subjected to Nagarpalika or its appointed agencies approval at his cost so as to make them multi hazard proof (i.e. Cyclone, Earthquake). **IS 1893-2002 Criteria for Earthquake Resistance Design of Structures Part - I & Draft IS 1893-2002 Part II (Liquid Retaining Tanks) should be observed strictly.**
- The Contractor shall organize on the job and off the job-training program for the staff of the Nagarpalika or their nominated personnel within a period of four months from the date of completion.
- The Contractor shall be responsible to make good and bring to original position road and land surfaces etc. damaged during construction of structures at his cost.
- The Contractor shall be responsible for all the damages to the underground cables, power lines, telephone lines, other water/sewer lines and other infrastructure facilities etc. while executing the works under this contract and shall bear all costs relating to repairs / replacements.
- The contractor shall be responsible for failure of Structure during the full period of contract and the **defect liability period of One year from the date of completion.**
- The Contractor will prepare and present interim/running and final bills.
- The Contractor shall be responsible for the safety and performance of all civil and other structures up to the end of period of defect liability of One year from the date of completion. The damages/defects identified by the "Engineer in-charge" shall be made good, as per Standards, by the contractor at his cost and risk. In case of collapse of structures in part or full replacement/reconstruction shall be done by the contractor at his cost and risk.
- On successful completion of works and Operation & Maintenance as per the contract thereafter contractor shall handover the works to Nagarpalika.
- **The document can be down loaded from the site of department**
- The **NAGARPALIKA** assures all participants for the contract that adequate financial resources are available to cover the financial requirements and funds are available to meet the disbursement needs of the construction contracts in accordance with the provisions of tender documents.
- All the material shall be inspected by Nagarpalika internal system and/or through Third Party Agency appointed by the employer.
- **Special Condition:** - If Contractor fails provide materials in time and Nagarpalika have rights to provide those materials through its internal system of purchasing or utilization of those materials on their project the rate chargeable shall be the actual cost of material at site including all the taxes and 5% cost for storage.

1.6 **The Employer:**

- Nagarpalika only under special circumstances and solely at its own absolute discretion consider the request of contractor to provide material to the contractor which he is unable to provide because of acceptable and recorded reasons, on payment of a price equivalent to the unit rate contained in the Price Bid or the Nagarpalika issue rate whichever is higher. Contractor will have to arrange his own transportation from the Nagarpalika store to his site of work at his own cost.
- Nagarpalika will handover the clear possession of the site of works to the contractor immediately after the issuance of work order to commence the works.
- Nagarpalika will provide indicative drawings and design parameters for all works to be designed by the contractor.
- Nagarpalika will approve the detailed designs and drawings presented by the contractor either through its own internal system or through its authorized and appointed Third Party Agency.
- Nagarpalika will approve and pay all interim/running/final bills presented by the Contractor.
- Nagarpalika will be responsible to get all statutory permissions and clearances from the concerned central / state or local statutory authorities. However, the contractor shall have to manage the day-to-day activities based on these clearances on site. Nagarpalika shall provide required help and assistance for such day-to-day activities.
- The Nagarpalika will make available Right of Use for construction of shelter home, its day-to-day management on site shall be the responsibility of the contractor for which Nagarpalika shall provide necessary help and assistance.

1.7 The works under this Contract shall be executed on the basis of Turnkey concept of Design Building, Constructing, testing and Commissioning all Civil Mechanical, electrical works and also cover Three year of defect liability period.

1.8 The Bidder is required to note that details of the proposed project given in the bid are subject to review and refinement during the course of detailed engineering to be undertaken by the successful bidder before commencement of the works.

1.9 All bids are to be completed and returned to the Employer in accordance with these Instructions to Bidders.

1.10 Throughout these bid documents the term "Bid" and "Tender" and their derivatives (Bidder/Tendered/Contractor/Applicant, bid/tendered, bidding/tendering, etc.) are synonymous. Also, throughout the bid documents, the word "day" means a calendar day, the word "month" means a calendar month and the word "year" means a calendar year.

1.11 Information material borrowed by the Bidders, if any, shall remain the property of the Nagarpalika and shall be provided by the Nagarpalika for information, solely for the purpose of the bids execution under this Contract. All such borrowed material shall be returned to Nagarpalika after submission of the bids.

2 SOURCE OF FUNDS:

RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021-2021-22,2022-23) UNTIED, TIED GRANT... As is to be financed through the funds available with the Nagarpalika or resources to be raised by Nagarpalika from financial institutions.

3 ELIGIBLE BIDDERS:

- 3.1 The bidders who, after a look to the qualification criteria feel that they will be qualified can participate in this **Single Stage - Two Envelope** bidding procedure. The participating bidders shall be subjected to assessment of their technical and financial competence to carry out the work under this tender as per the **Qualification Criteria** contained in **Appendix - 1**. Only bidders qualified under this process will become eligible for opening of the price bid.
- 3.2 Bidders shall provide evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 3.3 Bidders shall not be listed under a declaration of ineligibility for corrupt or fraudulent practices issued by the Central Govt. State in accordance with sub-clause 45.1 (c) or the list of black listed contractors announced by Nagarpalika / Govt. of Gujarat or its Public Sector undertakings.

4 ELIGIBLE MATERIALS, EQUIPMENTS & SERVICES:

- 4.1 For purposes of Clause 4 above, "services" means the works and all project-related services including design services.
- 4.2 For purposes of Clause 4 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.
- 4.3 The materials, equipment and services to be supplied under the contract shall comply with the following provisions:
 - (a) All materials, equipment and services (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other equipment and services) shall be designed to be used prior to, during, and after the calendar year (**latest year**);
 - (b) Neither the performance nor functionality of such materials, equipment and services shall be affected by dates prior to, during, and after the (**latest year**)(c)
Such materials, equipment and services, and the logic included therein, shall operate during each such time period without error relating to date data, specifically including any error relating to, or the production of, date, data which represents or references different centuries or more than one century and the correct treatment of the Year as a leap year, and
 - (d) The provision and use of such materials, equipment and services shall not infringe or violate any industrial property of intellectual property rights or claim of any third party.

5. QUALIFICATION OF THE BIDDER:

- 5.1 To be qualified for award of Contract, bidders shall:
 - (a) Submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and
 - (b) Submit Qualification requirements specifying financial capacity, technical capacity, minimum acceptable levels with regards to Bidder's experience in relevant projects and other relevant factors such as work in hand, future commitments, and litigation history as given and described in the **Appendix 1** to Instruction to Bidders.

- (c) Submit proposals regarding work methods, scheduling and re sourcing which shall be, provided in sufficient detail to confirm the bidders' capability to complete the works in accordance with the specifications and the time for completion.
 - (d) Submit Memorandum of Understanding (MoU) with material supplier clearly stating the terms & conditions of the MoU. Such MoU shall not be amended or modified without prior consent from Nagarpalika during the period of performance of contract, Nagarpalika shall not allow such change except for special reasons.
- 5.2 ~~Joint venture consortium of two or more firms / members / companies, as partners shall comply with the following requirements:~~
- (a) ~~In case of bidder participating as a Joint Venture, on his selection for award of contract, all members of the Joint Venture will have to sign the contract with the Employer and will be jointly and severally liable for performance of the contract/ Award of contract will be in the name of Joint Venture consortium which will be considered as "Legal Entity" as far as this bid/contract concern.~~
 - (b) ~~The bid, and in case of a successful bid, the Form of Contract Agreement, shall be signed with the name of Joint Venture which will be legally binding on all partners;~~
 - (c) ~~One of the partners shall be declared as Prime Bidder authorized to be in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;~~
 - (d) ~~The partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract;~~
 - (e) ~~All partners of the joint venture shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the Authorization mentioned under (b) above as well as in the Bid Form and the Form of Contract Agreement (in case of a successful bid); and~~
 - (f) ~~A copy of the Stamped and notarized agreement entered into by the joint venture partners shall be submitted with the bid. Roles, responsibilities and financial stakes of all members of the Joint Venture consortium shall be clearly and unambiguously prescribed in the Joint Venture agreement. In case of non-prescription, the JV agreement will be declared as invalid and the bid will be treated as a single bidder, in the name of bidder, who has purchased the bid documents.~~
 - (g) ~~In case of Joint Venture technical strengths of all the members shall be grouped together for evaluation. Financial strengths of all the JV members will be considered proportionate to their financial stakes.~~
 - (h) ~~In case of "MoU", with a supplier experience and strengths of supplier will be considered for evaluation of Supply and manufacture experience criteria.~~
- 5.3 ~~Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the bidders' proposals to meet the Employer's Requirements and the completion time referred to in Sub-Clause 1.2 above.~~
- 5.4 ~~All guarantees shall be in the name of the joint venture if the bid is submitted in the form of a joint venture consortium.~~

6. ONE BID PER BIDDER:

Each bidder shall submit only one bid either by itself, or as a partner. A bidder who submits or participates in more than one bid under this proceed will cause all those bids to be rejected.

7. COST OF BIDDING:

The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs.

8. SITE VISIT:

- 8.1 The bidder is advised to depute a suitable team to visit and examine the Site of Works and its surroundings for fully understanding of the job and ascertain the difficulties that may be encountered during execution of the works and for obtaining for himself, on his own responsibility, all information that may be necessary for preparing the bid and entering into the Contract. The cost of visiting the Site shall be entirely at bidder's own expense.
- 8.2 The bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the bidder, its personnel and agents, will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses Incurred as a result of the inspection.

B. BIDDING DOCUMENTS

9. CONTENT OF BIDDING DOCUMENTS

- 9.1 The bidding documents are those stated below, and should be read in conjunction with any Addenda issued in accordance with Clause 11:

VOLUME - I: TECHNICAL BID

AS PER SBD

VOLUME - II: PRICE BID

AS PER SBD

- 9.2 The bidder is expected to examine carefully the contents of the Bidding documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Pursuant to Clause 28, bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

10. CLARIFICATION OF BIDDING DOCUMENT:

A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex) at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification, which it receives earlier than 7 days prior to deadline for submission of bids. Copies of the Employer's response, including a description of the enquiry, will be forwarded to all purchasers of the bidding documents.

11. AMENDMENTS OF BIDDING DOCUMENTS:

- 11.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder modify the bidding documents by issuing addenda.
- 11.2 Any addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause 9.1, and shall be communicated in writing or by fax to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by fax to the Employer.
- 11.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids, in accordance with Clause 23.
- 11.4 All amendments and modifications issued by the Employer shall be deemed to be integral part of the contract to be signed with the successful bidder.

C. PREPARATION OF BIDS

12. LANGUAGE OF BID:

The bid, and all correspondence and documents, related to the bid, exchanged between the bidder and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the bid the English translation shall prevail.

13. DOCUMENTS COMPRISING THE BID:

- 13.1 The bid Shall be submitted Online Through N-Procure, Where Criteria relating to Technical Bid and Price bid shall be filled and submitted On-Line.
- 13.2 The technical proposal shall contain the following:
 - (i) Bid Form for Technical Proposal and Appendix to Technical Proposal;
 - (ii) Power of Attorney
 - (iii) Information on Qualification (Completion Certificate given by component Authority as per Bid Evolution Criteria)
 - (iv) Confirmation of Eligibility
 - (v) Schedule of Major items of equipment's
 - (vi) Schedule of major items of Constructional plant
 - (vii) Schedule of key personnel
 - (viii) Schedule of key Sub-contractors
 - (ix) Schedule of recommended spare parts
 - (x) Schedule of compliance with the bidding documents
 - (xi) Schedule of construction facilities
 - (xii) Schedule of construction method
 - (xiii) Any other material required to be completed and submitted by bidders in accordance with these instructions to bidders.
 - (xiv) Form of Bid Security
 - (xv) Original Document of Tender Fee and Earnest Money Deposit
- 13.3 The price proposal shall be submitted On-Line

14. BID FORM & PRICE SCHEDULE:

The Bidder shall complete the Bid Forms and schedules furnished in the bidding documents in the manner and detail indicated therein, following the requirements of Clauses 15 and 16.

15. BID PRICES:

- 15.1 Unless specified otherwise in Employer's Requirements, Bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the facilities and, where so required by the bidding documents, the acquisition of all permits, approvals and licenses, etc. services as may be specified in the bidding documents, all in accordance with the requirements of the Conditions of Contract.
- 15.2 The bidders shall have to give detailed rate analysis in justification of the prices as may be required by the employer as a part of the evaluation process, if so desired by the employer.

16. BID CURRENCIES:

The prices shall be quoted on fixed and firm price basis in Indian currency (i.e. INR) only without any price escalation and / or statutory variation.

17. BID VALIDITY:

- 17.1 Bids shall remain valid for a period of 120 days after the date of opening of technical proposals specified in Sub-Clause 26.1
- 17.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by cable. A bidder may refuse the request without forfeiting its bid security. A bidder agreeing to the request will not be required or permitted to modify its bid, but will be required to extend the validity of its bid security for the period of the extension, and in compliance with Clause 18 in all respects.

18 BID SECURITY:

- 18.1 The bidder shall furnish, as part of its bid with the technical proposal, a bid security in the amount of **(Almost 1% of the Amount put to tender)**.
- 18.2 The bid security shall, at the bidder's option, be in one of the following form:
- (a) A Demand Draft payable to **(Name of Executing Authority given in Appendix to Bid details)** issued by a reputed Scheduled Bank except co-operative bank or a foreign bank.
 - (b) A fixed deposit receipt pledged in the name of **(Name of Executing Authority given in Appendix to Bid details)** from reputed Scheduled Bank except co-operative bank or a foreign bank and valid up to 30 days from the date of closure of the bid validity period of 120 days.
 - ~~(c) An unequivocal and unconditional Bank Guarantee in the prescribed format given in this document issue by reputed Scheduled Bank except co-operative bank or a foreign bank and valid up to 28 days from the date of closure of the bid validity period of 120 days.~~

~~The format of the bank guarantee shall be in accordance with the sample form of bid security included in Section 6; other formats may be permitted, subject to the prior approval of the Employer. The bid security shall remain valid for 28 days beyond the original validity period for the bid, and beyond any period of extension subsequently requested under Sub-Clause 17.2.~~

- 18.3 Any bid not accompanied by an acceptable bid security shall be rejected by the Employer as non-responsive.
- 18.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, after the expiration of the period of bid validity.
- 18.5 The bid security of the successful bidder will be returned when the bidder has signed the Contract Agreement and furnished the required performance security.
- 18.6 The bid security may be forfeited;
- (a) If the bidder withdraws its bid, except as provided in Sub-Clauses 25.1 and 30.2.
 - (b) If the bidder does not accept the correction of its bid price, pursuant to Sub-Clause 36.2; or
 - (c) In the case of a successful bidder, if it fails within the specified time limit to:
 - (i) Sign the Contract Agreement,
 - (ii) Furnish the required performance security,

19. ALTERNATIVE PROPOSALS BY BIDDERS:

Bidders are not permitted to give any alternative offer containing technical or other alternatives. Their bid proposals shall be in total conformity of the employer's requirement as described in the bidding documents.

21. FORMAT AND SIGNING OF BID:

21.1 The bidder shall prepare one original hard copy of the technical proposal

- 21.2 The original copy of the bid shall be typed or written in indelible ink (in the case of copies, Photostats) are also, acceptable and shall be signed by a person or persons duly authorized to sign on behalf of the bidder, pursuant to Sub-Clauses 5.1 (a) or 5.2 (b), as the case may be. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.
- 21.3 The bid shall contain no alterations, omissions 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 initialed by the person or persons signing the bid.

D. SUBMISSION OF BIDS

22 SEALING AND MARKING OF BIDS:

- 22.1 The bid shall be submitted online through E-tendering.

Online: The Price bid shall be filled online in the prescribed format provided on the Website and Submitted before 09/07/2026 up to 18.00 hrs.

22.2 SUPPORTING DOCUMENTS :

While the bid shall be submitted online all the supporting documents including EMD and tender fee shall be submitted in sealed envelope along with other enclosure. Information to be provided in hard copy as a part of supporting documents shall be sent to the Chief Officer, Khambhat. Nagarpalika, Khambhat. Duly signed by the authorized signatory. The Supporting documents shall be submitted on or before due date and time in a sealed envelope clearly super-scribed with Tender Description, Address of Bid office and Due date.

The Bidder has to send all supporting documents by registered post only. So as to reach at the Bid Submission Office on or before the last date & time fixed for receipt

of BID. Khambhat. Nagarpalika is not responsible for any loss or delay of Tender in transit.

The bid shall be in two envelopes as follows:

Envelop A - Bid security

Envelop B - Technical Bid & Supporting Documents.

22.2 The bidder shall seal the original bids in an inner and outer envelope; duly marking the envelopes as "ORIGINAL".

22.3 The inner and outer envelopes shall

(a) Be addressed to the: Employer at the following address:

**Chief Officer,
KHAMBHAT. NAGARPALIKA,
KHAMBHAT.
Phone No: (O) 02698 (221300)**

(b) Bear the following identification:

RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

22.4 In addition to the identification required in Sub-Clause 22.3, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned, unopened in case it is declared "late" pursuant to Clause 24.

22.5 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.

3. DEADLINE FOR SUBMISSION OF BIDS:

23.1 **Bids must be received by the Employer at the address specified above not later than 18/07/2026 up to 18.00 Hrs. through registered post/ speed post only.**

23.2 The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 11, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

24 LATE BIDS:

24.1 Any bid received by the Employer after the deadline for submission of bids prescribed in Clause 23 will be rejected and returned unopened to the bidder.

25 MODIFICATION & WITHDRAWAL OF BIDS:

25.1 The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline for submission of bids.

25.2 The bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause 22, with the outer and inner envelopes additionally marked "MODIFICATION" or

"WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

- 25.3 No bid may be modified by the bidder after the deadline for submission of bids, except in accordance with Sub-Clauses 25.2 and 36.2.
- 25.4 Except as provided in Sub-Clause 30.2, withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in Sub-Clause 17.1 may result in the forfeiture of the bid security pursuant to Sub-Clause 18.6.

E. OPENING & EVALUATION OF TECHNICAL PROPOSAL

26 OPENING OF TECHNICAL PROPOSAL:

- 26.1 The Employer will open the technical proposals, in the presence of bidders' representatives who choose to attend at:

<p style="text-align: center;">Chief Officer KHAMBHAT NAGARPALIKA In Office of the Nagarpalika Khambhat Date & Time 20/07/2026 at 12.00 Hrs. (If Possible)</p>

The bidder's representatives who are present shall sign a register evidencing their attendance.

- 26.2 The price proposals will remain unopened and will be held in the custody of the Employer until the time of bid opening of the price proposals. The time and date and location of the bid opening of the price proposals will be advised in writing or by fax by the Employer and will follow the receipt of approval by the Nagarpalika of the evaluation of the technical proposals.
- 26.3 Envelop marked "WITHDRAWAL" shall be opened and read out first bids for which an acceptable notice of withdrawal has been submitted pursuant to clause 25 shall not be opened.
- 26.4 The bidder's names, bid modification & withdrawals, such other details as the employer may consider appropriate, will be announced & recorded by the employer at the opening. The bidder's representatives will be required to sign this record.
- 26.5 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with sub clause 26.4.

27 PROCESS TO BE CONFIDENTIAL:

Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence the Employer's processing of bids or award decisions by any way may result in the rejection of the bidder's bid.

28 PRELIMINARY EXAMINATION OF TECHNICAL PROPOSAL:

The Employer will examine the bids to determine whether they are complete, whether the documents have been properly signed, whether the required security is included, and whether the bids are generally in order. Any bids found to be non-responsive for any reasons or not meeting the minimum levels of the performance or other criteria specified in the bidding documents will be rejected by the Employer and not included for further consideration.

29 EVALUATION & COMPARISON OF TECHNICAL PROPOSAL:

The employer will carry out a detailed evaluation of the bids in order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set for them in the bidding documents. In order to reach such a determination, the Employer will examine the information supplied by the Bidders and other requirements in the bidding documents, taking into account the following factors:

a. Qualification

- i. the determination will take into account the Bidder's financial, technical all production capabilities and past performance; it will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to Sub-Clause 5.1(b), as well as such other information as the Employer deems necessary and appropriate; and
- ii. An affirmative determination will be a prerequisite for the employer to continue with the evaluation of the technical proposal; a negative determination will result in rejection of the Bidder's bid.

b. Technical:

- i. Overall completeness and compliance with the Employer's Requirements; the technical merits of plant and equipment offered and deviations from the Employer's Requirements; suitability of the facilities offered in relation to the environment and climatic conditions prevailing at the site; quality, function and operation of any process control concept included in the bid;
- ii. Achievement of specified performance criteria by the facilities;
- iii. Compliance with the time schedule called for in Technical proposal and any alternative time schedules offered by Bidders, as evidenced by a milestone schedule provided in the bid;
- iv. Any deviations to the commercial and contractual provisions stipulated in the bidding documents.

30 CLARIFICATION OF TECHNICAL PROPOSALS:

30.1 The Employer may conduct clarification meetings with any Bidder to discuss any matters, technical or otherwise, where the Employer requires amendments or changes to be made to the Technical Proposal.

30.2 Any effort by the bidder to influence the employer in the Employer's evaluation of technical proposals, bid comparison or the Employer's decisions on acceptance or rejection of bids may result in the rejection of the bidder's bid.

31 INVITATION TO ATTEND OPENING OF PRICE PROPOSALS:

31.1 At the end of the evaluation of the technical proposals the Employer will invite bidders who have submitted substantially responsive technical proposals and

who have been determined as being qualified for award to attend the bid opening of the price proposals. Bidders shall be given reasonable notice of the price proposal bid opening.

- 31.2 The Employer will notify Bidders that have been rejected on the grounds of being substantially non-responsive to the requirements of the bidding documents in writing and return the unopened price proposal.

F. OPENING & EVALUATION OF PRICE PROPOSALS

32 OPENING OF PRICE PROPOSALS:

- 32.1 The employer will open the price proposals of all bidders who submitted substantially responsive technical proposals at the time and date at the location advised to the bidders. The bidder's representatives who are present shall sign a register evidencing their attendance.
- 32.2 The bidder's name, the Bid Prices, the total amount of each bid, any discounts, and such other details as the employer may consider appropriate, will be announced and recorded by the employer at the opening. The bidder's representatives will be required to sign this record.
- 32.3 The employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with Sub-clause.

33 PROCESS TO BE CONFIDENTIAL:

Information related to the examination, clarification, evaluation and comparison of bids and recommendation of the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful bidder has been announced. Any effort by a bidder to influence the employer's, processing of bids or award decisions may result in rejection of the bidder's bid.

34 CLARIFICATION OF PRICE PROPOSALS AND CONTACTING THE EMPLOYER:

- 34.1 To assist in the examination, evaluation and comparison of price proposals, the employer may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing or by cable, but no change in price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the employer in the evaluation of the bid in accordance with clause 36.
- 34.2 Subject to Sub-clause 34.1, no bidder shall contact the employer on any matter relating to its bid from the time of opening of price proposals to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the employer, it should do so in writing.
- 34.3 Any effort by the bidder to influence the employer in the employer's evaluation of price proposal, bid comparison or contract award decision may result in the rejection of the bidder's bid.

35 PRELIMINARY EXAMINATION OF PRICE PROPOSALS AND DETERMINATION OF RESPONSIVENESS:

- 35.1 The Employer will examine the bids to determine whether they are complete, whether the documents have been properly signed, whether the required security is included, whether the bids are substantially responsive to the requirements of the bidding documents; and whether the bids provide any

clarification and / or substantiation that the Employer may require pursuant to Clause 3.4.

- 35.2 A substantially responsive bid is one which conforms to all the terms, conditions and requirements of the bidding documents, without material deviation or reservation and includes the amendments and changes, if any, requested by the Employer during the evaluation of the bidder's technical proposal.
- 35.3 If a price proposal is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

36 CORRECTION OF ERRORS:

- 36.1 Price Proposals determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Arithmetic errors will be rectified on the following basis. If there is a discrepancy between the unit rate and the total cost that is obtained by multiplying the unit rate and quantity, the unit rate shall prevail and the total cost will be corrected unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit rate, in which case the total cost as quoted will govern and the unit rate corrected. If there is a discrepancy between the total bid amount and the sum of total costs, the sum of the total costs shall prevail and the total bid amount will be corrected.
- 36.2 The amount stated in the Form of Bid for Price Proposal will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security may be forfeited in accordance with Sub-Clause 18.6(b).

37 EVALUATIONS AND COMPARISON OF PRICE PROPOSAL:

- 37.1 The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 35.
- 37.2 The Employer's evaluation of a bid will take into account, in addition to the bid prices indicated in the Schedule of Prices, the following costs and factors that will be added to each Bidder's bid price in the evaluation using pricing information available to the Employer, in the manner and to the extent indicated in Sub-Clause 38.4 and in the Employer's Requirements.
 - (a) The additional price, if any, reflected in the price proposal. If the price stated is not realistic the bid is liable to be rejected,
 - (b) Compliance with the time schedule called for in the Appendix to Price Proposal and evidenced as needed in a milestone schedule provided in the bid;
 - (c) The projected operating costs during the initial period of operation of the facilities,
 - (d) The functional guarantees of the facilities offered against the specified performance criteria of the plant and equipment; and
 - (e) The extra cost of work, services, facilities etc., required to be provided by the Employer or third parties.
- 37.3 (a) The Employer reserve the right to accept or reject any variation or deviation. Variations, deviations, and other factors which are in excess of the requirements of the bidding documents or otherwise result in the accrual of unsolicited benefits to the Employer shall not be taken into account in bid evaluation.

- (b) The estimated effect of the price adjustment provisions of the Conditions of Particular Application, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
- (c) If the bid of the successful bidder is substantially below the Employer's estimate for the contract, the Employer may require the bidder to produce detailed price analyses to demonstrate the internal consistency of those prices. After evaluation of the price analysis, the Employer may require that the amount of the performance security set forth in Clause 42 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

G. AWARD OF CONTRACT

38 AWARD:

Subject to Clause 41, the Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the Lowest Evaluated Bid Price, provided that such bidder has been determined to be (i) eligible in accordance with the provisions of Clause 3; and (ii) qualified in accordance with the provisions of Clause 5.

39 EMPLOYER'S RIGHT TO ACCEPT ANY BID OR TO REJECT ANY OR ALL BIDS:

Notwithstanding Clause 40, the Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Employer's action.

40 NOTIFICATION OF AWARD:

- 40.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder by fax, confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which 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 Conditions of Contract called "the Contract Price").
- 40.2 The notification of award will constitute the formation of the Contract.
- 40.3 Upon the furnishing by the successful bidder of a performance security (and domestic preference security where required), the Employer will promptly notify the other bidders that their bids have been unsuccessful.

41 SIGNING OF CONTRACT AGREEMENT:

- 41.1 At the same time that he notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Form of Contract Agreement provided in the bidding documents, incorporating all agreements between the parties.
- 41.2 Within 15 days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Employer.

42 PERFORMANCE SECURITY:

- 42.1 Within 15 days of receipt of the notification of award from the Employer, the successful bidder shall furnish to the Employer a performance security in an amount of 10 percent of the Contract Price in accordance with the Conditions of

Contract. The form of performance security provided in Section 6 of the Bidding documents may be used or some other form acceptable to the Employer.

- 42.2 Failure of the successful bidder to comply with the requirements of Clauses 42 or 43 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security.

43 CORRUPT OR FRAUDULENT PRACTICES:

- 43.1 The Nagarpalika requires that bidders/suppliers/contractors has follow the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy:

- (a) Defines for the purposes of this provision, the terms set forth below as follows:
 - (i) “Corrupt practices” means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and
 - (ii) “Fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the determination of the Borrower, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the borrower of the benefits of free and open competition;
- (b) Will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- (c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded an contract if it at any time determines that the firm has engaged in corrupt and fraudulent practices in competing for, or in executing, an contract.

Furthermore, bidders shall be aware of the provision stated in sub-clause 1.16 and Sub-clause 15.5 of the Conditions of Contract, part II – conditions of particular application.

KHAMBHAT NAGARPALIKA KHAMBHAT

Terms and Conditions:

- Bidder must have follow all Rules and Resolutions Issued by Government of Gujarat Roads and Building Department/Finance Department /Central Government.
- For Roads Works Bidder must have to Follow Resolution No.PRC-10-2015-55-C Dated 04.11.2015 issued by GOG, R&B Department.
- Price Escalation / Star Rate Price Adjustment Will not be paid by KHAMBHAT NAGARPALIKA KHAMBHAT.
- All other Acts / Rules / Regulation, by laws order, notification etc. present or future Applicable to the CONTRACTOR / OWNER from time to time for performing the aforesaid WORKS.

SITE VISIT CERTIFICATE.
(ON COMPANY'S LETTER HEAD)

**To
The Chief Officer
Khambhat
Nagarpalika
Khambhat.**

Dear Sir,

SUB: BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

1. With reference to the tender invited by you for the above mentioned work/s, I/We do hereby confirm that I/We have carried out site visit and understood the project requirements in detail.
2. I / We have satisfied ourselves as to the current site conditions as on date _____, and agree to execute the project in accordance with the tender requirements.
3. We agree that at your sole discretion and without assigning any reason whatsoever, you reserve the right to accept and/or reject any or all tenders. The Chief Officer **Khambhat Nagarpalika, Khambhat** does not bind itself to accept the lowest tender.

Signature of Engineer
KHAMBHAT NAGARPALIKA

Yours faithfully,

Date:
the firm)

(Signature of the tenderer with the seal of

Witness:

ANTI-BLACKLISTING INFORMATION
(On Stamp Paper Rs. 300) Notarized.

M/s _____ hereby certify and confirm that I or any of our Partner/ Promoter/s/director/s are not barred by Government of Gujarat (GOG)/any other entity of GOG or blacklisted by any State Government or Central Government/Department/Agency in India or from abroad from participating in Work/s, as individually/Partnership Firm as on Dt._____. We further confirm that we are aware that our bid for the captioned tender would be liable for rejection in case any material misrepresentation is made or discovered about the requirements of this tender at any stage of the bidding process or thereafter during the agreement period. Dated this _____ day of, 2026.

Name of the Bidder:

Signature of the Authorized person:

Name of the Authorized Person:

(ON COMPANY'S LETTER HEAD)

LETTER OF SUBMISSION OF BID, ASSURANCE LETTER.

**To,
CHIEF OFFICER
KHAMBHAT NAGARPALIKA
KHAMBHAT.**

Respected Sir,

SUB: BID DOCUMENT FOR RENOVATION & REPAIRING OF EXISTING 11.00 MLD WATER TREATMENT PLANT WITH REPLACEMENT OF PIPE & VALVE ARRANGEMENTS, MECHANICAL & ANCILLARY WORK AT KHAMBHAT NAGARPALIKA UNDER: 15TH FINANCE COMMISSION (YEAR:2020-2021- 2021-22,2022-23) UNTIED, TIED GRANT.

1. With reference to the tender invited by you for the above mentioned work/s, I/We do hereby offer to perform, provide execute complete and maintain the work/s in conformity with the drawings, conditions of tender articles of agreement and conditions of contract, specifications, and bill of quantities for the sum of Total Quoted Amount at the rate quoted in the bill of quantities.
2. I / We have satisfied ourselves as to the location of site, examined the drawings and read of Articles of Agreement, conditions of tender, conditions of contract and specifications etc. and I/We understand that the works are to be completed within _____ calendar months. I/We agree to finish the whole of the works within _____ calendar months from the date of commencement of the work fully understanding that the time is the essence of the contract.
3. I/We will carry out various types of Pre and Post total station survey work in Connection with stipulated quantities in Schedule-B for smooth running of project and site layout management.
4. I/We will obtain at various locations for Deciding the Depth of Foundation and other criteria.
5. The Bidder/Contractor will have to Prepare Detailed Structure Design and Drawing on the Basis of Own Design for Component at his own Expanse According to Stages of Payment Given in Schedule-B, The Chief Officer Khambhat Nagarpalika, Khambhat, will not bare any Additional Expanse regarding the same.
6. We have independently considered the amount of liquidity damages as stated in the appendix and the general conditions of the contract and agree that it represents fair estimate of the loss likely to be suffered by THE CHIEF OFFICER KHAMBHAT NAGARPALIKA KHAMBHAT in the event of the works not being completed by us in time.

7. If our tender is accepted, we will, when required, furnish the security deposit for the sum named in the appendix to the general conditions of the contract for the due performance of the contract.
8. We agree to abide by this tender for the period of Bid validity from the Last date of Submission of tender, which may be extended further by mutual agreement. It shall remain binding upon us. If the tender is withdrawn by us, our earnest money will be forfeited.
9. Unless and until a formal agreement is prepared and executed this tender together with your written acceptance thereof shall constitute a binding contract between us.
10. We agree that at your sole discretion and without assigning any reason whatsoever, you reserve the right to accept and/or reject any or all tenders. The Chief Officer Khambhat Nagarpalika, does not bind itself to accept the lowest tender.

Yours faithfully,

(Signature of the Tenderer with the seal of the

Date:
firm)

Witness:

1. Signature :

Name:

Address:

2. Signature :

Name:

Address: