

STANDARD BIDDING DOCUMENT

PROCUREMENT OF

CIVIL WORKS

**Name of Work: Construction, Operation & Maintenance (For 5 Years) of Lift Irrigation Scheme At Village: CHOCHALA (KISHORI F)
Tal. DAHOD, District: - DAHOD**

COMPLETE BIDDING DOCUMENT



GUJARAT WATER RESOURCES DEVELOPMENT CORPORATION LTD
GANDHINAGAR

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INVITATION FOR BID
(IFB)

NATIONAL COMPETITIVE BIDDING

1. The Executive Engineer, Unit -1(GWM) Vadodara invites bids for the Construction, Operation & Maintenance (For 5 Years) of Lift Irrigation Scheme@ Village: CHOCHALA (KISHORI F) Ta-DAHOD Di-DAHOD project detailed in the table. The bidders may submit bids for the following works.

TABLE

Pack age No.	Name of work	Approximate value of works (Rs.)	Bid security (Rs.)	Cost of docume nt	Period of comple tion	#Class of Registration / Category of contractor if required
1	2	3	4	5	6	7
	Construction , Operation & Maintenance (For 5 Years) of Lift Irrigation Scheme @ Village- CHOCHALA (KISHORI F) Ta-DAHOD Di-DAHOD	10962069.00	110000/-	3600+ 648(GST)=4248	11 Months	Class-C and above

2. Prospective / Interested bidder may download the Bid Documents from website <https://www.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 Vadodara _____ and in favor of 'The **Executive Engineer, UNIT-1(GWM) VADODARA Post Office Building, Geri compound, Race course, Vadodara Pin :390007, PHONE NO 0265-2372159, Fax No :0265-2372159**, Once the Bid is received online, Bid Document / Tender Fee will not be refundable.

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 Demand Draft, and FDR / Bank Guarantee bidder shall send the same in original through R.P.A.D. so as to reach to **The Executive Engineer, UNIT-1(GWM) VADODARA Post Office Building, Geri compound, Race course, Vadodara Pin :390007, PHONE NO 0265-2372159, Fax No :0265-2372159**, within 7 Days from the last day of bid submission.

Peneltative action for not submitting Demand Draft / FDR / Bank Guarantee in

- original to Executive Engineer / Tender Inviting Authority by bidder shall be initiated.
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 on at hrs. at the office of The Executive Engineer, UNIT-1(GWM) VADODARA Post Office Building, Geri compound , Race course , Vadodara Pin :390007, PHONE NO 0265-2372159, Fax No :0265-2372159, to clarify the issues and to answer questions on any Matter that maybe raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents.~~
6. #Bid Security (EMD) is **Rs.110000/-** 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 then 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,

For the works costing above 7.5crore (IRRIGATION PROJECT),7.0crore (BUILDING&BRIDGE) kindly refer to No. paracha/1097/1397(11)/pa.fa./MICELL(K-1) Date.18/01/2018 & No. No.paracha/1097/1397(11)/pa.fa./MICELL(K-1) Date.30/09/2022

For the works costing under 7.5 crore for Irrigation works and 7.0 crore for Building and Bridge Works following documents shall be submitted in electronic format only through online by scanning and the (i) Bid Document Fee / Tender Fee (ii) Bid Security / EMD should be sent in original to the Tender opening authority through RPAD, so as to reach the Executive Engineer within 7 days from last day of submission of Bid.

TABLE -1

1	copy of Registration Certificate	Scanned copy	Self Attested Copy
2	D.D. of tender fees	Scanned copy	In Original
3	E.M.D.	Scanned copy	In Original
4	Bank Certificate of required amount (amount mentioned in NIT only) .	Scanned copy	In Original
5	copy of Power of attorney	Scanned copy	Self Attested Copy
6	Copy of Partnership deed	Scanned copy	Self Attested Copy
7	Copy of memorandum of Association (If pvt./public limited Company)	Scanned copy	Self Attested Copy
8	Self attested Latest Income tax return certificate	Scanned copy	Self Attested Copy
9	Self attested Pan card	Scanned copy	Self Attested Copy
10	Self attested Registration GST No.	Scanned copy	Self Attested Copy
11	Existing Commitments and On-going Work along with other details mentioned in Section 2 (Qualification Information). The same shall be assessed as per the relevant clauses of Qualification criteria only	Scanned copy	In Original
12	Notarized Affidavit (As per section-2) (Page no.34)	Scanned copy	In Original
13	Undertaking both Bid validity and Cash Credit Facility	Scanned copy	In Original
14	Work Experience with Form 3A. The same shall be assessed as per the relevant clauses of Qualification criteria only.	Scanned copy	Self Attested Copy and duly signed not below rank of EE
15	Any Other Documents	Scanned copy	Self Attested Copy
16	Form (A) : Notarized Affidavit on Rs. 300 Stamp Paper.	Scanned copy	In Original
17	Site Visit Certificate sign by DEE.	Scanned copy	In Original

SECTION-1
INSTRUCTIONS TO
BIDDERS(ITB)

Section 1: Instructions to Bidders

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A.GENERAL

1. Scope of Bid

- 1.1 The Employer (Named in Appendix to ITB) invites bids for the 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.
- 1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.
- 1.3 Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/ tendered, 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 QUALIFICATIONCRITERIA*:

(As per Prequalification Criteria Section, For the works costing Above 7.5 crore (IRRIGATION PROJECT), 7.0 crore (BUILDING & BRIDGE) kindly refer to No.paracha/1097/1397(11)/pa.fa./MICELL(K-1) Date.18/01/2018 &No.paracha/1097/1397(11)/pa.fa./MICELL(K-1) Date.30/09/2022

*** All applicable criteria required for the scrutiny of the tender shall be used apart from the prequalification criteria as elicited in the relevant GRs.**

~~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	Multiplying factor
-Base year of inviting tender-		
1.	2025-2026	1.00
2.	2024-2025	1.10
3.	2023-2024	1.21
4.	2022-2023	1.33
5.	2021-2022	1.46
6.	2020-2021	1.61

~~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: (a) Achieved a minimum annual financial turnover of Rs. Crore for works in progress and completed in all classes of civil engineering construction works in any one year, over the last five financial years. (b) Experience in successfully completing or substantially completing at least one contract of similar work of at least 40 percent of the value of proposed contract done within the last five financial 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 if work executed jointly otherwise as per the scope of work define in Joint Venture agreement. 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) 11 (c)~~

~~Contractor should have completed construction work of ----- Nos. of Tubewell / Recharge Tubewell / Piezometer within last five financial years. Certificate of competent authority of work done with detail shall be produced.~~

~~4.5.4. Personnel Capabilities.~~

~~Availability for his work of personnel with adequate experience as required; as per Appendix~~

~~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.~~

~~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 disqualified if they have:~~

~~Made misleading or false presentation 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.~~

~~4.5.10 The bidder who has applied for corporate Debt Restructuring (CDR) / facing recovery proceedings from financial institutions / facing winding up processing / those under BIFR in the last 5 financial year shall be considered for bid qualification. However, if the bank / financial institution has accepted the proposal of debt restructuring on or –~~

~~before the last date of online submission, the same shall be considered for further evaluation. An affidavit by bidder along with certificate from bank must be produced in such cases. In case of Joint Venture agreement, this provision shall be applicable for both lead partner and JV partner.~~

**#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. As per Pre-qualification Criteria refers same documents

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 one year (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 forms, statements and Attachments the submitted in proof the qualification requirements; and / or Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delay in completion, litigation history, or financial failures etc.; and/ or
- Participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

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.

B. BIDDING DOCUMENTS

8. Content of Bidding Documents

- 8.1 These to 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	
6	Form of Bid	
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings	
10	Documents to be furnished by bidder	

- 8.2. Volumes I is 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- I in two parts (refer clause 12).
- 8.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, 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.

~~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 meetings 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 I 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	
9	Drawings	

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.

13.3 All duties, taxes, and other levies except GST payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder. (GST will be paid extra)

13.4 Deleted

13.5 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 Employer 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 maybe 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. Deleted

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 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

- 24.1 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

- 26.1 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.
- 26.2 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.
- 26.3 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. Deleted

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 to 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 up to 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. Deleted

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. | [Cl.1.1] |
| 2. | The last five years.
2025-2026
2024-2025
2023-2024
2022-2023
2021-2022 | |
| 3. | This Annual Financial Turnover Amount is Rs.
..... | [As per Pre-qualification Criteria] |
| 4. | Value of Work is Rs..... | |
| 5. | Deleted | |
| 6. | The cost of electric work is Rs 0 | |
| 7. | The cost of water supply/sanitary works is Rs. | |
| 8. | Liquid assets and/or availability of credit facilities is Rs..... | [Cl.4.5.6] |
| 9. | Price level of the financial year | [As per Pre-qualification Criteria] |
| 10. | The pre-bid meeting will take place at..... | [Cl. 9.2.1] |
| 11. | The technical Bid will be opened at the office of the Superintending Engineer, Ground Water Management Wing, Vadodara on dtat..... PM | |
| 12. | Address of the Employer:..... | |
| 13. | Deleted | |
| 14. | The bid should be submitted latest by
As stated on online NIT | [Cl.20.1&20.2] |
| 15. | The bid will be opened at.....As stated on online NIT | [Cl.23.1] |
| 16. | The Bank Draft in favor of <u>The Executive Engineer, UNIT-1(GWM), VADODARA</u> | |
| 17. | Deleted | |
| 18. | Escalation factors (for the cost of works Executed and financial figure to a common base value) for works completed | [As per Pre-qualification Criteria] |
-
- | <u>Year</u> | <u>Financial Year</u> | <u>Multiplying factor</u> |
|------------------------------|-----------------------|---------------------------|
| 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 |

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

[ReferenceCL.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 15 years)	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 As per Pre-Qualification Criteria refer same document)

#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 Two Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs.
4. Minimum One 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 Deputy Executive Engineer-in-charge of the work the Name, Qualifications, copy of mark sheet, Color 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)

Sr. No	year	Amount (in Rs. Lakhs)
1	2025-26	
2	2024-25	
3	2023-24	
4	2022-23	
5	2021-22	

15.2.1 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	
20-20							
20-20							
20-20							
20-20							
20-20							

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 base year 2025-2026):

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
Etc.				

- 1.7 Proposed sub-contract and firms involved

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

Attach copies of certificates on possession of valid license for executing water supply/ sanitary work/ building electrification works.

- 1.8 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.
- 1.9 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.
- 1.10 Name, address, and telephone, telex, and fax numbers of the Bidders bankers who may provide references if contacted by the Employer.
- 1.11 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 Program

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 are putted 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
Upto 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

SECTION-3
CONDITIONS OF CONTRACT

Conditions of Contract

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GENERAL CONDITIONS OF CONTRACT

- 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 whose 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 turnover 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 sub contract 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. Sub-contracting 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

- 9.1 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.
- 9.2 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 Contractor's 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.

- 13.3 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.
- 13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.
- 13.5 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 program 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, Ground water Management Wing, Vadodara** (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 Ground Water Management Wing, Vadodara**

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 Ground water Management Wing, Vadodara** 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 Ground water Management Wing, Vadodara** both the parties have to refer to the **#Managing Director, Gujarat Water Resource Development Ltd., Gandhinagar , 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

A. TIME CONTROL

27. Program

- 27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Program 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 Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The Contractor shall submit to the Engineer, for approval an updated program at intervals no longer than the period stated in the Contract data. If the Contractor does not submit an updated program 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 program has been submitted.
- 27.4 The Engineer's approval of the program shall not alter the Contractor's obligations. The Contractor may revise the program and submit it to the Engineer again at any time. A revised program 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.

B. QUALITYCONTROL

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....

For works of WRD Except Building

(a) (1) 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)(1) For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 12 months from the certified date of completion. (2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 6 months from the certified date of completion.

(c) (1) For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount more than RS. 10,00,000, the defect liability period shall be 3 Years from the certified date of completion. (2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 10,00,000 to 1 Crore, the defect liability period shall be 12 months from the certified date of completion.

(d) (1) For all WRD works of tender amount more than RS. 1 Crore, the defect liability period shall be 3 Years from the certified date of completion

B. For Building works of WRD: -

For Building works of WRD, Follow the R&B Circular dated.03/12/2009 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.

WRD Circular No. Matas/102013/MICELL(K-1) Dated 13/12/2013

33.2 For Road works:

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 / Deputy Executive Engineer 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 49 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 Executive Engineer 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 50 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 Executive Engineer 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.

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 #1.00% 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. COSTCONTROL

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 programs 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.
- 40.2 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 beforementioned, 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 program is updated, the contractor is to provide the engineer with an updated cash flow forecast.

42. Payment certificates.

- 42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 42.2 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).
- 42.3 The value of work executed shall be determined by the Engineer.
- 42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 42.5 The value of work executed shall include the valuation of variations and compensation events.
- 42.6 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

- 43.1 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.
- 43.2 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.
- 43.3 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

- 44.1 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
- 44.2 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 except 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 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.

- 48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Successfully Completion of operation and maintenance 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.
- 48.3 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

- 49.1 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.
- 49.2 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.
- 49.3 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 Contactor 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.~~

~~51.2 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.~~

~~51.3 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.~~

51.4 Deleted

52. Securities

52.1 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.

54.1 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.

59.2 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 program 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 his 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 representation 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.

59.3 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.

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

60. Payment upon Termination

60.1 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.

- 60.2 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 labor, 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 there under, 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 may be.
 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 or 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 labor 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 up to 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) Act1981
 3. Environmental (Protection)Act1986

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(GCCClause24)

The procedure for arbitration will be as follows: -

- 65.1 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, Ground Water Management Wing, Vadodara** (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, Ground Water Management Wing, Vadodara**

65.2

1. For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer, Ground Water Management Wing, Vadodara** both the parties have to refer to the **#Managing Director, Gujarat Water Resource Development Ltd., Gandhinagar** Gujarat concerned for the conciliation process.
2. For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **Superintending Engineer, Ground Water Management Wing, Vadodara** both parties have to refer to the **#Managing Director, Gujarat Water Resource Development Ltd., Gandhinagar, 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.

SECTION-4
CONTRACT DATA

#CONTRACTDATA

Clause Reference With respect To section 3

Item marked "N/A" do not apply to this Contract.

1. The Employers is [CL.1.1]
Name: Superintending Engineer
Address: Ground Water Management Wing, Vadodara
Name of authorized Representative (will be intimated later)
2. The Engineer is Executive Engineer
Name of Authorized Representative: Unit-1(Ground Water Management) Vadodara
3. The Defects Liability Period is **3 years** 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 [CL.1.1,17&2]
11 Months after start of work with the following milestones:
Milestone dates: [CL.2.2& 49.1]
Physical works to be completed Period from the start date
Milestone 1 i.e. 10 % 27days.
Milestone 2 i.e. 35% 95days.
Milestone 3 i.e. 75% 202days.
Milestone 4 i.e. 100% 270days.
6. The Site is located At. Village- CHOCHALA (Kishori F) Ta-Dahod Di-Dahod [CL.1.1]
7. The name and identification number of the Contract is: [CL.1.1]
8. The works consist Excavation, Pipe Line, Brick work, Concrete, Electric pump [CL.1.1]
B.O.Q. The works shall, inter alia, include the following, as Specified or as directed:

(A)Lift Irrigation Work

1. The bids invited for construction of lift irrigation scheme at village – CHOCHALA (Kishori F) Ta-Dahod Di-Dahod District. It is proposed to construct pump house at Kali River @ village. CHOCHALA
2. The alignment of pipeline passes through private agricultural land for about 7.01 km length. It is also planned to construct to outlet Kundies and other associated works.
3. The major scope of Work includes the following components but not limited to:
 - i. Construction of Outlets, Pump house, M.D.C. Intake well/Jack well/RCC Ovara etc.
 - ii. Providing, lowering, laying, jointing of P.V.C. & M.S. Pipe line.

- iii. Providing, and erecting pumping machinery with accessories.
 - iv. Providing, and Erecting Electrical works and its allied works.
 - v. Formation and Registration of Co-operative society of Beneficiaries.
 - vi. Operation & Maintenance of Lift Irrigation Scheme with Civil, Mechanical and Electrical maintenance
 - vii. Handing over charge of scheme to the Registered Society of farmers and procedure of transfer of electric connection in the name of Registered Society of farmers before completion of O & M period etc.
4. Third party Inspection Agency if required to be engaged for construction work, then cost there of shall be borne by GWRDC Ltd. However, the contractor shall co-ordinate with them and meets the necessary requirements.
 5. The time limit for construction (Renovation)work is 9 months (including monsoon). On completion of construction work the pumping machinery, pipeline, and other remaining components of the project are to be constructed, completed and commissioned within this time limit.
 6. On commissioning of the project Operation and Maintenance period starts immediately. The total period of operation and maintenance is 5 years. Bidders are instructed to refer carefully the scope and technical specification as well as requirements etc. For the operation and maintenance period and quote the bid accordingly.
 7. The contractor shall take all necessary action for obtaining electric connection for the power supply to pump machinery and other installation for this project. The department will only sign necessary documents for obtain power connection from concern electric company and pay the charges/ deposits for electric connection to the electric company.

However, the contractor shall carry out all the activities including commissioning of the project, in such a way that on completion of construction/Repairing activities, the commissioning and operation of the project can be made immediately.

All necessary coordination with the department, local authorities, electric company etc. shall be made by the contractor at no extra cost and no time is spent in want of electric connection.

(B) Other Items

Any Other Items as required to fulfill all contractual obligations as per the Bid documents. [CL.1.1]

10. The following documents also form part of the Contract:

Pre-qualification criteria 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 program 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 90 days. | [CL.27.3] |
| 21. The amount to be withheld for late submission of an updated program shall be Rs 5 lakh | [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 'PVC pipe' (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 labor component

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

$$V_L = 0.85 \times (P_1/100) \times R \times (L_i - L_0)/L_0$$

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

L_0 = 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 Labor Bureau, Ministry of Labor, Government of India

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

P_1 = 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

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

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

C_0 = 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 PVC pipe component

- (iv) Price adjustment for increase in the cost of PVC pipe 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 PVC pipe.

B_0 = The all India wholesale price index for **PVC pipe** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

B_i = The all India average wholesale price index for **PVC Pipe** 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_b =Percentage of PVC pipe 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.

F_0 = The official retail price of High-Speed Diesel (HSD) at the existing consumer pumps of IOC at the nearest center 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 center for the 15th day of the month of the under consideration.

P_f = Percentage of fuel and lubricants component to 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

P_0 = 28 days period to opening bids.

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. Labor-Pl.....	22.00 %
2. Cement - Pc-	4.00 %
3. Steel - Ps-	3.00%
4. PVC pipe-Pb.....	27.00%
5. POL-Pf-	4.00 %
6. Plant and Machinery spares Pp	15.00%
7. Other material.....	25.00%

	Total-100.00%

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 delay in completion of works For Whole of work {CL.49} (1/2000)th of the Initial contract price, rounded off to the nearest Thousand, per day. For sectional Completion (wherever specified In item 5 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 Contract Price rounded off to The nearest thousand {CL. 49}

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~~ 2.5% 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 One bank guarantees of 2.5 % of each valid for the full period.

ii ~~Equipment~~ 50% for new and 25% 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 **Deleted**
Advance for
Non-
perishable
material
Brought to site

(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 before 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 15 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 {CL60} the Employer’s additional cost for completing the Works shall be 20 per cent.

39. Input rate for Cement shall be considered as per CE CG SOR 2021-22: 6562.132 Rs. /MT. according to same cement recovery shall be done.

SECTION-5
TECHNICAL SPECIFICATION

GENERAL SPECIFICATIONS

1. In the specifications “as directed” / “approved” shall be taken to mean “as directed / approved by the Engineer in charge.
2. **Wherever a reference to any Indian Standard appears in the Specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.**
3. In “Mode of Measurement” in the specifications wherever a dispute arises in the absence of specific mention of a particular point of aspect, the provisions on these particular points or aspects in the relevant Indian standards shall be referred to
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits :
 - i) Length, width and depth (height) 0.01 Meter
 - ii) Areas 0.01 Sq. Mtr.
 - iii) Cubic contents. 0.01 Cu.Mtr.In recording dimensions of work, the sequence of length, width and height (depth) or thickness shall be followed.
5. The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specific, it shall mean “all leads”
7. Lift shall be measured from plinth level.
8. Up to “floor two levels” means actual height of floor (Maxi. 4 M) up to 3 Mt. Above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in it specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation containing them tuber of the specification of the material and prefix ‘M’ e.g. M-5
11. Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation what so ever on account of any such materials being rejected by the Engineer in charge.
12. The contract rate of the item of work shall be for the work completed in all aspects.
13. No collection of materials shall be made before it is not approved from the Engineer in charge.
14. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.

15. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
- i. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or over loading of the various components of the structure.
 - ii. All works shall be carried out in a workman like manner as per the best techniques for the particular item.
 - iii. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall kept in sufficient numbers and in good working condition on the site of the work.
 - iv. The mode, procedure and manner of execution shall be such that it does not cause damage or over loading of the various components of the structure during execution or after completion of the structure.
 - v. Special modes of construction not adopted in general Engineering practice if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, found and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer in charge shall not, however absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
 - vi. All installations pertaining to water supply and fixtures there of as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the contractor.
 - vii. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act" and such other laws and rules prescribed by Government from time to time.
 - viii. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure to ensure the safety of men, materials and machinery on the works as also of the work itself.
 - ix. Approval to any of the executed items for the work does not in any relieve the contractor his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

SPECIFICATIONS OF MATERIALS

M-1: Water

Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil and injurious alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in RCC container for transport, storage and handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.

If required by the Engineer-in-charge it shall be tested by comparison with distilled water comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

Water for curing mortar, concrete or masonry should not be too acidic or too alkaline.

It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.

Hard and bitter water shall not be used for curing.

Potable water will generally found suitable for curing mortar or concrete.

M-3: Cement

Cement shall be ordinary Portland slag cement as per I.S. 12269-1976 or Portland slag cement as per I.S. 455-1976.

M-6: Sand

Sand shall be natural sand, clean, well graded, hard strong, durable and gritty, particles free from injurious amounts of dust, clay kanker nodules, soft or flaky particles shale, alkali salts organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 8 percent of silt as determined by field test. If necessary the sand shall be washed to make it clean.

Coarse Sand:

The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0 The Sieve analysis of coarse shall be as under:

I.S. Designation	Sieve passing sieve.	Percentage by weight Designation	I.S. Sieve percentage by weight passing sieve.
4.75 mm	100	600 Micron	30 – 100
2.36 mm	90 - 100	300 Micron	5 – 70
1.18 mm	70 – 100	150 Micron	0 - 50

Fine Sand:

The finance modulus shall not exceed. 1.0 The sieve analysis of fine sand shall be as under.

I.S. Designation	Sieve passing sieve.	Percentage by weight Designation	I.S. Sieve percentage by weight passing sieve.
4.75 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	75-100	150 Micron	0-10

M-11: Cement Mortar

Water: Water shall conform to Specification M-1,

Cement: Cement shall conform to Specifications M-3,

Sand: Sand shall conform to M-6.

Proportion of Mix:

In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out while mixing the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

M - 12: Stone Coarse Aggregate for Nominal mix Concrete

Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved aggregate shall have no deleterious fraction with cement. The size of the coarse aggregate for plain cement and ordinary reinforced cement concrete shall generally be as per the table given below. However: In case of reinforced cement concrete the maximum limit may be restricted to 6 mm less than the minimum lateral clear distance between bars or 6 mm less than the cover whichever is smaller.

TABLE:

I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal Size.			I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal Size.		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.50 mm	-	-	-
63 mm	100	-	-	10 mm	0.50	0.20	0.30
40 mm	85-100	100	-	4.75 mm	-	0.50	0.50
20 mm	0-20	85-100	100	2.35 mm	-	-	-
16 mm	85-100	-	-				

Note: This percentage may be varied somewhat by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests, indicated in I.S. 383-1970 and 456-2000 shall have to be carried out to ensure the acceptability.

The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean.

M-13: Black Trap or Equivalent Hard Stone Coarse

Aggregate for Concrete: Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

The aggregates shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved; Aggregate shall have no deleterious reaction with cement.

The necessary tests indicated in I.S. 383-1970 and I.S. 456-2000 shall have to be carried out to ensure the acceptability of the material.

If aggregate is covered with dust it shall be washed with water to make it clean.

M-14: Brick Bats Aggregate

Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense Bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm. 50 mm. size unless otherwise specified in the item. The under burnt or over burnt brick bats shall not be allowed.

The brick bats shall be measure by volume suitable boxes or as directed.

M-15: Bricks

The Bricks shall be hand or machine molded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and nodules of free lime, they shall have smooth rectangular faces with sharp corners and shall be of uniform color.

The Bricks shall be molded with a frog of 100 mm. x 40mm. and 10mm. to 20mm. deep on one of its flat sides. The Bricks shall not break when thrown on the ground from a height of 600 mm.

The size of modular Bricks shall be 190 mm. x 90 mm. x 90 mm.

The size of the conventional cricks shall be as under:

(9" x 4.3/8" x 2,3/4") 225 x 110 x 75 mm.

Only Bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.

Length + 1/8" (3.0 mm) Width + 1/16" (1.50 mm) Height + 1/16" (1.50 mm)

The crushing strength of the Bricks shall not be less than 35 Kg/Sq. Cm. **The average water absorption shall not be more the specified in the relevant IS code.** Necessary tests for crushing strength and water absorption etc, shall be carried out as per I.S. 3495 (Part-1 to 4) – 1992.

M-16: Stone

The stone shall be of the specified variety such as Granite/Trap Stone/ Quartzite or any other type of good hard stones. The stones shall be only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious veins, patches of loose or soft materials etc., and weathered portions and other structural defects or Imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weigh. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg/Sq. Cm. unless otherwise, specified.

The samples of the stone to be used shall be got approved before the work is started.

The Khanki facing stone shall be dressed by chisel as specified In the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the bushing on the exposed face shall not

project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

M-18: Mild Steel Bars:

Mild steel bars reinforcement for R.C.C. work shall conform to I.S. 432 (Part-II) 1982 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-2000.

All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing.

For the purpose of payment, the bar shall be measured correct up to 10 mm. length and weight payable worked out at the rate specified below:

<u>No</u>	<u>Dia</u>	<u>Weight</u>	<u>No</u>	<u>Dia</u>	<u>Weight</u>
1.	6 mm.	0.22 Kg/Rmt.	8.	20 mm.	2.47 Kg/Rmt.
2.	8 mm.	0.39 Kg/Rmt.	9.	22 mm.	2.98 Kg/Rmt.
3.	10 mm.	0.62 Kg/Rmt.	10.	25 mm.	3.85 Kg/Rmt.
4.	12 mm.	0.89 Kg/Rmt.	11.	28 mm.	4.83 Kg/Rmt.
5.	14 mm.	1.21 Kg/Rmt.	12.	32 mm.	6.31 Kg/Rmt.
6.	16 mm.	1.58 Kg/Rmt.	13.	36 mm.	7.99 Kg/Rmt.
7.	18 mm.	2.00 Kg/Rmt.	14.	40 mm.	9.86 Kg/Rmt.

M-19: High Yield Strength Steel Deformed Bars

High yield strength steel deformed bars shall be either cold twisted other rolled and shall conform to I.S. 1786-2000 and I.S. 1139-1966 respectively.

Other provisions and requirements shall conform to specification no. M-18 for Mild Steel Bars.

M-20: High Tensile Steel Wires

The high tensile wires for use in pre-stressed concrete work shall conform to I.S. 2090-1962.

The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per Para 6-1 of the I.S. 1785-1983. Testing shall be done as per I.S. requirements.

The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any there harmful matter.

Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing

through a pressure box containing Carborundum.

The high tensile wire shall be obtained from manufactures in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled.

M-21: Mild Steel Binding Wire

The mild steel wire shall be of 1.63 mm. or 1.22 mm. (16 to 18 gauge) diameter and shall conform to I.S. 280 – 2006.

The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust. Oil paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-26: Shuttering

The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical bullies properly cross braced together so as to make the centering rigid. In places of bullies props, brick pillar of adequate section built in mud mortar may be used.

The form work shall be sufficiently strong and shall have camber, so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of live load of men working over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall permit leakage of cement grout.

If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work. The complete form work shall be got inspected by and got approved from the Engineer-in-charge, before the reinforcement bars are placed in position.

The props shall consist of bullies having 100 mm. minimum diameters measured at mid length and 80 mm. at thin end shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0 – 10 sq. m. laid on sufficiently hard base.

Double wedges shall further be provided between the sole plate and the wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete.

The timber used in shuttering shall not be so dry as to absorb water from concrete and swell or bulge nor so green or wet as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.

As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes

avoided.

The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.

The shuttering for beams and slabs shall have camber of 4 mm. per meter (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

M-44: Paints

Oil paints

1. Oil paints shall be of the specified colour and as approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved Steiner will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.
2. All the paints shall meet with the following general requirements:
 - i. Paint shall not show excessive setting in a freshly opened full can and shall easily be re-dispersed with a paddle to a smooth homogeneous state. The paint shall show no curdling, leveraging, caking or colour separation and shall be free from lumps and skins.
 - ii. The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.
 - iii. The paint shall not skin within 48 hours in a three quarters filled closed container.
 - iv. The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.
3. Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever.

Enamel paints

1. The enamel paint shall satisfy in general requirements in specification of oil paints, Enamel paint shall conform to I.S 2933-1975.

M-48 Rough Kotah Stone

1. The Kotah stones shall be hard even, sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green Brown coloured shall not be allowed for use They shall be without any soft veins, cranks of flaws.
2. The size of the stones to be used for flooring shall be of size 600 mm x 600 mm and/or size 600 mm. x 450 mm as directed However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified
3. The edges of minus 30 mm on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be + 3 mm
4. The edges of stones shall be truly chiselled and table rubbed with coarse sand before paving. All angles and edges of the stones of shall be true, square and free from chipping and surface shall De true and plain
5. When machine cut edges are specified, the exposed and the edges at joints shall be machine cut The thickness of the exposed machine cut edges shall be uniform

M-51: Marble Slab

Marble slab shall be white or of other and of best quality as approved by the Engineer-in-charge.

Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.

Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slab shall be minimum 460 mm. x 450 mm. and preferably 600 mm. x 600 mm.

However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.

The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen of finished slab to be used shall be deposited by the Contractor in the office for reference.

Except as above the marble slabs shall conform to I.S. 1130-1969.

M-56: Galvanized from pipes and fittings

Galvanized iron pipes shall be of the medium type and or required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and allgalvanized iron fittings shall be of the standard ' R ' or equivalent make

M-62: A. Foot Rests

A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm.x 130 mm. x 20 mm shall be provided with the water closet.

M-69 Nahni Trap

1. Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability The thickness of the base metal shall not be less than 6.5 mm The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability The size of nahni trap shall be specified and shall be of self cleaning design.
2. The Nahni trap shall be of-quality approved by the Engineer-in-charge and shall generally conform to therelevant Indian Standards.
3. The Nahni trap provides shall be with deep seal, minimum 50 mm. except at places where trap with deep seal cannot be accommodated. The cover shall be cast iron perforated cover shall be provided on the trap of appropriate size.

M-75 Crydon Ball valve

Mall valve of screwed type including polythene float and necessary level etc shall be of the size as mentioned in the description of item and shall conform to I.S 1703-1977.

M-78 Barbed Wire

1. The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two line wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed + 0.08 mm
2. The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.
3. The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any

welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.

4. The lengths per 100 Kg. of barbed wire I.S. type I shall be as under:
5. Nominal 1000 meter Minimum 934 meter Maximum 1066 Meter.

DETAILED TECHNICAL SPECIFICATION

ITEM No.: 1 to 6 EXCAVATION WORK

Excavation of pipe line trenches/foundation trenches in the strata including all sort of Soil, Hard Murrum, Soft Rock and Hard Rock depositing the excavated stuff as and where directed up to lead of 50.00 Mt. and below mentioned lift of excavation below average G.L. including refilling, cleaning the site with thin jungle cutting but excluding dewatering if any.

1. Soft soil- up to 1.50 Mt.
2. Hard Murrum - up to 1.50 Mt.
3. Hard Murrum - 1.50 to 3.00 Mt
4. Hard Murrum - 3.00 to 5.00 Mt
5. Soft Rock - up to 1.50 Mt.
6. Soft Rock –3.00 to 5.00 Mt.

1) General

Any soil which generally yields to the application of pickaxes and shovels, phawaras rakes or any such ordinary excavating implement or organic soil, grovel silt, sand turf loam, clay, peat etc., fall under this category.

2) Clearing the site

The site on which the structure is to be built shall be cleared with thin jungle cutting but excluding dewatering, all obstructions like loose stone, materials and rubbish of all kind, bush wood and trees shall be removal as directed. The materials so obtained shall be property of the Government and shall be conveyed and stacked as directed within 50 mt. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

3) 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 labour, materials, etc., required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4) 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 if not specified. The bottom of the excavated area shall be levelled both longitudinally and transversal as directed by removing and watering as required nos. earth filling will be allowed for bringing it to level. If by mistake or any other reason 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. In addition to this, proper shoring and strutting shall be provided in case of deep excavation exceeding 3 meters or so to prevent any local soil instability. IS 3764 (CL NO : 5) shall be referred for the same.

5) Disposal of the excavated stuff

The excavated stuff of the selected type shall be used in refilling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up to 50 m and specified lift.

6) Mode of measurements & payment

The measurement of excavation in trenches / foundation shall be made according to the sections of trenches shown on the drawing or as per instruction 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.

The rate shall be for a unit of one cubic meter.

For such items, payment shall be made for respective strata and lift – as per the approved rate.

ITEM No. :7 P.C.C WORK

Providing and laying hand mixed and un-vibrated plain cement concrete as under of different proportion for foundation laid in situ including temping smooth finishing, curing and lead upto 50 mt. moreover, lift 1.50 mt.etc. completed.

7. P.C.C. 1: 2: 4 of cement sand and kapchi (25 mm & under)

Materials

Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, and Stones aggregate Size as above shall conform to M-12.

Workmanship

General

Before starting concrete the bed of foundation trenches shall be cleared of all loose materials,

levelled, watered and rammed as directed.

Proportion of Mix

For P.C.C. 1: 2: 4 of cement sand and kapchi (25 mm & under)

The proportion of cement, sand and coarse aggregate shall be 1- part of cement, 2- parts of sand and 4- parts of stone aggregates and shall be measured by volume.

For P.C.C. 1: 4: 8 of cement sand and kapchi (20mm to 40 mm)

The proportion of cement, sand and coarse aggregate shall be 1- part of cement, 3- parts of sand and 6- parts of stone aggregates and shall be measured by volume.

Mixing

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of breakdown of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency.

However in such case 10 % more cement than other wise required shall have to be used. Without any extra cost. The mixing in Mechanical Mixture shall be done for a period 1 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

Transporting & placing the concrete:

The concrete shall be handled from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cm to 20 cm.

The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

Curing:

After the final set, the concrete shall be kept continuously wet if required by ponding for a period of not less than 7 days from the date of placement.

Mode of Measurement & Payment:

The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed.

The rate shall be for a unit of one cubic meter.

For such items, Payment shall be made for respective proportion and lift – as per the approved rate.

ITEM No. : 8 T.M.T..BAR

Providing and fixing in position T.M.T.Bar reinforcement or tor steel bars reinforcement as per detail drawing and design including cutting bending and binding in position with binding wires as directed with all leads and lifts etc.complete.

T.M.T.Bar Reinforcement (Fe 415)

Materials

Mild Steel bars shall conform to M-18; Mild steel binding wires shall conform, to M-21.

Workmanship

The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

Reinforcing steel shall conform accurately to the dimensions 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 less than twice the diameter of the round bar and the length of the 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 round 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.

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 concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not 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 be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, pre-cuts mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be

exercised to prevent any displacement of reinforcements in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm in such a manner that they do not slip over each other at the time of fixing and concreting.

As far as possible, bars of full length shall be used, In case this is not possible. Over lapping of bars shall be done as directed. When practicable, over lapping bars shall not touch each other, but be kept apart by 25 mm or 1.25 times the maximum size of 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 tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.

Whenever 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 transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads. Steel for couplings shall conform to Relevant I S

When permitted or specified on the drawings, joints of reinforcement bars shall butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel 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 arc 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 properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814-2004. 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.

Mode of Measurements & Payment

Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place of lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 even though steel is supplied to the contractor by the department on actual weight.

Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement. The rate for reinforcement includes cost of steel & binding wires, it's carting to work site, cutting, bending, placing, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.

The rate shall be for a unit of One Kg.

ITEM No. : 9 R.C.C WORK

Providing and laying in position RCC as under proportion using cement sand and crushed aggregate (25 mm and under) for plinth course, lintels, slabs, beams, columns, chajja, lofts, barrels, etc. including cost of frame work providing and shuttering temping smooth finishing, curing as directed with all leads and lifts etc. complete.

R.C.C. 1:2:4,

General

The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 25 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

The designation ordinary M-10, M-15., M-20, M-25 specified (to be considered on volumetric batching) as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1.5:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively. No component of the Structure (RCC works) shall be made to rest on loose/problematic/made up soil. If required all sorts of necessary Soil Investigation as directed by Engineer in charge shall be carried out before executing Such RCC works. The provisions of Standard Bidding Document (Clause no 34) shall be abided in such cases.

Grade of concrete	Total quantity of dry aggregate by volume per 50 kg. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. Of cement maximum.
1	2	3	4
(1:3:6)	300 Litres	Generally 1:2 for Fine aggregate to coarse	34 Litres
(1:2:4)	220 Litres	aggregate by volume 160 but	32 Litres
(1:1.5:3)	160 Litres	subject to an upper limit of	30 Litres
(1:1:3)	100 Litres	1:1.1/2 and lower limit 1:3	27 Litres

The water cement ratios shall not be more than those specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be increased to overcome the difficulties of placements and compaction so that the water-cement ratio

specified in the table is not exceeded.

Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the mean available.

The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bars or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

Workmanship

Proportioning : Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu.meter. Boxes of suitable size shall be used for measuring sand ,aggregate. The size of boxes (internal) shall be 35 cm x 25 cm and 40 cm deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulk age shall be made.

Mixing :

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. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. 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 shows 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.

When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth water tight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in uniform layer on top of the measured quantity of fine and coarse aggregates which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform color. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

Consistency :

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S.-1199-1939. The slump of 10 mm to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

Inspection :

Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

Centring design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided 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, kapachi or metal pieces shall not be used for this purpose.

Transporting and laying :

The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work 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.

Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position 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.

Except where otherwise agreed to by the Engineer-in-charge, concrete shall be deposited in horizontal layers to compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped in to place from height exceeding 2 meters. When trucking or chutes are used they shall be kept close 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 wet 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.

All concretes shall be compacted to produce a dense homogeneous mass with the assistance of vibrator unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, when vibrators can not be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the space between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

Placing

The concrete shall be deposited as nearly as practicable in its final position to avoid rehandling. The concrete shall be placed and compacted before initial setting of concrete commences and should not be subsequently disturbed. Methods of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement or movement of formwork. As a general guidance, the maximum permissible free fall of concrete may be taken as **1.5 m** as per IS 456:2000. Furthermore, When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation.

Curing :

Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process, It shall be covered with wet sacking Hessian or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the day of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

Sampling and testing of concrete:

Samples from fresh concrete shall be taken as per I. S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I. S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following as per the provisions laid by IS 456:2000:

Quantity of concrete in the work	Nos. of samples	Quantity of concrete in the works	Nos. of samples
1-5 cu.m.	1	16-30 cu.m.	3
6 - 15 cu.m.	2	31-50 cu.m.	4
51 and above	4 \pm one additional for each additional 50 mm. or part thereof		

Note: At least one sample shall be taken from each shift. Six test specimens shall be made from each sample, three for testing at 7 days and the remaining three at 28 days, The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be

suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 Kg /Cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified testing of concrete.

Stripping :

The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix, In normal circumstances (generally where temperatures are above 20.C) and where ordinary concrete is used forms may be struck after expire of periods specified as below for respective item of form work.

- | | | |
|--|-----|---------------|
| 1. Side of walls, columns and vertical face of beams | ... | 16 to 24hours |
| 2. Beam sophist (props. Left under) | ... | 3 days |
| 3. Removal of props. Slabs | | |
| i. Slabs spanning up to 4.50 m | ... | 7 days |
| ii. Slabs spanning over 4.50 m | ... | 14 days |
| 4. Removal of props. Slabs and arches | | |
| i. Slabs spanning up to 6.00 m | ... | 14 days |
| ii. Slabs spanning over 6.00 m | ... | 21 days |

All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25mm. below the surface of the concrete and the resulting holes be filled by cement mortar all fins caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

Mode of measurement & Payment

The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawing or as directed shall not be measured. No deduction shall be made for.

- a. Ends of dissimilar materials such as joints, beams, posts, girders, patters purling trusses, corbels and steps etc. up to 500 Sq.cm. in section.
- b. Opening up to 0.10 Sq.m.

The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.

The rate shall be for a unit of one cubic meter.

For such items, Payment shall be made for respective proportion and lift – as per the approved rate.

ITEM No. 10 to 13 PVC PIPES

Providing, Laying & jointing in standard length ISI Mark rigid un-plasticized PVC pipes suitable for irrigation water with self fit joint incl. Necessary fittings like Tee, Bend, Coupler, Reducer, End cap etc with joining material (Cement Solvent)of following class and diameter as per IS specification No.4985 / 2000 etc. comp. (4 KG / CM2, 6 KG / CM2, 8 KG / CM2, 10 KG / CM2)

P.V.C.pipe :- diameter of 100mm,110 mm, 140 mm,160 mm,180 mm, 200 mm, 250 mm, 280 mm, 315 mm, 355mm,400mm etc.

Materials

The required quantity of U. P. V. C. pipe of required size with PVC specifications shall be supplied by the contractor as per relevant I.S Code .Tolerance criteria in length and size for U.PVC pipe are not

permissible. (I.S. 4985/2000).

The jointing materials such as solvent cement of approved make shall be supplied by the contractor and also cleaning agents such as methyl no chlorides or similar solvent emery cloth cotton waste etc. also shall be brought by the contractor.

The Manufacturer of the U-PVC pipes shall have minimum following requirements.

The manufacturer shall have own testing laboratory.

The manufacturer shall have a combined production capacity of U-PVC and HDPE pipes not less than 25000 M.T. per annum. But the manufacturer registered under small scale industries under The Government of Gujarat shall have a combined production capacity of U-PVC and HDPE pipe not less than 10000 M.T. per annum shall be allowed.

The manufacturer shall have capacity of manufacturing minimum upto 2.50 kg/Cm² pressure pipe and capacity of manufacturing upto 400 mm Dia. Pipes with IS Certification.

The manufacturer shall have own R & D department.

The U-PVC pipes shall be used only of single manufacturer. The manufacturer of the pipes shall provide a "manufacturing testing certificate" for the all the pipes supplied in a legible format to the contractor immediately once the lot of pipes is dispatched. The contractor shall be liable to collect the same from the Manufacturer at his own cost if any such incurred.

The U-PVC fittings of same manufacturer shall be used. If same manufacturer are not manufacturing fittings other branded fittings shall be used with prior approval of Engineer in charge.

All U-PVC pipes shall be supplied duly inspected and tested by CIPET (Central Institute of Plastic Engineering and Technology) or GIRDA (Gujarat Industrial Research and Development Agency). No loose sample for testing shall be allowed.

Authentic copy of document for required criteria shall have to be provided by the Agency to the department. The department or third party agency approved by the department shall be offered for verification of documents, if required. All the expenditure for above inspection shall have to be borne by the Agency. The Agency shall facilitate the department (Engineer in charge) to visit the manufacturing utility for envisaging the manufacturing process of the Pipe line involved in the Project. Such cost of visit and all expenses shall be completely borne by the Agency only.

Scope of contract:

The contract includes supplying and delivering and safe stacking of Un plasticized with PVC pipes confirming to relevant Indian standards along with solvent cement solution.

Standards:

- a) The UPVC Pipes and UPVC Couplers to be manufactured supplied and delivered and used under the scope of contract shall be manufactured in accordance and confirming to I.S. :4985-2000 or its latest revision or amendments. The Pipes only shall be with ISI certification mark.
- b) U-PVC Couplers shall be confirming to IS:4985-2000

- c) Solvent Cement Solution shall be of a good quality.
- d) Laying & jointing shall be done as per IS 7634 (Part-3) : 1975 or its revision.

Marking :-

The methods of marking all the pipes to be delivered at site of work shall ensure that all the information will remain legible even after transportation. Storage in open space etc. in general the legible and indelible marking upon the goods shall indicate the followings.

- i. I S I certification mark on each pipes.
- ii. Manufacturers brand name and / or trade mark.
- iii. The outside diameter and pressure of pipes.
- iv. Any other important matter that the manufacturer of purchaser deems fit to be inscribed.

Technical specification for UPVC Pipes**Supply of Material :-**

The general requirement relating to supply to material and manufacture of UPVC pipes and shall be confirming to the relevant Indian standard specification no. 4985-2000 or its latest revision the pipe shall be with ISI mark.

U-PVC Pipes and couplers shall be confirming to and manufactured as per IS:4985-2000 or with its latest revision or amendments.

The dimensions material compositions test etc. shall be as per IS:4985-2000 or with its latest revision or amendments. Each pipe shall be marked with ISI certification mark.

Testing of Materials

The pipe shall be offered for inspection agency at the manufacture's site/factory. The pipe shall be approved by CIPET (Central Institute of plastics Engineering and Technology) or the third party agency approved by the Executive Engineer. The Executive Engineer shall appoint his representative for testing of material in his presence if required. All the expenditure for testing material & procurement of Manufacturer testing certificate and Lab testing reports is to be borne by contractor. No extra cost of any material,tools and labor's requirement for testing will be given to the contractor.

The material shall be tested as per IS of respective material.

Laying :

Before lowering of P.V.C. pipe in excavated trenches, the trenches shall be inspected and it shall be in proper line and level. If any materials such as kapachi pointed roads, roots of tree etc. shall be removed. As far as possible the trenches shall be excavated in true line. Pipe line should be straight level or as far as possible in gentle gradient and not excavated on borrow pit near road.

The pipes after cleaning shall be jointed outside the trenches by spigot and socket jointing method

and then shall be carefully lowered and freely in proper manner in the trenches. The jointing of P.V.C. pipe line shall be in following manner.

- a) Clean carefully male and female at end of pipes.(spigot and socket)
- b) If the grease, oil etc. is found on the end of pipes shall be removed by well clean cloth.
- c) The solvent cement solution shall be applied after the ends are made rough by emery cloth.
- d) the uniform coat of solvent cement solution shall be smoothly applied with brush other than nylon or synthetic on the outer surface of spigot and inner side of socket.
- e) The spigot ends shall then be immediately inserted in the socket ends by turning the pipe round. So that the solvent cement can be uniformly spreaded.
- f) The jointing work of pipe as described in Para (e) above shall be completed within the period of one minute. Pipe to be laid, shall be stored under cool atmosphere.
- g) the pipe joint shall be exposed generally to atmosphere at 30o C. for five minutes. depending up on temp. For more strength of joints, it shall be not disturbed for 24 hours. At the end of jointing work ,the open pipe shall be protected by plugging. The jointing work of P.V.C. pipe shall not be carried out in a cloudy atmosphere and in rainy season, because it affects the strength of solvent cement and it is possible to have leakage from the same.

Inspection of material:

Inspection of the pipe item shall be carried out by Engineer in charge delegated by the Executive Engineer or the representative agency appointed by G.W.R.D.C. All the expenditure for inspection charges if any in any case of inspection agency appointed by the GWRDC shall be paid by agency and visit certificate if required shall be produced by the Agency from manufacturing company.

Measurement :

The measurement of pipe line works carried out as per specification shall be payable on running meter basis & 10% of value of this item shall be kept in the deposit and same will be refunded within 15 days after satisfactory testing at site without leakage. For such items, Payment shall be made for respective class and diameter – as per the approved rate.

ITEM No. : 14 to 15 R.C.C.PIPES

Providing and Fixing in position R.C.C. pipe of NP2 class as per IS:458-1988 of following diameter with collar including caulking joints in cement mortar (1:1) proportion using jute string soaked in cement slurry and finishing joints and laying pipe to the designed grade and levels including making connections with masonry chambers testing of pipe line as per design condition, curing as directed with all lead and lifts etc. complete.

300 mm, 600 mm NP2 Class pipe

The contractor shall procure certificate from the pipe manufacture regarding the steel provided in the pipes and collars confirming to IS:458-1988 or its revised edition and this certificate is to be

submitted to the sub-division office when the pipes are brought on the site and before starting laying of the pipe line in the trenches. The steel provided in the pipe may be tested by Engineer-in-charge before manufacturing of pipe at pipe factory.

The NP2 class R.C.C. pipe with collar shall be provided as per I.S.S. 458-1988. These pipes when tested to their maximum design hydraulic static pressure head, shall not shown any sign of leakage of breakage or deterioration of any sort.

The pipes shall be tested for dimension workmanship and finish and for hydrostatic test in accordance with I.S. 458-1988. 25 pipes shall be tasted for a lot size 50 and more for dimensional requirements finish and deviation from straight as required vide clauses 7 and 8 of I.S. 458-1988. for hydrostatic pressure, pressure required tests are as per general technical specification of pipes decided by the Engineer-in-charge are to be carried out by competent authority and these tests shall be considered sufficient for accessing quality of pipes. The required pipe shall withstand hydrostatic pressure of 0.7 kg/cm² (7.00 mt. head) as per I.S.S. 458-1988. Without any leakage of joints. The full expenditure for testing shall be borne by the contractor. The tests shall be carried out in presence of the Engineer-in-charge or his authorized agent at the factory or Government approved organization like GERI Laboratories etc. The date of manufacturing shall be already written on the pipe itself before immersion in the water. If test results are not found as per I.S. 458-1988 during the inspection such pipes will be liable to summary rejection by the inspection officer. The reinforcement in the pipes shall confirm to the I.S. Specification No. I.S. 458-1988 class NP2 in all respect. Since it will not be possible by the Corporation to inspect the reinforcement for each and every pipe brought on site, it will be the whole responsibility of the contractor to as certain this from the pipe manufacturers. The contract shall be considered full responsible in this respect , all pipes having reinforcement below the specified limit shown I.S. for NP2 class will be rejected. In general pipes shall be manufactured and tested as per I.S. 458-1988.

Lowering & jointing of R.C.C. Pipes

The R.C.C. pipes shall be lowered properly in the well graded excavated trenches after cleaning the pipes properly. The pipes shall be joined by R.C.C. collar with C.M. in 1:1 proportion by using jute string soaked in cement slurry. The pipe line shall be laid as per instructions of Engineer-in-charge in proper grade.

Curing and Refilling

- 1) Curing of joints shall be done by wet gunny bag and protect the joints from direct sun rays. The joints shall be cured for 14 days.
- 2) After 14 day curing period is over, the trenches shall be filled in two stage. In first stage, the trenches shall be filled up to the top of pipe. This filling shall fully shall be well compacted with earth filling below and around the pipe. In second stage rest of the trenches shall be filled up to

the original ground level and the filling shall be watered and well compacted and no extra payment shall be made for the same.

Hydraulic Test

The pipe line shall be laid in continuity and shall be in small sections for purpose of testing and as directed by the Engineer-in-charge. The contractor shall make his own arrangement for filling the lines with water for testing purpose. The necessary accessories for plugging the ends of the pipes for taking pressure test will be provided by the contractor. The pipe line shall be tested to the pressure of one and half time of the working pressure in the particular sections. Leakage joints if any shall be made good and tests reapplied until no further leakages are noticed. The lines shall be tested in section as specified and shall be subjected to maximum steady pressure. When the required pressures on the gauge the testing pump shall be cut of and the pressure shall be maintained without any drop to the satisfaction of the Engineer-in-charge.

In absence of satisfactory hydraulic test given by the contractor, 10% payment will be withheld from the bill.

The measurement of pipe line works shall be payable on running meter basis of completed in all respect including hydraulic test etc. complete.

For such items, Payment shall be made for respective class and diameter – as per the approved rate

ITEM No. 16 TO 18 M.S.PIPES

Providing and joining ISI marked M.S. pipe of required length with M.S. flange of following dia by necessary cutting and welding work and laying the same in excavated trench of rising main, suction / delivery of pump motor, after laying, the flanged pipes joint with necessary nut bolt of required size by using rubber packing of required thickness, after fitting M.S. pipe. Paints the M.S. pipe with anticorrosive paints etc. comp.(As per IS 3589 – 2001, 4270 – 2001, 1239 – 2004)

M.S. Pipe of 100 mm diameter (5.4mm thick), 125 mm. diameter (5.4mm thick), 150mm diameter (5.4mm thick), 200 mm diameter (6.30 mm thick), 250 mm (7.1 mm thick), 300 mm diameter (7.1 mm thick), 350 mm diameter (8.00 mm thick), 400 mm diameter (8.00 mm thick)

Scope of Work

The item cover for providing, laying & joining M.S. pipe of above diameter for rising main, suction & delivery of pump motor by providing & supplying flanges of required diameter including nut bolts, rubber packing & red oxide to paints the M.S. pipe etc. should be mfg. as per I.S 1239-2004, 3589-2001, & 4270-2001. should be of superior quality. The whole material for the above item to be got approved by the competent authority before the work commence welding of flange at the ends of M.S. pipes of specified length and also welding two pipes at end by providing extra supports. Laying the pipes in excavated trenches after painting with anti corrosive paint & bolting two flanged pipes by using rubber packing sheet as per required grade & position and as per the instruction of

Engineer-in-charge.

The item covers erecting in position the M.S. pipe including cost of supplying pipes, flanges, nut bolts, rubber packing, red oxide including cutting, bending, welding, bolting & painting etc. complete.

Welding of Pipe

During erection pipes are to be welded with welding rods, confirming to I.S. 814-1974 with its latest addition & I.S.I. make welding rod should be Ferro speed M.S. electrodes 4 to 5 mm. diameter, 450 mm. length. All the work performed shall be subjected to inspection. rest of completed work shall have to be given by the contractor as required by the Engineer-in-charge. While testing the corrected and completed work, any defect in workmanship is found, the same should be rectified by the contractor at his own risk and cost. The contractor shall replace, free of cost, any defective workmanship discovered during testing. No extra cost will be given for the purpose. All the joints and connections shall be water tight. The Engineer-in-charge may demand test checking of weld joints, if required. The primary requirement to accept the work is the water tightness of each and every joint. No extra claim for satisfactory completion of the work as per the design requirement will be entertained.

Material

1. M.S. Pipe:

Supply of M. S. Pipe having minimum wall thickness confirming to I. S. 1239 – 2004, 3589-2001, 4270-2001 (or latest revision).

wall thickness : confirming to I.S. with tolerance as per IS

Details of M.S. Pipe (Diameter/Thickness/Relevant I.S. Code)						
Sr. No.	Diameter of Pipe	Outer Diameter	Thickness in mm	Relevant I.S. Code	Fe as per I.S.	Remarks
1	100	115.00	5.40	1239-2004 or Latest version Heavy	330	For Suction-Delivery pipe
2	125	140.80	5.40		330	
3	150	168.30	5.40	3589-2001 or Latest version	410/450	For Rising main Pipe
4	200	219.10	6.30		410/450	
5	250	273.00	7.10		410/450	
6	300	323.90	7.10		410/450	
7	350	355.60	8.00		410/450	
8	400	406.40	8.80		410/450	
9	450	457.00	10.00		410/450	

Length of Pipe: Random length of 4 to 7 meter.

Strength of Steel: FE 410 – FE 450.

Hydraulic Test Pressure: As per IS : 1239 – 2004, 3589-2001, 4270-2001 (or latest revision).

The pipe may be offered for inspection at the manufacture's site if required. The contractor has to take prior approval for the same. All the expenditure for above inspection shall have to be borne by the Agency. The Agency shall facilitate the department (Engineer in charge) to visit the manufacturing utility for envisaging the manufacturing process of the Pipe line involved in the Project if at all required. Such cost of visit and all expenses shall be completely borne by the Agency only.

Weight of Pipes: As specified in the IS : and subject to tolerance as per IS.

Bevelling of Ends: Both the ends should be bevel faced with chamfer of 300 + 50 - 00 perpendiculars to the axis of the pipes as per Para 9.3 of IS 1239 -2004, 3589-2001, 4270-2001 (or latest revision)

Coating : Pipe should be coated with black bitumen paints to external surface as mentioned in IS 1239 – 2004, 3589 : 2001, 4270-2001 (or latest revision)

2. Flanges:

The required Nos. of flanges shall have to be supplied by the contractor. The qty. of flanges is depend upon the actual working condition and as per requirement of specified length of M.S. pipe as desired by Engineer-in-charge. (IS standard).

The mfg. & supplying of M.S. Flanges suitable as per size of pipe, its duly machined as per attached drawing & dimension, manufactured from mild steel confirming to IS 226 materials. The sample of M.S. Flanges of each size is required to be got approved before the work commence.

3. Bolts & Nuts with Washers:

The required material will be supplied by the contractor. The M.S. bolt nut of 3" x 3/4" size of standard material As per I S 1363 Part I & II

4. Rubber Seat:

The required material will be supplied by the contractor & it should be having 1/8" thickness of standard materials.

5. Red oxide:

The required material will supplied by the contractor & it should be standard make & superior quality.

Fabrication & Transportation

All work of fabrication i.e. joining the pipe ends with welding plates and with flange at specified length of pipe shall be performed and completed in a thorough workman like manner, equal to the

best modern practice in fabrication of metal work of the type covered. The work shall be carefully performed to the entire satisfaction of the Engineer-in-charge. The contractor shall ensure that the workmanship by him is free from injuring and defect and shall replace free of cost. And defect in workmanship, fabrication, transportation, handling and strong until final acceptance by the Engineer-in-charge.

Welding

All welding shall be done by electric arc method using a process which will exclude the atmosphere from the molten metal except where otherwise specifically permitted. The welding rods shall be of the heavily coated type designed for all position welding, and the size, type of use, less shall be made in accordance with the Indian standards, only qualified welding operator shall be employed to perform welding, surface to be welded shall be cleaned of rust, paint and other foreign matters where weld metal is deposited in two or more layers, each shall be crushed with brush or otherwise the subsequent layer deposited.

All welding precautions shall be taken to minimize stress due to heat by using the proper sequences in welding by pressing the welds, while hot, or by other satisfactory methods. All the arrangement for welding is to be done by the contractor at his own cost.

Cleaning and Painting

The contractor shall furnish, prepare and supply all materials for cleaning, painting and coating of metal work as per direction of Engineer-in-charge. The cost of furnishing, preparing and supplying red oxide which is required for the work including labour, tools and equipments shall be included in the rate tendered for the complete item.

Erection (Laying)

The reference lines, centre lines, grades and levels having relation of civil structures shall have to be established on site. The contractor so as to facilitate section in proper manner. Erection in the field shall be done by bolting two flanged pipe ends by using the nuts and bolts with washers on both the sides and by using rubber sheet packing in between the flanges. The contractor shall perform this work with greater accuracy to ensure leak proof joints.

All parts shall be accurately assembled and erected in lines and levels as directed by the Engineer-in-charge.

Inspection & Tests

All the work performed shall be subjected to inspection. rest of completed work shall have to be given by the contractor as required by the Engineer-in-charge. While testing the corrected and completed work, any defect in workmanship is found, the same should be rectified by the contractor at his own risk and cost. The contractor shall replace, free of cost, any defective workmanship discovered during testing. No extra cost will be given for the purpose. All the joints and connections shall be water tight. The Engineer-in-charge may demand test checking of weld joints, if required.

The primary requirement to accept the work is the water tightness of each and every joint. All the necessary arrangements for the testing as per the design requirements shall have to be made by the contractor by his own cost. No extra cost of any material, tools and laborers required for the testing will be given to the contractor. No. extra claim for satisfactorily completion of the work as per the design requirement will be entertained.

Measurement & Payment

The measurement of work shall be payable on running meter basis of completion of work in all respect inclusive of hydraulic testing. In absence of satisfactory hydraulic test to be given by the contractor, 10% payment will be withheld from the bill basis as per relevant diameter and class of pipe mentioned.

For such items, Payment shall be made for respective thickness and diameter – as per the approved rate.

Temperature Variations

All the pipes and couplers to be manufactured, supplied and delivered shall be subjected to weather condition like sun, dust, rain, wind as available in State of Gujarat. They shall also be subjected to carry and convey drinking water under variable temperature conditions ranging from 40°C to 45°C.

Mode of Measurement & Payment

The payment shall be made on Rmt. basis as per relevant diameter and class of pipe mentioned

ITEM No. 19 to 22 PROVIDING AND FIXING VALVES.

Providing and fixing ISI mark following class and dia. of different type of valves necessary fittings of standard design and specification including testing with all lead and lifts etc. complete.

Sluice valve as per I.S.: 14846 - 2000

(100 mm diameter/125 mm diameter/ 150 mm diameter/ 200 mm diameter/ 250 mm diameter/ 300 mm diameter/ 350 mm diameter)

General

The contractor shall be covering manufacturing, supplying and delivery of sluice valve conforming to IS 14846 - 2000 or its latest revision (Specification for sluice valve (50 to 1200 mm. sizes) with ISI certification.

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 mentioned above with ISI certification mark on each sluice valves.

Temperature Variation

All sluice valves manufactured, supplied and delivered shall be subjected to drinking water under

variable temperature condition ranging from 4° to 45° C.

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 'o' distinctly and permanently.
- (7) Any other important matter that the manufacturer deems fit to be inscribed embossed.

Test Certificate

The contractor shall always provide manufacture's test certificate (MTC) in accordance with every batch/lot as valves so manufactured and supplied.

Nominal Pressure

Sluice valves shall be designed by nominal pressure(PN) defined as the

- a. maximum permissible gauge working pressure in MPa as "PN-1.6" (MPa=10 kgf/m² approx)
- b. The nominal size shall refer to the nominal bore at any point, shall not be less than the nominal size required.

Material

The materials for the different component parts of the sluice valve shall confirm to requirements given in Table.

Sr. No.	Component	Preferred Material	Ref. to I.S.No.	Grade of designation	Alternative Material	Ref to I.S. No.	Grade or Designation
i)	Body, bonnet, dome, stool cover, wedge stuffing box, gland thrust plate, and cap.	Grey cast iron	210	FG 200	Spheroid or Nodular iron Cast steel	1865 1030	260-300/ 12 or 500 /2
ii)	Hand wheel	Grey cast iron	210	FG 200	Mild steel Cast steel Nodular iron	2062 1030 1865	F 410 WA 230 – 450W 400/12
iii)	Steam	Stainless steel	6603	12Cr 3 04Cr 18Ni 0 04Cr 17 Ni 12 MO 2	High Tensile Brass Stainless steel	320 or 6912 6603	HT 2 FHTB 2 20Cr13
iv)	Wedge nut,	Leaded tin	318	LTB - 2	High Tensile	320	HTB 2

	shoe, channel	bronze			Brass Phosphor bronze	6912 28	FHTB-2
v)	Body seat ring, wedge facing ring and bushes	Leaded tin bronze	318	LTB - 2	Alloy steel	3444	Gr.1 Gr.4 Gr.10 04Cr18Ni10
vi)	Bolts	Carbon steel	1363 (Part I)	Class 4.6	Stainless steel	6603	
vii)	Nuts	Carbon steel	1363 (Part 3)	Class 4.0	Stainless steel	6603	
viii)	Gasket	Compressed fiber Board	638	Type B	Neoprene Rubber		
ix)	Gland packing	Jute & hemp	5414		Rubber	638	Type B

Materials for components parts of sluice valve.

- (1) Specification for grey iron casting (third revision)
- (2) Specification for high tensile brass rods and sections (revised)
- (3) Specification for leaded tin bronze in hot sand casting (revised)
- (4) Specification for technical supply 'condition threaded fasteners (first revision).
- (5) Specification for compressed asbestos fiber jointing (first revision).
- (6) Specification for gland packing, jute and hemp.

Manufacture

Sluice valve bodies for 50 mm to 1200 mm size valves shall be provided with double flanged ends connection or As per Instruction of Engineer In Charge.

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.

Lowering, Laying and Jointing of Valves

Reflux valves, Butterfly valves, Sluice valves and Air valves

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 (Rate for all class of valves)

A. Item No. 19 : Sluice Valve, Butterfly Valves, Scour Valve, Reflux Valve

Cast iron double-flanged sluice valve with two tail pieces suitable to pipe shall be supplied and carted by the Contractor as per latest IS. The rate shall include loading, unloading and stacking at site.

The sluice valve/butterfly valves and tailpieces shall be examined before laying for cracks and other

flows. They shall be undamaged in all respect.

The sluice valves shall be operated before laying.

All grits and foreign materials shall be removed from the inside of the valves before placing.

All the four faces shall be thoroughly cleaned and coated with a thin layer of mineral grease.

The tightening of gland shall be checked with a pair of inside-callipers. Clearance between the top of stuffing box and the underside of the gland shall be uniform all the sides.

Jointing Material:

The Contractor shall provide all necessary jointing materials such as nuts bolts, rubber packing, white zinc, jute, lead, wool etc.

All tools and plant required for installation of sluice valve shall be provided by the Contractor.

All jointing materials shall be got approved from the engineer-in-charge before use.

Mode of Measurement & Payment

The nut and bolts shall conform to Relevant I S Measurement shall be paid on number basis.

B. Item no.20 - Air valve of Single acting - 40 mm dia. / 50 mm / 80 mm /100mm.

Single acting air valve combined with screw down is isolating valve.

All the valves are provided with all of suitable size at the maximum working pressure double acting air valve should be combination of both the small and large orifice valve in single unit with a common connection to the mains for automatically discharging air during pipe filling and ventilating the pipe during emptying.

The bodies pressure cover and splash covers should be finest Grey cast iron carefully machined and jointed for small orifice valve walls should be of rubber. Scrawled inlet nipple off gun mental, large orifice valves have balls of vulcanite closing of rubber sitting. The operating screws should be solid forged bronze with gun mental nuts and cast iron caps. The double air valves is to combine with screw down isolating valve. The size of the valves is indicated with inlet diameter other details of the balls, flange bolts. No. of bolts and working pressure should be as per I.S. 14845 – 2000 Standard specification of the Double Acting Air valve should be approved by the Engineer-in-charge before supplying the materials.

Fixing:

Item included all labour charges for fixing Air valve by drilling necessary hole in R.C.C / P V C /M.S. pipe and making joints watertight and excavation and refilling if required for fixing same on R.C.C. / P.V.C./M.S. pipe. Vertical pipe of required diameter, quality & length for fixing Air valve and same shall be abended in R.C.C. block should also be provided with no extra cost.

Mode of Measurement & Payment

The whole item shall be carried out as per the instructions of Engineer-in-charge. The measurement shall be taken and paid on number basis

B.Item No. 20 : Air valve of double acting - 50 mm.

Providing:

Double acting air valve combined with screw down is isolating valve.

All the valves are provided with all of suitable size at the maximum working pressure double acting air valve should be combination of both the small and large orifice valve in single unit with a common connection to the mains for automatically discharging air during pipe filling and ventilating the pipe during emptying.

The bodies pressure cover and splash covers should be finest Grey cast iron carefully machined and jointed for small orifice valve walls should be of rubber. Scrawled inlet nipple off gun mental, large orifice valves have balls of vulcanite closing of rubber sitting. The operating screws should be solid forged bronze with gun mental nuts and cast iron caps. The double air valves is to combine with screw down isolating valve. The size of the valves is indicated with inlet diameter other details of the balls, flange bolts. No. of bolts and working pressure should be as per I.S. 14845 – 2000 Standard specification of the Double Acting Air valve should be approved by the Engineer-in-charge before supplying the materials.

Fixing :

Item included all labour charges for fixing Air valve by drilling necessary hole in R.C.C / PVC pipe and making joints watertight and excavation and refilling if required for fixing same on R.C.C. / P.V.C./M.S. pipe.

Mode of Measurement & Payment

The whole item shall be carried out as per the instructions of Engineer-in-charge. The measurement shall be taken and paid on number basis.

C. Item no. 21 & 22: Reflux Valve - 125mm.diameter, 200mm.diameter

Best Indian Make cast iron Flanged Reflux valve suitable to prevent back of water to the pump from rising main. Valve should be suitable for hand ling raw usual water having high turbidity Reflux valve should be as per IS:5312 part-1 (latest Edition) and made of close grained C.I.

1	Test Pressure	(1) Body 1.5 MPa (2) Seat 1 MPa (3) Working 1 MPa
2	Cover	It should be made of closet grained T.I. with provision of air release plugs IS-210 FG 200
3	Flanged	Should be drilled as per I.S. 1538
4	Materials for body seal	Leaded tin base, CI IS 210 GP FG 200

Fixing:

Item included lab our charge for fitting of reflux valve with flanged delivery side M.S. pipe of pump motor to control and backward flow of water towards the pump motor side by using necessary rubber packing. Nut, Bolt, Washer etc. as per I.S.

Mode of Measurement & Payment

The whole item shall be carried out as per instruction of Engineer-in-charge, the measurement shall be taken and paid on the number basis.

D. Item no. _____: ~~Pressure release valve with tailpiece—100 mm diameter, 150mm diameter, 200 mm diameter—~~

Best Indian make pressure relief valve satisfying the following requirement.

1. ~~Body~~ : ~~ASTM A16 Gr. W. C. B. (Hydro-Pressure test 35 kg/ cm²)-~~
2. ~~Seat~~ : ~~18 Cr 8 Ni~~
3. ~~Main Valve~~ : ~~18 CV 8 Ni /13 CR.~~
4. ~~Value Spring~~ : ~~S. S. 304~~
5. ~~Gasket~~ : ~~Spiral Wound SS 304 with asbestoses filler~~
6. ~~Cap Bolt / Nat~~ : ~~Carbon Steel~~
7. ~~Piston~~ : ~~18 CR., 8 Ni~~
8. ~~Adjusting Screw Spring & Button~~ : ~~Carbon Steel~~
9. ~~Cap & Spring Housing~~ : ~~C. I. IS 210 CR.~~
10. ~~Max Melt Pressure~~ : ~~17.5 Kg / Cm² at 27°C with reduced pressure 75 % of inlet pressure~~

~~Fixing:~~

~~Item includes labour charges for fitting of pressure relief valve by using necessary rubber packing. Nut, bolt, washer etc. as per I.S. 14150~~

Mode of Measurement & Payment

~~The whole item shall be carried out as per instruction of Engineer-in-charge. The measurement shall be taken and paid on the number basis.~~

ITEM No. 23 G.IPIPE

Providing & Fixing G.I. Pipe 50 mm diameter, (B Class)

The item including providing, supplying & fixing inspection as per instruction of Engineer-in-charge.

Standards

- a) The G. I. Pipes to be manufactured supplied and delivered under the scope of this contract shall be manufactured in accordance and confirming to IS : 1239(Part1)1990 or its latest revision or amendments. The pipes only shall be with ISI certification mark.
- b) For Hot Dip Zinc coating IS: 4736-1986 or its latest revision and IS: 2613 or its latest revision will be applicable.
- c) All screwed tubes shall be supplied with pipe thread confirming to IS: 554-1985 Gauging in accordance with IS: 8999-1979 shall be considered as an adequate test for conformity of threads of IS: 554-1975.

- d) The dimensions , material composition test etc. shall be as per IS: 1236(1) 1989 or its latest edition – Each pipe shall be marked with I.S.I. certification mark.

Temperature Variations

All the pipes and couplers to be manufactured, supplied and delivered shall be subjected to weather condition like sun, dust, rain, wind as available in State of Gujarat. They shall also be subjected to carry and convey drinking water under variable temperature conditions ranging from 40°C to 45°C.

Mode of Measurement & Payment

The payment shall be made on Rmt. basis as per relevant diameter and class of pipe mentioned.

Item No. 24 STEEL PLATFORM

Providing and fabricating and Fixing Steel platforms on R.C.C. jack well of different diameter with walk way and railing around jack well including fabrication, erection work etc.complete.

Size of Platform 4500 mm Dia.

Finished rolled materials shall free from the cracks, flaws, injuries seems, slaps, blisters, ragged and imperfect edges and other defects, It shall have a smooth, uniform finish, and shall be straight, It shall be also be free from loose mill scale rust pits or other defects effects affection its strength and durability.

The acceptance of any materials on inspection at the mill, i.e. rolling mills, foundry or fabricating plant where materials for the work is manufactured, shall not be a bar to its subsequent rejection, if found/defective, Mild steel for bolts and nuts shall confirm to I.S. specification. All work shall be in accordance with the drawings. Care shall be taken that all parts of an assembly for accurately together. All the structural steel members and parts shall have straight edges and bug surfaces. If necessary, they shall be straightened or flattened by pressure unless they are required to be of curvilinear forms. They shall also be free from twist. Pressure applied for straightening or flattening shall be such as would not injure the materials. Adjustment surface or edges shall be in close contact or at uniform distance throughout. All the structural steel parts, where required, shall be sheared, chopped, sawn or flaw not on ground accurately to the required dimensions and shape. All edges of splice and gusset plates 5 mm thick and over shall be machined and those less than 5 mm thick may be sheared and ground.

All the work performed shall be subjected to inspection. rest of completed work shall have to be given by the contractor as required by the Engineer-in-charge. While testing the corrected and completed work, any defect in workmanship is found, the same should be rectified by the contractor at his own risk and cost. The contractor shall replace, free of cost, any defective workmanship discovered during testing. No extra cost will be given for the purpose. All the joints and connections shall be water tight .The Engineer-in-charge may demand test checking of weld joints, if required.

The primary requirement to accept the work is the water tightness of each and every joint. All the

necessary arrangements for the testing as per the design requirements shall have to be made by the contractor by his own cost. No extra cost of any material, tools and laborers required for the testing will be given to the contractor. No. extra claim for satisfactory completion of the work as per the design requirement will be entertained. The platform shall be fabricated to the exact shape and dimensions shown on the detailed drawings. The steel sections shall be bent cold to the required shape by making V-cuts in the horizontal portion at not less than eight place for single will at uniform intervals along length.

The V-cuts shall then be welded together electrically steel cutting edges shall be transported on site and shall be conveyed to the exact location by any means and shall be placed in true position as directed by Engineer-in-charge. After fabrication work of platform, all steel materials used should be painted with anticorrosive paint in two coats.

The necessary pump lowering arrangement shall be made as per drawing and as per instruction of Engineer in charge.

Mode of Measurement & Payment

The measurement shall be paid on basis in Sq.mt. The weight of steel components will be calculated as per I.S. specifications.

Item no: 25 . PUMP HOUSE AND QTR. (TYPE-B)

- **Providing and constructing of different type of Pump Room and quarter: Type B : Size : 3.00 m x 5.00 m**

1. Scope of Work:

Type A : The item is included the work of Excavation, P. C. C., B. B. Masonry, R. C. C., Cement Plaster, Door, Window, Flooring and white or colour wash, road sign board, cupboard, ceramic tiles, sink, light fitting, including sanitary and plumbing work, fencing as per standard design etc. The work shall be carried out as per detail drawing and as per instruction of engineer in charge.

Type B : The item is included the work of Excavation P. C. C., B. B. Masonry, R. C. C., Cement Plaster, Door, Window, Flooring, white or colour wash etc. The work shall be carried out as per detail drawing and as per instruction of engineer in charge.

The work shall be carried out as per drawing and instruction given by Engineer In charge. The Pump house inside size shall be as per drawing.

Mode of Measurement & Payment

Payment shall be made on number basis.

Details items of work shall be carried out as follows:

- **Excavation:** The work shall be carried out as per relevant specification of item
- **P.C.C:** The work shall be carried out as per relevant specification of item.

- **Providing B.B. masonry IInd class using British size Conventional Bricks in cement mortar of prop. (1:6) for foundation plinth and super structure including striking out joints 20mm deep with curing finishing joints and providing scaffolding as directed with all leads and all lifts etc. completed.**

1. For foundation.

a) Materials

Water shall conform to M-1, Cement shall conform to M-3, sand shall conform to M-6, Brick shall conform to M-15, and Cement mortar shall conform to M-11.

b) Workmanship

Proportion:

The proportion of the cement mortar shall be 1: 6 (1 cement : 6 fine sand) by volume.

Wetting of Bricks:

The Bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the Bricks are wetted with water is as indication of through wetting of Bricks.

Laying :

Bricks shall be laid in English bond unless directed otherwise, Half or cut Bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.

A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be property bedded and set home by gently tapping with handle of trowel or wooden mallet. Its side face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course the vertical joints shall be fully filled from the top with mortar.

The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, mason's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

Both the faces of walls of thickness greater than 23 cm shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this in not possible, the work shall be raked back according to bond (and not left toothed) at and angle not steeper than 45 degrees.

All features , pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

Joints :

Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not expose 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

Curing :

Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

Preparation of foundation bed:

If the foundation is to be laid directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry. If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

c) Mode of measurements

The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plans or as directed shall be final. Battered tapered and curved portions shall be measured net.

No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items.

1. Ends of joints, beams, posts, girders, purloins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq. cm.
2. Openings not exceeding 1000 Sq. cm.
3. Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 cm and the bearing does not extend to the full thickness of wall.
4. Drainage holes, and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
5. Iron fixtures, pipes up to 300 mm. diameter, hold fasts, and doors and windows built into masonry and pipes etc. for concealed wiring.
6. Forming chases of section not exceeding 350 Sq. cm. in masonry.

2. For super structure

a) Materials

The relevant specifications of item No.3(A) shall be followed except that masonry work to be carried out above plinth level to floor two level.

b) Workmanship

The relevant specifications of item No.3(A) shall be followed except the masonry work to be carried out above plinth level to two floor level.

The frames of doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames holdfasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frame.

Necessary scaffolding shall be provided. The support of scaffolding shall be sound and strong tied together with horizontal pieces over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this case, scaffolding hole shall rest in hold header horizontal coarse only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding holes.

The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

For the face of brick work where plastering is to be done, joint shall be raked out to a depth not less than thickness of joints. The face of brickwork shall be cleaned and mortar dropping removed on very same day that brick work is laid.

c) Mode of Measurement

The measurements of this item shall be taken for the brick masonry fully completed in super structure. The limiting dimensions not exceeding those shown on the plans or as directed shall be final. Battered tapered and curved portions shall be measured net.

No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items.

1. Ends of joints, beams, posts, girders, purloins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq. cm.
2. Openings not exceeding 1000 Sq. cm.
3. Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 cm and the bearing does not extend to the full thickness of wall.
4. Drainage holes, and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.

5. Iron fixtures, pipes up to 300 mm. diameter, hold fasts, and doors and windows built into masonry and pipes etc. for concealed wiring.
6. Forming chases of section not exceeding 350 Sq. cm. in masonry.

➤ **R. C. C.**

The work shall be carried out as per relevant specification of item reinforced cement concrete: The work shall be carried out as per relevant specification of item.

➤ **M.S.Bar.**

The work shall be carried out as per relevant specification of item Steel Reinforcement: The work shall be carried out as per relevant specification of item.

➤ **Providing plaster of cement and sand in 1:3 proportion including preparing surface providing scaffolding, finishing, curing as directed etc. complete. (25 mm thick & 15 mm thick)**

a) Materials.

Water shall conform to M-1, The cement mortar of proportion 1:3 shall conform to M-11.

b) Workmanship.

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 plaster which shall be independent of the walls.

Preparation of back-ground:

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 retarder 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 retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

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.

For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building from 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.

Application of plaster

The plaster about 15 x 15 cm 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 towelling or over working the float shall be avoided. All corners, arrases, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, arrases junctions etc. shall be carried out with proper templates to be size required.

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.

In suspending the work at the end for 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 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.

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 on the outside of the plaster and keeping them wet.

c) Mode of measurements

The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

Thickness of the plaster shall be exclusive of the 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.

This item includes plastering up to floor two level.

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 corners if any shall be deducted.

So fits of stairs shall be measured as plastering on ceilings. Following soffits shall be measured separately.

For jambs, so fits, sills etc. for openings not exceeding 0.50 sq.mt. each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.50 sq.mt. each in area and for openings exceeding 0.50 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 0.50 sq.mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
- b. Deduction for openings exceeding 0.50 sq.mt. but not exceeding 3.00 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.

For openings having door frames equal to projecting beyond the thickness of wall full deduction for opening shall be made from each plastered face of the wall.

In case of openings of area above 3.00 sq.mt. each deduction shall be made for openings but jambs, soffits sand sills shall be measured.

➤ **Extra over item of plaster for finishing with a floating coat of neat cement slurry.**

a) Materials & workmanship

The relevant specification of item no. 6 shall be followed for materials and workmanship except that this work is only providing smooth cement finish with floating coat of neat cement slurry.

The coat of cement and finesand 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.

In any continuous face of wall the finishing treatment should be carried out continuously

and day to day breaks made to coincide with architectural breaks in order to avoid unsightly junctions.

b) Curing :

All the plaster work shall be kept damp continuously for a period of 7 days.

c) Mode of measurements

The relevant specifications of item of base coat shall be followed for measurements.

- **Providing white or colour washes in three coats including scaffolding, cleaning, surface, etc. complete.**

The Item Shall be Executed As per I S 6278 - 1978

The lime shall be prepared from fresh burnt white stone lime. The lime shall be of approved quality as per IS 712-1984. The lime shall be dissolved in a trough or barrel with a sufficient quantity of water and the whole mass shall be thoroughly mixed and strained through a clean cloth. Clean gum dissolved in hot water shall be then added in the proportion of 2 grams. of gum to a litre of

lime. Sarash for Rico may be used in place if gum is not available. Before white wash is applied on the surface of walls, the walls shall be thoroughly cleaned. Each coat of color or white wash shall be laid on with one coat with a stroke of brush from the top down wards and another from bottom up ward over the first brush before it dries. Totally three coats to be applied. White wash shall not get easily scrubbed or after application of second coat. If color wash is required to be done, approved shaded color tube may be added as per instruction of the Engineer-on-charge. The measurement shall be taken for the exact dimension of drawing etc. complete.

- **Providing and laying I. P. S. flooring of plain cement concrete 40 mm. thick in proportion (1:2:4) using crushed aggregate (20 mm. and under) laid in situ over 120 mm. thick B.B.C.C. (1:5:10) including tamping, smooth finishing, curing, lining as directed with all leads and all lifts etc. completed**

Proportion of brick bats cement concrete (1:5:10) of 120 mm. thick shall be of the 1 part of cement, 5 parts of sand and 10 parts of brick bats by volume. The specification of this item shall be as per item No.5 except the proportion of B.B.C. C.

The specification for providing (1:2:4) R.C.C. 40 mm. thick shall be as per item No. 5 except reinforcement and centering.

Placing of plain cement concrete (1:2:4) shall start after the bottom is well dressed, watered and rammed by rammers. Concrete shall not be allowed to be thrown from top but shall be gently laid in place, Ramming and finishing shall be done till concrete become solid and impact.

The proper slope should be given so that the water may be drained and pool of water may not be collected. The top surface of the flooring shall be finished with C.M. (1:2) while the concrete is in

initial stage of setting suitable square design on another pattern shall be marked over it as directed. The rate includes laying and finishing with square diagonal pattern, watering for 14 days etc. The measurement shall be taken and paid the square meter of flooring. Dimension shall be measured between plastered walls up to two decimals of a meter and areas worked upto two places of a decimals of a square meter. The rate is inclusive of finishing surface in C. M. (1:2) etc. complete.

- **Providing and fixing steel doors with angle 40 x 40 x 6 mm. & 25 x 25 x 4 mm. frame with shutters of 16 gauge as per approved drawings and design with two coats of approved oil paint etc. complete.**

The frame shall be of mild steel standard approved by Engineer-in-charge of work. The frame shall be properly and neatly welded in line and level either by electric welding or by butt flush welding. Necessary chapels, hinge and holdfast shall be properly and neatly welded in true line and level either by electric welding or butt flush welding.

The weight of angle for the frame shall be as per I. S 808-1964 Or It's Latest Version. and not less than 3.50 kg / Rmt. of the section. Hinges shall be 3 Nos. for single shutters and 6 Nos. for double shutters welded to the frame.

a) Shutters:

The steel shutters shall be of 16 gauge mild steel plate fitted with section of size 40 x 40 x 6 mm. or equivalent section. The sheets should be without rust and corrosion. There shall not be any spot and crèches on steel shutters. The doors with shutter shall be manufactured as per detailed drawings and instructions of Engineer-in-charge.

b) Fitting :

The door shall be well fitted with following fixtures and fastening as under :

- | | |
|--------------|--|
| 1. Hold fast | 6 Nos. 150 mm x 40 mm. x 5 mm. |
| 2. Stopper | 1 Nos. 20 cm. |
| 3. Aldrop | 1 Nos. 30 cm. |
| 4. Tadi | 1 Nos. 30 cm. |
| 5. Hinges | 6 Nos. for double shutter & 3 Nos. for single shutters. 10 cm. |
| 6. Handle | 2 Nos. 15 cm. |

c) Painting:

The surface of shutters and frames shall be oil painted with three coats of approved paint. The paint shall be of ISI Mark of approved shade. A prime coat of painting with primer paint shall be applied on the remaining surface before. All I.S. code shall be applied for all materials like M.S. angle, bar, paint etc. The rate includes all cost of materials fabrication and lab our for fixing in position etc. complete.

- **Providing and fixing steel window with angle 40 x 40 x 6 mm. & 25 x 25 x 4 mm. frame with shutters of 16 gauge plate as per approved drawings and design with two coats of approved oil paint etc. complete.**

The specification of frames and shutters shall be as per item No. 9 the window with shutters shall be manufactured as per detailed drawing as per instruction of Engineer-in-charge.

The frames shall be provided with 12 mm. dia. M.S. bars at cm. 10 c/c welded to the frame for window grill purpose.

The window shall be provided with following fixtures and fastening as under

1. Hold fast	4 Nos.	size 150 mm x 40mm x 6 mm
2. Stopper	2 Nos.	size 10 cm.
3. Hinges	4 Nos.	size 10 cm.
4. Hook & stopper	2 Nos.	size 30 cm.
5. Handles	2 Nos.	size 15 cm.

The rate includes all cost of materials, fabrication and labour for fixing in position etc. complete

- **Filling in plinth with sand under floors including consolidating, watering, ramming and dressing etc. complete.**

a) Materials

Sand shall conform to M 6.

b) Workmanship

The relevant specification of material shall be followed except that sand shall be filled in under floors, including watering, ramming, consolidating and dressing etc. complete.

c) Mode of Measurements

The item includes collecting, carting sand with all lead and labour for filling the same in plinth under floors.

- **Providing cement sand vata (10 cm x 10 cm) size quarter around in cement mortar 1:1 prop. Including net cement finishing watering etc. comp.**

a) Material:

- Water shall conform to M-1 Cement mortar shall conform to M-11.

b) Workmanship :

- The work of cement vata of 10 cm x 10 cm size shall be carried out at junction of parapets and terraces, and at distribution tank & kundies as directed. The vata shall be finished in quarter round shape. The work shall be carried out in the best workmanlike manner. The inter portion of rain water pipe shall be rounded off properly during constructing the vata. The work shall be cured for 7 days.

- **Providing and fixing R.C.C. Precast Jali 40 mm. thick for ventilator or of approved quality and design including fixing in position curing finishing as directed. Comp.**

- The precast C.C. jail of approved quality and design 40 mm thick shall be provided as directed by Engineer –in-charge. The jail should be fixed over proper backing of cement mortar after fixing the jail. The finishing to joints shall be done with cement mortar (1:3) without any extra cost.
- **Providing and fixing 45 cm x 30 cm x 2.5 cm thick year plate of Marble stone set in cement mortar 1:1 including finishing and engraving letter etc. complete.**
 - Marble plate shall be white and of approved quality and shall be of size as mentioned in the item Confirming As per I S 1130 – 1969 Lettering shall be done-by U - shape engraving and shall be filled with black paint of approved quality. Lettering shall be done as directed by the Engineer-in-charge. The marble plate shall be fixed in neat cement at a place as directed by the Engineer-in-charge. Cement shall confirm to relevant IS Specification.
 - The letter B.B. of (Border) as directly by the Engineer-in-charge shall be carved on the face of the boundary stone & letter shall be painted with black Japan.
- **Supplying & fixing Road Sign Board of M. S. Plate and angles iron including painting Lettering etc. complete. Including fixing in CC (1:4:8) with necessary excavation etc. comp. As per IRC Type design (Non Reflective type)**
 - The size of the board shall be 110 cm in length & 60 cm in height. It shall be prepared form M. S. Plate of 6 mm thickness. The angle iron post shall be of 75 mm x 75mm and 6 mm thick Confirming as per I S 808. The length of iron post shall be 2.1 meters. The post shall be fixed to the board by welding. The Welding shall be true and strong and neat in appearance.
 - The board shall be fixed in C. C. 1:4:8 concrete. The concrete block for each post shall be 30 cm x 30 cm in size. The depth of the concrete block shall be 85 cm of which 60 cm will be below ground and 25 cm above ground level. The exposed concrete block. i.e. its portion above ground level shall be neatly finished and its shape should be truly square.
 - The post shall be painted with two coats of paint, alternatively in black & white strips 23 cms in height after applying one coat of anticorrosive paint. The paint shall be of approved quality. The board shall be painted with colour as directed by Engineer-in-charge. The information as per instruction of Engineer-in-charge shall be written on board with letters & signs is accordance with I.R.C. The information may be one or more three script. viz. Hindi, English & Gujarati.
 - The board shall be fixed truly vertical & workmanship of the board shall be neat, clean & good in appearance.
 - The item includes all material, labour, tools, welding, concreting, painting, lettering etc.
- **SOLAR STREET LIGHTING SYSTEM**
 - A stand alone solar photovoltaic street lighting system (SLS) is an outdoor lighting unit used for illuminating a street or an open area. The solar street lighting system consists of solar photovoltaic (SPV) module, a luminary, storage battery, control electronics, inter-connecting wires/cables, module mounting pole including hardware and battery box. The luminary is based

on compact fluorescent lamp (CFL) which emits light when electric current passes through it. The luminary is mounted on the pole at a suitable angle to maximize illumination on the ground. The PV module is placed at the top of the pole at an angle facing south so that it receives solar radiation throughout the day, without any shadow falling on it. A battery is placed in a box attached to the pole.

- Electricity generated by the PV module charges the battery during the day time which powers the luminary from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

BROAD PERFORMANCE SPECIFICATIONS

PV Module	74 Wp under STC
Battery	Lead acid Tubular Flooded or tubular GEL / VRLA, 12V- 75 AH C/10
Light source	Compact fluorescent lamp of 11 watt
Mounting	Minimum 5.50 meter pole mounted
Electronics efficiency	Minimum 85% Total
Inverter	Quasi sine wave or sine wave type
Duty cycle	Dusk to dawn
Autonomy	3 days or minimum 42 operating hours per permissible discharge

TECHNICAL DETAILS

PV MODULE

- i. Indigenously manufactured PV module should be used.
- ii. The PV module should have crystalline silicon solar cells and must have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited laboratory.
- iii. The power output of the module (s) under STC should be a minimum of 74 WP at a load voltage* of 16.4 ± 0.2 V. Either two modules of minimum 37 WP output each or one module of 74 WP output should be used.
- iv. The open circuit voltage* of the PV module under STC should be at least 21.0 Volts.
- v. The module efficiency should not be less than 14%
- vi. The terminal box on the module should have a provision for opening it for replacing the cable, if required.
- vii. A distinctive serial number starting with NSM will be engraved on the frame of the module or screen printed on the tedlar sheet of the module.

*The load voltage and voc conditions of the PV modules are not applicable for the system having MPPT based charge controller.

BATTERY

- i. Lead Acid, tubular positive plate flooded electrolyte or Gel / VRLA type.
- ii. The battery will have a minimum rating of 12V, 75 Ah at C/10 discharge rate.
- iii. 75% of the rated capacity of the battery should be between fully charged and load cut off conditions.

- iv. Battery should conform to the latest BIS/ International standards.

LIGHT SOURCE

- i. The lamp should be 11 Watt compact fluorescent lamp (CFL) with 4 pins along with proper pre-heating circuit.
- ii. The lamp should be housed in an assembly suitable for outdoor use, with a reflector on its back. No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles – two minutes ON followed by four minutes OFF is one cycle.

ELECTRONICS

- i. The total electronic efficiency should be at least 85%
- ii. The inverter should be of quasi sine wave/ sine wave type, with frequency in the range of 20 – 30 KHz
- iii. Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
- iv. No load current should be less than 20 mA.
- v. The PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.
- vi. The PCB containing the electronics should be capable of solder free installation and replacement.
- vii. Necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided.

ELECTRONIC PROTECTIONS

- i. Adequate protection is to be incorporated under “No Load” conditions e.g. when the lamp is removed and the system is switched ON.
- ii. The system should have protection against battery overcharges and deep discharge conditions.
- iii. Fuse should be provided to protect against short circuit conditions.
- iv. Protection for reverse flow of current through the PV module (s) should be provided.
- v. Electronics should have temperature compensation for proper charging of the battery throughout the year.
- vi. Adequate protection should be provided against battery reverse polarity.
- vii. Load reconnect should be provided at 80% of the battery capacity status.

MECHANICAL COMPONENTS

- i. A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.
- ii. The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that the module can be oriented at the specified tilt angle.
- iii. The pole should be made of Galvanized iron (GI) pipe.

- iv. The height of the pole should be 4 meters above the ground level, after grouting and final installation.
- v. The pole should have the provision to hold the luminaries.
- vi. The lamp housing should be water proof and should be painted with a corrosion resistant paint.
- vii. A vented acid proof and corrosion resistant metallic box with a locking arrangement for outdoor use should be provided for housing the battery.

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery "Load Cut Off" condition.

QUALITY AND WARRANTY

- i. All the components and parts used in the solar street lighting systems should conform to the latest BIS or IEC specifications, wherever such specifications are available and applicable.
- ii. The street lighting system including the battery will be warranted for a period of five years from the date of supply.
- iii. The PV modules (S) will be warranted for a minimum period of 25 years from the date of supply. The PV modules must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.
- iv. The warranty card to be supplied with the system must contain the details of the system.

OPERATION AND MAINTENANCE MANUAL

An operation instruction and maintenance manual, in English and the local language, should be provided with the solar street lighting system. The following minimum details must be provided in the manual:

- Basic principles of photovoltaic
- A small write-up (with a block diagram) on solar street lighting system its component, PV module, battery, electronics and lamina tire and expected performance.
- Type, model number, voltage & capacity of the battery, used in the system.
- The make and wattage of the CFL used in the lighting system.
- About charging and significance of indicators.
- Clear instructions about erection of pole and mounting of PV module (s) and lamp housing assembly on the pole.
- Clear instructions of regular maintenance and trouble shooting of the solar street lighting system.
- DO's and DON'T's.

- Name and address of the contact person for repair and maintenance, in case of non-functionality of the solar street lighting system.

➤ **Room wiring confirming IS 694 for PVC insulated copper wire 2.50 Sq.mm with standard accessories like PVC pipe,Switches,plug,saddle etc.complete.**

Details of Items In Room Wiring Kit

SR NO	Description
1	2.5 sq mm P V C insulated Copper Wire ISI IS 694
2	Rigid PVC Pipe of 19 mm diameter having thickness 12 mm & 3 min Length
3	Rigid PVC Bend 19 mm diameter
4	Rigid PVC elbow 19 mm diameter
5	Rigid PVC Tee 19 mm diameter
6	Rigid P V C 4 Way Junction Box
7	Polished Wooden Plain Board Of Teak wood Size 18"x6"x1 1/4"
8	Polished Wooden Plain Board Of Teak wood Size 16"x6"x1 1/4"
9	Polished Wooden Teak wood Round 3 1/2" dia x 1 1/2" thick
10	Polished Wooden Board of Teak wood with Black / White Bakelite sheet groove for 4 piano switches and one five pin socket size of 8"x4"x1 1/2"
11	Polished Wooden Board of Teak wood with Black / White Bakelite sheet groove for 3 piano switches and one five pin socket size of 7"x4"x1 1/2"
12	Roll Plug No 8 Grip make
13	6 Amp 240 Volts Piano type One Way Switch
14	6 Amp 240 Volts Piano type 5 pin Socket (2 in 1)
15	Swan Holder (Angle Holder)
16	32 AMP 240 Volts double pole surface switch with neon indicator
17	G I Wire 18 gauge
18	G I Base Saddle 19mm diameter
19	Justy Bolt Nuts 2"x1/4"
20	Justy Bolt Nuts 1"x1/4"
21	Justy Khila 1 1/2" Long
22	Justy Khila 3" Long
23	Hexagonal Pin with Nut & Washer 2"x5/16"
24	Water proof Bucket fitting suitable for 40-watt Lamp
25	Nettle fold Screw of following Size <ul style="list-style-type: none"> a) 12mm x 5mm b) 20mm x 5mm c) 30 mm x 7 mm

d) 35 mm x 8mm

e) 60mm x 8 mm

26 P V C Tape roll Steel grip Bhore Make 19 cm x10 m

All above Item should be packed in proper new card board paper box except item no -2 (P V C Pipe)

The Item in complete room wiring kit should be Supplied for as per details with ref no size / Rating make quality.

The All Items/ materials should be good quality.

C F L Light

5 / 7 / 9 / 11 watt.
13/15/18 watt.
20/23/25/26 watt.

i. The lamp should be 11 Watt compact fluorescent lamp (CFL) with 4 pins along with proper pre-heating circuit.

ii. The lamp should be housed in an assembly suitable for outdoor use, with a reflector on its back.

No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles – two minutes ON followed by four minutes OFF is one cycle.

Ceiling Fan

Ceiling fan including their suspension shall confirm to I S 374-1960 specification for electric ceiling fans and regulators (Revised)& to the following Requirement.

- A. All ceiling fan shall be wired to ceiling roses or to special connector boxes to which fan rod wires shall be connected & Suspended from hooks or shakels with insulators between hooks & suspensions rods there shall be no joints in the suspensions rod but if joints be avoidable then such joints shall be screwed to special coupler of 5 cm minimum length & both ends of pipes shall touch together within couplers and shall in addition be secured by means of spilt pins alternately the two pipes may be welded.
- B. Fans clamps shall be suitable design according to the nature of construction of ceiling on which these clamps are fitted in all cases fan clamps shall be fabricated from tested new metal of suitable size & they shall be as close fitting as possible fan clamps for reinforced concrete roots shall be buried with the casting and due care shall be taken that they shall serve the purpose , fan clamps for wood beam shall be of suitable flat iron fixed on two sides of the beam and according to the size & Section of the beam one or two mild steel bolts passing through the beam shall hold both flat irpns to geather fan clamps for steel joints shall be fabricated from tested flat iron to fit in rigidity to the bottom flange of the beam care shall be taken during fabrication that the metal does

not crack while hammering to shape other fan clamps shall be made to suit the position, but in all cases care shall be taken to see that they are rigid & safe.

Note. : All fan clamps shall be so fabricated that fans revolve steadily

- C. Canopies on top & Bottom of suspension rod shall effectively hide suspensions & connection to fan motors , respectively .
- D. The lead, in , wire shall be of nominal cross ,sectional area not less than 1.0 mm² with copper and 1.5 mm² with aluminum& shall be protected from abrasion
- E. Unless otherwise specified, the clear distance between the ceiling fan & the floor shall be less than 2.75 m

Materials and workmanship shall comply with the relevant India Standard (With amendments) current on the date of submission of the tender. All the substitute items included in this item shall be carried out as per drawing. No extra payment shall be made for any extra work. The addition or alteration if any in this item shall be approved by Engineer in charge.

Item no: 26 DIFFERENT TYPES OF MAIN DELIVERY CHAMBER. (TYPE- B)

1. **Providing and constructing different type of Main Delivery Chamber: Type A : size : 2.70m x 2.20 m x 1.50 m/ Type B : 2.70m x 2.20 m x 2.0 m/ Type C : 2.70m x 2.20 m x 2.50 m/ Type D : 2.70m x 2.20 m x 3.00 m/ Type E : 2.70m x 2.20 m x 3.50 m/ Type F : 2.70m x 2.20 m x 4.00 m/ Type G : 2.70m x 2.20 m x 5.00 m**

2. Scope of Work:

The item is included the work of Excavation, P. C. C., B. B. Masonry, R. C. C., Cement Plaster, and white or colour wash, m.s. bar ,earth work, U-Step, G.I.Pipe, M.S.Pipe Air valve, as per standard design etc. The work shall be carried out as per detail drawing and as per instruction of engineer in charge.

Mode of Measurement & Payment

Payment shall be made on number basis.

Details items of work shall be carried out as follows:

- **Excavation:** The work shall be carried out as per relevant specification of item
- **P.C.C:** The work shall be carried out as per relevant specification of item.
- **B.B. Masonry:** The work shall be carried out as per relevant specification of item.
- **R.C.C:** The work shall be carried out as per relevant specification of item.
- **M.S.Bar:** The work shall be carried out as per relevant specification of item.
- **Plaster:** The work shall be carried out as per relevant specification of item.
- **Floating Coat:** The work shall be carried out as per relevant specification of item.

- **Earthwork form borrow pits:** The work shall be carried out as per relevant specification of item
- **U-Step:** The work shall be carried out as per relevant specification of item.
- **Providing & Fixing G.I. Pipe 50 mm diameter, 80 mm diameter, (B Class)**

The item including providing, supplying & fixing inspection as per instruction of Engineer-in-charge.

Standards

- e) The G. I. Pipes to be manufactured supplied and delivered under the scope of this contract shall be manufactured in accordance and confirming to IS : 1239(Part1)1990 or its latest revision or amendments. The pipes only shall be with ISI certification mark.
- f) For Hot Dip Zinc coating IS: 4736-1986 or its latest revision and IS: 2613 or its latest revision will be applicable.
- g) All screwed tubes shall be supplied with pipe thread confirming to IS: 554-1985 Gauging in accordance with IS: 8999-1979 shall be considered as an adequate test for conformity of threads of IS: 554-1975.
- h) The dimensions , material composition test etc. shall be as per IS: 1236(1) 1989 or its latest edition – Each pipe shall be marked with I.S.I. certification mark.

Temperature Variations

All the pipes and couplers to be manufactured, supplied and delivered shall be subjected to weather condition like sun, dust, rain, wind as available in State of Gujarat. They shall also be subjected to carry and convey drinking water under variable temperature conditions ranging from 40°C to 45°C.

Mode of Measurement & Payment

The relevant specifications of item of base coat shall be followed for measurements.

- **Valve :** The work shall be carried out as per relevant specification of item.

Item No. 27 STRUCTURAL STEEL WORK

Providing & fixing M.S. channel section/Angle section (medium weight) including fabricating, applying two coats of oil paint over one coat of anti corrosive paints with fixing over wall of pump room / RCC pillar etc. comp. (Structural work for pump lowering arrangement.).

a).Materials:

1. The structural steel section as specified or required shall be cut, square and correct length as per requirement. The steel section shall be confirming to IS 808-1977. for dimension.
2. The steel section shall be finished rolled materials, shall be new, unused free from cracks, flaws, injuries, seems, slaps, busters, ragged and imperfect edges and other defects. It shall

have a smooth, uniform finish and shall be straight. It shall also be free from loose mill scale rust pits or other defects affecting its strength and durability.

3. The dimensional and weight tolerances for rolled shapes shall be in accordance with ARE: 1859 for indigenous steel and equivalent applicable codes for imported steel.

PAINTING OF STEEL WORK:

a)Materials:

4. Red Oxide – Zinc chrome primer shall confirm to IS- 2074.
5. Synthetic enamel paint shall confirming to IS-2932
6. All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the Engineer in charge for the brand of manufacture and the colour/shade. All the materials shall be brought to the site in sealed containers.

b)Workmanship:

7. Painting work shall be carried out only on thoroughly dry surfaces. Painting shall be applied either by brushing or by spraying. The workmanship shall generally conforming to the requirement of IS 1477 (Part-2). The channel section shall be fixed in accurate level, line in R.C.C. wall of Intake structure as per instruction of Engineer in charge.
8. No materials shall be painted or dispatched to site without inspection and approval by the Engineer in charge unless such inspection is waived in writing by the Engineer in charge.
9. The contractor shall provide all the testing and inspection services and facilities for shop work except where otherwise specified.

d)Measurement

11. The measurement of this item shall be taken on K.G. basis.

Item No. 28 DEWATERING

Dewatering by pumping set of required capacity, temporary platform, carting pumping at site and fixing the same position including all accessories and fuel and labour etc. comp. (5.00 H.P.Engine x 40hr = 200 HP-hr)

Where water is met in excavation due to stream flow, seepage, springs, races or other reasons, the contractor shall take adequate measures such as bailing pumping, to keep foundation trenches dry when so required and to protect the green concrete / masonry against damage by erosion or sudden rising of water level. The methods to be adopted in this regard and other details thereof shall be to the choice of the contractors but subject to approval of the Engineer-in-charge. Approval of the Engineer-in-charge shall, however not relieve the contractor of the responsibility for the adequacy of dewatering and production arrangement and for the quality and safety of the works.

- c) Pumping from the interior of any foundation enclosure shall be done in such manner as to preclude the possibility of movement of water through any fresh concrete. No. pumping shall be permitted during the placing of concrete or for any period of at least 24 hours thereafter, unless it is done a suitable sump separated from the concrete work by a water tight wall or other similar means.

Mode of Measurement & Payment

- d) The payment shall be made on engine H.P. - hrs of running for dewatering.

ITEM No. 29 WELDED MESH JALI

Providing and fixing 10 mm dia. M.S. bars welded mesh (Jali) for cover over outlet pipe one coat anticorrosive, oil painting three coats as directed etc. complete.

- e) The required size of jali shall be provided of 10 mm dia. M.S. bars and fixed as per the drawing & instruction of Engineer-in-charge. Jali is to be properly fixed by keeping the sighted platform for jali with B. B. masonry and plaster, three coats of if painting including one coat of anti-corrosive shall be applied of approved quality.
- f) The measurement shall be paid for one complete item on Sq. meter. basis.

ITEM No. 30 U STEP

Providing & fixing 'U' steps fabricated out of 16 mm dia. M.S. bar as per drawing & design including applying two coats of oil paint over one coat of anti corrosive paints etc. comp.

a) Materials:

- g) 16 mm.dia mild steel bars shall conform to M-18.

b) Workmanship:

- h) The work shall consist of furnishing and placing bar to the shape and dimension shown as on the drawings or as directed.
- i) The relevant specification for steel cutting & bending as per item No.4 shall be followed. The M.S.bar of 16 mm. diameter shall be bent in 'U' shape with 0.40 x 0.20 x 0.40 m size with necessary cover on both the sides. The 'U' shape of bar shall be fixed in the masonry wall of intake wall or distribution tank at 0.45 m spacing from bottom to top in zigzag manner between each step. The ends shall be completely embedded in the wall so that it can take the load.
- j) The 'U' step bar shall be fixed with special care and exercised to prevent any displacement in the position of each step.
- k) The 'U' step bar shall be provided with applying two coats of synthetic enamel oil paint over one coat of red oxide primer or anti corrosive paint of the best quality from an approved manufacturer.

c) Measurement:

- l) The measurement shall be taken as per no basis.

Item No. 31 TO 32 M.S.BEND

Supplying & Fixing Portion submerged arc M.S.Railway bend outside coated with best quality bituminous paint having be welled ends pates coil confirming to Is 3589/2001 or its latest version/amendments for following Dia.

M.S. Bend (Short/Long)of 125 mm dia 150 mm. dia., 200 mm. dia. 250 mm dia.300 mm dia

a) Scope of Work :

- m) The item cover for laying & joining M.S. Bend of above diameter for rising main, suction & delivery of pump motor by providing & supplying flanges of require diameter nut bolts, rubber packing & red oxide to paints the M. S. Bend etc. should be mfg. as I.S. & superior quality. The whole material for the above item to be got approved by the competent authority before the work commence welding of flange at the ends of M.S. Bends of specified length and also welding two pipes at end by providing extra supports. Laying the Bends in excavated trenches after painting with anti corrosive paint & bolting two flanged pipes by using rubber packing sheet on grade & position as per the instruction of Engineer-in-charge.
- n) The item covers erection in position the M.S. Bend including cost of supplying flanges, nut bolts, rubber packing red oxide including cutting, bending, welding, bolting & painting etc, complete.

b) Welding of Pipe:

- o) During erection Bends are to be welded with welding rods, confirming to I.S. 814-1947 with its latest addition & I.S.I. make welding rod should be Ferro speed M.S. electrodes 4.00 mm. diameter 450 mm. length.

c) Material

d) Material

- M.S. Bend: - The required M.S. Bend will be arranged by the contractor .
- Flanges :- The required Nos. of flanges will be supplied by the contractor. The qty... of flanges is depend upon the work of nature & the flange at the ends of M.S. Bends of specified length desired by Engineer-in-charge.
 - The mfg. & supplying of M.S. Flanges suitable as per size of Bend, its duly machined as per attached drawing & dimensions, manufactured from mild steel confirming to IS 226 materials. The sample of M.S. Flanges of each size is required to be got approved before the work commence.
- Bolts & Nuts with Washers: - The required material will be supplied by the contractor. The M.S. bolt nut of 3" x ¾" size of standard materials.
- Rubber Seat: - The required material will be supplied by the contractors & it should be having 1/8" thickness of standard material.
- Red oxide: - The required material will be supplied by the contractor & it should be standard make & superior quality.

e) Fabrication and Transportation

- p) All work of fabrication i.e. joining the Bend ends with welding plates and with flange at specified length of Bend shall be performed and completed in a thorough workman like manner. Equal to the best modern practice in fabrication of metal work of the type covered. The work shall be carefully performed to the entire satisfaction of the Engineer-in-charge. The contractor shall ensure that the workmanship by his is free from injury and defect and shall replace free of cost. And defect in workmanship, fabrication, transportation, handling and storage until final acceptance by the Engineer-in-charge.

f) Welding

- q) All welding shall be done by electric arc method using a process which will exclude the atmosphere from the molten metal except where otherwise specifically permitted. The welding rods shall be of the heavily coated type designed for all position welding, and the size, type of use shall be made in accordance with the Indian standards, only qualified welding operator shall be employed to perform welding, surface to be welded shall be cleaned of rust, paint and other foreign matters where weld metal has been deposited in two or more layers, each shall be brushed with brush or otherwise cleaned before the subsequent layer is deposited.
- r) All welding precautions shall be taken to minimize stress due to heat by using the proper sequences in welding by preheating the welds, while hot, or by other satisfactory methods. All the arrangement for welding is to be done by the contractor at his own cost.

g) Cleaning and Painting

- s) The contractor shall furnish, prepare and supply all materials for cleaning, painting and coating of metal work as per direction Engineer-in-charge. The cost for furnishing, preparing and supplying black bitumen painting which are required for the work including labour, tools and equipments shall be included in the rate tendered for the complete item.

h) Erection (Laying)

- t) The reference lines, centre lines, grades and levels having relation of civil structures shall have to be established on site. The contractor so as to facilitate section in proper manner.
- u) Erection in the field shall be done by bolting two flanged pipe ends by using the nuts and bolts with washers on both the sides and by using rubber sheet packing in between the flanges. The contractor shall perform these work with greater accuracy to ensure leak proof joints.
- v) All parts shall be accurately assembled and erected in lines and levels as directed by the Engineer-in-charge.

i) Inspection & Tests:

- w) All the work performed shall be subjected to inspection. Rest of completed work shall have to be given by the contractor as required by the Engineer-in-charge. While testing the corrected and completed work, any defect in workmanship is found, the same should be rectified by the contractor

at his own risk and cost. The contractor shall replace, free of cost, any defective workmanship discovered during testing. No. extra cost will be given for the purpose. All the joints and connections shall be water tight.

- x) The Engineer-in-charge may demand test checking of weld joints.

The primary requirement to accept the work is the water tightness of each and every joint. All the necessary arrangements for the testing as per the design requirements shall have to be made by the contractor by his own cost. No extra cost of any material, tools and labourers required for the testing will be given to the contractor. No extra claim for satisfactory completion of the work as per the design requirement will be entertained.

j) Measurement & Payment

- y) The measurement of works shall be payable on No basis of completion of work in all respect.

- M.S. Bend: - The required M.S. Bend will be supplied by the Contractor
- Flanges :- The required Nos. of flanges will be supplied by the contractor. The qty.. of flanges is depend upon the work of nature & the flange at the ends of M.S. Bends of specified length desired by Engineer-in-charge.
 - The mfg. & supplying of M.S. Flanges suitable as per size of Bend, its duly machined as per attached drawing & dimensions, manufactured from mild steel confirming to IS 226 materials. The sample of M.S. Flanges of each size is required to be got approved before the work commence.
- Bolts & Nuts with Washers: - The required material will be supplied by the contractor. The M.S. bolt nut of 3" x ¾" size of standard materials.
- Rubber Seat: - The required material will be supplied by the contractors & it should be having 1/8" thickness of standard material.
- Red oxide: - The required material will be supplied by the contractor & it should be standard make & superior quality.

k) Fabrication and Transportation

- z) All work of fabrication i.e. joining the Bend ends with welding plates and with flange at specified length of Bend shall be performed and completed in a thorough workman lime manner. Equal to the best modern practice in fabrication of metal work of the type covered. The work shall be carefully performed to the entire satisfaction of the Engineer-in-charge. The contractor shall ensure that the workmanship by his is free from injuring and defect and shall replace free of cost. And defect in workmanship, fabrication, transportation, handling and strong until final acceptance by the Engineer-in-charge.

l) Welding

- aa) All welding shall be done by electric are method using a process which will exclude the atmosphere from the molten metal except where otherwise specifically permitted. The welding rods shall be of

the heavily coated type designed for all position welding, and the size, type of useless shall be made in accordance with the Indian standards, only qualified welding operator shall be employed to perform welding, surface to be welded shall be cleaned of rust, paint and other foreign matters where weld metal lies is deposited in two or more layers, each shall be crushed with brush or otherwise cleaned before the subsequent layer deposited.

- bb)** All welding precautions shall be taken to minimize stress due to heat by using the proper sequences in welding by pressing the welds, while hot, or by other satisfactory methods. All the arrangement for welding is to be done by the contractor at his own cost.

m) Cleaning and Painting

- cc)** The contractor shall furnish, prepare and supply all materials for cleaning, painting and coating of metal work as per direction Engineer-in-charge. The cost for furnishing, preparing and supplying black bitumen painting which are required for the work including labour, tools and equipments shall be included in the rate tendered for the complete item.

n) Erection (Laying)

- dd)** The reference lines, centre lines, grades and levels having relation of civil structures shall have to be established on site. The contractor so as to facilitate section in proper manner.
- ee)** Erection in the field shall be done by bolt bolting two flanged pipe ends by using the nuts and bolts with washers on both the sides and by using rubber sheet packing in between the flanges. The contractor shall perform these work with greater accuracy to ensure leak proof joints.
- ff)** All parts shall be accurately assembled and erected in lines and levels as directed by the Engineer-in-charge.

o) Inspection & Tests:

- gg)** All the work performed shall be subjected to inspection. Rest of completed work shall have to be given by the contractor as required by the Engineer-in-charge. While testing the corrected and completed work, any defect in workmanship is found, the same should be rectified by the contractor at his own risk and cost. The contractor shall replace, free of cost, any defective workmanship discovered during testing. No. extra cost will be given for the purpose. All the joints and connections shall be water tight.

- hh)** The Engineer-in-charge may demand test checking of weld joints.

The primary requirement to accept the work is the water tightness of each and every joint. All the necessary arrangements for the testing as per the design requirements shall have to be made by the contractor by his own cost. No extra cost of any material, tools and labourers required for the testing will be given to the contractor. No extra claim for satisfactory completion of the work as per the design requirement will be entertained.

p) Measurement & Payment

- ii)** The measurement of works shall be payable on No basis of completion of work in all respect.

Item No. 33 PROVIDING AND ERRECTING PUMPING MACHINERY

Providing and erecting monoset three phase 400/440 Volt,50 c/s A.C supply & 2900 rpm including lowering laying pipeline fixing of valves, panel board & including fixing of NRV on delivery side(Rising main to over head tank) with required accessories.

3 Nos of 17.50 H.P. each Total 52.50 H.P. ,17 LPS, Head 36.00 mt.

The Three Phase Horizontal Mono Submersible Pump Sets for the Water Supply Scheme should be as per IS : 14220/ 1994 with Latest revision.

The standard specific the technical requirement for Three Phase Horizontal Mono Submersible Pump Sets. Commonly used in sump for handling clear cold water for application in water supply etc.

The duty point of the pump set should be located at the optimum efficiency point of the pump rating curves and there should not be steep fall in efficiency in the operating range as specified in Annexure-II for relevant capacity. The verification of the pump sets performance will be as per relevant latest is at rated voltage . The pump with lesser number of stages will be preferred . R.M.P of pump set shall be 2900 at 50 Hz.

Company shall be offered the Efficiency within -5 digit at pump Operating Head Rang at +10% to -25% (i.e. if company shall be offered 50% efficiency at duty point , 45% efficiency are maintained at pump Head Operating Rang +10% to -25%)Three Phase,50 Hz,415 (+10% to -15%) Volts ,2900 RPM.

Minimum Motor Horse power Rating ,cable size, starting system and delivery sixe shall be as per Annexure-II attached .in case ,if the motor rating exceeds the minimum rating given in the Annexure-II ,then the starting methods as applicable shall have to be given accordingly .

Vendor List

- 1) Lubi Industries LLP Ahmedabad 2) MBH Pump (Guj) PVT.LTD Ahmedabad 3) Pullen Pump Industries PVT.LTD Ahmedabad 4) Techno Industries 5) Unnati Pump Enterprires Ahmedabad 6) Mak Pump Industries 7) Unnati Industries Corporation GIDC Naroda Ahmedabad

1 PUMP :

The pump casing should be free from blow holes ,sludge inclusion and other detrimental defects. Casing should be provided with renewable wearing rings expect in radial flow pump set. Casing should be provided with wearing rings. Casing should be hydraulic tested up to 1.5 times shut off pressure.

2 IMPELLER :

Impeller should be of closed type, ensuring required performance and free of cavitations . The material of impeller will be as per Annexure-I .

3 SHAFT :

The common shaft of pump & motor , below the impeller shaft assembly , shaft protection sleeve shall be provided . it shall have surface finishing of 0.75 Microns . the material of shaft shall be as per Annexure-V.

4 MOTOR :

The submersible motor shall confirm to IS : 9283/1994 with latest revision should be totally enclosed squirrel cage induction type water – coolest and water lubricated ,sealed against entry from outside water .

The windings shall be of wet type . the thrust bearing should be of wet type water lubricated and designed to take all untoward load at most unfavorable running conditions. Front and rear bearing housing and trust bearing housing should preferably be fixed separate replaceable bolts / studs and (not threaded connections) to the facilitate easy dismantling. inspection agency will open the motor base and check the thrust bearing and mark the identification.

Full proof sealing arrangement by sand guard shall be preferred in the motor inlet body to prevent open well impurities like sand .slit from entering the motor bearing .stator and motor should be impregnated with a superior varnish class B thermal insulation properties by vacuum pressure on stator cold rolled stamping used.

Rotor shall be painted with polyurethane painted with polyurethane paint & backed property under controlled temperature condition and not by manual or gravity flow to remove air pocket so that these are thoroughly filled up by varnish .motor rotor should be preferably lead shot blasted .subsequently, rotor body should be baked repeatedly under controlled conditions to ensure long life of paint and finish to the surface to avoid corrosion before power coasting .

The rotor shaft shall be as per Annexure-I and provided with sleeves having material as per Annexure-I in the

bearing portion . the windings should be accessible to facilities checking and locating and faults without disturbing all the coils and also to enable replacement of any defective coils .it should be possible to rewind the stator with readymade protested coils in order to save time during the repair . Kelvin bridge/digital resistance meter shall be treated preferable for measurement of hot and cold resistance o winding for evaluated temperature rise .full proof

arrangement should be made for stopping the rotating of shifting of stamping inside the stator body due to operation of pump sets earth leakage current should not be more than 50 mili-amperes at rated voltage.

2.1 The quoted H.P of motor should meet both the following conditions :

2.1.1 The minimum power margin over and above the duty points shall be 15% the offered motor should not have output rating less than that mentioned in ANNEXURE-II (under the column min H.P) in any case. The motor rating shall be equal to or up to 10% higher than that mentioned in the ANNEXURE-II according to offered overall efficiency .However the motor shall not get overload during the specification head range of +10% to -25% over duty point head as per IS.

2.1.2 The motor should not get overloaded in the range of +10% to -25% of the specification pump head. The meaning of overload will be as per IS : 14220

2.2 All rotating parts should be individually balanced if applicable on machine for minimum 700 RPM according to the relevant IS (and vibrations of the assembly during the testing shall not exceed shall not exceed to 80 microns peak to peak . (As per Relevant IS)

2.3 Brass Drain Plug Provided.

2.4 SS Suction strainer Provided

2.5 Compensating device Provided.

2.6 Rotor painted and baked under controlled condition or powder coated.

2.7 Winding easily assembles.

2.8 Winding subjected to 1.5 KV for 30 Seconds .

2.9 Matching Grooves for stopping stamping from rotation and shifting

2.10 Stamping treated chemically to recover unwanted substance and impurities .

2.11 rotor lead/ sand shot blasted

2.12 Thrust plate lapping is done on machine and the limit is 0.3 Micros

2.13 Stator end ring shall be of bronze metal or M.S. if applicable OR S.S

2.14 Stator is rewind able with readymade protested coils in each type of motor offered .

2.15 Agency shall submit cross sectional drawing of pump motor with clear indication of material specification for the major components covered under specification .

3 METHOD OF STARTING :

Up to 7.5 HP, D.O.L starter, 08 HP Star Deltas .

And 21 HP and above auto transformer starting

4 CABLE :

Motor shall be provided with three core / six core Flat PVC copper water proof and flexible cable of necessary Length and suitable size as per IS standard. The cross sectional areas should be sufficient so as not to cause voltage drop of more than 2.5% of nominal voltage i.e.10 volts at 400 volts throughout the length of the cable . Required size of the flat cable should be provided with ISI Mark (IS : 694) Manufactured by GWRDC Approved venders or as per approval of Engineer in Charge.

5 MARKING :

The method of marking all the pumps 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 .

- 1) Manufacturers brand name and / trade mark/ model embossed/ year of manufacturing engraved. on each pumps & motors
- 2) Any other important matter that the manufacturer deemed fit to be inscribed.
- 3) BEE logo is preferable manufacturer may give BEE logo Voluntarily.

A name plate corrosion resistant materials shall be affixed on the pump sets with the following details.

1	Name of Manufacturer	
2	Category No.	
3	Model	
4	Serial no	

5	Delivery Size (NRV) size in mm	
6	Number of stage	
7	Head in meter at duty point	
8	Operating head range in meter for overloading requirements.	
9	Discharge in LPM at duty point	
10	Overall efficiency in % at duty point	
11	Motor rating in KW	
12	Rated current in Amp.	
13	Rated voltage (V) with variation	
14	Rated speed in rpm	
15	Frequency (Hz)	
16	Connection star/delta	
17	Type of duty (Whether continuous or Not)	
18	Minimum submergence in meter	
19	Year of manufacture	

PERFORMANCE TESTING

Pump shall have to be tested as per IS : 14220/ IS: 11346 and motor will be tested as per I.S. 9283 at manufactures works .

- 6.1 Suppliers have to give inspection call with internal test report in specimen sheet shown in IS : 11346 for pump test .
- 6.2 The firm has to maintain and produce proper record such as calibration of instrument etc for verification by inspecting agency .
- 6.3 The leakage current of pump set shall not Exceed 50 mills Ampere at rated voltage . the firm shall furnish their quality assurance plan to the inspecting agency who will review the same to their satisfaction.
- 6.4 Rejection of any kind during inspection will be viewed seriously ,cumulative three rejection may be considered as sub standard product of the firm and GWRDC will reserve the right to stop giving further order under the contract.
- 6.5 To be witness by third party inspecting agency (rites / MARS) each pump tested for its full operating range in accordance with the IS standard, site condition shall be stipulated as near as possible. They shall be carried out with minimum discharge. Each pump shall be tested at its rated speed with its working range. Test shall preferably be conducted with actual drive capacity meter. During pump testing reading to the extent possible shall be taken to correspond to the net effective range specification in the data sheet and ever its full working range from its closed valve shall be drawn. The curve produced shall determine the capability of pump see to meet guaranteed performance at site.
Pump motor shall be offered for inspection by third party inspection agency at the manufacture's site. The third party Agency rites or MARS approved by the Engineer-in charge The contractor has to take approval for the same. Components of pump shall not be painted before inspection. All the test report conducted by third party agency or department shall be submitted to the Engineer in Charge.

4.10 MATERIAL TEST CERTIFICATE:

Material test certificate for the various pump components shall be furnished for purchaser's approval. Test certificate to be provided.

The payment will be made on satisfactory completion as above with testing. If testing after Installations not done. 10% of the cost will be with held as a deposit at the time of final bill and released after satisfactory testing. Inspection of this item will be carried out by Executive Engineer or respective Agency appointed by the GWRDC All the Expenditure for inspection Charges shall be produced by the Contractor. Also produce the relevant certificate form manufacture company with mention that the prudent to as per I.S. confirm.

The Item also includes with necessary platform required. For fixing as directed by the Engineer in

charge.

Before placing the order for pump Approval to be obtained from Engineer in charge.

Measurement shall be on the Unit basis includes pump and motor starter, etc. complete.

4.11 GUREENTEE OF PERFOMANCE:

The pump and motor shall be guaranteed against defect in materials workmanship under normal use and service for a period at least 12 months or as given by the company. The contractor shall have to give necessary documents for that the time of final payment with all necessary detail required for under guaranteed service.

4.12 MODE OF MEASUREMANT:

The payment of item shall be made on. No. basis. 10% of value of this item shall be kept in the deposit and Refunded after satisfactory testing required discharge at site.

DATA SHEET
L.I. Scheme @ Vill. CHOCHALA (Kishori F) Ta.Dahod Dist. Dahod

I)	PUMP DETAILS	
1	Capacity in LPM	1020 (17 LPS per pump)
2	Head in MTR	36.00 Mt.
3	Type of pump	Three phase mono submersible
4	Pump efficiency at duty point-----%	As per ANNEXURE NO.II
5	Pump input at duty point (KW)	As per ANNEXURE NO.II
6	Maximum submergence required in Mtr.	As per ANNEXURE NO.II
7	Specific speed	As per ANNEXURE NO.II
II)	MOTOR DETAILS :	
1	Motor rating (HP/KW)	As per ANNEXURE NO.II
2	Synchronous motor speed (RPM)	As per ANNEXURE NO.II
3	Efficiency of motor at full load	As per ANNEXURE NO.II
4	Efficiency of motor at duty point	As per ANNEXURE NO.II
5	Power factor at full load	As per ANNEXURE NO.II
6	Power factor at duty point	As per ANNEXURE NO.II
7	Method of Starting (star Delta/ATS/DOL)	As per ANNEXURE NO.II
8	Duty point	
	Current at duty point	As per ANNEXURE NO.II
	RPM at full load	As per ANNEXURE NO.II
	RPM at duty point	As per ANNEXURE NO.II
	Starting current as percentage of full load current	As per ANNEXURE NO.II
	Starting torque as percentage of full load torque	As per ANNEXURE NO.II
9	Motor input at duty point	As per ANNEXURE NO.II
10	Reserve power of motor ,minimum 15% margin over duty point condition	As per ANNEXURE NO.II
III)	CABLE	
1	Size of cable	6.00S.q mm (3 x 2 core)
2	Make of cable	As per ANNEXURE NO.II
3	Maximum current carrying capacity of cable	As per ANNEXURE NO.II

VI)	OVERALL EFFICIENCY	
	Overall efficiency of pump set at Duty point —————%	As per ANNEXURE NO.II
1	Please confirm materials as per specification or otherwise state the variation	As per ANNEXURE NO.II
2	Delivery size in mm	125 mm dia

ANNEXURE – I
MATERIALS FOR COMPONENTS OF MONOSET HORIZONTAL SUBMERSIBLE PUMPAS PER IS : 14220/1994 WITH LATEST REVISION

ANNEXURE NO.II

Sr. No.	Name of Parts	Materials of Construction
1	2	3
1	Shaft sleeve when used	Grade X20 Cr 13 Conforming t IS:1570 (Part -5) 1985
2	Motor bearing housing and base	Grade FG 260 of IS:210/1993
3	Pump & motor shaft (Common)	SS AISI 410
4	Bearing Bush	Leaded tin bronze Grade LTB4
5	Rotor	Electrical sheet steel and electro grade copper rods Conforming to IS:613/1984.
6	Stator Core	Electrical sheet steel and PVC insulated winding wire conforming to IS: 8783/1978
7	Winding Wire	As per relevant IS: 14220/ and IS:9283
8	Breather and diaphragm	Nitrile rubber
9	Cable	Three core Flat PVC Copper Cable with IS mark (IS:694)
10	Cable Gland	Nitrile rubber
11	Thrust Bearing face combinations.	Carbon – stainless steel
12	Water drain plug.	Bronze
13	Impeller	Leaded Tin Bronze LTB 2 of IS:318/1981
14	Casing	Cast iron Grade FG 260 of IS:210/1993
15	Sand Guard	S.S 304
16	Studs	SS AISI 410

DETAILS TO BE FILLED IN INDIVIDUAL THREE PHASE MONO HORIZONTAL SUBMERSIBLE PUMPSETS YEAR 2018

Sr. No	PUMP DETAILS	3.1	3.2	3.3	3.4	3.5	3.6	3.7	4.1	4.2	4.3	4.4	4.5	4.6	4.7	Rem arks
1	Capacity in LPM	700	1000	700	870	1300	1175	1300	1275	1020	960	900	1600	1500	1860	
2	Head in MTR	24	24	27	32.5	32	37	50	11	36	26	15	26	30	34	
3	Type of Pump	LHL-10	LHS-14	LHL-9	LHS-23	LHS-30	LHS-34	LHS-37	LHL-16a	LHL-11	LHS-15	LHS-25	LHS-31	LHS-31A	LHS-38	
4	Pump efficiency at duty point ____%	57	60	57	57	61	59.00	61	64	65.00	62.00	62	63	62	63	

5	Pump input at duty point (KW)	4.82	6.54	5.42	8.11	11.15	12.05	17.42	3.58	4.56	6.12	8.24	10.8	11.87	16.41	
6	Maximum submergence required in mtr.	1 MTRS.														
7	Specific speed	109.08	130.37	99.85	96.87	119.8	102.1 4	85.72	264.27	256.06	160.9 9	141.3 6	155.3	135.0 7	136.9 3	
II)	MOTOR DETAILS:															
1	Motor rating (HP/KW)	10.00	12.50	10.00	15.00	20.00	20.00	30.00	6.00	17.50	12.50	7.50	17.50	20.00	30.00	
2	Synchronous motor speed (RPM)	2900														
3	Efficiency of motor at full load	76.00	77.00	76.00	78.00	80.00	80.00	80.00	72.00	75.00	76.00	78.00	79.00	80.00	80.00	
4	Efficiency of motor at duty point	76.00	77.00	76.00	78.00	80.00	80.00	80.00	72.00	75.00	76.00	78.00	79.00	80.00	80.00	
5	Power factor at full load	0.81	0.82	0.81	0.82	0.90	0.90	0.90	0.85	0.86	0.81	0.82	0.87	0.90	0.90	
6	Power factor at duty point	0.80	0.81	0.80	0.80	0.87	0.87	0.88	0.83	0.85	0.80	0.80	0.86	0.87	0.88	
7	Method of starting9Star-Delta /ATS/DOL)	S.D.	S.D.	S.D.	S.D.	S.D.	S.D.	A.T.S.	D.O.L.	D.O.L.	S.D.	S.D.	S.D.	S.D.	A.T.S.	
8	Current at duty point	19.50	25.00	19.50	29.00	39.00	39.00	50.00	12.00	14.50	19.50	29.00	34.00	39.00	50.00	
	RPM at full load	2900														
	RPM at duty point															
	Starting current as percentage of full load current in %	800	800	800	800	800	800	800	800	800	800	800	800	800	800	

	Starting torque as percentage of full load torque in % (Min.)	125	125	125	125	125	125	125	125	125	125	125	125	125	125	
9	Motor input at duty point	6.34	8.49	7.13	10.4	13.93	15.05	21.76	4.97	6.07	8.04	10.55	13.66	14.82	20.5	
10	Reserve power of motor Minimum 15% margin cover duty point condition	35.75	29.68	27.72	26.27	25.67	19.68	20.81	20.38	17.11	18.43	25.08	16.85	20.89	25.4	
III)	CABLE :															
1	Size of cable	2.5	2.5	2.5	2.5	4.0	4.0	16.0	1.5	6.00	2.5	2.5	4.0	4.0	16.0	
2	Make of cable	G.W.R.D.C. APPROVED MAKE														
3	Maximum current carrying capacity of Cable (single cable)	18	18	18	18	26	26	57	14	18	18	18	26	26	57	
VI)	OVERALL EFFICIENCY OF UNIT :															
	At duty point	43.32	46.20	43.32	44.46	48.80	47.20	48.80	46.08	48.75	47.12	48.36	49.7	49.60	50.40	

ITEM No. 34 OIL IMMERSED/STAR-DELTA STARTER (16 to 20 H.P)

Providing & fitting A. C. Three phase Oil immersed starter (D.O.L.) star/ delta & A.T.S. Type with metering panel

1. Manually / Automatic operated Oil immersed type i.e. as per IS:13947 (Part 4 Sec.1) 1993 (or Latest Revision) the interrupting medium should be Oil MEI (Mysor Electrical Industries, Bangalore) / JMP (Jyoti) / Kilburn / Crompton/ UEI/Advance/ Asian make Star-Delta starter fitted with three Magnetic type overload release with oil dash pot time lags of thermal type over load relay, stop push button and Plain entries for PVC Copper Cable of Submersible Motor operating on Three Phase, 50 Cycle (+/-) 3% 415 Volt + 10% - 15% Volt. Supply and preferably having following features or as per their own standard design and confirming to IS 13947 (Part-4/Sec.I) 1993 (Or latest revision) ISI marked product will be preferred. The Starter shall be will mounting cum pedestal type. The enclosure of Starter and metering panel should be vermin proof and as per IP 50. The Starter should be suitable for squirrel cage motor of submersible pump set.
2. The Starters as per their own (Manufacturers) standard design and confirming to IS:13947 (Part-4/Sec I) 1993 (or Latest Revision) IEC PUB 949-4-1 (1990) are also acceptable but if any major deviation found other than features specified below (Point No.1 to 10) should be pointed out clearly in offer with respect to their own design.
3. Fixed contact carrier assembly, moving contact and rubbing contact, assembly mounted on Non – Hygroscopic Bakelite insulated shaft to give free access to contact assemblies and moisture proof to eliminate insulation failure.
4. All fixed and moving contact made of high-grade electrolyte hard drawn cold rolled solid copper with the hardness to give long contact life. Contacts shall be suitable for Category AC-3 duty.
5. Fixed and moving contact of round oval design to achieve roller type self wipes action to remove surface oxides and sulphides during making and breaking.
6. Rubbing contacts matched by high pressure alloy steel springs to achieve high pressure positive contact during long period of operation and during change over from start to run position.
7. Interface barrier of high-grade hygroscopic Bakelite materials to localize are by shielding.
8. Independent acting magnetic/ thermal overload relays with direct acting type in each phase designed on Electromagnetic/ Electro Thermal principle and filled with four position Oil dash pot time lags easily and fully adjustable manually to suit any typical operating voltage and starting time condition requirement to enable the motor to reach near synchronous speed during starting period and before changeover. Relay having guaranteed non-edging property and rapid inverse

tripping time characteristics in over load to trip the starter. Relay should be as per IS: 13947 (Part-4/Sec.1)1993 (or latest addition).

9. Starter handle (in case of manually operated) with positive sequencing, device making it impossible to go into running position without moving the handle into start position.
10. Under Voltage release should be such that the inter locking catch to ensure guaranteed release and tripping during very low voltage condition (Below 50% normal Voltage).
11. All current carrying terminals studs/ strips of hard drawn high electrically conductive brass materials with nuts, bolts and washers to carry required current without any damage. The main body of the starter should be moisture proof and dust proof design of C.I. Grade FG-260 or suitable thick CRCA metal sheet, starter enclosures should have IP 50 classification category protection. The body of Starter/Panel box must be fully enamel paint for de-rusting and weather resistance.
12. Fixed contact shaft shall be bolted with the side plate in order to facilitate maintenance work. Starter should have easily replaceable finger contacts, and moving contacts, which are of self-aligning type with renewable tips. The starter should be provided with ear thing terminal duly identified by sign.

- **METERING PANEL :**

13. Over and above the starter as specified above, it shall be provided with the panel box mounted on it comprising with single phasing prevent or water level guard, volt meter, Ammeter, 3 Phase Indicating lamps, duly fixed in the CRCA Steel Box of minimum 1.5 mm thick and this Panel Box shall be fixed on the starter with making required connection with starter. The metering panel and starter both should be fitted on suitable size of angle iron structure. The details of accessories to be included in metering box shall be as under. The detailed specification of which are attached herewith. For protection of dust, the rubber lining should be provided on the door of metering panel box. After application of Zinc Chrome Primer, the panel box shall be stove enamelled with two coats of final paint.
14. Single Phasing Preventer with over voltage and under voltage cut out device with bypass toggle switch-1 No.
15. Water Level Guard with bypass toggle switch-1 No. The 1 sq.mm. PVC Insulated copper wire of one coil (91.44 m) and brass Electrode to be provided with it.

Voltmeter with Selector Switch-1 No.

Ammeter -1 No.

Earth leakage relay – 1 No.

Control fuses (Re-wire able type) – 3 Nos.

LED Indicating lamps – 8 Nos.

- **MODE OF MEASUREMENT AND PAYMENT**

16. The payment of item shall be made on No. basis of required capacity.

ITEM No. 35- MAIN SWITCH (Rewritable TP type 63 Amp)

Providing & fitting M.C.T.P. main switches of rewriteable or I I R C type fuses suitable for 415 v acceptable makes as per category-II & III approved by Electrical Division, Govt. of Guj. R&B Department.

17. Providing of rewire able TP type M.C.T.P. Main Switches of re-wire able fuses suitable for 415 V acceptable makes as per category-II & III approved by Electrical Division, Govt. of Gujarat, R&B Department.
- | | |
|------------------------|-------------------------|
| (a) Capacity – 16 Amp. | (d) Capacity – 100 Amp. |
| (b) Capacity – 32 Amp. | (e) Capacity – 200 Amp. |
| (c) Capacity – 63 Amp. | |
1. All Main switches (Other than those of iron clad pattern) carrying current of 10 Amp. Ad above shall be fitted for back connection land shall be suitably protected.
 2. All switches and circuit breakers shall be constructed in accordance with the I.S. 4237-1967. General requirement for switch gear and control gear for voltage not exceeding 1000 Volts and other relevant I.S. provided also that spring shall be either of phosphor bronze or if steel shall be copper or Nickel plated and that handle shall be so fastened that they do not tend to unscrew or become loose.
 3. All main switches shall be either of metal clad enclosed pattern or of any insulated enclosed pattern which shall be fixed at close proximity to the point of entry of supply.
 4. Switch boards shall not be erected above gas, stoves or sinks or within 2.5 m. of any washing unit in the washing rooms of laundries or in the bath rooms, lavatories, toilets or kitchens.
 5. Switch boards, if unavoidably fixed in places likely to be exposed to weather, to drip or to abnormal moist temperature the outlet casing shall be weather proof and shall be provided with glands or bushing of adopted to receive screwed conduit according to the manner in which cables are run. PVC and double flanged bushes shall be fitted in the holes of the switches for entry and exit of wires.
 6. A switch board not be installed so that its bottom is within 1.25 m. above the floor unless the front of the switch board is completely enclosed by a door or the switch board is located in a position to which only authorized persons have access.
 7. Switch boards shall be recessed in the wall if so specified in the schedule of work or in the special specification. The front shall be fitted with hinged panel of other suitable material such as Bakelite in wood frame with locking arrangement. The outer surface of door being flush with the walls. Ample room shall be provided at the back for connections and at the front between the switchgear mountings and the door.
 8. Equipments which are on the front of a switch board shall be so arranged that inadvertently personal contact with live parts is unlikely during the manipulation of switchgear, changing of fuses or like operations.

9. No holes other than the holes by means of which the panel is fixed shall be drilled closer than 1.3 cm from any edge of the panel.
10. The various live parts, unless they are effectively screened by substantial barriers of non-hydroscopic, no-inflammable insulating material, shall be so spaced that space shall not be maintained between such parts and earth.
11. The arrangement of gear shall be such that they shall be readily accessible and their connections to all instruments and apparatus shall also be traceable.
12. In every case in which switches and fuses are fitted on the same pole, these fuses shall be so arranged that the fuses are not alive when their respective switches are in the off position.
13. No fuses other than fuses in instrument circuit shall be fixed on the back of or behind a switch board panel or frame.
14. All the metal switchgears and switch boards shall be painted, prior to erection with one coat of antirust primer, after erection they shall be painted with two coats of approved enamel or aluminium paint as required on all sides wherever accessible.
15. All switch boards connected to medium voltage and above shall be provided with "Danger Notice Plate" conforming to relevant Indian Standards.
- **MODE OF MEASUREMENT AND PAYMENT**
18. The payment of item shall be made on number basis of required capacity.

ITEM NO. 36 TO 37 COPPER CABLE

a. 6.00 Sq.mm and 10.00 Sq.mm

Providing Three Core flat PVC insulated water proof & flexible copper cable used for the sub-motor pump & shall conforming to IS 690 size mm acceptable makes finolex / Goodcab/ jainson/MG/ Reliance (1.5 to 16 sq.mm) sabar (25 sq.mm)

1. Motor will be provided with three core that flat PVC insulated and PVC sheathed water proof flexible 3 core flat copper cable conforming to IS:694 of 1990.
2. The cross sectional area of conductor should be sufficient so as not to cause voltage drop of more than 3% of rated voltage. The size of conductor shall be adequate and suitable for continuous use under water and air. Along with pump set, 5 mtrs. Lead cable has to be supplied. The length of extra cable shall be equal to head of pump set in meter plus 3 meters more. The minimum cross section of cable required is as per enclosed table of cable.
3. The cable used with submersible motor shall be of Finolex, Good Cab, Jainson, Emgee, Sabar, Reliance (up to 4 sq.mm.)
4. The cable guard cable clips should be provided along with the pump to prevent damage to cable when handling pump or lowering of the same.

5. It should be got tested through T.P.I. with test certificate.

- **MODE OF MEASUREMENT :**

The payment of item shall be made on Rmt. Basis of require size and capacity.

ITEM No. 38- SPECIFICATION OF SHUNT CAPACITOR (6 KVAR)

Providing Indoor type shunt power capacitor with G.E.B. test certificate with ISI mark as per IS 2834 (or Latest addition) (MPP) Type (Dry) Oil impregnated)

19. The shunt capacitors shall be confirming to IS NO: 13340:1993 (with latest revision) and with ISI mark. The capacitors shall remain permanently connected with the cable of squirrel edge 3 phase induction type Submersible Motor having rated speed of 2900 RPM. Operating on A.C. 3 Phase 415 + 10% and – 15% volts with frequency 50 C/S. The frequency variation should be as per IS:13340:1993 with latest revision if any. The ambient temperature at the site of location of capacitor shall be 450 C.
20. The capacitor shall be of indoor type. The container shall be either metallic or non metallic type. The power loss of capacitor offered should be clearly indicated without which the offer shall be rejected. The capacitors shall be mixed dielectric capacitor or polypropylene or MPP type and shall having self discharging device. The capacitor shall be or oil impregnated type by vacuum method for increase in life of capacitor. The capacitor should have explosion proof arrangement and preferably with its failure indicating feature. Capacitors are for power installations as per Indian Elect Rules 1956.
21. The capacitor shall be provided with 3 phase Insulated copper wires of ISI marked and 1 meter in length for each phase (3x1=3 meters total) duly connected in unexposed manner in the flexible pipes.
22. The inspection of the capacitor will be carried out at the works as per IS:13340:1993 with latest revision if any. It shall be obligatory on party of the tenderer to get the capacitors tested and approved by GUVNL. Authority.

- **MODE OF MEASUREMENT AND PAYMENT:**

23. The payment of item shall be made on KVAR basis of required capacity.

ITEM No. 39 - M.S.CLAMP(A Type 450 x 65 x 10 mm),

Clamp made from M.S.Plates with three holes on either side with nuts and bolts of std. make and suitable size.

24. Providing of Hot forged M.S. Clamps size (a) 450 mm diameter x 65 mm width x 10 mm thickness (b) 750 mm diameter x 75 mm width x 10 mm thickness (c) 750 mm diameter x 75 mm width x 16 mm. Thickness(d)900 mm diameter x 100 mm width x 16 mm thickness manufactured from M.S.

flat confirming to IS : 226 & fitted With $\frac{3}{4}$ " diameter 3" long high tensile strength bolt, Nuts & Washers. (2 sets on each sides) Overall length for clamps should be 24" suitable for column pipes.

- **MODE OF MEASUREMENT :**

25. The payment of item shall be made on pair basis of required size.

ITEM No. ____ - ROOM WIRING

26. Room wiring confirming IS - 694 for PVC insulated copper wire 2.50 Sq.mm with standard accessories like PVC pipe, Switches, plug, saddle etc. complete.

- **Details Of Items In Room Wiring Kit**

SR NO	Description
1	2.5 sq mm P V C insulated Copper Wire ISI IS 694
2	Rigid PVC Pipe of 19 mm diameter having thickness 12 mm & 3 m in Length
3	Rigid PVC Bend 19 mm diameter
4	Rigid PVC elbow 19 mm diameter
5	Rigid PVC Tee 19 mm diameter
6	Rigid P V C 4 Way Junction Box
7	Polished Wooden Plain Board Of Teak wood Size 18"x6"x1 1/4"
8	Polished Wooden Plain Board Of Teak wood Size 16"x6"x1 1/4"
9	Polished Wooden Teak wood Round 3 1/2" dia x 1 1/2" thick
10	Polished Wooden Board of Teak wood with Black / White backalite sheet groove for 4 piano switches and one five pin socket size of 8"x4"x1 1/2"
11	Polished Wooden Board of Teak wood with Black / White backalite sheet groove for 3 piano switches and one five pin socket size of 7"x4"x1 1/2"
12	Roll Plug No 8 Grip make
13	6 Amp 240 Volts Piano type One Way Switch
14	6 Amp 240 Volts Piano type 5 pin Socket (2 in 1)
15	Swan Holder (Angle Holder)
16	32 AMP 240 Volts double pole surface switch with neon indicator
17	G I Wire 18 gauge
18	G I Base Saddle 19mm diameter
19	Justy Bolt Nuts 2"x1/4"
20	Justy Bolt Nuts 1"x1/4"
21	Justy Khila 1 1/2" Long
22	Justy Khila 3" Long
23	Hexagonal Pin with Nut & Washer 2"x5/16"

24. ~~Water proof Bucket fitting suitable for 40-watt Lamp~~
25. ~~Nettle fold Screw of following Size~~
- ~~a) 12mm x 5mm~~
 - ~~b) 20mm x 5mm~~
 - ~~c) 30 mm x 7 mm~~
 - ~~d) 35 mm x 8mm~~
 - ~~e) 60mm x 8 mm~~
26. ~~P V C Tape roll Steel grip Bhole Make 19 cm x 10 m~~
27. ~~All above Item should be packed in proper new card board paper box except item no 2 (P V C Pipe)~~
28. ~~The Item in complete room wiring kit should be Supplied for as per details with ref no size / Rating make quality.~~
29. ~~The All Items/ materials should be good quality.~~
30. ~~Payment Made in Point Basis~~

ITEM No. Moulded Case Circuit Breaker (Above 80 amperes & up to 630 Amperes)

~~Approved Make Four pole Moulded case circuit breaker having capacity ICU of 35KA at 415-V. cat.III.~~

- ~~1. The moulded case circuit breaker (MCCB) shall be air break type and having quick make quick break with trip free operating mechanism.~~
- ~~2. Housing of the MCCB shall be of heat resistant and flame retardant insulating material.~~
- ~~3. Rotary type operating handle of MCCB shall be provided in front and should clearly indicate ON / OFF / TRIP positions and should have padlocking facility.~~
- ~~4. The electrical contact of the MCCB shall be of high conducting non deteriorating silver alloy contacts.~~
- ~~5. The MCCB should have earth leakage / fault release with adjustable current setting facility and mechanical interlock facility (if with two incomers).~~
- ~~6. The MCCB should be provided with microprocessor based adjustable type over load release with time delay and adjustable type short circuit with time delay protection device.~~
- ~~7. The MCCB rating should be selected as per type II co-ordination (IEC 60947-4-1) chart as per manufacturer (s) standards or as per value of the table specified herein whichever is higher.~~

• ~~Circuit Breakers~~

- ~~31. Switches & Circuit Breakers whether Fixed Separately or combined with lamps holders or fittings must comply with the following Requirement~~

- a. ~~overt heading must not take place at the point of contact or elsewhere when the full current flows continuously.~~
 - b. ~~they must be so constructed or arranged that the contacts cannot accidentally close when left open~~
 - c. ~~The basis must be of incombustible non-conducting & moisture proof material.~~
 - d. ~~Circuit Breakers as must be so arranged and placed that no combustible material is endangered by their action.~~
 - e. ~~Unless placed in an engine room or in a compartment especially arranged for the purpose they must their life parts covered. The cover must be incombustible material and must be either non-conducting or of rigid metal & clear of all internal mechanism for more than 6 amperes at pressure exceeding 125 volts metal cover must be lined with insulated material.~~
 - f. ~~In position where they are liable to injury or come in to contact with goods they must be further protected by an open fronted box or either suitable guard~~
 - g. ~~Handless must be insulated and so arranged that the hand cannot touch live metal or be injured through and adjacent fuse blowing.~~
 - h. ~~Switches having a handle projecting through an open slot in the cover must not be used.~~
- ~~**MODE OF MEASUREMENT :**~~
32. ~~The payment of item shall be made on number basis.~~

ITEM No. 40 - ELCB (Earth Leakage Circuit Breakers) Category – III (25 Amp.)

Approved make E.L.C.Bs/RCCBs confirm to IS: 12640 and havin sensitivity of 30 mA and short Circuit withstand capacity of 6 KA and suitable for operation on single phase 240 v having characteristic of quick action & do not incorporate any electronic component.for following Max.rating erected as directed.

33. Approved make / ELCB / RCCBS confirming to IS:12640 and having sensitively of 30 MA and short circuit withstand capacity of 6 K.A. and suitable for operation on 3 phase and neutral 415 V. having characteristic of quick action & tripping with all advance feature & do not in-corporate any electronic component for following max.rating erected as directed.

25 AMP FP 40 Amp. FP 63 AMP FP 100 Amp. FP (100 MA sensitivity)

34. The basic must be of incombustible, non-conducting and moisture proof material.
35. Circuit breaker as must be so arranged and placed that no combustible material is endangered by their action unless placed in an engine room or in a compartment especially arranges for the purpose, they must their line parts covered. The covers must be of incombustible material and must be either non conducting or of rigid metal and clear o all internal mechanism.

- **MODE OF MEASUREMENT :**

36. The payment of item shall be made on NO. Basis.

ITEM No. 41– EARTHING PANEL BOARD (C Type)

Supplying & erecting funnel type earthing having earth plate of following size buried in specifically prepared earth pit 3 mtr. Below ground with 40 Kg. charcoal and salt with alternate layers of charcoal & salt, 20 mm. dia. G. I. pipe with Funnel with a wire mesh for watering & Bricks masonry block, G. I. pipe with funnel with a wire mesh for watering & Bricks masonry block, C. I. Cover complete as per para 7.3 of IS 3043 with necessary length of double Galvanised Iron / copper earth wire No. 6 SWG bolted with lug to the plate and covered in 12 mm dia. G. I. pipe 2.5 mtr. long complete connected to the nearest switch gear with end socket as per direction & duly tested by earth tester confirming to IS (As per drawing).

1- *Installation of Ear thing Plates:* (A) With 30 x30x0.35 cm C.I. earth Plate (B) With 45 x45x0.35 cm C.I. earth Plate (C) With 60 x60x0.315 cm Copper earth Plate.

37. All installation of ear thing shall conform to Indian Electricity Rules. IS. 3043 and its latest addition and I.E.E. The copper earth plates should be tinned before installation. The earth plate of copper 60 cm x 60 cm x 3.515 mm thick size as mentioned in the schedule be in separate pits at least 150 cms to 300 cms. away from the building at a depth necessary to reach moist earth surface but with a minimum depth of 2.5mt. from the finished ground level up to the top vertical dodge of earth electrode. The earth plate shall be thoroughly cleaned to remove all dirt from the surface and be tinned properly for electrical contact with the main ground. Each earth pit should be provided with 38 mm dia. G.I. Pipe 2.5 Mt. Long or more depending up to the depth of pit, put over the vertical edge of earth plate (with top end of pipe provided with a closed to coupler). Alternative layers of salt and coke shall be provided surrounding the plate. The pits shall be filled when the plates are in position and with the approval of Engineer in charge.
38. To facilitate watering the pit, a concrete compartment should be made with funnel with mesh and cover plate as per rules provided in ISI regulation. The masonry endorers shall be 25 cm x25 cm x 25 cm (deep) with C.I. lid of 23 cm x 30 cm size. After installation, the earthing resistance of each earth plate should be measured by resistance measure in the presence of Engineer in charge, three days after the completion of earthing work, and the value should confirm to regulations.

MODE OF MEASUREMENT: The payment of item shall be made on NO. basis.

ITEM No. 42 TRIPOL POLE NEUTRAL PANEL BUS BAR (A Type)

**(A).100 Amp. Capacity (B) 200 Amp.capacity (C) 300 Amp.capacity
Triple pole & neutral 440V/500V panel mounting bus bars having
current Density not more than 0.8Amp/Sq.mm**

1. Main bus bars shall be of uniform cross section in Aluminium as specified in the drawing / data sheet. Feeder to bus or cable alley entry of bus bar shall be effectively sealed by electrical and thermal insulation barriers so that products of flashover do not travel from one cubicle to other cubicle creating multiple faults. Bus bar shall be calculated on 50 ° C ambient temperature and 85 ° C for continuous and short time rating.
2. Wherever Aluminium to copper connections is required, suitable bimetallic connections / clamps shall be provided.
3. Maximum temperature of the bus bars and the bus connections shall not exceed 85 ° C.
4. The bus bars shall be provided with heat shrinkable sleeves fully insulated encapsulation in epoxy resin with moulded caps protecting all joints or heat shrinkable PVC sleeves and tapes and colour coded for identification.
5. Separate supports shall be provided for each bus bar. If common support is provided for all bus bars, anti tracking barriers shall be incorporated.
6. In order to avoid any accidental hazards, bus bar compartments shall be protected with 3 mm. thick Hylem / Bakelite sheets.
7. The neutral bus bar shall be half size that of phase bus bars in the case of all panels.
8. Calculation of cross sectional areas, current carrying capacity for rightly rated bus bar shall be provided along with calculation of temperature rise. De rating factors shall be considered as per governing standards & requirement of the system.
9. Bus bar material i.e. aluminium shall be electrolyte grade aluminium with test certificate (s) of the lot. It shall be of reputed make i.e. Hindalco/ Nalco /Balco / Banco.

- **MODE OF MEASUREMENT :**

The payment of item shall be made on Rmt. basis.

Item NO: 43 to 46 DIFFERENT TYPES OF KUNDIES

Providing & Constructing Air vent/Outlet Kundi,Air vent Kundi,& SV Chamber As Per Drawing & Design As Directed.(A).Airvent cum Outlet (B) Airvent Kundi (C) Sluice valve Chamber 150 mm Dia.(D)Sluice valve Chamber 200 mm Dia (E)Sluice valve Chamber 250 mm Dia (F)Sluice valve Chamber 300 mm Dia

39. In This Item PCC , BB Masonry , Cement Plaster, Finishing coat PVC pipe Fittings Items Specification are As Per relevant, P V C pipe & P V C joints and I S I mark different class & diameter of different type of valves specifications Relevant Specification shall be Followed.
40. The work shall be carried out as per Drawing and properly joiningwith distribution pipeline in proper line and level &as per Instruction Given by Engineer in Charge.
41. Payment shall be done on No. basis.

ITEM No. 47 DIVERSION

Diversion of water course/ providing coffer dam and bound of Island as may be necessary for foundation and maintaining the same for the period as may be necessary etc. complete.

i. Diversion by Channel

42. Diversion of water flow by way of excavation of trench and bounding of island of soil(in gunny bags) band for foundation of well including dismantling coffer dam as per instruction of Engineer – in-charge etc. complete.
43. Measurement shall be paid Lump sump as Job Item.

ITEM No. 48 CHAIN PULLEY BLOCK

Providing Chain Pulley Block with Triple gear arrangement lifting hook ,load chain, hand chain & locking device with necessary mounting girder/structure, spur gear travelling trolley and all accessories (2.00 Tone Capacity) etc Complete.

- | | |
|---|-----|
| 44. Tested Load, Tones | 4.5 |
| 45. Pulling effort on Hand Chain, Kg. | 41 |
| 46. Hand chain required to be passed | |
| 47. For lifting load through one m(M. Approx) | 114 |
| 48. Standard clear lift range, in mt. | 6 |
| 49. Load Chain size, mm | 11 |
1. Specification for- 2 or 3 Tones Hand Operated Balanced Spear Gear Chain Pulley Block requirement as below :
 2. Frame: Fabricated steel frame shaped to occupy minimum headroom ensures permanent alignment of spindles and gears enclosed and protect the load chain wheel and brake unit. Detachable steel cast totally enclosed the gears.
 3. Hooks:

Hooks are of forged steel and in shape, materials and strength comply, with IS-8610 for chain hoists on single fall of chain, top hook swivels in a cross head which farms part of hoists on two or more falls of chain the top hook swivels in a cast steel yoke where as bottom hook rotates on thrust bearing and is supported by bottom block frame.
 4. Safety Latch :

Every bottom hook is equipped with a safety latch a safety latch for top hook is an optional attachment.
 5. Load chain Wheel :

Made from heavy duty malleable cast iron (IS-2108) has pockets accurately cast to receive

calibrated load chain.

6. Load Chain :

Higher tensile steel grade 40. As per IS : 3109. All chains are electrically resistance welded and heat treated to give ductility toughness and wear resistance, Accurately calibrated, Pitched and polished to ensure free movement, each link is tested to twice the safe working load and can withstand shock loads.

7. Gears :

All gears are accurately machine cut from alloy steel and case hardened to ensure long life.

8. Load Brake :

The precision self-actuating screw and disc type mechanical brake engages instantly and provides uniform performance with loaded loads or less than the rated capacity. When lowering a load is under perfect control at all times. That is exceptionally valuable where accurate movement is demanded for spotting loads.

9. Ratchet wheel are hardened and surfaces ground to maintain parallelism, with adequate thickness to engage properly with pawl.

10. Hand Chain Wheel :

Made from gray cast iron grade FG 260 to IS 210 having bore with square threads and pockets accurately, cast to receive calibrated hand chain, Hand chain guards provided to prevent the chain from snagging and fouling. Hand chain guards are bolted to frame which enables easy removal and refitting of chains.

11. Lubrication :Totally enclosed gear case is packed with sufficient grease during assembly, The driving pinion is provided with grease nipple for lubricating bearing surface, between load gear wheel and driving pinion to ensure smooth and trouble free operation.

12. Test :

Chain pulley block conform to the testing requirements of IS 3832 and are tested for 50% overload at works or in case of Morris make, supporting company certificate is to be submitted by the contractor

Mode of Measurement & Payment

Measurement and Payment shall be made as per number basis of required capacity.

ITEM No. 49 O & M

Operation & Maintenance of Lift Irrigation Scheme with Civil , Mechanical and Electrical maintenance including formation and Registration of Co-operative society of Beneficiaries and

handing over charge to the Registered Society after Completion of O & M period etc. Completed for 5 years

Scope of work (Operation and Maintenance)

Preface:

The contractor shall operate and maintain all the works executed by him and system as a whole with due care and diligence, so as to have the intended quantity of water available at the delivery points with the required efficiency and reliability. All the man-power, Machineries, Plants, Equipments, Vehicles and other facilities shall have to be arranged provided by the contractor as per the provision of the contract. Terms and condition narrated in tender documents are also equally applicable in the operation and maintenance period.

Scope of work:

The entire scheme is to be successfully handed over to the co-operative society in good functional condition; the contractor shall perform all the roles and duties narrated in the forgoing paras.

The O & M period of this contract shall be 5 years incl. Defect liability period applicable as per tender condition.

The contractor shall submit report regarding completion of civil work in stipulated time limit and commissioning of the project to the Engineer – In – Charge. In the case when the project is commissioned during any irrigation season, the contractor shall start performing all the duties immediately, including providing irrigation facility to the beneficiaries. However, for the payment purpose, the period of O&M work shall be considered from next upcoming season and no separate payment shall be made for performing such duties.

The contractor shall operate, maintain and up keep the following services.

1. Pumping and delivery of water through pipeline to the end outlet (or) at intermediate outlet as per the requirement of beneficiaries of the scheme.
2. Operation, Maintenance and up-keepment of all civil structures, pipeline, valves, pumps and motors, all the electrical, mechanical and instrumentation components, including control devices as per system requirement. So as to meet the required standard of performance.
3. Maintenance of all buildings and all the structures including Pump house, intake structure, distribution system, pumping machineries, electrical equipments, internal road and other all allied works of scheme.

4. Management of the pump house, plant, pipeline, supply and discharges arrangement, communication arrangement, reporting and record keeping as per instruction of E. I. C.
5. Providing O & M training to the members of Group of co-operative society.
6. **Formation of co-operative society:** The contractor shall form; the co-operative society involving all the beneficiaries, as per the prevailing norms of the department and shall obtain necessary registration from the competent authority. Such co-operative society shall be formed before commencement of operation and maintenance period.

The contractor shall make all efforts for opening bank account in the name of the co-operative society in Nationalized Bank.

The contractor shall make all the efforts for maintaining such co-operative society and it shall be functional till the end operation and maintenance period. The management of co-operative society shall also be carried out as per the prevailing norms of the department.

The co-operative society has to collect charges from the beneficiaries to meet the requirements of water charges (if any), electricity bills. The contractor shall workout such rate involving the co-operative society and such charges and shall be got approved from Engineer – In - Charge before starting the O & M work.

7. Electric connection and electricity charges:

The contractor shall workout the power requirement and performs all the duties for availing necessary electric connection from the local electricity company. The departmental official will only assist and sign the application form and pay necessary charges/Fees/Deposit etc. The contractor shall carry out necessary liaison and follow up with the electricity company in perform all the duties so that the electricity is available at the time of commissioning of the project.

The contractor shall collect the electricity charges from the co-operative society and make all the necessary arrangements for timely payment to the Electricity Company and report to Engineer – In – Charge, on all electric billing cycle along with payment receipt.

In the last quarter of the fifth year of operation and maintenance period, the electric connection is to be transferred in the name of the co-operative society. Hence, all the necessary procedures shall be done by the contractor.

8. Training and Meetings:

The training camp shall be organized with all concern farmers of command area and plan with them for successful implementation and development of irrigation facility, as well as

production of agricultural product with latest agriculture technology.

The minimum training requirements in the following areas:

- a) Participatory Irrigation Management
- b) Latest agricultural techniques
- c) Land levelling
- d) Benefits of ongoing other Government schemes (like Vadi Project, Aatma Project, Van Bandhu Kalyan Yojana etc.)
- e) Efficient Water Uses
- f) Sharing all the technical details of the project and training on Operation and Maintenance
- g) Micro Irrigation System
- h) Any other as desired by Engineer-In-Charge

9. The periodical photographs of construction work, completion work, and the testing work of project as well as the photographs of all event for development irrigation facility vice training and awareness programme of the farmers, training of operation and maintenance of scheme etc.
10. The O & M charges will be paid at the end of a year after recommendation and verification of the E.I.C. with the condition of availability of funds.

11. Table showing activity to be performed:

Sr. No.	Particulars of activity	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1	Repairs to Civil / Mechanical (including Pump and Motor) / Electric works carried out under this Tender	Yes	Yes	Yes	Yes	Yes
2	Creation and Registration of Co. Op. society (piyatmandali) and opening their Bank Account	Yes	NA	NA	NA	NA
3	Training of Agricultural activity to beneficiary of LIS	Yes	Yes	NA	NA	NA
4	Keeping Functional the piyatmandali	Yes	Yes	Yes	Yes	Yes
5	Collection Irrigation Dues From Beneficiaries of L. I. Scheme.	Yes	Yes	Yes	Yes	Yes

6	Collection Electric Charges From Beneficiaries of L.I. Scheme and deposited to concern Authority as per Energy bills.	Yes	Yes	Yes	Yes	Yes
7	Procedure for Electric connection to be transfer in the name of co operative society.	NA	NA	NA	Yes	NA
8	Handing over the charge of assets and scheme to the registered group of beneficiaries.	NA	NA	NA	NA	Yes

12. The restoration period for repairing work / replacement work shall be as under.

Sr. No.	Type of work	Restoration period
1	Repair of PVC/M.S. Pipes	1 days
2	Repair / Replacement of all valves along the pipeline	3 days(Maximum)
3	Repair / Replacement of Electrical, Mechanical(Including Pump and Motor) , Instrumentation equipment	Within 24 hours Maximum 5 days.
4	For major repairing	Maximum 10 days.

13. ADMINISTRATIVE PROVISIONS

- a) **RISKS AND OBLIGATION OF THE CONTRACTOR:** The contractor shall take full responsibility for the care of the Lift Irrigation Scheme with Civil, Mechanical and Electrical etc works from the date of issue of the work order for the whole of the works, until the date of completion of the operation and maintenance period, when the responsibility for the care shall pass to the employer. If any loss or damage happens to the Lift Irrigation Scheme with Civil , Mechanical and Electrical etc works or any part thereof, or materials and plant for incorporation therein, during the period for which the contractor is responsible for the care thereof from any cause whatsoever, the contractor shall, rectify such loss or damage at his own cost so that the Lift Irrigation Scheme with Civil , Mechanical and Electrical etc works conform in every respect with the provisions of the contract to the satisfaction of the Employer. The contractor shall also be liable for any loss or damage to the works in the course of O & M carried out by him for the purpose of complying with his obligation.

In the case of risks causing loss or damage due to Theft, Fire or any other cause, any such determination shall take into account the responsibility of the contractor.

- b) **INSURANCE:** The contractor shall without limiting his or the Employer's obligations and responsibilities insure:
- The works, together Lift Irrigation Scheme with Civil , Mechanical and Electrical etc works with materials and plant for incorporation therein, to the full replacement cost (term "cost" in this context shall include profit)
 - The contractor's equipment and other things brought onto the site by the contractor, for a sum sufficient to provide for their replacement at the site will be taken by contractor. The

insurance detailed above shall be in the joint names of the contractor and the employer at the contractor's cost and shall cover the employer and the contractor against all loss or damage from whatsoever cause arising other than as provided in clause of contract from the start of the operation and maintenance until the date of completion of operation and maintenance in respect of the facility or any section or part thereof as the case may be.

- Any amounts not insured or not recovered from the insurers shall be borne by the contractor in accordance with their responsibilities under clause of contract.
- The contractor shall except if and so far as the contract provides otherwise indemnify the employer against all losses and claims in respect of:
 - i. Death of or injury to any person or
 - ii. Loss of or damage to any property (other than the works)
 - iii. which may arise out of in consequent of the Operation and maintenance of the Lift Irrigation Scheme with Civil , Mechanical and Electrical etc works and the remedying of any defects therein ,and against all claims proceedings, damages, costs, charges and expenses whatsoever in respect there to.
- The insurance policy shall include a cross liability clause such that the insurance shall apply to the contractor and to the Employer as separate insurers.
- The Employer shall not liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the contractor or any subcontractor other than detain or injury resulting from any act or default of the Employer his agents or servants. The contractor shall identify and keep indemnified the Employer against all such damages and compensation other than those for which the Employer is liable as aforesaid, and against all claims proceedings damages costs, charges and expenses whatsoever in respect thereof or in relation thereof.

14. **PERSONNEL:** All Contractor's personnel employed during operation and maintenance period at the Lift Irrigation Scheme with Civil , Mechanical and Electrical etc works at any time during the period covered by the present contract will be provided by him. The Employer is not liable for personnel in any way and cannot be held responsible in the event of litigation of any sort between the contractor and members of the Lift Irrigation Scheme with Civil, Mechanical and Electrical etc works personnel or their representatives.

All decisions related to staff numbers and qualifications should be approved by the E I C.

The Contractor undertakes to comply with applicable legislation and the code of labour law on

matters of health, hygiene and safety and shall assume responsibility for works required in the event of any change in applicable regulations.

Sr. No.	Description	Minimum Qualification Required	Requirement	Penalty rate per month in case of non-compliance in Rs.
1	Expert in Agriculture	B.R.S.	Minimum one day visit per month, for 5 year of O&M Period	2,000.00
2	Social Development	B.S.W	Minimum one day visit per month, for 5 year of O&M Period	2,000.00
3	Social Worker	Master in Social workers/MSW	Minimum one day visit per month, for 5 year of O&M Period	2,000.00
4	Operator/ Chowkidar for L.I. Scheme	SSC	Minimum 2 persons, throughout the O&M period of five years	10,000.00 per person

15. In case of failure in confirming the above requirement, it shall be carried out by department at risk and cost of the Agency and the amount will be recovered from the bill or deposit available for the works under Department.

Measurement & Payment:

1. The target development of command area for providing irrigation facility is 65 Hact.
2. The yearly target for providing irrigation facility is as under :

1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
40% area	70% area	100% area	100% area	100% area

Note :

- a. The area overlapping in single crop shall not be considered for other season, during any year.
 - b. In the case when no water is available for irrigation, only 30% of the payable rate shall be payable for maintaining all the project components.
 - c. After 2nd year, in the case of providing irrigation facility in lesser area, the payment shall be made at reduced rate and the decision of Engineer in Charge is final and binding to the contractor.
3. In case of excess irrigation coverage, no extra payment shall be made.
 4. The Payment of O & M works shall be made on yearly basis.

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

BILL OF QUANTITIES

Preamble

1. The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.
2. 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.
3. 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.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. 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).
6. 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.
7. 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.
8. The method of completed work of payment shall be in accordance with the specification for NWRWSK Department. For building works specifications for building and Road Department are to be followed.
9. Errors will be corrected by the Employer for any arithmetic errors pursuant to **Clause29** of the Instructions to Bidder.
10. 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.

BILL OF QUANTITIES

(A) Percentage Rate Tender (Upto INR 50 Cr.)

(B)

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures	Amount

I/We am/are willing to carry out the work at..... %above/below percent (Should Be written in figures and words) of the estimated rate mentioned above. Amount of my/our tender works out as under.

Estimated amount put to tender

Estimated amount put to tender

Deduct.....%below

Add.....%Above

Net

Net

In words

In words

(C) For Item Rate Tender (For above INR 50 Cr.):

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate		Amount
				In figures	In Words	

(A) Total Tendered Amount

(B) Rebate on above tendered amount (if any) % (in figure)

(in words)

(C) Net Tendered Amount (A-B) (in figure)

(In words)

#

1	The Contractor shall exhibit a board with detailed specification and details of work as directed by the Engineer-In-Charge for which no extra payment shall be made.
2	The labor cess will be deducted as per prevailing rules i.e. 1% of the work done.
3	GST and Income tax TDS will be deducted at a source while making payments of bills
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/CDate: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.

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 boundun to ----- (name of Employer) (Herein after 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

D. Fails or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders; or

E. does not accept the correction of the Bid Price pursuant to Clause27 (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 upto 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, upto 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, upto 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 **28days** 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) (herein after called -- "the Contractor") shall deposit with (name of Employer) a bank guarantees 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'STRULY

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

(Letterhead 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)

To, _____ (date)

_____(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) (Herein after 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 WITNESSET HAS FOLLOWS

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to the min the conditions of contract herein after 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

SECTION-9
DRAWINGS

SECTION-10
DOCUMENTS TO BE FURNISHED BY BIDDER