

STANDARD BIDDING DOCUMENT

PROCUREMENT OF CIVIL WORKS

COMPLETE BIDDING DOCUMENT



GOVERNMENT OF GUJARAT

NARMADA WATER RESOURCES, WATER SUPPLY & KALPSAR DEPARTMENT

RAJKOT IRRIGATION PROJECT CIRCLE, RAJKOT

E-TENDER PAPER FOR THE WORK OF

Name of work : WAGADIA WATER RESOURCES PROJECT
Construction of Simtal Road along river Nani Fulzar at village :
Wagadia Tal. & Dist. Jamnagar.

- | | | | |
|----|--|----|---|
| 1. | Estimated cost put to tender | :- | Rs. 1,52,89,876=24 |
| 2. | Earnest Money Deposit | :- | Rs. 1,53,000=00 |
| 3. | Last Date of Downloading of Tender | :- | Date 23-07-2026
Up to 18.00 Hrs.(I.S.T.) |
| 4. | Last Date of online Submission of Price Bid. | :- | Date 23-07-2026
Up to 18.00 Hrs.(I.S.T.) |
| 5. | Date of Opening (Online) Price-Bid | :- | Date 24-07-2026
@ 12.00 Hrs. (I.S.T.) |

OFFICE OF THE EXECUTIVE ENGINEER

UND IRRIGATION DIVISION

“Seva Sadan No.4”Ground Floor, Beside Rajpark Society,
Jamnagar-Rajkot Highway, Jamnagar-361001

PHONE No.(0288)2572088

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GOVERNMENT OF GUJARAT
Water Resources Department

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INVITATION FOR BID (IFB)

NATIONAL COMPETITIVE BIDDING

- 1.0 The **Executive Engineer, Und Irrigation Division, Jamnagar** invites bids for the construction of works detailed in the table. The bidders may submit bids for any or all of the following works.

TABLE

Package No.	Name of work	Approximate value of works (Rs.)	Bid security (Rs.)	Cost of document (Rs.)	Period of completion	Class of Registration Required
1	2	3	4	5	6	7
1	<u>Wagadia W.R. Project.</u> Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar.	1,52,89,876=24	1,53,000/-	3,600/-	11(Eleven) Months	"B" & Above

- 2.0 Prospective / Interested bidder may download the Bid Documents from website <https://tender.nprocure.com> free of cost till the Time and Date as mentioned on online NIT at website <https://tender.nprocure.com>.

#

- 3.0 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 **Jamnagar** and in favour of 'Executive Engineer, **Und Irrigation Division, Jamnagar.**' Once the Bid is received online, Bid Document / Tender Fee will not be refundable. As per GoG R&B Department's Circular No. PARCH/102/000/IB/221/(59)/C Dtd.24/01/2007.

The Demand Draft for Bid Document / Tender fee and FDR / Bank Guarantee against Bid Security / EMD shall be submitted in electronic format through online (by scanning) while uploading the bid, this submission shall mean that bid document / tender fee and Bid Security / EMD has been received. Accordingly, the offer of only those shall be opened whose Bid Document / Tender Fee and Bid Security / EMD have been received electronically. However, for the purpose of realization of Demand Draft, and FDR / Bank Guarantee bidder shall send the same in original through R.P.A.D. so as to reach to #Executive Engineer, **Und Irrigation Division, Jamnagar** within 7 Days from the last day of bid submission.

Penaltative action for not submitting Demand Draft / FDR / Bank Guarantee in original to Executive Engineer / Tender Inviting Authority by bidder shall be initiated. **WRD GR No. PRC-102014-1-MICell-K.1 Dtd.29-10-2014 & Dtd. 21/05-2022.**

- 4.0 Bids received online, will be opened on the time, date and place as specified in the online NIT at website <https://tender.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 Dt.....12.00 hrs. at the office of Superintending Engineer, Rajkot Irrigation Project Circle, 2/5, Jilla Seva Sadan-2, Rajkot-360001. Ph. No. 0281-2443680 to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents. DELETED~~

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

- 7.0 **Other Information is as under :-**

A. Agencies can prepare and edit their offers a number of times before the end of the tender submission date and time. After the tender submission date and time, the bidder cannot modify / edit / withdraw their submitted offer in any case. No written or online request in this regard shall be granted.

- B. Offers in physical form will not be accepted in any case.
- C. Demand Draft purchased by the other than bidder and issued after the last date of submission of Bids, will not be considered or accepted.
- D. The cost incurred by the contractor for this offer for clarification or attending discussion, conferences or site visits will not be reimbursed by the Employer or Engineer-in-Charge.
- E. Conditional tender shall not be accepted.
- F. Any changes, addition, alternation made in the prescribed form attached with tender are liable to be rejected.
- G. Any change in format or conditional Bank Guarantee will not be accepted and the bidder will be considered non-responsive.
- H. All the bidders are instructed to fill in information strictly in accordance with the format given in the checklist /qualification document / tender document.
- I. It is mandatory for the bidders to supply each and every information as asked strictly in electronic format at appropriate places only.
- J. Blank / insufficient information shall be treated as nil information and shall result in disqualification.
- K. Even if the bidder has been qualified in a similar or larger size of project in the past, it shall not be deemed to be a ground / reason for not giving required information for this work / bid.
- L. Information supplied for earlier projects shall not be considered while evaluation of this bid. The Government will not ask for any other information, unless it is found absolutely necessary by the competent authority.
- M. If found necessary, the contractor will be intimated for negotiation,

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

For the works costing under Rs. 7.5 crore for Construction work of Water Resources Department, Rs. 7.0 crore for Roads, Bridges and Building and Rs. 0.50 crore for Electrical work following documents shall be submitted in electronic format 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.

- (i) Bid Document Fee / Tender Fee
- (ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors
- (iii) Registration Certificate of Appropriate Class
- (iv) Copy of Pan Card & GST Number
- (v) 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 credit facilities up to 25 percent of the value of the contract / contracts applied.
- (vi) ~~Work Experience, if necessary.~~ **DELETED**
- (vii) Other Documents, as required. (As Per Section-10)
- (viii) Undertaking for Bid Validity. (As Per P.No.90)

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SECTION-1
INSTRUCTIONS TO BIDDERS
(ITB)

Section-1 :- Instructions to Bidders

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A. GENERAL

1.0 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/ tenderer, bid / tender, bidding/ tendering, etc.) are synonymous.

2.0 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.

3.1 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.

4.0 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. DELETED~~

~~4.2 Deleted~~

~~4.3 Deleted~~

~~4.4 Deleted~~

~~# 4.5 Qualification criteria :- DELETED~~

~~(Applicable for the works which require Pre Qualification) As Per GoG NWRWS & K Department's Circular No.Paracha/1097/1397(11)/pa.fa./MICELL(k-1) Dated 18/01/2018)~~

- ~~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 :- DELETED~~

~~4.5.2 Base year and Escalation :- DELETED~~

~~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	20__-20__	1.00
-1	20__-20__	1.10
-2	20__-20__	1.21
-3	20__-20__	1.33
-4	20__-20__	1.46
-5	20__-20__	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 :- DELETED~~

~~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 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)~~

~~(c) Contractor should have completed 60% of quantity of principal items of work like concrete, earthwork, pipeline, pumping station etc. 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 :- DELETED

~~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 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. DELETED~~

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 financial years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the applicant.

4.5.9 Disqualification :-

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

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

4.5.10 The bidder who have 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) :- DELETED~~

~~(Applicable only for estimated project cost of 50 Crore and above) :-~~

~~4.6.1 Joint ventures must comply with the following requirement :-~~

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

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

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

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

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

~~4.7 Bid Capacity. :- DELETED~~

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

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

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

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

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

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

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

- ~~- Made misleading or false representation in the 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.

5.0 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.

6.0 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.

7.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

B. BIDDING DOCUMENTS

8.0 Content of Bidding Documents

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

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

- 8.2 Volumes I, II, III and IV are available online and documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume-V in two parts (refer clause 12).
- 8.3 The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, 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.

9.0 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 :-~~ **DELETED**

- ~~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. tender.nprocure.com. Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.~~

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

10.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

C. PREPARATION OF BIDS

11.1 Language of the Bid :-

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

12.0 Documents Comprising the Bid :-

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

Part-I shall be named "Technical Bid" and shall comprise

- (i) Bid Document Fee / Tender Fee
- (ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors
- (iii) Registration Certificate of Appropriate Class
- (iv) Copy of Pan Card & GST Number
- (v) 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 credit facilities up to 25 percent of the value of the contract / contracts applied.
- ~~(v) Qualification Information and supporting documents as specified in Section 2-DELETED~~
- ~~(vi) Certificates, undertakings, affidavits as specified in Section 2-DELETED~~
- ~~(vii) Any other information pursuant to Clause 4.5 of these instructions-DELETED~~
- (viii) Undertaking that the bid shall remain valid for the period specified in Clause 15.1
- (ix) Undertaking for Bid Validity. (As Per P.No.90)

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	I
1	Instructions to Bidders	
2	Pre Qualification Information, and Other Forms-DELETED	
3	Conditions of Contract	
4	Contract Data	
5	Technical Specifications	II
6	Form of Bid	III
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings-DELETED	IV
10	Documents to be furnished by bidder (As Per Section-10)	V

13.0 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)**
- 14.0 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.
- 15.0 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.

#16.0 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/4/2024/2859/D.M.O. Date 01/05/2025 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 (As Per Section-8).
- 16.6 The bid Security may be forfeited
- (a) If the Bidder withdraws the bid after Bid opening during the period of Bid validity.
 - (b) If the Bidder does not accept the correction of the Bid Price, if any or
 - (c) In the case of a successful Bidders, if the Bidder fails the specified time limit to
 - (i) Sign the Agreement; or
 - (ii) Furnish the requirement Performance Security (As Per Section-8).
 - (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.8-6-2018)

17.0 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.

18.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

D. SUBMISSION OF BIDS

19.0 Deleted

20.0 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.

21.0 Deleted

22.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

E. BID OPENING AND EVALUATION

23.0 Bid Opening :-

- 23.1 The Employer will open all the Bids received including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clauses 20 and 23.3, In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.
- 23.2 Deleted.
- 23.3 The “Technical Bid” shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the invitation for bid (ref. Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the financial bid will not be opened.
- 23.4.1 (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.

24.0 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.

25.0 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.

26.0 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.

27.0 Deleted

28.0 Deleted

29.0 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.

30.0 Deleted

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

F. AWARD OF CONTRACT

31.0 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.

32.0 Employer's Right to Accept any Bid and to Reject any or all Bids :-

32.1 Not with standing 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.

33.0 Notification of Award and Signing of Agreement :-

33.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition of contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

33.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security (As Per Section-8) 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 (As Per Section-8), the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34.0 Performance Security :-

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

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

- (a) If the Contract Price offered by the Selected Bidder is lower than 10% but upto 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 20% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
 - (b) If the Contract Price offered by the Selected Bidder is lower than 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 30% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
 - (c) This Additional Performance Security shall be treated as part of the Performance Security.
- (B) The Performance Security shall be valid beyond 60 (sixty) days **from the stipulated date of completion of the project** and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

Performance security shall become refundable / releasable within 15 days after certified project completion date subject to fulfillment to contractual obligation and settlement of all dues and claims.

- 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.

~~35.0 Advance Payment and Security :- DELETED~~

~~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.~~

36.0 Deleted

37.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

APPENDIX TO ITB

Clause Reference With respect to Section-1

1. The Name of the Employer is **Executive Engineer, Und Irrigation Division, Jamnagar** [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 NOT APPLICABLE~~ DELETED
4. Value of Work is Rs. **152.90** Lac
5. Deleted
6. ~~The cost of electric work is NOT APPLICABLE~~ DELETED
7. ~~The cost of water supply / sanitary works is NOT APPLICABLE~~ DELETED
8. Liquid assets and availability of credit facilities is Rs. 38.22 Lakhs
9. ~~Price level of the financial year NOT APPLICABLE~~ DELETED
10. ~~The pre-bid meeting will take place at Superintending Engineer, Rajkot Irrigation Project Circle, 2/5, Jilla Seva Sadan-2, Rajkot-360001~~ DELETED
11. The technical Bid will be opened at the office of the **Superintending Engineer, Rajkot Irrigation Project Circle, 2/5, Jilla Seva Sadan-2, Rajkot** on **Date 24-07-2026 at 12.00 AM/ PM**
12. Address of the Employer: **Executive Engineer, Und Irrigation Division, Jilla Seva Sadan-4, Ground Floor, Jamnagar**
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 **Superintending Engineer, Rajkot Irrigation Project Circle, Rajkot** as stated on online NIT [Cl. 23.1]
16. The Bank Demand Draft in favor of **"Executive Engineer, Und Irrigation Division, Jamnagar"**.
17. Deleted
18. ~~Escalation factors (for the cost of works executed and financial figure to a common base value) for works completed~~ DELETED

Year	Financial Year	Multiplying factor
Base year of inviting tender	20__-20__	1.00
-1	20__-20__	1.10
-2	20__-20__	1.21
-3	20__-20__	1.33
-4	20__-20__	1.46
-5	20__-20__	1.61

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

~~LIST OF KEY PLANT & EQUIPMENT TO BE DEPLOYED ON CONTRACT WORK~~
~~[Reference Cl. 4.5.5]~~

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

Sr. No.	Plant or Machinery	Location	Age of Machinery (Maximum 15 Years)	Make	Capacity	Approximate Value	Remarks
1	2(a)	2(b)	3	4	5	6	7
DELETED							

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

List of Key Personnel to be deployed on Contract Work

(Reference Cl. 4.5.4)

Employment of a qualified site Engineer by the Contractor :-

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

- 1.0 Two graduate Civil Engineers and three diploma Civil Engineers when cost of the work to be executed is more than Rs.50 lakhs.
- ~~2.0 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. **DELETED**~~
- ~~3.0 Minimum Two Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs. **DELETED**~~
- ~~4.0 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. **DELETED**~~

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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SECTION-2
QUALIFICATION INFORMATION
[NOT APPLICABLE]

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.

~~1.0 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 — 20 — 20~~

Work performed in the last five years — 20 — 20

(— in Rs. Lakhs) — 20 — 20

_____ 20 — 20

_____ 20 — 20

~~1.3 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 Employee	Description of work	Contract No.	Value of Contract (Rs. Crore)	Date of issue of work order	Stipulated period of completion	Actual date of Completion	Remarks 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.~~

*To be modified as per the nature and scope of work

Year	Name of the work	Name of the Employer	Quantity of work Performed (Cum/MT)				Remarks* (indicate Contract Ref)
			Cement Concrete (including RCG & PCC Item 1)	Masonry Item 2	Earth works Item 3	Bituminous work Item 4	
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 :-

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 proposal position
Project Manager				
Etc.				

- 1.7 ~~Proposed sub contract and firms involved~~

Sections of the work	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 Programme~~

~~2.0 Deleted~~

~~3.0 Additional Requirements :-~~

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

~~(i) Affidavit~~

~~(ii) Undertaking~~

~~* Fill the name of Consultant~~

**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF
CREDIT FACILITIES
(CLAUSE 4.5.6 OF ITB)
BANK CERTIFICATE**

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

If the contract for the work, namely _____ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. _____ to meet their working capital requirements for executing the above during the contract period.

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

AFFIDAVIT

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

(Signed by an Authorized Officer of the Firm)

Title of Officer

Name of Firm

Date

UNDERTAKING

I, the undersigned do hereby undertake _____ that our firm M/s _____ would invest a minimum cash 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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CONDITIONS OF CONTRACT

A. GENERAL

1.0 Definitions :-

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meaning.
- 1.2 **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid
- 1.3 **Compensation Events** are those defined in Clause 44 hereunder
- 1.4 The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1
- 1.5 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.
- 1.6 The **Contract data** defines the documents and other information which comprise the Contract.
- 1.7 The **Contractor** is a person or corporate body whose Bid to carry out the Work has been accepted by the Employer.
- 1.8 The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial Bids.
- 1.9 The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.
- 1.9 **Days** are calendar days: **months** are calendar months.
- 1.10 The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.
- 1.11 The **Employer** is the party who will employ the Contractor to carry out the Works.
- 1.12 **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.
- 1.13 **Equipment** is Contractor's machinery and vehicles brought temporarily to the site to construct the Works.
- 1.14 The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

- 1.15 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.
- 1.16 **Materials** are all supplies, including consumables, used by the contractor for incorporation in the works.
- 1.17 **Plant** is any integral part of the work which is to have mechanical, electrical, electronic or chemical or biological functions.
- 1.18 The **Site** is the area defined as such in the Contract Data.
- 1.19 **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.
- 1.20 **Specifications** means the Specifications of the works included in the Contract and any modification or addition made or approved by the Engineer.
- 1.21 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.
- 1.22 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.
- 1.23 **Temporary Works** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.
- 1.24 A **Variation** is an instruction given by the Engineer, which varies the Works.
- 1.25 The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2.0 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.

3.0 Language and Law :-

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

4.0 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.

5.0 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.

6.0 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).

~~7.0 Sub-Contracting :-~~ DELETED

- ~~7.1 The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**~~

- ~~7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.~~

8.0 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.

9.0 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.

10.0 Employer's and Contractors Risks :-

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

11.0 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.

12.0 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.

13.0 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.

14.0 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.

15.0 Queries about the Contract data :-

15.1 The engineer will clarify queries on the Contract Data

16.0 Contractor to Construct the Works :-

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

17.0 The Works to be completed by the Intended Completion Date

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

18.0 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.

19.0 Safety :-

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

20.0 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.

21.0 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.

22.0 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.

23.0 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.

24.0 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, Rajkot Irrigation Project Circle, Rajkot** (Higher Authority) within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the Superintending Engineer.
- 24.2 (a) For the work upto Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer, Rajkot Irrigation Project Circle, Rajkot**, both the parties have to refer to the Chief Engineer (Saurashtra-N.W.R.W.S. & KD) 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, Rajkot Irrigation Project Circle, Rajkot**, both the parties have to refer to the Secretary, Water Resources Department, Government of Gujarat for the conciliation process.

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

25.0 Procedure for Disputers :-

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

26.0 Deleted

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

B. TIME CONTROL

27.0 Programme :-

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

28.0 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

29.0 Deleted

30.0 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.

31.0 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.

32.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

C. QUALITY CONTROL

33.0 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 here under from the certified date of completion. The Engineer in charge shall give the contractor a notice in writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the part of the contractor, the Engineer-in-charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, Incurred by him in rectification, removal or re-execution. The Defects Liability period shall be as under....

(A) For 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. ~~DELETED~~
- (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. ~~DELETED~~
 - (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. ~~DELETED~~
- (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. ~~DELETED~~
 - (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. ~~DELETED~~
- (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 :- ~~DELETED~~

~~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 :- ~~DELETED~~

~~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~~

~~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. 13/12/13).~~
- ~~(3) Videography for the surface under Maintenance Guarantee is to be done as per Govt. letter No.: SSR/10/2015-16/26/C, Dtd. 26/11/15 for the work costing more than Rs. 5.00 Crore.~~
- ~~(4) Setting up of adequate laboratory & deployment of quality engineers. The contractor shall have to set up the laboratory with adequate equipment. Till the setting up of adequate laboratory is completed & reported of this to the engineer (subject to due verification by engineer's representative) by contractor in writing, Rs. 2,00,000/- shall be withheld. The qualified quality Engineer shall be deployed exclusively for this contract by the contractors. If quality Engineer is not deployed by contractor within one month after the date of work order, the amount equivalent to Rs. 20,000 per month shall be recovered till the actual deployment of quality engineer. The amount so recovered towards the deployment of quality engineers shall not be refunded.~~
- ~~(5) Asphalt work will have to be cross checked as per G.R. No.: RGN/60/2006/35/C, dtd. 31/05/07 before final bill is paid.~~

~~(6) Maintenance during Construction Period :-~~

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

~~of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the 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.~~

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

34.0 Tests :-

- 34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.
- 34.2 # 1% of the amount of work done for works upto Rs.10 crore of estimate cost should be deducted from R.A. Bill of the contractor for testing the quality of material workmanship. Whereas for estimated cost of works more than 10 crore, the charges for testing of quality of material workmanship shall be deducted from R.A. bill of contractor as per actual charges. ~~As Per GoG NWRWS & K Department's Circular No. PARCH/132023/401/MICELL Dated: 05/10/2023.~~ **DELETED**
- 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.

35.0 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.

36.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

D. COST CONTROL

37.0 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.

38.0 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.

39.0 Variations :-

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

40.0 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 before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of the dispute, the decision of the Superintending Engineer of the Circle shall be final.

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

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

41.0 Cash Flow Forecasts :-

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

42.0 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

43.0 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.

44.0 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.

45.0 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.

46.0 Currencies :-

- 46.1 All payment shall be made in Indian Rupees.

47.0 Price Adjustment :-

- 47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, 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.

48.0 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 Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.
- 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.

49.0 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.

~~50.0 Bonus :- DELTED~~

- ~~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%

~~51.0 Advance Payment :-DELETED~~

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

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

~~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~~

52.0 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 certified date of completion of the project 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 of the work.

Performance and Additional Performance Security shall become refundable / releasable within 15 days after project certified completion date subject to fulfillment of contractual obligation and settlement of all dues and claims.

53.0 Deleted

54.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

E. FINISHING THE CONTRACT

55.0 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.

56.0 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.

57.0 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.

~~58.0 Operating and Maintenance Manuals :-~~ DELETED

- ~~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.~~

59.0 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 programme and the stoppage has not been authorized by the Engineer
2. The Engineer instructs the Contractor to delay the progress of the Works and the instructions is not withdrawn within 28 days;
3. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstructions or amalgamation
4. A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate
5. The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
6. The Contractor does not maintain a security which is required;
7. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
8. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

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

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 Not with standing the above, the employer may terminate the Contract for convenience.

60.0 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.

61.0 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.

62.0 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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

F. SPECIAL CONDITIONS OF CONTRACT

63.0 LABOUR :-

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

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

64.0 COMPLIANCE WITH LABOUR REGULATIONS :-

During continuance of the contract, the Contractor and his sub- contractor shall abide at all times by all existing labour enactments and rules made there under, regulations, notification and bye laws of the State or central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour 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 there under, 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 to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer, if they employ 50 or more contract labour.

(F) Minimum Wages Act 1948 :-

The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Building, Roads, Runways are scheduled employment.

(G) Payments of wages Act 1936 :-

It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

(H) Equal remunerations Act 1979 :-

The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against female employees in the matter of transfer, training and promotions etc.

(I) Payments of Bonus Act 1965 :-

The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above Rs. 3500/- per month shall be worked out by taking wages as Rs.2500/- per month only. The Act does not

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

(J) Industrial Disputes Act 1947 :-

The Act lays down the machinery and procedure for resolutions of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(K) Industrial employment (standing Orders) Act 1946 :-

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

(L) Trade Unions Act 1926 :-

The Act lays the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have given certain immunities from civil and criminal liabilities.

(M) Child Labour (Prohibition & Regulation Act 1986 :-

The Act prohibits employment of children below 14 years of age in certain occupations and process and provides for regulation of employment of children in all other occupations and processes. Employment of Child labour is prohibited in Building and Construction Industry.

(N) Inter - State Migrant workmen's (Regulation of Employment & Conditions of service) Act 1979 :-

The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

(O) The Building and Other Construction workers (Regulation of employment and Conditions of Service) Act 1996 and the Cess Act of 1996 :-

All the establishments who carry on any building or other constructions work and employ 10 or more workers are covered under this Act.

All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, First Aid facilities, Ambulance, Housing accommodations for workers near the workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

(P) Factories Act 1948 :-

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

(Q) Royalty charges :-

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

The Contractor shall ensure submission of all requisite details and documents for obtaining No Objection Certificate (NOC) /Royalty No Dues Certificate from the Mining Department, in accordance with Circular No.CGM/GMPIMTS/NOC/2025-26 dated 19/01/2026. The final bill shall be released only upon submission of valid certificates issued by the Mining Department; no claim whatsoever arising out of non-compliance with the above requirements shall be entertained."

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

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

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

65.0 ARBITRATION (GCC Clause 24) :-

The procedure for arbitration will be as follows : -

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

24.2 (a) the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer, Rajkot Irrigation Project Circle, Rajkot** both the parties have to refer to the **Chief Engineer (Saurashtra) & Additional Secretary, Narmada, Water Resources, Water Supply & Kalpsar Department, Gandhinagar** concerned for the conciliation process.

~~(b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the Superintending Engineer, both parties have to refer to the **Secretary, (Water Resources) Narmada, Water Resources, Water Supply & Kalpsar Department, Gandhinagar** Government of Gujarat for the conciliation process.~~ **DELETED**

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.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SECTION-4
CONTRACT DATA

#CONTRACT DATA

	Clause Ref. With respect to section 3
Item marked "N/A" do not apply to this Contract.	
1. The Employer is (Name) Executive Engineer, Und Irrigation Division, Jamnagar (Address) Jilla Seva Sadan-4, Ground Floor, Jamnagar-Rajkot Highway, Beside Rajpark Society, Jamnagar-361001 Name of authorized Representative (will be intimated later)	[CL. 1.1]
2. The Engineer is Executive Engineer, Und Irrigation Division, Jamnagar. Name of Authorized Representative:	
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 11 (Eleven) Months after start of work with the following milestones: Milestone dates:	[CL.1.1,17&2]
<u>Physical works to be completed Period from the start date</u>	[CL.2.2 & 49.1]
Milestone 1 i.e. 25 % 83 Days	
Milestone 2 i.e. 50 % 165 Days	
Milestone 3 i.e. 75% 248 Days	
Milestone 4 i.e. 100% 330 Days	
6. The Site is located at Wagadia Dam site Near village Moti Bhalsan, Tal. Jamnagar, Dist. Jamnagar	[CL. 1.1]
7. The name and identification number of the Contract is:.....	[CL. 1.1]
8. The works consist of Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar with items as per B.O.Q. The works shall inter alia, include the following, as Specified or as directed.	[CL. 1.1]
(A) WRD Works	[CL. 1.1]

Site clearance; setting – out and layout; Construction and Maintenance of all types of dams and its component, earthen dam; spillway; installation of gate; excavation and earth work, approach road, Inspection Bunglows, checkdams, bandhara, T.R., weir, barrages, Flood Protection & Anti Sea Erosion work, canal lining and structures, , CD Works, structure repairing, Jungle cutting, Desilting, etc. other WRD works

~~(B) Road Works :~~

~~Site clearance; setting out and layout widening of existing carriageway and strengthening including camber corrections; construction of new road/ Parallel service road; bituminous pavements remodeling/construction of junctions, intersections, bus bays, lay bays; supplying and placing of drainage Channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridge, approaches and other related stones; protective works for roads/bridge; all aspects of quality assurance of various components of the works; rectification of The defects in the completed works during the Defects Liability Period; submission of "As-built" drawings and any other related documents; and other item of work as may be required to be carried out for completing the work in accordance with the drawings and the provisions of the contract and to ensure safety.~~

(C) Bridge Works

~~provision of foundations, piers abutments and bearing; prestressed / reinforced cement concrete superstructure; wearing coat, hand railings, expansion joints, approach slabs, drainages spouts/ dwnake pipes, arrangements for fixing light posts, water mains, utilities etc; provision of suitably designed protective works; providing wing/return walls; provision of road markings, road signs etc.; all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of "As-built" drawings and other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety~~

(D) Other Items :-

Any other items as required to fulfill all contractual obligations as per the Bid documents.

10. The following documents also form part of the Contract: As per clause 2-3 [CL. 2.3(9)]
 - (i) Bid Document Fee / Tender Fee.
 - (ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors.
 - (iii) Registration Certificate of Appropriate Class.
 - ~~(iv) Registration Certificate of Special Category Road / Bridge / Building and Category I / II / III, if required. DELETED~~
 - (v) GST Number
 - ~~(vi) Current Calanedar Year Bank Solvency Certificate of the year 2026 (20% value of Estimated cost put to Tender) DELETED~~
 - ~~(vii) Work Experience, if necessary... DELETED~~
 - (viii) Other Documents, as required... (As Per Section-10)
 - ~~(x) Document necessary for P.Q. DELETED~~
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 sub-contracting 25% of the Initial Contract Price. DELETED~~ [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 **from issue of work order.** [CL. 21]
19. The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance. [CL. 27.1]
20. The period between program updates will be 83 Days [CL. 27.3]
21. The amount to be withheld for late submission of an updated programme shall be @ 0.2% of contract price. [CL. 27.3]
22. The following events shall also be Compensation Events Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document. [CL. 44]
 - (i) Removal of underground utilities detected subsequently.
 - (ii) Significant changes in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation,
 - (iii) Removal of unsuitable material like marsh, debris dumps, etc. not caused by the contractor.

- (iv) Artesian conditions
 - (v) Seepage, erosion landslide
 - (vi) River training requiring protection of permanent work
 - (vii) Presence of historical, archeological or religious structures, monuments interfering with the works
 - (viii) Restriction of access to ground imposed by civil, judicial, or military authority
23. The currency of the Contract is Indian Rupees [CL. 46]
24. **The formula (e) for adjustment of prices are as under :-** [CL. 47]
- If any of the commodities like Cement, Steel or Bitumen are not found applicable in a work, the weight component of that commodities {i.e. 'Cement' (Pc), 'Steel' (Ps) or 'Bitumen' (Pb) as indicated in SBD for the purpose of Price Adjustment} shall be clubbed with the weight component of 'Other Material' (Pm), such that the gross % weight of the components shall remain as 100%.
 R = value of work as defined in Clause 47.1 of Conditions of Contract.

Adjustment for labour component :-

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

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

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

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 Labour Bureau, Ministry of Labour, Government of India

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

P_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.

DELETED

Adjustments of bitumen component

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

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

 ~~V_b = Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.~~
 ~~B_0 = The official retail price of bitumen at the IOC depot at the nearest centre on the day 28 days prior to the scheduled date of opening of technical bid.~~
 ~~B_i = The official price of bitumen of IOC depot at the nearest centre :~~

- ~~- For the first 15 days of the month under consideration, the price declared on the 1st day of that month.
 - For the remaining days of the month under consideration, the rate declared on the 16th day of that month.~~

 ~~P_b = Percentage of bitumen component of the work.~~

Adjustment of POL (fuel and lubricant) component

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

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

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

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

P_f = Percentage of fuel and lubricants component of the work

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

Adjustment for Construction Machinery

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

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

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

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

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

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

Adjustment of other materials Component

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

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

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

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

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

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

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

1. Labour -PI	29.82 %
2. Cement - Po	29.49 %
3. Steel - Ps	7.83 %
4. Bitumen - Pb	0 %
5. POL - Pf	1.34 %
6. Plant & Machinery Spares Pp	5.34 %
7. Other Materials - Pm	26.18 %
Total	100.00 %

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

- | | | | |
|-----|---|--|---------------------|
| 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 Section 3. | [CL. 50]
DELETED |
| 29. | Maximum limit of bonus for early Completion of work | 5 percent of the Contract Price. | [CL. 50]
DELETED |
| 30. | The amount of the advance payment are :- DELETED | | [CL. 51 & 52] |

Nature of Advances

Amount (Rs.) Conditions to be fulfilled

- | | | |
|------|---|---|
| i. | Mobilization :-
10% of the contract Price | On submission of unconditional Bank Guarantee. (to be drawn before the end of 20% of the contract period). The contractor may furnish four bank guarantees of 2.5 % of each valid for the full period. |
| ii. | Equipment :-
90% for new and 50% of depreciated value for old equipment. Total amount will be subject to a maximum of 5% of the Contract Price. | After equipment is brought to site (provided the Engineer is satisfied That the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance |
| iii. | <div style="display: inline-block; vertical-align: middle;"> Secured Advance for Non-perishable material Brought to site </div> <div style="display: inline-block; vertical-align: middle; font-size: 3em; margin: 0 10px;">}</div> <div style="display: inline-block; vertical-align: middle;"> Deleted </div> | |

~~(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 :- DELETED | [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. DELETED~~

32. **Deleted**

33. The securities shall be for the following minimum amounts equivalent [CL. 52]

As a percentage of the Contract Price :

Performance Security for 5 percent of contract price plus Rs.

(to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5.

The standard form of Performance security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.

34. ~~The Schedule of Operating and maintenance Manuals.....N/A~~ **DELETED** [CL. 58]

35. The date by which “as- built” drawings (in scale as directed) in 2 sets 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. [CL. 58]

36. ~~The amount to be withheld for failing to supply “as built” drawings by the Date required is~~ **5% of Estimated cost put to tender.** **DELETED** [CL. 58]

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 the Employer’s additional cost for completing the Works shall be 20%. [CL. 60]

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SECTION - 5

TECHNICAL SPECIFICATION

AS PER ATTACHMENT ON PAGE NO. 97

SECTION - 6
FORM OF BID

FORM OF BID

Description of the Works :

BID

To :

Address :

1.0 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 _____

(_____)

2.0 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.

3.0 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.

4.0 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.

5.0 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

- 1.0 The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.
- 2.0 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.
- 3.0 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.
- 4.0 The rates and prices shall be quoted entirely in Indian Currency.
- 5.0 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).
- 6.0 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.
- 7.0 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.
- 8.0 The method of completed work of payment shall be in accordance with the specification for Road and Bridge works. For building works specifications for building are to be followed.
- 9.0 Errors will be corrected by the Employer for any arithmetic errors pursuant to **Clause 29** of the Instructions to Bidder.
- 10.0 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 (Up to INR 10 Cr.)

Item No.	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures (Without GST)	Amount
AS PER ATTACHMENT ON PAGE NO. 94 TO 96					

I am/we are willing to carry out the work at _____ % below/above percent (Should be written in figures and words) of the estimated rates 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

(B) ~~For Item Rate Tender (For above INR 10 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).....

#

- 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.
- The labour cess will be deducted as per prevailing rules i.e.1% of the work done.
- GST and Income tax TDS will be deducted at a source while making payments of bills
- In all R.C.C. Items in Rate Analysis Standard Cement Consumption has been taken as per Govt.G.R.:PRC-10/2017CementConsumption/16/CDate:11/05/2017as stated in S.O.R. therefore in R.C.C. items where there is a change as per actual mix design the cost of difference of cement consumption have been deducted from the rate of original item at the rate of input rate mentioned in all the tender.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SECTION - 8
SECURITIES AND OTHER FORMS

BID SECURITY (BANK GUARANTEE)

WHEREAS, ----- (name of Bidder) (hereinafter called the "The Bidder") has submitted his bid Dated ----- (Date) for the construction of -----
----- (Name of Contractor hereinafter called "the Bid")

KNOW ALL PEOPLE by these presents that We ----- (name of Bank) of (name of country) having our registered office at -----
(hereinafter called "the bank") are bound unto ----- (name of Employer) (hereinafter called "The Employer") in the sum of _____* for which payment well and truly to be made to the said Employer the Bank itself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this ----- day of 20 ____
THE CONDITIONS of these obligations are :-

- (1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

OR

- (2) If the Bidder has been notified of the acceptance of his bid by the Employer during the period of Bid Validity :
 - A. Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or
 - B. Fails or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders; or
 - C. does not accept the correction of the Bid Price pursuant to Clause 27 (Correction of Errors)

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred conditions or conditions.

This Guarantee will remain in force up to and including the date _____** days after the deadline for submission of Bids as such the deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension (s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date

DATE -----

SIGNATURE-----

WITNESS -----

SEAL -----

(Signature, name and address)

* The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1(Bid Security) of the Instructions to Bidders.

**** 45 days** after the **end of the validity period** of the Bid. Date should be inserted by the Employer before the Bidding documents are issued.

PERFORMANCE SECURITY

TO,

----- (Name of Employer)
----- (Address of Employer)

WHEREAS ----- (name and address of contractor)
(hereafter called "the Contractor") has undertaken, in pursuance of Contracts No. -----
----- dates ----- to execute ----- (name of Contract and brief
description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall
furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as
security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on
behalf of the Contractor, up to a total of ----- (amount of
guarantee)* (in words), such sum being payable in types and proportions of currencies in
which the Contract prices is payable, and we undertake to pay you, upon your first written
demand and without cavil or argument, any sum or sums within the limits of -----
----- (amount of guarantee) as aforesaid without your needing to prove or to show
grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before
presenting is with the demand.

We further agree that no change or addition to or other modification of the terms of the
Contract to of the Works to be performed thereunder or of any of the Contract documents which
may be made between your and the Contractor shall in any way release us from any liability
under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until 60 days from the date of expiring of the Defect Liabilities
period.

Signature and Seal of the guarantor -----
Name of Bank -----
Address -----
Date -----

* An amount shall be inserted by the Guarantor, representing the percentage the Contract
price specified in the Contract denominated in Indian Rupees.

ADDITIONAL PERFORMANCE SECURITY

[Clause 34.1. (A)]

TO,

----- (Name of Employer)
----- (Address of Employer)

WHEREAS ----- (Name and address of contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. --
----- dates ----- to execute ----- (Name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of -----
(amount of guarantee)----- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications. This guarantee shall be valid until **28 days** from the project completion date.

Signature and Seal of the guarantor -----
Name of Bank -----
Address -----
Date -----

BANK GUARANTEE FOR ADVANCE PAYMENT DELETED

TO,

(Name of Employer)

(Address of Employer)

(Name of Contractor)

Gentlemen,

~~In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, _____ (name and address of Contractor) (hereinafter called "the Contractor") shall deposit with (name of Employer) a bank guarantee his proper and faithful performance under the said Clause of the Contract in an amount of (amount of Guarantee)* _____ in words).~~

~~We, the _____ (bank of financial institution), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ (name of Employer) on his first demand without whatsoever right of obligation on our part and without his first claim to the Contractor, in the amount not exceeding _____ (amount of guarantee)* words) _____ (in~~

~~We further agree that no change or addition to or other modifications of the terms of the Contractor or Works to be performed thereunder or of any of the Contract documents which may be made between _____ (name of Employer) and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modifications.~~

~~This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ (name of employer) receives full repayment of the same amount from the contractor.~~

YOUR'S TRULY

Signature and Seal _____

Name of Bank/ Financial Institution _____

Address _____

Date _____

* An amount shall be inserted by that Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

Letter of Acceptance
(Letter head paper of the Employer)

_____ (date)

To, _____ (Name and address of the Contractor)

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ (Name of the contract and identification number, as given in the Instructions to Bidders) for the Contract Price of Rupees _____ (____) (amount in words and figures) as corrected and modified in accordance with the Instructions to Bidders* is hereby accepted by our agency.

You are requested to furnish performance security, in the form detailed in para 34.1 of ITB for an amount equivalent to Rs. _ within **10 days** of the receipt of this letter of acceptance up to beyond **60 days** from the date of expiry of defects Liability period i.e. up to _____ and the Additional Performance Security for an amount equivalent to Rs. ____ shall be valid beyond 28 (twenty-eight) days of Project Completion Date i.e. up to _____ and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours Faithfully

Authorized Signature Name and
title of Signatory Name of
Employer

* Delete "Corrected and" or and modified if only one of these actions applies.
Delete as corrected and modified in accordance with the Instructions to Bidders, if corrections or modifications have not been effected.

Issue of Notice to proceed with the work

(Letterhead of the Employer)

----- (date)

To,

_____ (Name and address of the Contractor)

Dear Sirs,

Pursuant to your furnishing the requisite security in ITB Clause 34.1 and signing of the Contract for the construction of _____ at a bid Price of Rs. _____.

You are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully

(Signature, name and title of signatory
authorized To sign on behalf of
Employer)

AGREEMENT FOR

This agreement, made on the ___day of _____between____ (name and address of Employer) (Hereinafter called “the Employer) and _____(name an address of contractor) hereinafter called “the Contractor” of the their part.

Whereas the Employer is desirous that the Contractor execute _____

Name and identification number of contract (hereinafter called “the works”) and the employer has accepted the Bid by the Contractor for the execution and completion of such works and the remedying of any defects therein, at a cost of Rs. _____

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to and they shall be deemed to form and be read construed as part of this Agreement.
2. In Consideration of the payment to be made by the Employer to the contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to executive and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.
3. The employer hereby covenants to pay the Contractor in consideration of the execution and completion of the works and the remedying the defects wherein contract price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the contract.
4. The Following documents shall be deemed to form and be ready and construed as part of this Agreement viz.
 - (i) letter of Acceptance
 - (ii) Notice to proceed with the works:
 - (iii) Contractor’s Bid

- (iv) Conditions of contract: General and Special
- (v) Contract Data
- (vi) Additional conditions
- (vii) Drawings
- (viii) Bill of Quantities and
- (ix) Any other documents listed in the Contract
data as forming part of the Contract.

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

The Common seal of _____ Was hereunto affixed in the presence of :
Signed, sealed and Delivered by the said _____

In the presence of

Binding signature of Employer _____

Binding Signature of Contractor _____

UNDERTAKING
(For Investment)

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

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

UNDERTAKING
(For Validity)

I, the undersigned do hereby undertake that our firm M/s
..... agree to abide by this bid for a period days for date
fixed for receiving the same and it shall be binding on us and may be accepted at any
time before the expiration of that period.

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

SECTION - 9
DRAWINGS

SECTION - 10

DOCUMENTS TO BE FURNISHED BY BIDDER

(ALSO UPLOAD ALONG ONLINE DURING BID SUBMISSION)

Sr. No.	Name of Documents	Reference Clause	Reference Format Page No.
1	Bid Document Fee / Tender Fee	As per P.No.4 of National Competitive Bidder	--
2	Bid Security / EMD or Valid EMD Exemption Certificate or in terms of Bank Guarantee (Valid 165 Days from the date of bid submission) of Appropriate Class of Registration of Approved Contractors.	As per Table of IFB Refer Clause No.16 for provision of Bank Guarantee.	--
3	Registration Certificate of Appropriate Class	As per P.No.4 of National Competitive Bidder	
4	GST Number and Pan Card.	----“----	--
5	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 credit facilities up to 25 percent of the value of the contract / contracts applied.	----“----	--
6	Undertaking for Investment	----“----	P. No.34
7	Affidavit	----“----	P. No.33
8	Undertaking for Bid Validity.	----“----	P. No.90

UND IRRIGATION DIVISION, JAMNAGAR

Name of work : **WAGADIA WATER RESOURCES PROJECT**
Construction of Simtal Road along river Nani Fulzar at village :
Wagadia Tal. & Dist. Jamnagar.

SCHEDULE-A

Statement showing the cost of material to be supplied by the Department as per Schedule-A

Sr. No.	Particulars	Approximate Quantity	Rate in which Materials will be charged to the Contractor. Unusable (Rs. In Cum.)	Amount	Place of Delivery	Remarks
-----NIL-----						As per Govt. of Gujarat N.W.R.W.S. & K. Deptt. order No.MICell/102010/17/(2)K-2 Dt. 21-01-2014 but recovery done as per note.

Special Attention :-

- 1.0 As per Govt. of Gujarat N.W.R.W.S. & Kalpsar Department Order No.MICell/102010/17/(2)K.1 Dt.21-1-2014, for the hard rock, which is excavation from the work will be issued to the agency the amount will be recovered as under.
(I) Hard Rock utilized for the work recovered rate **Rs.481.81** per Cum.
(II) Hard Rock not utilized for the work recovered rate **Rs.224.08** per Cum.
- 2.0 Necessary royalty for this material have to be paid by the agency as per prevailing rules & regulation to the Industries & Mines Dept. according to classification of materials. The quantity will be same as the total quantity of Hard Rock, which is excavated from the work. This fact should be kept in mind while quoting the tender rates of these items.
- 3.0 Steel & Cement shall not be supplied by Govt. Contractor shall have to procure the materials of ISI Mark at his own cost from the market to the site of work. OPC cement 53 Grade and steel should be of standard make. Mini Factory make cement and rerolled steel should not allowed to use the work.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

BILL OF QUANTITIES

(A) Percentage Rate Tender (Up to INR 10 Cr.)

Name of work : **WAGADIA WATER RESOURCES PROJECT**
Construction of Simtal Road along river Nani Fulzar at village :
Wagadia Tal. & Dist. Jamnagar.

Item No.	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures	Amount
1	Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth upto 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials. (D) By Mechanical means in area of thorny jungle.	0.90	Hect.	34889.38	31400.44
2	Excavation in all sort of strata and formations incl. depositing the unuseful excavated stuff as and where directed incl. sorting and stacking useful materials as directed upto 200 mt lead and all lift etc. complete incl. dewatering. (A) IN OVER BURDEN HARD MURRUM.	1880.00	Cum.	79.00	148520.00
3	Providing, cutting, bending, binding and fixing in position as per drawing TMT BAR, reinforcement for R.C.C. works and anchor bars incl. cost of black annealed 16 to 18 BWG M.S.. Wire etc. complete with all lead and lift. (B) Fe-500	16.90	M.T.	76574.00	1294100.60
4	Prov. & Laying in position cement concrete using cement , sand and crushed metal coarse aggregate by mass and machine mix for PCC/RCC including necessary formworks compaction by vibrator, curing as directed with all lead & lift etc complete.(Excluding cost of steel) FOR .BODY WALL, APRON, TRAINING WALL, SIDE WALL, SPLAY WALL, KEY WALL, CUT OF WALL ETC. 4/C) Controlled Concrete Grade M-15 & MSA-40mm.	72.50	Cum.	3423.00	8831340.00
5	Providing, supplying, Lowering and laying ISI Standard R.C.C. NP-3 Class pipes in standard lengths of following Diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to Size,	72.50	Rmt.	3969.00	287752.50

Item No.	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures	Amount
	and jointing in proper position, grade and alignment at all level as level as directed by Engineer-in-charge including all labour, giving hydraulic testing as per ISI code. (G) 900mm Dia NOTE :- One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.				
6	Earthwork in embankment using excavated stuff including spreading in uniform layers breaking clods and dressing to design section for all sorts of soil and soft murrum hard murrum for different leads as under and all lifts above GL etc. complete but with rolling & watering. (A) Lead upto 200 Mt.	1880.00	Cum.	113.50	213380.00
7	Earthwork for embankment including breaking clods, dressing with all lead and lift and including watering rolling and consolidation of subgrade in layers at O.M.C. to required dry density including filling the depression which occur during the process using power roller 8T to 10T. (E) From Borrow area within 3.0 KM. lead.	16030.00	Cum.	182.14	2919758.70
8	Providing & laying dry rubble stone pucca pitching with panel (of size not more than 10 Sqmt.) of stone masonry 45cm thick wall in C.M. 1:5, without base, inverted filter and header stone but with 10 cms thick murrum layer (for Base) incl. hand packing and trimming and dressing slopes etc. (C) 23 Cms thick stone pitching with pointing in C.M.1:2	2160.00	Sqmt.	723.00	1561680.00
9	Providing & fixing Guard stone of Precast C.C. M-15 I.R.C. standard & design 75 x 20 x 20 Cm. including white washing etc. complete. (a) In Earth	36.00	No.	54.00	1944.00
Total Rs....					15289876.24

I am/we are willing to carry out the work at _____ % below/above percent
(Should be written in figures and words) of the estimated rates mentioned above. Amount of
My/Our tender works out as under :-

Estimated Amount	Rs. 1,52,89,876=24	Estimated Amount	Rs. 1,52,89,876=24
Put to Tender Rs.		Put to Tender Rs.	
Deduct _____%	Below Rs. _____	Add _____%	Above Rs. _____
	Net Rs.		Net Rs.
(Rupees in words) _____		(Rupees in words) _____	

Note :-

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 labour 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-10/2017CementConsumption/16/CDate:11/05/2017as 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.
5. The rates to be quoted by the contractor must be inclusive of all duties, taxes, and other levies **except GST** payable by the contractor under the contract.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

WAGADIA WATER RESOURCES PROJECT

SUB SECTION-5(I)

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SUB SECTION-5(I)

WORK & SITE CONDITION

1.0 INTRODUCTION

1.1 GENERAL FEATURES OF THE PROJECT :-

The proposed Wagadia Water Resources Project is to be constructed across the river Nani Fulzar near Village Vaniyagam of Jamnagar Taluka of Jamnagar district. The proposed project is purely an irrigation Project envisaging the construction as under.

Wagadia Water Resources Project - Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar.

2.00 LOCATION :-

The proposed site is situated near Village Vaniyagam is about 30 km away from Jamnagar which is on Jamnagar-Moti-Bhalsan-Beraja category other district road. The site is approachable from Jamnagar-Moti-Bhalsan-Beraja category other district road. The Nearest Railway station is Jamnagar which is about 30 km. away from proposed site.

3.00 COMMUNICATION :-

The nearest place for ordinary marketing is Jamnagar situated at 30.00 Km. The site is connected by Jamnagar-Moti-Bhalsan-Beraja category other district road.

4.0 BRIEF DESCRIPTION OF PROJECT WORK :-

I. WORK TO BE EXECUTED/SCOPE :-

The works to be carried out under this tender are as under :

Wagadia Water Resources Project - Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar.

5.00 LABOUR :-

Availability of good except sowing and harvesting period. However there may be shortage of skilled labour like masons, carpenters, operators, mechanics etc. However the contractor shall have to make his own inquiry in this regard and quote his rates.

6.00 HOUSING :-

Area being highly rural, there is no local housing arrangements available and contractor will have to make his own arrangements for his staff and labour etc. in the area as may be made available on rental basis as Clause-56 of B-1 tender.

7.00 WATER SUPPLY :-

The contractor shall have to make his own arrangement of water supply for his work. Fresh use of water for work will be allowed to be free of cost to the contractor from the river length flowing in the construction area and for the said purpose should be arranged by the contractor at his own cost.

8.00 DRAINAGE :-

Suitable and adequate arrangements shall have to be made by the contractor for drainage of water around his colony and work spot. The contractor shall also have to install and maintain at his own cost suitable drainage system to dispose off sewage and sullage from his colony. The labour colony layout shall be got approved from the Engineer-in-charge.

9.00 CAMP REGULATIONS :

The contractor shall be responsible for maintaining law and order in his camp and on his work, and for that he shall employ such officers, watchmen or other persons as required. Unauthorized or undesirable persons shall be excluded from the camp and from the works. If in the opinion (which shall not be questioned) of the Engineer-in-Charge any employee or agent of the contractor misbehaves and/or causes obstructions in the proper execution, or otherwise makes himself undesirable, the contractor shall, on receipt of the instruction to do so, remove him from the premises.

10.0 MEDICAL AID :-

There is no dispensary on project site. However there is a Government Hospital in Jamnagar about 30.00 km from site. The services of this hospital will be available to contractor's staff and labour on payment of requisite charges as may be required to be paid.

11.0 POWER SUPPLY :-

Power supply shall be arranged by the contractor at his own cost. No power supply is guaranteed by the department.

12.0 ROADS :-

The contractor shall construct and maintain the inspection roads and quarry roads for all purposes required during construction at his own cost. There will however be no charge for any reasonable use of any road constructed by Government at site of work.

13.0 POST, TELEGRAPH & TELEPHONE :-

A post office is available in Jamnagar. At present no trunk connection has been installed at canal site. Contractor shall make his own arrangements for telephone, if required.

14.0 BANK FACILITY :-

Branches of State Bank of India and other Schedule Banks are available at Harshadpur & Jamnagar.

15.0 SUPPLY OF PETROL & DIESEL :-

There is petrol pump near the site diesel and petrol will be available at Harshadpur situated about 15 Km from R.R. site.

16.0 MATERIALS :-

(i) Sand :-

Sand is available in river at village Moti Bhalsan within about 5 Km. from work site. The sand is found quite suitable and it is expected that sufficient quantity of sand required for the work will be available.

(ii) CEMENT :-

Cement is to be procured by the Contractor. The use of cement in the various items of construction shall be on weight and the contractors are required to provide suitable weight batchers or seals as approved by the Engineer. No extra charges for weighting for the purpose of use of cement is admissible.

(iii) The contractor shall have to make his own inquiries regarding availability of above materials and other materials required for **Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar.** The Epoxy Material shall be purchased from standard (BIS) companies as directed by Engineer-in-charge and accordingly he shall quote the rates. If the material of required standard is not available from the specific quarries and specified lead, lift mentioned in the tender specification, no extra lead will be payable to the contractor by the department.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(II)
GENERAL CONDITIONS

All the conditions given in the clauses appearing hereinafter shall be deemed to form a part of the Contract and shall be deemed as supplemental to the same. These conditions shall be binding to the contractor in the same manner as the conditions of contract in the Section-3.

1.0 DEFINITIONS :-

In the contract (as hereinafter defined), the following words and expressions shall have the meanings hereby assigned to them.

(a) Approved/Approval :-

Means approval in writing.

(b) Construction Plant :-

Means all equipment, appliances or things of whatsoever nature required for the execution, completion or maintenance of the work or temporary works but does not include materials or other things intended to form or forming part of permanent work.

(c) Contract :-

Means the instructions and information for tenderers, general and special conditions of contract, specifications, drawings, tender (including schedules of quantities & tender prices), the formal agreement and all addenda and attachments related to the above.

(d) Contractor :-

Means the particular person, firm or corporation with whom the contract has been made for executing the works.

(e) Drawings :-

Means the drawings referred to in the specifications, any modifications of such drawings approved in writing by the Executive Engineer, and such other drawings as may from time to time be furnished or approved in writing by the Engineer-in-charge.

(f) Engineer-in-Charge :-

Means the Engineer-in-charge of the works, specified parts of the works under the contract or such other departmental assistants or subordinates to whom the Engineer-in-charge may have delegated certain duties, acting separately within the scope of the particular duties entrusted to them.

The contractor will be given a copy of the Government authorization designating the Engineer-in-charge by name and delegating him his authority at the time when contract is signed. It is however, to be distinctly understood that, no delegation of powers shall be made to such departmental assistants or subordinates, except in respect of supervision to ensure compliance of the contract conditions.

- (g) Government :-**
Means the Government of Gujarat, Narmada, Water Resources, Water Supply & Kalpasar Department or Employer or Owner.
- (h) I.S.S. :-**
Means Indian Standard specifications.
- (i) Day :-**
Means a day from midnight to midnight.
- (j) Month :-**
Means from the beginning of a given date of calendar month to the end of preceding date of the next calendar month.
- (k) Week :-**
Means seven consecutive days.
- (l) Rupees :-**
Means Rupees of Indian Currency.
- (m) Site :-**
Means the lands and other places on, under, in or through which, the works are to be executed or carried out and any other lands or places provided by the Owner for the purposes of the contract together with such other places as may be specifically designated in the Contract or subsequently approved as forming part of the site.
- (n) Superintending Engineer :-**
Means the Superintending Engineer in overall charge of the works.
- (o) Temporary Works :-**
Means all temporary works of every kind required for performance of the Contract.
- (p) Works :-**
Means the works to be executed in accordance with the contract.

2.0 CONTRACTOR'S OBLIGATIONS :-

The contractor shall be deemed to have carefully examined the works and site conditions, the Specifications, Schedules and Drawings and shall be deemed to have fully acquainted himself regarding the local conditions.

If he shall have any doubt as to the meaning of any portion of these General Conditions, the Special Conditions, the scope of the work, the specifications or any other matter concerning the contract, he shall in good time before submitting his tender set for the particulars thereof, and submit them to the Engineer-in-charge that such doubt may be removed.

- 2.1** The Contractor shall unless in the cases specially provided for, make all payments at his own expenses, undertake to do all things and supply all labour, materials, constructional

plant, temporary works, transport, supervision and everything whether of a temporary nature or permanent nature required in and for construction, completion and maintenance of the works and for performing the obligations of the contract for which Narmada & Water Resources Department would have to undertake to do or Narmada Water Resources and Water supply Department had carried out the construction, completion and maintenance of works.

3.0 GOVERNMENT AUTHORISED TO WITHHOLD PAYMENT DUE TO THE CONTRACTORS :-

The Government shall have a lien over all money payable to the Contractor under this contract and also over his Security Deposit withheld or recoveries made under the relevant clauses of this Contract in respect of any Government Tax or taxes or other moneys which may become payable to Government by the Contractor, either alone or jointly with another, under any provisions of the Government Acts or any other statutory enactments in force, in modification or substitutions thereof. Government shall at all times be entitled to deduct the said sum of taxes due from contractors from the moneys, securities or deposits which may become payable or returnable to the Contractor under this contract.

4.0 AUTHORITY OF THE ENGINEER-IN-CHARGE :-

Said in so far as it is legally or physically impossible, the contractor shall execute, complete and maintain the works in strict accordance with the contract under the directions and to the entire satisfaction of the Engineer-in-charge and shall comply with and adhere strictly to the Engineer-in-charge's instructions and directions or any matter (whether mentioned in the contract or not). The Engineer-in-charge shall decide all questions which may arise as for quality and acceptability of materials furnished and work executed, manner of execution, rate of progress of the works, interpretation of Plans & Specifications and acceptable fulfillment of the contract on the part of the Contractor. He shall also determine the amount and quantity of work performed and materials furnished and his decision and measurements shall be final. In all such matters and in any technical questions which may arise pertaining to the contract and his decision shall be binding upon the Contractor.

The Engineer-in-charge shall have the power to enforce such decision and order. If the contractor fails to carry out the same promptly, i. e., if the contractor fails to execute the work ordered by the Engineer-in-charge, the Engineer-in-charge may give Notice to the Contractor specifying a reasonable period therein and on expiry of that period proceed to execute such work as may be deemed necessary and recover the cost thereof from the contractor.

5.0 CONTRACT DRAWINGS & SPECIFICATIONS :-

- A. Supply of sets of contract drawings and certified copy of accepted tender will be governed by Engineer-in-charge.
- B. The drawings which form part of these specifications show the work to be done in as much details as is possible at the stage of tender invitation. They will be supplemented or superseded by such additional detailed working drawings as may be necessary as the work progresses. The contractor shall perform the work on these features and in accordance with these additional detailed or revised working drawings at the applicable rates and terms as per the contract. Revised and/or additional drawings will be available for inspection in the office of the engineer - in charge and if copies of the same are required by the contractor. Three sets of such revised and/or additional drawings will be given free of cost on request. Additional copies of the same will be supplied at the discretion of the engineer and the contractor will be charged Rs.100 (One Hundred only) for each of such additional copy of the drawings.
- C. The contractor shall check all drawings and tender specifications carefully and advise the engineer-in-charge immediately if any errors or omissions are noticed. The contractor shall not take undue advantage of any kind of error or omission in the drawings and tender specifications supplied.

6.0 USE OF SITE :-

- A. The contractor shall be permitted to use for the permanent occupation of the work. He will also be allowed during the period of his contract the use of any other lands at the rate specified of tender in the vicinity of the works as and when the engineer may consider such use to be necessary for the classified purpose of work. The contractor shall not commence any operation on such lands without prior approval of the engineer.
- B. All areas of operation including those for his staff and labour colonies handed over to the contractor shall be cleared and handed back in good condition to the engineer except the area under works constructed as per this contract or those for which specific approval has been obtained from the engineer. The contractor shall make good to the satisfaction of the engineer any damage or alterations made to the areas which he has to hand back or to other property or land handed over to him for the purpose of this work.
- C. The contractor shall preserve all existing vegetations such as trees on or adjacent to the site which do not interfere with the construction as determined by the engineer. The contractor shall take all possible precautions in felling trees authorized for removal to avoid any unnecessary damage to vegetations and the trees not to be fall on structures

under construction or workman and shall be responsible for any damage if it occurs in such operations. All produce from cutting of trees, grass etc. shall be the property of government and shall be stacked at the place specified by the engineer. No claim shall be made for such cutting and stacking of trees or grass etc. by the contractor.

- D. The lands shall as herein before mentioned, be handed over back to the engineer within six months after completion of the work under this contract. Also, no land shall be held by the contractor longer than the engineer shall consider or deem it necessary and the contractor shall on due notice by the engineer vacate and return the land which the engineer may certify so as no longer required by the contractor for purpose of the work.

7.0 BASE LINES AND GRADES :-

- A. Permanent base line (and cross lines) shall be established at sufficiently close intervals with bench marks at all corner points to serve as "Reference Grid". The contractor shall provide at his expense, all templates, pillars, stacks, equipment, materials and labour for establishing the grid lines and pillars & preserve during the whole period of construction. These shall be laid out with prior approval of the engineer-in-charge. No base line or bench mark or reference mark shall be used as reference line, or bench mark or level for the work without prior approval of the engineer. The contractor shall maintain certified copies of such approved reference lines, marks and levels and shall not remove any of them without prior approval of the engineer.
- B The contractor shall further lay out the work from these reference base lines in consultation with the engineer and shall establish level connection therewith, not with standing the fact that the same might have been checked by the engineer's staff.
- C. The contractor shall be responsible for proper execution of the work to such lines and grades as may be specified on the drawings or established or indicated by the engineer.

8.0 FENCING, LIGHTING & VENTILATION :-

- A. Except as hereinafter provided, the contractor shall, unless otherwise specified, be responsible for the fencing, lighting, ventilation, taking of necessary safety measures for all works included in the contract and/or for proper provisions of temporary roadways, foot ways, guard, fences, caution notice etc. as far as the same may be necessary by reasons of the work, for the accommodations of workmen, for passengers or other traffic and of the owners and occupations of adjacent property and the public and shall remain fully responsible for any accident that may occur on account of his failure to take proper and timely precautions.

B. LIGHTING :-

All the work, approaches and galleries shall be adequately illuminated with electric lights to the satisfaction of the engineer. The power lighting connection, wiring equipment shall be subjected to the inspection and passing by Electrical Inspector to Government, authorised under the Indian Electricity Act. Any addition & alteration or omission shall be got approved from the engineer and got certified from the Electrical Inspector. Work spots such as faces of excavation, concreting and masonry work, grouting etc. shall be adequately flood lighted to the satisfaction of the engineer. All costs involved in drawing low tension or high-tension lines, meters, switches, starting and lighting accessories are to be borne by the contractor. Assistance may be given by the Department in the form of expediting power supply release and connections by Gujarat electricity board. Wherever, if more than one agency is working in the area, the contractor who has provided lighting arrangement, shall extend the facilities to the other contractors who shall pay for such facilities at mutually agreed rates. In case of dispute, the matter shall be decided by the engineer whose decision shall be final.

C. VENTILATION :-

All galleries, cross drains, adits, stair wells, shall be properly and adequately entiled by a system of ducts and fans to the satisfaction of the engineer. Positive artificial means of ventilation shall be employed and shall be in operation at all times. When more than one agency is working at one location, all the agencies should cooperate with each other. No contractor shall stop or threaten to stop his ventilation system and jeopardise the work of other contractor. The contractor who will be using the ventilation facilities installed by other contractor, shall make payment to him at mutually agreed rates and in case of dispute, the engineer's decision shall be final and binding on all parties.

In case of work are connecting passage ventilation circulation system be kept on getting modified as and when different passage gets jointed excavation or the same and when they get out of when further work of concreting etc. as taken in hand. Also the demand of fresh air may charge when more than one agency are working. The general layout ventilation shall be changed suitable to avoid any part being isolated from ventilation system and fresh air being short circulated.

- D.** All the arrangements made for fencing, lighting and ventilation shall be maintained by the contractor throughout the tendency of the contract, till physical taking over of the work by the department.

E. MAINTENANCE OF SERVICES :-

If, after all the works under this contract are completed and accepted as such and in case the engineer so directs, the contractor shall maintain the lighting, ventilation, drainage, communication facilities etc.

The payment for such services maintained as per the direction, after the completion and acceptance of the work under this contract, shall be made at the rate by the engineer - in - charge at his discretion. The maintenance of these services during the tendency of the work, is of course the contractor's responsibility and at his cost except otherwise specified.

9.0 EXPLOSIVES AND INFLAMMABLE MATERIALS :-

If explosives or inflammable materials are to be used for execution of the works, the contractor shall at his own risk & cost obtain such license or licenses for storing and using the explosives. The contractor shall produce such license whenever demanded by the engineer-in-charge or its subordinate for its verification. For storage of explosives & inflammable materials, the contractor shall construct & maintain magazines, either temporary or permanent, required for storage in accordance with the requirement of the appropriate government explosive rules in force. Such magazines shall be clearly marked "Dangerous Explosives" in the regional scripts and shall be kept in the care of competent watchmen at all the times. The Department shall not take any responsibility whatsoever in connection with the storage of explosives on site or of any accident etc. in connection therewith. All operations of the contractor in which or for which explosives are used shall be at his own risk and upon his sole responsibility. The Contractor shall have to engage licensed blaster for all such operations in actual excavation needing blasting etc.

10.0 LIABILITY FOR ACCIDENTS TO PERSONS :-

Responsibilities and liability of the contractor under "Workmen's Compensation Act".

In addition, following shall also apply.

- A On the occurrence of an accident which results in death of workmen employed by the contractor or which is no serious as likely to result in death of any such work and, the contractor shall within 24 hours of happening of such accident, intimate in writing to Engineer the facts of such accident. The contractor shall indemnify Government against all loss or damage sustained by the government resulting directly or indirectly from his failure to give intimation in the matter aforesaid, including the penalties or fines, if any, payable by govt. Due to such lapse, the contractor shall be fully responsible for government's failure to give notice under the Workmen's Compensation Act or otherwise / to conform to the provision of the said act in regard to such accidents.
- B In case of an accident in respect of which compensation may become payable under Workmen's Compensation Act whether by the contractor or by government as Principal employer, it shall be lawful for the engineer to retain out money due and payable to the

contractor such sum or sums of money as may in the opinion of the engineer be sufficient to meet the liability. The opinion of the engineer shall be final in regard to all matters arising under this clause.

- C The Contractor shall be bound to provide in writing the details of employments, emoluments paid and status of the workmen concerned as may be required, under the act to the engineer-in-charge.

11.0 ACCESS TO SITE AND WORK ON SITE :-

The engineer, may, if he considers fit from time to time enter upon any lands which may be in possession of the contractor under this contract for the purpose of executing any work not included in this contract and may execute such work not included in this contract by agents, or by other contractors at his option and the contractor shall, in accordance with requirements of the engineer afford all reasonable facilities for execution of the works including occupation of the lands by structure or otherwise for any workmen or for the workmen of the government who may be employed in the execution on or near the site of the work not included in the contract or of any contract in connection with or ancillary to the work, and in default, the contractor shall be answerable to government for any delay or expense incurred by reasons of such default. It is provided always that if the exercise of these powers shall cause any damage to the contractor he may within fifteen days of such damage arising make statement of the same to the engineer who shall from time to time assess the value in his judgment of such damage and the government shall from time to time pay to the contractor the amounts (if any) accepted as justified by the engineer.

12.0 OTHER CONTRACTS FOR THE WORKS :-

Government has the right to split up the work as per the site conditions into distinct items and this contract shall apply only to those items which have been specified in this contract. When the government enters into other contract for specified items of the contract work, each contractor shall co-operate with the other to the fullest extent, shall allow each other every facility and co-ordination for execution of their works simultaneously & satisfactorily as intended in the designs and specifications and drawings. Should there be a dispute or disagreement between the contractors for any cause whatsoever, the same shall be referred to the engineer whose decision regarding the co-ordination, co-operation and facilities to be provided by any of the contractors to the other, shall be final and binding upon all parties and such a decision or decisions shall neither vitiate any contract nor absolve the contractor of his responsibility under the contract nor form the ground for any claim or compensation.

13.0 INTEREST ON MONEY DUE TO CONTRACTOR :-

No omission by the engineer to pay the amount due upon measurements or otherwise shall vitiate or make void the contract nor shall the contractor be entitled to any interest upon any guarantee on the Running Account bill & final payments in arrears nor upon balance which may on the final settlement of his account become due to him.

14.0 CONTRACT DOCUMENTS AND MATTERS TO BE TREATED AS CONFIDENTIAL :-

All documents, correspondence, orders decisions and other matters concerning the contract shall be considered as of confidential and restricted nature by the contractor and he shall not divulge or allow access thereto by any unauthorised persons of any kind.

15.0 MAINTENANCE :-

Notwithstanding what has been mentioned in the contract for a period from the date of issue of the final certificate till the expiry of twelve calendar months commencing immediately after the plant or works have been considered to be put to commercial use, shall be liable for the proper maintenance and for replacement of any part of the plant, materials, workmanship or any other reason for which in the judgment of the engineer, the contractor is responsible and for making good any damage arising therefrom. The Department's decision regarding date of beginning of commercial use of the completed work under the contract, depending upon the circumstances and merits of the situation shall be final.

The maintenance period in respect of plant or works for which replacement of any part has been made for the above reason, shall be further extended until the expiry of twelve months after the replaced parts have been put into commercial use.

16.0 WORK DURING NIGHT OR ON SUNDAYS & HOLIDAYS :-

Unless otherwise provided, none of the permanent works shall be carried out during night, Sundays or authorised Holidays without the permission in writing. However, when such work is unavoidable or necessary for the safety of life or the properties of work, the contractor shall take necessary action immediately and advise the Executive Engineer accordingly.

17.0 PATENT RIGHTS :-

In the event of any claim or demand being made or action being brought against government for infringement of letter of patent, registration of design or trade mark in respect of any machinery, plant, work, materials or things used or supplied by the

contractor under this contract or in respect of any method of using or working by the government or such machine, plant, work, materials or the things belonging to the contractor, he shall indemnify government against all costs and expenses arising from or incurred by the reasons of any such claim, provided the Government shall notify the contractor immediately that such claim is made and that the contractor shall be at liberty, if he so desires with the assistance of the government if required but at the contractor's expenses to conduct all negotiations for the settlement of the same or any litigation that may arise there from and provided that no such machinery, plants, materials, or things shall be used by the government for an purpose or in manner other than that for which they have been supplied by the contractor and specified under this contract. Whenever the contractor desires to use any design, device, materials or process covered by the letter of patent, or copyright, the right for such use shall be generally secured by suitable legal agreement by the contractor with the owner and the copy of such agreement shall be filed with the Engineer-in-charge.

18.0 CO-OPERATION WITH OTHER CONSTRUCTION AGENCIES :-

When two or more contractors are engaged on work in the same vicinity, they shall work together in a spirit of co-operation and accommodation. The contractor shall not take, cause to be taken any steps or actions that may cause disruptions, discontent or disturbance to the works, labour and arrangement of other contractors in the neighbourhood and the project locality. In case of any difficulties among the contractors, the engineer-in-charge shall direct the manner in which each contractor shall conduct his work so far as it affects the other.

19.0 NOTICES : HOW TO BE GIVEN :-

Where any legal notice or any other document or any order or direction is to be given to or served upon the contractor, it shall be deemed to be duly given, if it shall have been either delivered to him personally or to his recognised agent (including in the case of company, the Secretary of such company), or delivered at or sent through Registered A.D. addressed to the contractor at the contractor's office on the site, or sent through the Registered A.D. Post addressed to the last known place of business, or in case of a company to its registered office and in the case of a firm of contractors, a notice or other document, which shall be so given to or served on any one of the partners in such firm shall be deemed to have been given to or served on all of them.

20.0 COST OF FACILITIES AND INCIDENTAL WORK :-

The cost of all the facilities or any other incidental work etc. as prescribed in various clauses that may have to be provided by the contractor for the purpose of this contract,

shall be borne by the contractor and no payment shall be made for the same unless specifically mentioned or stipulated.

21.0 DAMAGE BY FLOODS OR ACCIDENT :-

The contractor shall take full precautions against any damage to the work by flood or from accidents. No compensation shall be allowed to the contractor for his plants or materials lost or damaged by floods, unanticipated or otherwise, or from such other cause, during monsoon or unexpected rains, and he shall be liable to make good any damage to the plant, machinery or materials of Department hired by him and lost or damaged by flood or from any other cause while in his possession for use on works.

22.0 RELATION WITH PUBLIC AUTHORITIES :-

The contractor shall comply with all proper and legal orders and directions given from the time to time by any local or public authority & shall pay out his own money any fees or charged to which he may be liable.

23.0 TITLE OF CLAUSES :-

The titles of the clauses do not form part of the same and shall not affect their legal construction.

24.0 JURISDICTION :-

The contract shall be governed by the law of India in force from time to time and be subject to the Jurisdiction of Indian courts. In case of disputes raised by the contractor or Govt. of Gujarat, it shall be referred to Gujarat Public Works Contract Dispute Arbitration Tribunal established as per Arbitration Tribunal Act.1992.

25.0 CONSTRUCTION OF THE CONTRACT :-

The contract shall in all respects be constructed and operated as a contract as defined in the Indian Contract Act 1872 and all payments there under shall be made in Rupees unless otherwise specified.

26.0 VEHICLE TAX :-

The contractor shall have to pay the vehicle tax and goods tax even if the vehicles are to be plied in the project area. No claim for refund for the same shall be entertained.

27.0 OBSERVATION OF LABOUR LAWS :-

The contractor shall strictly observe all the requirements laid down in the Contract Labour (Regulation & Abolition) Act., 1970 and Gujarat Rules 1972 & Inter state Migrant

Workmen (Regulation of Employment & condition of services) Act -1979 Gujarat Rules - 1981 and other acts in force from time to time so far applicable.

28.0 TRESS PASS :-

The contractor shall, at all times, be responsible for any damage to all tress pass committed by him or his agent or working people in carrying out the work unless such trees pass is authorised by the Engineer-in-charge of work.

29.0 OTHER PERMISSIONS :-

The contractor shall approach directly, to the Municipal and other authorities for obtaining any type of permission required under Law. Suitable assistance will be rendered by the Department for expediting such permission. No claim for delay, if any, will be entertained.

30.0 OCCUPANCY OF ADDITIONAL LAND :-

In case when it becomes necessary for the due fulfillment of the contract for the contractor to occupy land outside the W.R.D. limits, the contractor shall make his own arrangement with the land owners and pay such amount as may be mutually agreed upon by them. The department will render the contractor all possible assistance to obtain land for such purpose.

31.0 EMPLOYMENT OF RESIDENT ENGINEER :-

The contractor shall employ a qualified, skilled and experienced Resident engineer for carrying out the work. Before appointing the resident engineer, the contractor shall obtain approval of the engineer-in-charge about the suitability and eligibility of the resident engineer. In submitting such proposal, the qualification and experience of the person shall be fully listed. The resident Engineer shall be considered at all times to be acting for the contractor with full responsibility in all respects.

32.0 FOREMEN, WATCHMEN AND WORKERS :-

The contractor shall employ competent foremen, watchmen and workmen. The engineer-in-charge shall at all time have the right to remove from the work any foreman or watchman or workman on ground of his unfitness or misconduct or complaints.

33.0 WORK ORDER BOOK :-

A work order book as prescribed by the Government will be maintained on the work and the contractor shall sign the orders in token of acceptance as given the Engineer-in-charge or his representative. He shall carry out the orders in the true spirit and as

required for the correct performance of the contract. Work order book is the property of the Department and shall remain in the custody of the Department supervisory staff on duty. The compliance shall be carried out promptly and reported to the Engineer-in-charge in good time by the contractor so that the work can be checked. If the contractor fails to take note of orders or instructions issued in the work order book or tries to avoid the same, The engineer-in-charge will have power to take suitable recourse. Any such action of the engineer for the non-compliance on the part of the contractor shall be binding upon him.

34.0 TENDER VALIDITY PERIOD :-

The tender offer shall be valid for a period not less than 120 days from the stipulated date of opening of tender.

35.0 OPENING OF TENDERS :-

35.1 The designated officer of department will open the E-Tender “Price Bid” on dated 24-07-2026 at 18.00 Hrs. on web site <https://tender.nprocure.com> in the office of the Superintending Engineer, Rajkot Irrigation Project Circle, 2/5, Jilla Seva Sadan-2, Rajkot-360001. The intending bidders or his / their representative, if he / they wish, can participate in the process of Online Tender Opening. Tenderer can log on to <https://tender.nprocure.com> on due date and time and mark their presence or participate in online tender opening in the department offices and view the results. To participate in Online Tender Opening Event, a Tenderer will have to login with his User ID and password, and click on “mark my attendance button” to view tender results.

35.2 Bidder may depute one authorized person to remain present at the time of opening of E-Tender, Based on the information furnished by the bidder in the E-Tender Price Bid. The E-Tender for price bids of qualified bidders will be opened as per procedure laid down for E-Tendering. The E-Tendering of Price Bid shall remain online until the date of opening of Price Bid. Earnest Money Deposit of unqualified bidder shall be released. The date and time of opening of E-Tender Price Bid on Dtd. 24-07-2026 at 12.00 Hrs. as stated in para 35.1 above.

35.3 Department reserve the right to accept or reject any of the application for qualification without assigning any reason thereof.

35.4 All the tenders will be opened, irrespective of the Online presence of the Tenderers.

36.0 EVALUATION OF TENDERS :-

The tenders will be verified for accuracy in the numerical calculations. Any tender with arithmetical mistakes will be corrected on the basis of the quantities of work given on

the tender form and the unit prices quoted by the tenderer in words, as per standing orders. In the case of tenders where the unit price appears unrealistic such tenders will be considered as unbalanced and, in the event, tenderer being unable to provide satisfactory explanation, the Government of Gujarat reserves the right to treat such tender as non responsive.

37.0 CONTRACT AWARD :-

Tenders shall remain valid for minimum period of 120 days from the stipulated date of opening of tender. The award of contract will normally be made within 120 days from the stipulated date of opening of tenders.

38.0 MODIFICATIONS :-

The Engineer-in-charge may order modifications at any time before the completion of the work. For all modifications, the Engineer-in-charge will issue revised plan, or written instructions or both and no modifications shall be made unless so authorised.

39.0 SIGNED DRAWINGS : NO AUTHORITY TO THE CONTRACTOR :-

Signed drawings alone shall not be deemed to be order for work unless it is entered in the agreement or schedule of drawings under proper attestation of the contractor and the Engineer-in-charge or unless it has been sent to the contractor by the engineer-in-charge with covering letter confirming that the drawings are the authority for work in the contract.

40.0 COPIES OF DRAWINGS AND SPECIFICATIONS :-

A copy of the drawings with modified or supplementary drawings and specifications shall be furnished free of cost to the contractor.

41.0 PLAN AND DRAWINGS :-

The contractor shall submit the following information to the Engineer-in-charge for approval within the time stipulated against each item below.

- A. A general lay-out plan of construction plant and equipment for the execution of work which the contractor proposes to adopt at site, in triplicate, within 14 days from the date of notice to proceed with work.
- B. Drawings or prints, in triplicate, showing the location of major plants and other facilities which the proposes to put up at the site, including any change in the general layout, at least 14 days prior or the commencement of the respective work.

42.0 REFERENCE MARKS AND BENCH MARKS :-

The basic center line, reference points and bench marks will be fixed by the Dept. The contractor shall establish at his cost, at suitable points, additional reference lines and bench marks as may be necessary. The contractor shall remain responsible for the sufficiency and accuracy of all these bench marks and reference marks. He should take precautions to see that the reference lines or points and bench marks fixed by the Department are not disturbed by his work and shall make good the damage at his cost.

43.0 MATERIALS AND WORKMANSHIP :-**A. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION :-**

The contractor shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for the proper fulfilling of the contractor's obligations under the contract. The contractor or his competent and authorised agent or representative approved in writing by the Engineer -in -charge, whose approval may at any time be withdrawn, shall remain constantly present on the works and shall give his whole time to the superintendence of the same. The contractor shall provide and employ sufficient number of qualified men for supervision all aspects of work.

B. CONSTRUCTION PLANT :-

The contractor shall provide and install all necessary construction plant and shall use such methods and appliances for the performance of all the operations connected with the work entered under the contract as will secure and satisfactory quality of work and rate of progress which will ensure the completion of the work within the time limit specified.

44.0 INFORMATION AND DATA :-

The information and data furnished herein related to the work and site conditions are general. It shall be the responsibility of the contractor to fully acquaint himself with the nature and the location of work, quarries, local conditions and other aspects which are relevant to the work.

45.0 PROTECTION OF ADJOINING PREMISES :-

The contractor shall protect the adjoining site against structural, decorative and other damages that may be caused by the execution of these works, and make good at his cost, any and all such damages.

46.0 LOCAL ROADS :-

The existing public roads near the site or work and roads constructed by the Government in the works area are shown in drawing volume. The contractor may construct and maintain the roads as required at his own expenses.

47.0 REMOVAL OF CONTRACTOR'S MEN :-

The contractor shall on the written direction of the Engineer-in-charge immediately remove from works any person employed thereon, who may in the opinion of the Engineer-in-charge be incompetent or has misconducted himself and such person shall not be again employed on the works without the written permission of the Engineer-in-charge.

48.0 TOLLS AND DUTIES :-

The contractor shall, unless otherwise specifically provided in the contract, pay all duties, tolls, octroi duties, quarry fees, royalties and other taxes on all materials and articles that he may use.

49.0 OLD CURIOSITIES :-

All old curiosities, relics, coins, minerals and any other item of archaeological importance found in excavation or pulling down shall be the property of the Government and shall be handed over to the Engineer-in-charge. If any structure be uncovered, the Engineer-in-charge's instruction shall be obtained before its demolition or removal.

50.0 OTHER WORKMEN :-

The Engineer-in-charge shall have full authority to depute workmen on the work site, execute other works not included in the contract. The contractor shall afford every reasonable facility during working hours to enable such workmen to carry out the other works provided that such work shall be carried out in such manner as not to impede the progress of the work included in the contract. The contractor, however, shall not be liable for any damage which may happen to or be occasioned by such other works, provided he complied with the instruction in connection therewith and provided that the damage is not caused by the contractor or his workman.

51.0 LAW GOVERNING CONTRACT :-

The contract shall be constructed according to and subject to the Laws of India and Jurisdiction of courts of India.

52.0 RATES EXCLUSIVE OF GST AND OTHER TAXES :-

The rate to be quoted by the contractor must be exclusive of GST & other statutory taxes as per the present applicable rates. At the time of payment of bills, GST & other taxes will be deducted from source as per prevailing provision of relevant Act. This matter is regarding TDS at source and as in this act time to time amendments are made according to latest provision deduction shall be made. Contractor has to quote rates exclusive of all taxes. Hence these taxes are not reimbursable.

Taxes imposed by the Government of Gujarat from time to time would be applied to this contract.

53.0 WORK UNDER POLICE PROTECTION :-

In case of dispute by land owner and consequent obstruction in execution of works when the land in question is in possession with the Department, contractor shall be bound to execute the demarcated works under police protection if required, and no extra cost for stoppage, slow work or obstructions, shall be payable to the contractor.

54.0 TERMINOLOGY :-

(1) Compaction :-

The densification of a soil & concrete by means of mechanical manipulation

(2) Consolidation :-

The gradual reduction in volume of a soil resulting from an increase in compressive stresses.

(3) Construction Joint :-

A joint occurring in a structure composed of homogeneous materials such as earth or concrete along a plane or surface, formed by cessation of placing of material for a time, such as overnight or for several days.

(4) Expansion Joint :-

A joint provided in exposed members between fixed points to permit vertical movement where differential settlement is anticipated.

(5) Concrete :-

A mixture of cement, water and inert aggregates with or without admixture.

(6) Concrete Mix :-

A Mixture of cement, water and inert aggregate which is freshly mixed during a period of two hours from the time of addition of water to the solid ingredients. Concrete surface upon or against which concrete is to be placed and the surface of existing concrete to which new concrete is to be bonded and the surface of concrete placed under the situations to which new concrete is to be placed on old concrete is so rigid that the new

concrete is so rigid that the new concrete cannot be incorporated integrally with that previously placed and defined as construction joints.

(7) Water Cement Ratio (W/C) :-

The ratio of the weight of water in concrete mix exclusive of the water absorbed by aggregates to the weight of cement.

(8) Workability :-

The property of fresh concrete which determines the amount of useful internal work necessary to produce complete compaction (Fresh concrete property)

(9) Absorption (Air-Dry basis) :-

The percentage of water absorbed by an air dried aggregate when immersed in water at 27° C for a period of 24 hours.

(10) Absorption (Saturated surface dry basis) :-

The percentage of water absorbed by aggregate when immersed in water at 27° for 24 hours, the aggregate being previously dried in an oven at 105° C to 110° C to constant weight.

(11) Admixture :-

A material other than water, aggregate and Portland cement used as an ingredient of cement and added to it immediately before or during its mixing.

(12) Durability of concrete :-

A durable concrete is one that performs satisfactorily in the working environment during its anticipated exposure condition during service (Hard concrete properties)

(13) Concrete Mix Proportion :-

The mix proportion shall be selected to ensure the workability of the fresh concrete and when concrete is hardened, it shall have the required strength, durability and surface finished.

(a) By designing the concrete Mix :-

Such concrete shall be called "Design Mix concrete " (DMC) or

(b) By adopting nominal concrete mix :-

Such concrete shall be called " Nominal mix concrete "(NMC)

(14) Curing :-

Curing is the process of preventing the loss of moisture from the concrete whilst (While) maintaining a satisfactory temperature regime

(15) Bulking of sand :-

If the sand is moist or contains moisture, then it occupies more volume which is called bulking of sand if moist sand is used in concrete. Then necessary correction have to be made for bulking of sand. For right proportion extra sand has to be added and reduce water content.

(16) Cold Joint :-

Placement of concrete shall be carried out at such a rate that lower layer concrete is being integrated with fresh concrete is always plastic. Normally this will be achieved if next layer is placed with 30 Minutes. If this is not done, cold joint will develop which must be avoided. The cold Joints are interfaced which remains as discontinuities and cause separation when subjected to tensile stress.

(17) Surface moisture :-

The moisture contained in the aggregate in excess of that contained in the nature voids of the aggregate.

(18) Apparent specific gravity :-

The weight of the oven dry aggregate divided by its absolute volume excluding the natural voids in the aggregate particles.

(19) Bulk specific gravity (oven dry basis) :-

The weight of the aggregate dried to constant weight in an oven at 100° C divided by its absolute volume including the natural voids in the aggregate particles.

(20) Bulk specific gravity (Saturated surface Dry basis) :-

The weight of the saturated surface dry aggregate divided by its absolute volume including the natural voids in the aggregate particles.

(21) Compaction of concrete :-

The basic aim of compaction is to get rid of entrapped air or voids. Voids reduce the strength of concrete and for every 1% entrapped air, the strength of concrete falls about 5% to 6%. Fully compacted concrete is dense, strong, durable, and impermeable. Badly compacted concrete will be weak, non durable and porous. III –Effects of voids.

- (i) Increase in permeability of concrete and in turn reduction of durability.
- (ii) Reduce bond between concrete and reinforcement or at construction joint and the required bond strength is not achieved.
- (iii) Produce visual blemishes such as blow holes and honey combing on surface.

(22) Compaction by vibration :-

Compaction through needle and/or pan vibrator is the most preferred method of vibration. When concrete mix is vibrated it is fluidized, which reduces the internal friction between the aggregate particles, the fluidization of concrete allows entrapped air to rise to the surface and the concrete becomes denser.

55.0 Work under Police Protection :-

In case of dispute by the land owner & consequent obstructions in the execution of works when the land in question is in possession with the department, the contractor

shall be bound to execute the demarcated work under police protection, if required, & no extra cost for stoppage, slow work or obstruction shall be payable to the contractor.

56.0 Explosive & Inflammable Materials :-

Use of Explosives and inflammable materials is not permitted.

57.0 In case of any dispute between provisions of this chapter & Sections of Standard Bidding Document (SBD), the provision of SBD shall prevail.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(III)
SPECIAL CONDITIONS

1.0 ACCURACY OF LINES, LEVELS AND GRADES :-

The various works shall be done true to line, level and grade. The periodical checking of these works by Government's staff shall not absolve the contractor of his responsibility regarding the accuracy. In case of any deviation or discrepancy in line, level or grade at the meeting faces, the contractor shall make good the discrepancy at his own cost and without any extra compensation for the additional work involved, Whenever such a discrepancy is found to arise at the junction of works of different contractors the responsibility to set right such discrepancy lies with the contractors concerned. The Engineer shall further have the unquestioned right if need be, to rectify the discrepancies and recover the costs from the contractor or contractors according to proportion as he may consider reasonable.

2.0 TESTING OF MATERIALS AND WORKS :-

- 2.1** All materials before being incorporated in the work shall be inspected visual & by common field tests according to Table-2 of GERI guidelines for Quality Control & Quality Assurance Vol-1, 2002 and shall have to approved by Engineer-in-charge and if found necessary got tested in government or government approved laboratory. Any work on which such materials are used without prior inspection (and when necessary prior testing) and without approval or written permission of the Engineer-in-charge is liable to be considered as unauthorized, defective and not acceptable. Testing charge shall be applicable as per Condition of Contract clause-34.0 of Section-2. Any additional test required to be carried out at any stage as per instruction of Engineer-in-charge. CE (QC), E.E. (Q.C.) D.E.E.(Q.C.) shall be carried out at Departmental cost, if sample test result are failed then the testing charge shall be borne by contractor. But if sample test results are found O.K., the cost of testing charges of materials shall be borne by department.
- 2.2** In the following cases also testing charges will be borne by contractor when the supply of sample and carrying out of such tests at contractor's cost is subject to approval and provided for or clearly intended in the contract and is carried out either at site of work or manufacturer's place or Government lab or Government approved lab.
- 2.3** Supply of samples and the carrying out of such tests is not provided for or not clearly indicated in the contract but on testing the materials is found defective and have to be rejected.
- 2.4** Any additional tests are to be carried out over and above those specified in the technical specification.

- 2.5 In all other cases the cost of testing charges shall be borne by the Government. The contractor shall however supply all materials required for test and also make good at his cost with materials, mixes and core holes and similar for other materials as may be directed by and to the satisfaction of the Engineer in charge.
- 2.6 An authorized representative to the contractor shall remain present at the time when the sample or cores etc. are taken and shall authenticate the facts if so require when the contractor's agent fail to remain present at aforesaid time the sample or cores etc. taken by the Engineer-in-charge or his representative shall be considered to be authentic. The contractor will however, be informed about the details of such sample and cores etc. having been taken
- 2.7 The materials, mixes and cores etc. shall be tested day to day or periodically at the Government laboratory field laboratory set up at the site of work or nearby regional or district level GERI laboratory (i.e. GERI, Rajkot) or Engineer Polytechnic colleges in Gujarat where facility of testing are available as per IS rules & regulation or Government approved private institutes and the results given there by shall be considered correct and authentic.
- 2.8 10% tests of total required tests or at least one sample (whichever is more) shall be tested at nearest GERI Lab. The choice of testing laboratory where test to be carried out shall on sole discretion of Engineer-in-charge.
- 2.9 If there are any dispute regarding test results, GERI test results shall be final and binded to all. If test results of sample does not complies relevant IS Code further investigation shall be carried out as pr IS:456-2000 or relevant IS Code of practice prior to rejection of work.
- 2.10 The contractor shall be given access to tall operations of tests that may be carried out as aforesaid so that he may satisfy himself regarding the procedure and methods adopted It shall then be contractors, responsibility to carry out the finished items to the standards based on the laboratory design and tests.
- 2.11 The day to day and periodical tests to be carried out on materials mixes cores and placed concrete, mortar etc. shall be specified by the Engineer in-charge from time to time and the contractor shall allow all facilities and co-operation towards collection of samples transportation up to any laboratories, all labour for collecting samples, casting testing of cubes shall be supplied by contractor without any extra payment for this.
- 2.12 Contractor shall have to construct pucca under ground curing water tank of size 2.0 x 2.0 x 0.60mt (or size as directed) at nearby site of work for curing of cube as per Engineer's instructions. No extra payment shall be made for this to the contractor.

- 2.13 It shall be responsibility of the contractor to provide clean water to fill the curing tank and maintain full water level in curing tank, periodically and also maintenance of leak proof curing tank throughout the work without any extra payment for this.
- 2.14 Contractor shall have to provide sufficient 15cm cube moulds and skilled labours for laboratory and field tests of works and materials for activity such as :
- (a) Cleaning, fitting and unfitting of moulds, oiling etc.
 - (b) Carting of moulds and placement into curing tank.
 - (c) Transporting the cubes from site of work to field laboratory for testing
 - (d) Helping in cube testing on compressive machine,
- 2.15 All facilities for carrying out field test on various materials, mixes & cores shall be provided by contractor. No extra payment for above work shall be made to the contractor.
- 2.16 The method of sampling and testing procedures and standard shall be as laid down by the Engineer-in-charges for respective items.

3.0 LOANS OF GOVERNMENTS TOOLS PLANTS & MACHINERY :-

No machinery or tools and plant articles are at present available with the Department. However, the machinery tools and plants as and where available with the Department may be supplied on hire as per rules and regulations as per the provisions contained in Government P.W.D. G.R. No.MCN/167(97)/Part-IV/H, Dated 01-01-1980 as amended from time to time, It must be also noted that machinery or equipments actually justified for use in the works and available with the Department will be given on hire, No claims for delay in procurement of such machineries or equipments shall be entertained.

4.0 ASSISTANCE IN PROCUREMENT OF PROPERTIES, PERMITS, IMPORT LICENCE, EXCHANGE FACILITIES ETC :-

In view of the general difficult position regarding the availability of Foreign Exchange, generally it shall not be released in the normal course by the department, for the purpose of plants and machinery required for execution of the works contracted.

- 4.1 However, the Engineer on request by the contractor may, if in his opinion the request be reasonable and is in the interest of the work and its progress, assist the contractor in the procurement of necessary import license, exchange facilities etc. for importing necessary plant, machinery or materials not locally available and payment of his foreign personnel or other remittance etc. He may also assist the contractor in securing priorities for delivery, transport etc. where such are needed. The Government will not, however be responsible for the non availability of any of the above facilities or delay in this behalf and no claim either in cost or time, on account of such failure or delay shall be admissible by Government.

4.2 As regards import license, the contractor's application will be scrutinized by the Engineer regarding the reasonableness etc. and recommendation will be made as deemed fit. The Engineer's decision in this regards shall be final and no claim either in cost or time on account of such decision shall be admissible.

5.0 SECURITY MEASURES :-

In view of the strategic importance of all the projects and installations, security restriction may be imposed by the Engineer as per the directions of the security authorities and the contractor shall abide by all such instructions scrupulously. In case a system of identity cards is introduced, the contractor shall at his cost provide his persons all such identity cards with photon, if necessary, and get these duly signed by the Engineer or his duly authorized representative. The contractor shall also keep the Engineer informed regarding all visitors and obtain proper permits for their visits. No unauthorized visitors shall be allowed on the work site.

6.0 APPLICABILITY OF SPECIFICATIONS :-

Considering the common and general items required in execution of irrigation Project, general subject wise specifications have been drawn and provided separately with the Tender. These provisions suitably provides requirements of execution of each component of work in general, consistent with the present practice of the scope of work and mode of execution and standards to be observed for the work, financial limitations as regards to the admissibility of work payment and acceptance of work against the tender requirement etc. are concerned. To avoid descriptive matter suitable reference for the relevant Indian Standards or otherwise is also specified. The whole idea is to guide the tenderer regarding the execution of work so as to base his rates accordingly.

The general subject wise specifications are further supplemented in separate chapter to cover the item wise specifications of work as per the Schedule "B" of the tender. These item wise specifications cover the applicable provision of the general specifications. considering the item description as per Schedule "B" Over and above these, the specific requirements of each item such as applicable leads, lifts, proportion of the mix, description about the execution of the item in details and other applicable aspects have been over in such specifications. Intending tenderers are, therefore, requested to read the tender papers on the above lines and quote their rates.

7.0 CHANGES IN DESIGN AND DRAWINGS :-

The drawings given with tender documents are based on the present available data. However, during execution of work. any change in design and drawings that may be

warranted on account of strata met with or the material that may be available or any other reasons shall not vitiate the contract and no extra payment shall be made to the contractor. The increase in quantities under the relevant items on account of the above changes shall be paid only at tendered rates of the relevant items for increase in quantities upto 10% of the tender quantity. Beyond 10% increase in quantities, the payment shall be made as per the clause of Condition of Contract.

- 7.1 Any change in gradation and proportion of coarse and fine aggregates in mix design of the concrete shall not entitle the contractor to any extra claim of this account.

8.0 DEWATERING AND DIVERSION AS AND WHERE REQUIRED :-

If there is no separate provision for dewatering, diversion of water and construction of temporary diversion road during construction in the monsoon the rates of respective item of works quoted by the contractor shall be consider inclusive of dewatering and diversion as and where needed with maintaining it during construction. In such condition no extra payment shall be made for dewatering and diversion of water, road diversion etc. Also no payment shall be made for any part of work or materials washed away or damaged during the monsoon or other period and it shall have to be made good by the contractor at his own cost. It is the responsibility of the contractor to make good or repair any Government property, material to be utilized for the present work completed part of present work damaged during the construction period.

9.0 APPLICATION OF PUBLICATIONS :-

All methods or procedure for execution of different items of work as mentioned in schedule-B shall unless otherwise specified, in this tender be referred to relevant I.S. specification and its supporting I.S. Code. Some of the important I.S. Publications for R.C.C. work and listed on Annexure-I as below.

ANNEXURE-I Important I.S. (B.I.S.) Publications for R.C.C. work

Sr. No.	I.S. Code	Description
1	I.S.: 457-1957 (Reprint Jan. 1987)	Code of practice for general construction of plain reinforced concrete for dams and other massive structures
2.	I.S. : 456-2000 (Reprint Aug2002)	Plain and reinforced concrete code of practice.
3.	I.S. : 10262-1982 (Reffirmed-2004)	Recommended guidelines for concrete mix design.
4.	I.S. : 1199-1959 (Reffirmed-1999)	Method of sampling and analysis of concrete.

Sr. No.	I.S. Code	Description
5.	I.S. 516:1959 (Reaffirmed-1999)	Methods of tests for strength of concrete.
6.	I.S. : 1786-2008	High strength deformed steel bars and wires for concrete reinforcement.
7.	I.S. : 269-2015	Specification for 53 grade ordinary Portland cement.
8.	I.S. : 280-2006	Mild steel wire for general engineering purpose.
9.	I.S. : 4926-2003	Ready mixed concrete code of practice.
10.	I.S. : 4985-2000	Unplasticized PVC pipes for potable water supplies.
11.	I.S. : 432 (P-I) 1982	Specification for Mild steel and medium tensile steel bars for concrete reinforcement
12.	I.S. : 383-2016	Specification for coarse sand fine aggregates from natural sources for concrete.
13.	I.S. : 650-1991	Specification of standard sand for testing of cement.
14.	I.S. : 9103-1999	Concrete Admixture specification
15.	I.S. 1489-1991	Specification for Portland pozzolana cement
16.	I.S. 12330-1988 (Raffirmed 2005)	Specification for sulphate Resisting Portland cement (S.R.P.C.)

10.0 SPECIAL CONDITION OF CONTRACT :-

All Agencies intending to carry out excavation have to carry out any type of excavation / digging only after prior intimation through **“Call before U Dig”** mobile application.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

GENERAL TECHNICAL SPECIFICATIONS

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SUB SECTION-5(IV)

CHAPTER-I

STANDARD GENERAL TECHNICAL SPECIFICATIONS

- 1.1 All the items occurring in the work and as found necessary during actual execution shall be carried out in workman like manner as per specifications below and as per written orders of the Engineer-in-charge.
- 1.2 A work order book as prescribed by the Engineer-in-charge shall be maintained on the site of work and the contractor shall carryout field compliance properly.
- 1.3 The contractor shall engage authorized representative who shall be responsible and competent for managing the work. He shall take orders from the Engineer-in-charge and shall be responsible for carrying out the same.
- 1.4 Quantities specified in the tender may vary at the time of actual execution and the contractor shall have not to claim for compensation on account such variation.
- 1.5 Unexcavated lengths of the canal shall be left whatever so required by the Department during the currency of the contract. These portions shall be excavated as and where required either before or after completion of the whole work.
- 1.6 No trees shall be cut without permission of Engineer-in-charge.
- 1.7 Diversion for roads if necessary shall be provided and maintained during the currency of the contract without any extra cost to the Department.
- 1.8 The work shall be executed strictly in accordance with plans & specifications. Only the best materials and sound construction shall be executed in a through workman like manner.
- 1.9 The drawing prepared and trial pits taken are for general guidance and indication and changes either minor or major are likely to take place. No claim for extra payment shall be made by the contractor for such changes.
- 1.10 The quantities in the schedule are only estimate quantities and during execution they may increase or decrease. Any claim put forward for this variation in quantity shall not be entertained.
- 1.11 The rejected materials shall be removed from the site within 24 hours. If they are not removed within this period, the same will be removed at the contractor's risk and cost by the Department.
- 1.12 The work is an important work and this fact shall be constantly borne in mind by the contractors and his workers. Works not specified above shall be carried out according to P.W.D. Hand Book or according to instructions of the Executive Engineer.

- 1.13 The work requires constant attention for line, levels and workmanship and hence the contractor shall have to keep the experienced technical staff on the work. The contractor has to supply the necessary materials and labour for the line and levels work at his own cost.
- 1.14 The contractor unless otherwise specified and providing in the contract shall pay all duties, tolls, quarry fees, royalties and taxes on all materials and articles they may use. The rate quoted by the contractor shall be considered inclusive of all such duties, fees, royalties, taxes etc.
- 1.15 In the specification "as directed / approved" shall be taken to mean "as directed / approved" by the Engineer - in - Charge.
- 1.16 Wherever a reference to any India Standard appear in the specifications, it shall be taken to mean as reference to the latest edition of the same in force on date of agreement.
- 1.17 In "Mode of Measurement" in the specifications, wherever a dispute arises in the absence of specification of a particular point or aspect, the provision on these particular points or aspect in the relevant Indian Standard shall be referred to.
- 1.18 All measurement and computations, unless otherwise specified, shall be carried out nearest to the following limits:-
- | | | |
|-----|----------------------------------|--------------|
| (1) | Length, Width and Depth (Height) | 0.01 Meter. |
| (2) | Areas | 0.01 Sq. Mt. |
| (3) | Cubic Contents (Except Wood) | 0.01 Cumt. |
| (4) | Cubic Contents (Wood Work) | 0.001 Cumt. |
- In recording dimensions of work in measurement book the sequence of length, width and height (depth) or thickness shall be followed.
- 1.19 The distance with constitutes lead shall be determined along the shortest practical route and not necessarily the rout actually taken. The decision of the Engineer - in - Charge in this regard shall be taken as final.
- 1.20 Where no lead is specified, it shall mean "all leads".
- 1.21 Lift shall be measured as per current practice for relevant item under direction or decision by Engineer-in-charge.
- 1.22 Definite particulars covered in the items of work, through not mentioned or include in it, specifications shall be deemed to be included therein.
- 1.23 Reference to specifications of materials as made in the detailed specification of the items of work is in the form of a designation containing the number of the specification of the material and prefix "M" i.e. "M-1" etc.
- 1.24 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 whatsoever on account of any such materials being rejected by the Engineer - in - Charge.

- 1.25 The contract rate of the item of work shall be for the work completed in all respects.
- 1.26 No collections of materials shall be made before it is got approved from the Engineer - in - charge.
- 1.27 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.
- 1.28 Materials if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
- 1.29 No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of various components of the structure.
- 1.30 All works shall be carried out in a workman like manner as per the best technique for the particular item.
- 1.31 All tools, templates, machinery and equipment for correct execution of the work as well as for check line, levels, alignment of the works during execution shall be kept in sufficient number and in good working condition on the site of work.
- 1.32 The contractors shall be responsible for observing the rules and regulations imposed under the "Mine and Minerals Act" and such other laws and rules prescribed by Govt. from time to time.
- 1.33 All necessary safety measures and precaution (including these laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works and also of the work it self.
- 1.34 The testing charges of all the materials, mixes and cores shall be paid by the department. (As per Condition of Contract Clause No.34)
- 1.35 Approval to any of the executed item for the work does not in any way relieved the contractor of his responsibility for the correctness, soundness, strength of the structure as per the drawings and the specifications.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-II

SPECIFICATION OF PRINCIPAL MATERAILS

The following specifications are only for the principal materials of construction which are included the details specifications of the items and indicated the requirements of quantities of the Materials. They are given and neither includes all the materials of construction nor exhibit all their desirable qualities. This should be supplemented by detailed specifications as per relevant IS Code unless otherwise not mentioned. The rate of all items are inclusive of all lifts and leads for the materials unless otherwise specified in detailed specifications.

M-1 WATER :-

- 1.1 Water used for mixing and curing of cement / lime mortar or concrete shall not be salty or brakish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces if oil, acid and injurious alkali, salts, organic matter and other deleterious materials which will either weaken the mortar or concrete or cause effloresces or attack the steel in R.C.C. water shall be obtained from sources approved by the Engineer-in-charge. Sources of water shall be maintained at such a depth and the water shall be withdrawn in such a manner as to exclude silt, mud, grass or other foreign materials. Containers for transport, storage and handling of water shall be clean container for transport, storage and handling of water shall be clean water. Water shall conforming to IS 456:2000 as per necessary test carried out.
- 1.2 Potable water is generally considered satisfactory for mixing and curing mortar or concrete.
- 1.3 Under ground water shall be checked before using it in mortar or concrete because of the presence of dissolved salts and chemicals which affects setting time and strength of concrete & Mortar.
- 1.4 Sea and sewage water shall not be used.
- 1.5 Water formed satisfactory for mixing shall also suitable for curing concrete and mortar. However water used for curing shall not produce any objectionable stain or unsightly deposit on the concrete or mortar surface. The presence of tannic acid or iron compounds shall objectionable.
- 1.6 Water shall chemically tested at Govt. Lab. / Govt. approved Lab. as directed by Engineer-in-charge. before being used it in mixing and curing in concrete or mortar once for approval of source of supply subsequently only in case of doubt and change in source of supply. The test results shall be as per permissible limit laid in IS : 456-2000.

Table-1**Permissible limit for solids in water****I.S. : 456-2000 (Specifications) I.S. 3625 (Part 17, 18, 24, 32 Test method)**

Sr. No.	Particulars of tests & I.S. Code for method of testing	Permissible limit Max.	Remarks.
1	Organic solids (I.S. : 3025 (Part-18)	200 mg/l	Frequency of sampling and testing shall be once for source of supply of subsequently in case of doubt and change in source.
2	Inorganic Solids (I.S.: 3025 (Part-18)	3000 mg/l	
3	Sulphates (As SO ₃) (I.S. : 3025 Part-24)	400 mg/l	
4	Chlorides (as CL) (I.S. 3025 Part-32)	2000 mg/l for P.C.C. and 500 mg/l for R.C.C.	
5	Suspended matter (I.S. 3025 Part-17)	2000 mg/l	
6	P.H. Value	Not less than 6	

M-2 CEMENT :-

- 2.1 Only 53 Grade ordinary Portland cement of reputed major cement plant conforming to IS : 269-2015 shall be used for entire work under the tender in all aspects. Mini plant cement shall not be allowed in any cases.
- 2.2 The contractor shall have to make his own arrangement to procure the cement bearing trade-mark or trade name, Grade of cement, type of cement, Name of manufacturer, Lot No., ISI (BIS) Mark, Net weight, etc. directly from the manufacturers or authorized dealer. The contractor shall have to make arrangement to load, cart and unload the cement to the site of work at his own cost. For verification of such purchase, the contractor shall have to produce all the original TAX- INVOICE or "RETAIL INVOICE" bearing GSTIN No. of seller and Buyer, Name of Agency, Name of work site, details of cement (Type and Trade Name), Quantity of cement, Net weight, separately shown GST levied and other details etc. What so, applicable as required as per Govt. rules, along with the testing details to the Engineer-in-charge of the work. The sectional officer of the work after verification of TAX-INVOICE or Retail Invoice as detailed above shall accepted the cements and thereafter entry shall be made to stock register from time to time for each receipt of cement and immediately intimate to sectional officer of quality control to take sample for testing of cement. Sectional officer of the work shall have to make entry either in stock register or in cement consumption register detailing date of receipt, Qty. of cement, type of cement, Lot No. trade name and sample taken for testing along with date of sampling.

2.3 TESTING OF CEMENT :-

2.3.1 Physical Analysis :-

TABLE NO : 1

Physical Requirements for 53 Grade ordinary Portland cement.

I.S. 269-2015 (Specifications) (Clause-7 Table No.3 P.No.4)

I.S. 4031-1968 (Physical tests)

Sr. No.	Physical Properties	Requirements as per I.S. 269-2015
1	Fineness (Specific Surface Area)	Not less than 225 M ² /Kg
2	Compressive Strength	
(a)	03 days (72 ± 1 h)	Not less than 27 Mps (N/mm ²)
(b)	07 days (168 ± 2 h)	Not less than 37 Mps (N/mm ²)
(c)	28 days (672 ± 4 h)	Not less than 53 Mps (N/mm ²)
3	Setting time (vacate apparatus)	
(a)	Initial	Not less than 30 minutes
(b)	Final	Not more than 600 minutes
4	Soundness	
(a)	By Le Chatelier method	Not more than 10mm
(b)	By Autoclave test	Not more than 0.8%
5	Consistency of Standard cement paste (Standard consistency)	The quantity of water required to produce a paste of standard consistency to be used for determination of water content of mortar for the compressive strength tests and for the determination of soundness and setting time.

2.3.1.1 Frequency of Sampling and test shall be as below :-

TABLE No.2

Sr. No.	Quantity of Cement	Nos. of sample	Nos. of Test	Remarks
1	Up to 50 MT	1	1	Same lot
2	50-100 MT	2	2	Same lot
3	100-200 MT	3	3	Same lot
4	200-300 MT	4	4	Same lot
5	300-500 MT	5	5	Same lot
6	500-800 MT	6	6	Same lot
7	800-1300 MT	7	7	Same lot
8	For each large consignment	8	8	Same lot

N.B. : If different lots found in cement Qty. as described in Col. No.2 of Table No.2 one sample from each lot shall be taken for Testing, minimum sample & Test shall be as per Table No.1 therefore sectional officer of work shall be enter lot No. against quantity of each lot in the stock register for each receipt from time to time. Sample shall be taken random.

2.3.2 Chemical Requirements :-

TABLE NO. 3

Chemical Requirements for 53 Grade ordinary Portland cement

I.S. 269-2015 (Specifications) (Clause-6.1 Table No.2 P.No.3)

I.S. 4032-1985 (Chemical analysis)

Sr. No.	Characteristic	Requirement
1	Ratio of percentage of lime to percentage of silica, alumina and iron oxide when calculated by the formula $\frac{CaO - 0.7 SO_3}{2.8SiO_2 + 1.2Al_2O_3 + 0.65Fe_2O_3}$	Not greater than 1.02 and not less than 0.8
2	Ratio of percentage of alumina to that of iron oxide.	Not less than 0.66
3	Insoluble residue, percent by mass	Not more than 5.0
4	Magnesia, percent by mass	Not more than 6.0
5	Total sulphur content calculated as sulphuric anhydride (SO ₃) percent by mass	Not more than 2.5 and 3.0 when tri-calcium aluminate (see Not 1) percent by mass is 5 of less and greater than 5, respectively.
6	Total loss on ignition	Not more than 4 percent

All chemical test required as per IS : 4032-1985 shall be carried out for one test per ten tests sample of above Para 2.31 i.e. for physical tests

2.4 The cement not satisfying the criteria as per IS : 269-2015 for 53 Grade OPC shall be rejected and contractor shall have to remove it from site immediately.

2.5 Field Test :-

The quality of cement shall be confirmed through physical & chemical test as prescribed in relevant IS in laboratory. These however taken time. However to quickly ascertain the quality of cement, some field test of indicative natures as like visual examination (Packing of bags), colour, Texture, initial setting time, Ball test, Float test etc. as described in GERI circular No.1 of 1986 issued vide GERI, Vadodara Letter No.MT-II/Cement/8321546 of 1986 and 10-3-1986 shall be conducted as guidelines to identify doubtful variety of cement. The doubtful cement when so identified shall be got tested in the laboratory on priority to confirm quality as per IS.

- 2.6 Large stocks of cement shall not be kept at the work but only sufficient quantity shall be kept to assure continuity of the work. The contractor shall have to provide and maintain efficiently water proof storage sheds for cement on the site of work. It shall be stacked on the platform 30 cm above the floor level and cement shall be covered with tarpaulin or any other impervious materials for covering in order to protect the cement bags from moisture. The tax shall be made at one mt. away from wall and distant between two stacks shall be kept also 1.00 mt. so as to count easy.
- 2.7 The cement bags shall be neatly stacked in an orderly manner so as to afford easy access and count. Deteriorated cement shall not be allowed for use.
- 2.8 A regular day to day account of cement received and used on the work together with the particular of the work and quantity of the work in which it was used, shall be maintained in ink separately by the responsible representative of the department and shall be signed at the end of the day's work by the department representative as well as contractor after proper verification in accounting be shown to the inspecting officer when asked for. In addition to above responsible representative of the department shall be maintained the register for consumption of cement as per circular issued vide GOG. ID circular No.CMT/2384/IB-60/25/H Dtd. 30-3-1984.
- 2.9 The contractor shall provide a double locking arrangement for the store and the key for one lock will remain with the Engineer-in-charge of the work or his authorized agent. Cement stored for more than 90 days according to Lot No. showing week, month, year shall not be used unless retested and found satisfactory. During the monsoon period cement shall be retested every month ensure quality.
- 2.10 The contractor shall provide at the site of work satisfactory storage for not less than 3 months average consumption of cement on work and shall keep the cement store in a manner that will satisfy the Engineer-in-charge.
- 2.11 The arrangements of storage and utilization of cement shall be such that to ensure the utilizations of cement in the order of its arrival at the stores, the contractor shall maintain satisfactory up to date records which would at any time show the dates of receipts and proposed utilization of cement lying in the stores at site. Cement shall be used in the "first in first out" method.
- 2.12 The Engineer shall at all times have access to the stores and the site of contractor and shall have authority to check and examine the method of storage, records, accounting and security provided by the contractor. The contractor shall comply with the instruction that may be made by Engineer in this connection. The contractor shall further at all time satisfy the Engineer on demand by the production of records of books of submission of return and Performa or by tother proofs that may be demanded that

the cement brought being used for the purpose for which it is brought and contractor shall at all times keep his records up to date of enable Engineer to apply such checks as he may be desire to impose.

- 2.13 The cement shall not be stored for unduly long period. It should be handled in such a way as to impair its strength or useful characteristics.
- 2.14 The Engineer-in-charge or his authorized agent will have the authority to verify the stock and check on the consumption in any manner he thinks proper.
- 2.15 Cement should be measured by weight with MT or Kg as the unit.

M-3 FINE AGGREGATES (SAND) :-

General :-

All fine aggregate shall confirm to IS; 383-2016 Natural sand from river shall be used only after screening and washing.

Sand for use in concrete work shall be natural sand; sand shall be clean, well graded, hard, durable and gritty particles free from injurious amount of dust, clay, silt, kanker, nodules, soft or flaky particles, shale, organic matter, loam, mica or other deleterious substances and shall be approved by the Engineer. The maximum size of particles shall be limited to 4.75mm. 100% Sand should be passed through 10mm IS sieve.

TABLE No. 4

Limits of Deleterious Materials

IS: 383-2016 (Specifications) (Clause 5.2.1 Table No.2 P.No.3)

IS: 2386 (Part-I, II)-1963 (Method of Testing)

Sr. No.	Deleterious substances and Method of test.	Fine Aggregate percentage by weight Maximum (Uncrushed)	Coarse Aggregate percentage by weight maximum (Crushed)
1	2	3	4
1	Coal and lignite IS : 2386 (Part-II) 1963	1.00	1.00
2	Clay lumps IS : 2386 (Part-II) 1963	1.00	1.00
3	Materials finer than 75 Micron IS Sieve. IS : 2386 (Part-I) 1963	3.00	3.00
4	Soft fragments IS : 2386 (Part-II) 1963	--	-
5	Shale IS : 2386 (Part-II) 1963	1.00	--
6	Total of percentage of all deleterious materials (except mica) including Sr. No.1 to 5 for Col.3 & 4	5.00	5.00

TABLE-5**Gradation of Fine Aggregate****IS : 383-2016 (Specification) (Clause No.6.3 Table No.9 P.No.7)****IS : 2386 (Part-I)-1963 (Method of testing)**

Sr. No	I.S. Sieve	Percentage(%) passing for			
		Grading Zone-I	Grading Zone-II	Grading Zone-III	Grading Zone-IV
1.	10mm	100	100	100	100
2.	4.75mm	90-100	90-100	90-100	90-100
3.	2.36mm	60-95	75-100	85-100	95-100
4.	1.18mm	30-70	55-90	75-100	90-100
5.	600 Micron	15-34	35-59	60-79	80-100
6.	300 Micron	5-20	8-30	12-40	15-50
7.	150 Micron	0-10	0-10	0-10	0-15
8.	F.M.	4-2.71	3.37-2.11	2.78-1.71	2.25-1.35
9.	F.A. Type	Coarse	Medium	Fine	Very Fine

- Note :-** (1) Grading becomes progressively final & from Zone-I to IV.
- (2) The grading of fine aggregate, when determined as described in IS 2386 (Part I) shall be within the limits given in Table 9 and shall be described as fine aggregate, Grading Zones I, II, III and IV. Where the grading falls outside the limits of any particular grading zone of sieves other than 600 μ m IS Sieve by an amount not exceeding 5 percent for a particular sieve size, (subject to a cumulative amount of 10 percent), it shall be regarded as falling within that grading zone. This tolerance shall not be applied to percentage passing the 600 μ m IS Sieve or to percentage passing any other sieve size on the coarse limit of Grading Zone I or the finer limit of Grading Zone IV.
- (3) The ratio F.A./C.A. should be reduced progressively.
- (4) Fine aggregate complying with the requirements of any grading zone in above table is suitable for concrete. It is recommended that very fine aggregate conforming Zone-IV should not be used in reinforced cement concrete.

3.2 Quality of Fine Aggregate :-

- 3.2.1 Deleterious Materials : Aggregate shall not contain any harmful material such as pyrites, coal, lignite, mica, shale, or similar laminated material, clay, alkali, soft Fragments sea shells and organic impurities in such quantity as to affect the strength or durability of concrete. Aggregate to be used for reinforced concrete shall not contain any material liable to attack the steel reinforcement. Aggregate which are chemically reactive with

alkalis of cement are harmful as cracking may take place.

3.2.2 **Limit of Deleterious materials :-**

The maximum quantity of deleterious material in fine aggregate (natural sand) shall not exceed the limits specified in Table-1 of IS : 383-2016 when tested in accordance with IS : 2386-1963. However the Engineer-in-charge at his discretion may relax some of the limits, Total deleterious substances like coal and lignite clay lumps, material finer than 75 micron IS sieve (Silt content less than 3%) shale etc. shall not be more than 5% including silt content for uncrushed natural sand.

3.2.3 **Grading of Fine aggregate and Fineness Modulus (F.M.) :-**

The grading of fine aggregates when determined as described in IS:2386 (Part-I) 1963 shall be within the limits given in table: 4 of IS 383-2016 and shall be described as fine aggregates grading zones I, II, III and IV for concrete work. The F.M. of sand shall have ranging between 3.37 and 2.11 ($2.11 < \text{F.M.} < 3.37$) subject to the sand being well graded, Gradation and F.M. of sand for masonry mortar & plaster shall be as per IS : 2116-1980 and IS: 1542-1992 respectively. For proper grading coarse & fine sand may be blended.

3.2.4 **Silt content :-**

The silt content shall not exceed 3% as per IS: 383-2016 when tested in accordance with IS: 2386 (Part-I) 1963.

The particular of tests, frequency and Acceptance criteria are shown in table below :

TABLE-6

Fine Aggregate (Sand)

IS : 2386 (Part-1 to 8) (Test Method) IS : 383-2016 (Specifications)

Sr. No.	Particulars of Tests & IS Code for Method of testing.	Frequency	Acceptance Criteria
1	Gradation & F.M. IS : 2386 (Part-I) 1963	1-Test per 150 M ³ Concrete work.	(i) for Concrete IS : 383-1970 (ii) For Masonry mortar IS: 2116-1980. (iii) For Plaster IS: 1542-1992
2	Specific Gravity (SPG) & water absorption, IS: 2386 (Part-3) 1963	Once for approval of source of supply subsequently in case of doubt and change in source.	As per relevant specification & design.
3	Silt content. IS:2386 (Part-I) 1963	1-Test per 150 M ³ Concrete work.	Not more than 3%

Initially before work commenced the entire test as mentioned in above Table-1 shall be carried out at GERI or approved institute or approved private laboratory. The source of sand shall have to specify by contractor and shall be got approved jointly by Engineer-in-charge.

The gradation of materials from any one source shall not vary in composition beyond the range of value that governs in selecting source of supply. For determining the degree of uniformity, determination of gradation & F.M. shall be made upon representative samples furnished by the contractor from such source as he propose to use. Fine aggregate from any one source having a variation in F.M. greater than ± 0.20 from the average F.M. of representative

sample submitted by the contractor shall be rejected or may be accepted subject to such change in the proportion of aggregate as the Engineer may direct.

If contractor desires to change of source prior approval of Engineer-in-charge shall have to be got well in advance and Engineer-in-charge shall give approval after satisfaction on additional test carried out.

3.3 Field Test :-

Field staff of QC shall have to be carried out tests like gradation, F.M., silt content, at field laboratory at frequency 1 test per 150m³ concrete work & register for the same shall be maintained at site of work.

3.4 Storage :-

The fine aggregate should be stacked carefully on a clean hard surface so that it will not get mixed up with deleterious foreign material.

Sand shall not be stocked in high conical heaps so that segregation of heavier particles by sliding down may be prevented. It shall be placed in layers not thicker than those resulting from lorry loads dumper on the same place.

3.5 Measurement :-

When required to be measurement shall be by volume with Cu.mt. as the unit. No deduction shall be made for the voids.

M-4 COARSE AGGREGATE (CRUSHED METAL) :-

Coarse aggregate shall be of machine crushed stone (Crushed metal) of black trap basalt. Coarse aggregate shall be hard, strong, dense, durable, clean of proper gradation and free from skin and coating likely to prevent proper adhesion of mortar or concrete (Adherent coating) and free from veins and free from injurious amount of disintegrator pieces, alkali, vegetable matter and other deleterious substance.

The coarse aggregate shall generally be cubical in shape and as far as possible flaky, elongated, scoriaceous pieces shall be avoided. It shall generally comply with the provisions of IS: 383-2016. Aggregate most of which is retained on 4.75 mm IS sieve and containing only so much finer material as is permitted as per IS: 383-2016.

4.1.1 **Size of aggregate (Provision in IS:456:2000) :-**

The nominal maximum size of coarse aggregate should be as far as possible within the limit specified but in no case greater than one fourth ($1/4$) of the minimum thickness of the member for plain cement concrete and in addition to this for reinforced cement concrete in can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corner of the form. For most work 20mm aggregate is suitable where there is no restriction to the flow of concrete in to section 40mm restriction to the flow of concrete in to section 40mm or larger size may be permitted. In concrete element with thin section, closely space reinforcement or small cover, consideration should be given to the use of 10mm nominal maximum size, Read to above para size of aggregate should be determined as follow.

4.1.2 **For Plain cement concrete (PCC) :-**

The nominal maximum size of $> \frac{1}{4} \times$ Minimum thickness of member aggregate.

4.1.3 **For reinforced cement concrete (RCC) :-**

The nominal maximum size of $> \frac{1}{4} \times$ Minimum thickness of member aggregate.

$> \text{the Minimum clear distance between main bar} - 5\text{mm}$
OR
 $> \text{The Minimum cover to the reinforcement} - 5\text{mm}$ } whichever is Smaller.

4.1.4 **The Minimum and maximum size of the aggregates may be between 4.75mm to 80mm. (about 3/16" to 3") & shall be well graded.**

The range in grading of coarse aggregate shall be as follow.

- | | | |
|-------|----------------------|---|
| (i) | 40m – 80mm (Or 63mm) | (Approximate 1 ½" to 3" (or 2 ½")) |
| (ii) | 20mm x 40mm | (-do 0III" (3/4") to 1 ½") |
| (iii) | 10mm – 20mm | (Approximately 0III" (1/2") to 0III" (3/4") |
| (iv) | 4.75 mm – 10mm | Grit as available in market. |

Engineer-in-charge may give relaxation to range in grading according to availability in market.

4.2 **Quality of coarse Aggregate :-**

4.2.1 **Deleterious materials & its limit :-**

Deleterious material as described and its acceptance criteria for crushed metal shall be as per IS: 383-2016 when tested according to IS: 2386 (Part-II)-1963, IS: 2386 (Part-I)-1963. In no case total of percentage of all deleterious materials finer than 75 micron IS sieve (Silt content) more than 5% by weight i.e.

Deleterious material (Coal and lignite, clay, slums) including silt content (3%) shall not be more than 5%.

4.2.2 **Gradation :-**

Graded coarse aggregates shall be supplied in the nominal size as per IS: 383-2016 or as per relevant specification provision.

The particular of tests, frequency and acceptance criteria are shown in Table-1 below.

TABLE-7

Coarse Aggregate (Crushed Metal)

IS : 2386 (Part-1 to 8) if method of test IS : 383-2016 (Specifications)(Clause No.5.4)

Sr. No.	Particulars of Tests & IS Code for Method of testing.	Frequency	Acceptance Criteria
1	Gradation IS : 2386 (Part-I) 1963	1-Test per 150 M ³ Concrete or as per specification.	As per relevant specification provision.
2	Sp. Gravity (SPG) & water absorption (WA) IS: 2386 (Part-3) 1963	Once for approval of source of supply subsequently in case of doubt and change in source.	SPG generally 2.5 to 3.0 & WA 1.0% to 1.50%
3	Flakiness & elongation Indices. IS:2386 (Part-I)-1963	Once for approval of source of supply subsequently in case of doubt and change in source.	30% maximum
4	Impact value IS:2386 (Part-4)-1963	Once for approval of source of supply subsequently in case of doubt and change in source.	As per IS:383-2016 (i) Concrete – Wearing surface – 30% Max.(Wt) (ii) Overlaid surface 45% Max. (Other than(i))

NB :- The kind of test to be got tested, out of above mentioned various test shall be carried out on the decision of D.E.E. (Q.C.) looking to function and nature of concrete and its usability after work.

4.3 **Field Test :-**

The material coming out of the IS : sieve shall be in the grade ranging from 40mm to 4.75 as specified or as determined as per IS:456-2000. (MSA as specified in specification or as determined as per IS : 456-2000). Each grade 40 mm, 40 mm– 20 mm, 20mm-10 mm, 10mm-4.75mm (Grit) which ever applicable according to MSA shall be stacked separately. The stack shall be considered as approved only if it conforms the following criteria.

- (1) The material retained on IS sieve corresponding to the upper limit of size of stack not exceeding 15% by weight.
- (2) The material passing through the IS sieve corresponding of the lower limit of size of stack not exceeding 15% by weight.
- (3) The sum of (1) and (2) above shall not exceed 20% by weight.

The gradation register shall be maintained at site. The frequency of test shall be 1-test per 150 m³ concrete work.

4.4 **Storage :-**

The aggregate of different sizes shall be stacked or batched or stored separately and handle in such a manner as to prevent inter mixing of different size of aggregates required separately for grading purpose. NO foreign materials shall be allowed to be mixed up with aggregates. It shall be covered to prevent mixing of dust etc. They shall be washed clean before use. The aggregates shall be stacked in one shape of frustum of pyramid of standard size as per code of practice or as directed by Engineer-in-charge.

4.5 **Measurement :-**

When required to be measured the measurement shall be by volume with Cum. as the unit. No deduction shall be made for voids.

Table-8

Specification of single size Coarse Aggregate

IS:383-2016 (Clause-6.1 & 6.2 Table No.7 P.No.6)

IS sieve Designation	Percentage passing for single size Aggregate					
	MSA 63mm	MSA 40mm	MSA 20mm	MSA 16mm	MSA 12.5mm	MSA 10mm
80 mm	100	-	-	-	-	-
63 mm	85-100	100	-	-	-	-
40 mm	0-30	85-100	100	-	-	-
20 mm	0-5	0-20	85-100	100	-	-
16 mm	-	-	-	85-100	100	-
12.5 mm	-	-	-	-	85-100	100
10 mm	0-5	0-5	0-20	0-30	0-45	85-100
4.75 mm	-	-	0-5	0-5	0-10	0-20
2.36 mm	-	-	-	-	-	0-5

Table-9
Size of coarse aggregate for mass concrete
I.S. 383-2016 (Clause-6.1.1 Table No.8 P.No.7)

Sr. No.	Class and size	I. S. Sieve designation	Percentage Passing
1	Very Large 150- 80mm	160mm	90 to 100
		80mm	00 to 10
2	Large 80 – 40mm	80mm	90 to 100
		40mm	00 to 10
3	Medium 40 – 20mm	40mm	90 to 100
		20mm	00 to 10
4	Small 20 – 04.75mm	20mm	90 to 100
		04.75mm	00 to 10
		0.236mm	00 to 02

M-5 Steel :-

The steel shall be procured by the contractors. The necessary testing certificate shall have to be produced by the contractors before using the same in the work. The testing of Steel shall be done for one sample for 40 M.T. (Forty M.T.) quantity of steel. After getting results as per I.S. code of its particular consignment, its use to be made as per prevailing practice. If the quality of Steel does not confirm to be requirement, as stated above, such steel shall have to- be' removed from the site of work by the contractors.

The bars and rods and structural steel shall be according to sizes and length as commonly manufactured in India. Measurements for determining computed on the basic of sectional given in I.S. specifications for Indian, steel and as per manufacturer's standard weights for imported steel.

The contractor shall make suitable arrangements For the storage of the Steel procured and Engineer or his representative shall have the authority at all times to inspect the storage arrangement and suggest modification and, improvements if any and the contractor shall comply with the same. The storing arrangement shall be such as to. be convenient .of inspection and check of materials,

The contractor shall at all time maintain proper records showing the basis of the procurement / indent, the receipt and utilization of the steel, procured by contractor and these shall be all times be open for inspection by the Engineer or his authorized representatives. The steels, Structural Steel as well as M.S. Steel not mentioned and required for the use on the work will have to be procured by the contractors, either from the Steel Authority of India or from the original producing companies, for

verification of which the contractor shall have to produce to the Executive Engineer-in-Charge, the original Vouchers. For purchase of the Steel from these sources as required. The steel of the required quantity shall have to be procured and used after being certified by the Engineer-in-charge to this effect and after submission to the Deptt. The necessary Test Report, of suitability of the Steel for use in the works concerned.

5.1 T.M.T. Bar :-

T.M.T. bars reinforcement for R.C.C. work shall confirm to I.S. its latest version and shall be of tested quality. It shall also comply with relevant part of I.S. 456-2000 or its latest version.

Chemical Composition I.S. 1786-2008 (Clause No.4.2 P.No.2)

Constituent	Percent, Maximum						
	Fe 415	Fe 415D	Fe 500	Fe 500D	Fe 550	Fe 550D	Fe 600
Carbon	0.30	0.25	0.30	0.25	0.30	0.25	0.30
Sulphur	0.060	0.045	0.055	0.040	0.055	0.040	0.040
Phosphorus	0.060	0.045	0.055	0.040	0.050	0.040	0.040
Sulphur & Phosphorus	0.110	0.085	0.105	0.075	0.100	0.075	0.075

Permissible variation from the limits I.S. 1786-2008 (Clause No.4.2.1 P.No.3)

Constituent	Variation, Over Specified Maximum Limit, Percent, Max
Carbon	0.02
Sulphur	0.005
Phosphorus	0.005
Sulphur & Phosphorus	0.010

Table 3 Mechanical Properties of High Strength Deformed Bars & Wires. (Clause 8.1 Table No.3 P.No.3)

Sr. No.	Property	Fe 415	Fe 415D	Fe 500	Fe 500D	Fe 550	Fe 550D	Fe 600
i)	0.2 percent proof stress / yield, Min, N/mm ²	415.0	415.0	500.0	500.0	550.0	550.0	600.0
ii)	Elongation, percent, Min. on gauge length 5.65 A, where A is the cross-sectional area of the test piece	14.5	18.0	12.0	16.0	10.0	14.5	10.0

Sr. No.	Property	Fe 415	Fe 415D	Fe 500	Fe 500D	Fe 550	Fe 550D	Fe 600
iii)	Tensile strength, Min	10% more than the actual 0.2% proof stress/ yield stress but not less than 485.0 N/mm ²	12% more than the actual 0.2% proof stress/ yield stress but not less than 500.0 N/mm ²	8% more than the actual 0.2% proof stress/ yield stress but not less than 545.0 N/mm ²	10% more than the actual 0.2% proof stress/ yield stress but not less than 565.0 N/mm ²	6% more than the actual 0.2% proof stress/ yield stress but not less than 585.0 N/mm ²	8% more than the actual 0.2% proof stress/ yield stress but not less than 600.0 N/mm ²	6% more than the actual 0.2% proof stress/ yield stress but not less than 660.0 N/mm ²
iv)	Total elongation at maximum force, percent, Min on gauge length 5.65 A, Where A is the cross-Sectional area of the test piece (see 3.9D	--	5	--	5	--	5	--

M-6 Cement Mortar :-

6.1 Water shall conform to specification M-1. Cement shall conform to specification M-2
Sand shall conform to M-3.

6.2 Proportion of Mix :-

6.2.1 Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes. The proportion of cement will be by volume on the basis of 50 Kg. / Bag of cement being equal to 0.0342 Cum. The mortar may be hand mixed or machine mixed as directed.

6.3 Preparation of mortar :-

6.3.1 In hand mixed mortar cement and sand in the specified proportions shall be thoroughly mixed dry on a clean Impervious platform by turning over at least 6 times or more till a homogenous 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.

6.3.2 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-7 BINDING WIRE :-

The binding wire for tying reinforcement shall be of soft & annealed mild steel conforming to IS-280. The diameter of wire shall be of 1.63 mm or 1.22mm (16 or 18 gauge). The use of black wire shall 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-8 STONE (RUBBLE) :-

The stone shall be of good quality hard stone. The stone shall be hard, sound, durable and free from defect like segregation, Seams, cracks, cavities, sand holes, flaws injurieveins, patches of loose or soft materials, weathered portion and other structural defects to affect their soundness and strength. The stone with round surface shall not be used. The source of the stone of required quality shall be got approved from the Engineer-in-charge well before carting the same to work site. The contractor shall have to arrange to cart, load, unload, stacks, the same to the site of work at his own cost from specified lead weathered skin maximum up to 2 mm thickness shall be allowed on one face of the stone only and shall not be more than 33 % of total number of stone to be used.

TABLE NO. : 1

Specifications : I.S.:1597 (Part-1)-1992, I.S.: 1123-1975 (Reaffirmed 1998)

I.S. : 8605-1977 (Reaffirmed 1998)

Methods of Test : I.S. : 1121-1974, I.S. : 1122-1974, I.S. : 1124-1974,

I.S. : 1125-1974, I.S. : 1126-1974

Sr. No.	Particulars of Tests	Acceptance criteria
1	Specific Gravity Apparent (I.S. : 1124-1974) True (I.S. : 1122-1974)	2.6 To 3.0
2	Water Absorption (I.S. : 1124-1974)	Not more than 5%
3	Compressive Strength 121 (Part-I) - 1974)	200 kg/cm ²

Kind of test to be carried out shall be depended on exposures, function of stone, specific use of stone masonry work, pitching work, Launching apron and condition prevailing.(exposed to atmosphere, buried to concrete cover submergence in water, In contact with soil) The kind of test to be carried out from above table shall be decided by Engineer in charge.

Size and weight of stone shall be as under.

Sr. No.	Type of work	Size	Weight
1	Masonry work for check dam	Not less than 15 cm in any direction	Not less than 25 kg.
2	Pitching work for dam	Not less than 22.50 cm in thickness	Not less than 25 kg.

Sr. No.	Type of work	Size	Weight
3	Launching apron for check dam	Not less than 25 cm in any direction	Not less than 40 kg.
4	Soling below apron for check dam	Not less than 15 cm in any direction	Not less than 25 kg.

Frequency of sampling and Testing :-

Stone to be used for pitching. Masonry, launching apron, soling etc. shall be tested once for approval of source of supply and subsequently only in case of doubt & change in source of supply.

M-9 SOIL :-

Semi pervious material should be used as a Soil in earthwork.

The material should be carry from selected burrow area as directed by Engineer-in-charge. No any extra payment shall be paid for transporting the material from borrow area to site of work. The transported material should be stacked in manner as directed by Engineer-in-charge.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-III

GENERAL TECHNICAL SPECIFICATION OF CONCRETE

1.0 SCOPE OF WORK :-

The work covered by this chapter consists of Controlled Concrete M-15 (MSA-40mm) grade for this work furnishing all materials required, equipment, machineries, labours for manufacture of concrete, transport, placing, form work, finishing, curing etc. and inclined sleepers and performing all the functions necessary for and ancillary to the work related by contractor.

2.0 MATERIALS :-

As per Section-V, Chapter-II of specification of Principal Materials.

*	Water shall confirm to specification	M-1
*	Cement shall confirm to specification	M-2
*	Fine Aggregate (Sand) –do--	M-3
*	Coarse Aggregate (Crushed Metal)-do-	M-4

3.0 COMPOSITION :-

Concrete shall be composed of cement, fine aggregate (natural sand), coarse aggregate, water and admixture if asked) well mixed in proportion and brought to the proper consistency. The design mix proportions shall be adjusted to produce a durable and workable concrete suitable for specified conditions of placement and design strength.

4.0 CLASSIFICATION :-

For all items of concrete in any portion of the structure or its associated works, shall be of design mix as specified in specification of item or as decided by engineer in charge as per provision made in IS-456 Page No-23 cluse-9.3. The cement concrete work to be carried out are classified in grades as mention in item of work. Following table is provided for general guidance to the contractor. There may be change in criteria like water cement ratio, slump, aggregate size and proportion etc, for which contractor is bound to carryout work without claiming any extra cost. The cement level mention in the Table-AA, given below are tentative and for general guidance only.

The design mix for different grade of concrete to be used, will be furnished by the department.

5.0 SLUMP :-

Slump test at field shall be carried out at the frequency according to frequency of sampling for compressive strength at 28-days on 150 mm x 150 mm x 150 mm cubes. And slump observed shall be registered.

6.0 For General Guidance only :-

Design mix for M-15 MSA-40mm of concrete grade to be used, will be furnished by the department. **M-15 Mix Design.**

Table-AA

Sr. No.	Grade Of Cement Concrete	MSA.	Min. Avg. Compressive Strength Of 3-Specimen AT FIELD ON 15 X 15 X 15 Cms. Cubes.	Min. Avg. Compressive Strength Of 3-Specimen AT LAB. ON 15 X 15 X 15 Cms. PRELIMINARY TEST CUBES.	MIN. CEMENT LEVEL REQ. AS PER IS PCC / RCC.	CEMENT LEVEL CONSIDER IN THE RATE PCC / RCC.	MAX. W/C. RATIO PCC / RCC.	REMARKS.
1	2	3	4.	5.	6.	7.	8.	9.
		mm.	kg/cm ² at 28 days.	kg/cm ² at 28 days.	kg/cum.	kg/cum.		
1	M-15	40	184	212	210	280	0.6	For P.C.C. moderate expose condition.
					N/A.	280	-	

NOTES :-

- Concrete works classified as above shall be designed with reference to the field strength shown in above table. Other requirements shall have to be adjusted to obtain this strength in each case incl. cement level. indicated in above table
- Compressive strength mention in column no-4 is based on characteristic compressive strength compliance requirement given on table-11 page no-30 of IS-456-2000.And it is the average characteristic compressive strength of three specimens.
- Compressive strength mentioned in column no-5 is based on para-9.2.2 (page no-22) of IS-456-2000 (The target mean strength of concrete Mix should be equal to the characteristic strength plus 1.65 times the std. deviation). Standard deviation of 3.5 is taken for M-10 & M-15,4.0 is for M-20 & M-25, and 5.0 is for M-30 & above as per IS-456,Page-23,Table-8
- The test result of the sample shall be the average of the strength of three specimens. The individual variation should not be more than(+)or(-)15 percentage of the average.
- The characteristic strength compliance requirement mentioned in column No-4 and target mean strength mentioned in column No-5 are based on 'GOOD QUALITY CONTROL' and MODERATE exposer condition.
- For every one kg of cement required to be reduced than that of stated in column No-7 of Table-AA in each case based on approved laboratory design mix, the recovery shall be made at Rs. ____ Per kg. of cement. And for every one kg of cement required to be added than that of stated in column No-7 of Table-AA, in each case based on approved laboratory design mix / nominal mix, NO EXTRA payment shall be made.
- Curing period shall be 14 days (min.) for OPC Cement.

- 8 Above details are primarily given for the guidance of contractor while quoting there tender rate and is only informative for the general requirement of concrete.

7.0 ACCEPTANCE CRITERIA :-

- i) COMPRESSIVE STRENGTH : The concrete shall be deemed to comply with the strength requirements when both the following conditions are met
- a) The mean strength determined from any group of four consecutive test results compiles with the appropriate limits in col-2 of Table-11 given on Page No-30 of IS-456-2000.
- b) Any individual test results complies with the appropriate limits in col-3 of Table-11 given on Page No-30 of IS-456-2000.

8.0 DESIGN MIX CONCRETE :-

The design mix for M-15 & MSA-40mm shall be design to produce the grade of concrete having the required workability and a characteristic strength and target mean strength not less than appropriate values given in table-AA column-4 & 5 respectively. Mix design done earlier not prior to one year may be considered adequate for later work provided there is no change in source and quality of the materials.

The design mix shall be carried out in Govt. Laboratory (GERI) / Govt. Approved Private Laboratory as per IS-10262 as decided by Engineer-in-charge.

9.0 FORMS FOR CONCRETE :-

IS-456 shall be applicable.

10.0 SAMPLING AND STRENGTH OF DESIGNED CONCRETE MIX :-

(Provision of IS: 456-2000) (or it's Latest Revision)

General :-

Samples from fresh concrete shall be taken as per IS: 1199 and cubes shall be made, cured and tested at 7 days and 28 days in accordance with IS: 516-2000.

Sampling procedure :-

A random sampling procedure shall be adopted.

Frequency (IS : 456-2000) :-

The minimum frequency of sampling of concrete of each grade for compressive strength shall be in accordance with the following :

Quantity of concrete in the work, m ³	Numbers of samples.
1 - 5	1
6 - 15	2
16 - 30	3
31 - 50	4
51 and more	4 plus one additional sample each additional 50 m ³ or part thereof.

Note :-

At least one sample shall be taken from each shift where concrete is produced at continuous production unit, such as ready-mixed concrete plant, frequency of sampling may be agreed upon mutually by suppliers and purchasers.

Test Specimen :-

Three test specimens shall be made for each sample for testing at 28 days. Additional samples may be required for various purposes such as to determine the strength of concrete at 7 days or all the time of striking the formwork, or to determine the duration of curing or to check the testing error. Additional samples may also be required for testing samples cured by accelerated methods as described in IS 9103. The specimen shall be tested as described in IS 516.

Test Results of sample :-

The test results of the sample shall be the average of the strength of three specimens. The individual variation should not be more than $\pm 15\%$ of the average. If more, the test results of the sample are invalid.

11.0 INSPECTION OF FOUNDATION BEFORE CONCRETE PLACEMENT :-

Following care shall be taken for rock surface, soil surface & concrete surface.

Rock Surface :-

- Check lines & levels, obtain clearance of geologist.
- Inspect with hammer for hollow sound.
- Remove loose rock.
- Clean with air and water jets under pressure.
- Keep surface wet for 24 hrs before placement of concrete.
- Ensure adequate drainage or dewatering or caulking for leaks.

Soil Surface :-

- Remove loose or soft patches.
- Moisture the surface to a depth of about 15 cm for 24 hrs before placement of concrete.
- Do tamping or rolling.

Concrete Surface :-

- Remove loose material.
- Existing concrete should be wet sand blasted & washed thoroughly.
- Completely dried immediately prior to placement.

12.0 BATCHING :-

Only mechanical weigh batching shall be allowed. The concrete mixing shall be done Ajax (Transit Mixer) only. The quantity of both cement and aggregate shall be determined by mass, water shall be weighted or measured by volume in a calibrated tank. All ingredient of concrete shall be taken by weight proportion as per concrete mix design finalized.

Except where it can be shown to the satisfaction of the Engineer-in-charge that supply of properly graded aggregate of uniform quality can be maintained over a period of work, the grading of aggregate shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions when required, the different sizes being stocked in separate stock piles. The material should be stock piled for several

hours preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible. The frequency for a given job being determined by the Engineer-in-charge to ensure that the specified gradient is maintained.

The accuracy of the measuring equipment (like weigh batcher) shall be within ± 2 percent of the quantity of cement being measured and within ± 3 percent of the quantity of aggregate, admixture (if considered in mix design) and water being measured proportion / Type and grading of aggregates shall be made by trial in such a way so as to obtained densest possible concrete. All ingredients of the concrete should be used by mass only.

Volume batching shall be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS: 2386 (Part-III). The mass volume relationship should be checked as frequently as necessary, the frequency for the given job being determined by Engineer-in-charge to ensure that the specified grading is maintained.

Volume batching shall not be resorted without prior consent of the Engineer-in-charge who may allow this at his sole discretion when the quantity of concrete work and the rate of its placement and so small as not to vary the use of complete batching equipment. It is important to maintain the water cement ratio constant at its correct value accordance with concrete mix design finalized. To this end determination of moisture contents in both

fine and coarse aggregates shall be made as frequently as possible. The frequency for a given job being determined by the Engineer-in-charge according to weather conditions. The amount of the added water shall be adjusted to compensate for any observed variations in the moisture contents. For the determination of moisture content in the aggregates IS: 2386 (Part-3) shall be referred to. To allow for the variation in mass of aggregate due to variation in their moisture content, suitable adjustments in the masses of aggregates shall also be made. In the absence of exact data, only in the case of nominal mixes, the amount of surface water may be estimated from the values given in table below.

Table

Sr. No.	Aggregate	Approximate Quantity of surface water	
		Percent by Mass	l/m ³
1.	Very wet sand	7.5	120
2.	Moderate wet sand	5.0	80
3.	Moist sand	2.5	40
4.	Moist gravel or crushed rock coarser the aggregate, less the water if will carry.	1.25 – 2.5	20-40

No substitutions in materials used on the work or alterations in the established proportions (CMD or NMC) except as permitted in previous two para as described above shall be made without additional tests to show that the quality and strength of concrete are satisfactory. In the absence of any automatic weigh batches, weighing shall be done only by means of providing and using steel measuring boxes shall have adjustable bottom to allow for daily variation in moisture properties of the fine and coarse aggregates. Enough boxes shall be provided separately for each ingredients as approved by Engineer-in-charge.

The contractor shall have to provide the weigh batchers of the requisite capacity to maintain the required progress on different item of work, calibration of weight batcher shall be carried out prior to use it and from time to time in presence of a Govt. representative nominated by Engineer-in-charge to check the accuracy of the measuring devices. The frequency of such test for establishment of accuracy shall be determined by the Engineer-in-charge. Unless otherwise directed, tests shall be made once in one or two weeks at random. The contractor shall provide standard test weights and other necessary equipment required for checking the operation performance of each scale or other measuring device. The contractor shall make such adjustment, repairs or replacement as may be necessary to meet with the requirement specified by the Engineer-in-charge for accuracy for measurement.

13.0 MIXING :-

Concrete shall be mixed in a Machine Mix. In no case manual mixing of concrete shall be allowed. The ingredients shall be fed in to the mixer simultaneously. A portion of water (5% to 10%) shall be fed first and an equal quantity shall follow the introduction of other materials. The remaining water shall be added uniformly and simultaneously when all other materials are in the mixer. Mixer shall not be loaded in excess of its rated capacity. The mixer shall be fitted with water measuring devices. The mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency. If there is segregation after unloading from the mixer, the concrete should be remixed.

For guidance, the mixing time shall be at least 2 min. For other type of more efficient, mixers, manufacturer's recommendations shall be followed. Workability should be checked at frequent interval. The freshly mixed concrete should be finally placed in position within 30 minutes.

The freshly mixed concrete should be tested for slump, unit weight, compressive strength and may also tested mixer uniformity, test, yield test, air content etc. Mixer shall be examined daily for change in condition due to accumulation of hard concrete or

mortar or due to wear of blades. No mixer shall be changed in excess of its rated capacity for mixing or agitations. The size of batch mixed in that mixer may be reduced, until upon testing a uniformly.

Whenever mixing is done at higher elevation (> 1.5 m) chutes former of plain G.I. sheets with its end provided with deflector. Inclination of the chute shall be so adjusted that segregating does not take place. Chutes shall be washed and clean as and when necessary.

14.0 FORM WORK :-

General :-

The form work shall be designed and construction which have sufficient strength so as to remain sufficiently rigid during placing and compaction of concrete and shall be such as to prevent loss of cement slurry from the concrete. For further details regarding design detailing etc. reference shall be made to IS: 14687. The tolerances on the shapes, lines and dimensions shown in the drawing or as directed by Engineer-in-charge shall be within the limits given below. The tolerances specified are for finished concrete and not for form works.

- a) Deviation from specified dimensions + 10mm
of cross Section of column and beam - 5mm
or similarly type ff super structure i.e.
Vertical components and Horizontal
components.
- b) Deviation from dimensions of footings.
 - (1) Dimension in plan :- + 50mm
- 10mm
 - (2) Eccentricity :- 0.02 times the width of the footing
in the direction of deviation but not
more than 50mm.
 - (3) Thickness + 50mm
- 10mm
or
 ± 0.05 times the specified thickness
whichever is less.

The tolerances apply to concrete dimensions only and not to positioning of vertical reinforcing steel or dowels, where the concrete surface can be trimmed to the prescribed lines, the use of forms shall not be required (e.g. cast-in-situ concrete work

are carried out on sub grade of canal with specified thickness). All exposed concrete surface having slope of one horizontal to one vertical or steeper shall be formed unless otherwise directed. The design of form work shall be quite necessary for heavy structure like high level bridge solid slab etc. for that contractor shall have to provide design and drawing from authentic structural engineer.

Cleaning and treatment of form work :-

All rubbish, particularly chippings, shavings and saw dust shall be removed from the interior of the forms before the concrete is placed. The face of form work in contact with the concrete shall be cleaned and treated with form release agent (oil). Release agents shall be applied so as to provide a thin uniform coating to the forms without coating the reinforcement.

For heavy structure, the forms shall be constructed of steel i.e. horizontal-vertical member or slant member i.e. props, Bracing, ties plates etc. shall be designed steel work. The surface of forms in contact with the concrete shall be clean, smooth, rigid and tight. The supports shall be so arranged to keep the maximum deflection within $1/360$ of the span. The forms shall be designed and constructed to permit early removal without damage to the concrete. Suitable devices shall be used to hold corners, adjacent ends of panels of other forms together in accurate alignment during compaction of concrete by vibration or other means. The forms and their joints shall be tight enough to prevent while vibrating, the loss of mortar or water from concrete. The ties and bracing as may be necessary shall be attached to form and to be used more than once. They shall be maintained in serviceable condition and shall be clean, smooth and free from adhering grout before being reused curved and special forms shall be of character that will result in smooth concrete surfaces. They shall be designed and constructed. So that they will not warp or spring during erection or placing of concrete.

Form Sheathing or Lining :-

In general forms for all structure shall consist of or shall be lined with steel plates panel shall be so treated or coated that there will be no chemical deterioration of the formed concrete surface.

Steel plate panel :-

Steel plate shuttering shall be of made of appropriate thickness of steel sheet and stiffened by steel angles of appropriate size. The shuttering shall be supported by steel pipes, channels, Girder and steel props and properly cross braced to gather, so as to make the centering rigid. The complete form work shall be got inspected by and got approved from the Engineer-in-charge before the reinforcement (in case of R.C.C. work) are placed in position.

The props shall consists of adjustable steel pipes with facility to tie with each other and form plate / channel by suitable type clamps.

As far as possible clamps, nut and bolts shall be used to hold the forms together and use of nails, spikes, and wires shall be avoided.

The type and conditions of forms sheathing or bridge work.

The ability of the forms to withstand distortion caused by placement and vibration of the concrete and the workmanship used in the form construction shall be such that formed surface after being treated will conform to the applicable requirements of these specifications pertaining to finish of formed surface where finishing is specified. The sheathing or bridge work shall be so placed that the joints makes in the concrete surface will be in the general alignment both vertically and horizontally.

Steel Sheathing & Steel Plates :-

Steel sheathing and steel plates should be free from twists, bends, offsets, wraps, etc. their surface should be neat clean, and smooth. Before placing concrete steel forms shall be thoroughly cleaned off all rust, dust, and loose materials. Colourless oil or grease of approved quality shall be applied before placing steel.

The size of angles used for framing and bracing of steel plates should be sufficient to withstand the weight of mass concreting without forming clinks, twists, offsets, wraps etc. in the steel plates. Bracing angles used on all the four sites of steel shuttering and steel channels shall have permissible to facilitate nut bolting.

Form Ties :-

Embedded metal rods or embedded wires ties for holding forms shall be used. Wire ties shall be cut off with the surface of concrete after the forms are removed.

Erection :-

Where forms for continuous surface are placed in successive units, the form shall fit tightly over the complete surface so as to prevent leakage of mortar or cement slurry from the concrete and to maintain accurate alignment of the surface. Forming of block joint to the concrete portion shall be done carefully to ensure a smooth joints and avoid sharp deviation, Projections, or edges and particular attention shall be paid in setting and tightening the form to ensure that the contraction / construction joint's surface are plumbed and in accurate alignment.

Inspection :-

The forms which have been erected and set to line and grade shall be inspected as to their accuracy. All forms anchor ties and bracing shall be checked for rigidity and tightness and form surface for cleaning and oiling. Where the forms appear to be insufficiently, braced, unsatisfactorily built either before or during the placing of

concrete, the work shall be suspended until the defects are rectified.

Stripping Time :-

Form shall not be released until the concrete has achieved a strength of at least twice the stress to which the concrete may be subjected at the time of removal of formwork. The strength referred to shall be that of concrete using the same cement and aggregates and admixture (if any), if any with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work.

While the above criteria of strength shall be the guiding factor for removal of form work, in normal circumstances where ambient temperature does not fall below 15° C and where ordinary Portland cement is used and adequate curing is done, following striking period may deem to satisfy the guideline given in above para (IS: 456-2000 provisions)

	Type of form work	Minimum period before striking form work.
(a)	Vertical form work columns piers, walls, beams.	16-24 hrs.
(b)	Soffit form work to slabs (Props to be refixed immediately after removal of form work)	3 days
(c)	Soffit form work to beams (Props to be refixed immediately after removal of form work)	7 days
(d)	Props to slabs : (1) Spanning upto 4.5 m (2) Spanning over 4.5 m	7 days 14 days
(e)	Props to beams and arches. (1) Spanning upto 6m (2) Spanning over 6m	14 days 21 days

The number of props left under their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab, beam, or arch as the case may be together with any live load likely occur during curing period or further construction.

Where the shape of the element is such that the form work has re entrant angles the form work shall be removed as soon as possible after the concrete has set to avoid shrinkage cracking occurring due to the restraint imposed.

Removal of forms :-

All forms shall be removed in a careful workman like manner without causing deflection or distortion and damage to the laid concrete sections and surfaces either due to removal of support or stripping operation. Supporting forms and shoring shall not be removed from form until the stripping period over. No superimposed load shall be allowed within the period for which the form work is required to remain in place.

Supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take the stresses due to its own weight and any other incidental superimposed load and the sequence shall be as directed by the Engineer. The use of crow bars and similar metal tools for loosening the form shall not be permitted. In design of forms, the sequence and facility of stripping of forms shall be taken into consideration and wedges shall be provided where necessary to facilitate removal. The form work shall be removed by driving the wooden wedges behind them and lightly tapping for loosening away from the concrete surface.

Forms should be removed at the earliest practicable time to facilitate curing the formed surface without much delay and repairs under most favourable conditions for good bond.

Transporting and Handling :-

After mixing concrete shall be transported to the form work as rapidly as possible by method which will prevent the segregation or loss of any of the ingredients or ingress of foreign matter or water and maintaining the required workability.

Conveying method and equipment shall be approved by the Engineer-in-charge not below the rank of Deputy Executive Engineer.

When mixing concrete from drum of mixer poured through chute (Plain G.I. sheet inclined properly) away from form work shall be remixed and then after conveyed to form work. Newly mix concrete is susceptible to segregation if dropped through height. The unrestrained dropping of concrete on apex of a pile also results in coarser particles segregating and concentrating at the toe of the slope. Unrestrained dropping, chuting and horizontal flow of concrete should not permitted.

Minimum handling and persistent precautions should be observed to prevent segregation and to see that concrete remains a cohesive mass.

During hot or cold weather, concrete shall be transported in deep containers other suitable methods to reduce the loss of water by evaporation in hot weather and heat loss in cold weather may also be adopted.

15.0 Placing (Placement) :-

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 of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement (In case of RCC) or movement of form work. As a general guidance, the maximum permissible free fall of concrete may be taken as 1.5 m.

When all components of structure are cast monolithically the concrete in the top 60 or

90 cm of walls & column should be of the lowest slump that can be vibrated adequately & should be fully consolidated at the surface.

Concrete should be deposited in horizontal layers. Each layer should be compacted thoroughly before succeeding layer is placed. In reinforced concrete work and plain cement concrete work, it is good practice to place concrete in layers 25cm and 45cm thick respectively. However, thickness shall be decided in view of size and shape of section, consistency of concrete, spacing of reinforcement, method of concrete placement, method of compaction and necessary of depositing concrete of next layer before hardening of previous layer which take place within 30 minutes.

Concrete shall be deposited continuously in order to avoid appearance of slightest layer line on the finished structure. No construction joint should be allowed to form unless directed by the designer.

Placement of concrete shall be carried out at such a rate that lower layer concrete which is being integrated with fresh concrete is always plastic. Normally this will be achieved if next layer is placed within 30 minutes of this is not done, cold joints will develop which must be avoided. The cold joints are interfaced which remain as discontinuities and cause separation when subjected to tensile stresses.

The concrete should be worked thoroughly in to all positions around reinforcement, embedded fixtures and in to corners of form work. Only slurry, if allowed to pass below reinforcement gives a firm finish but leaves voids near reinforcement and hence causes loss of bond and corrosion.

16.0 COMPACTION :-

Concrete should be thoroughly compacted and fully worked around the reinforcement, around embedded fixtures, and in to corners of the form work.

Concrete shall be compacted using mechanical needle vibrators & surface vibrators wherever required complying with IS 2505, IS 2506, IS 2514 and IS 4656 over vibration and under vibration of concrete are harmful and should be avoided vibration of very wet mixes should also be avoided. Complete consolidation can be judged by evidence of leveled appearance of concrete at exposed surface, embedment of surface aggregate, expulsion of entrapped air, formation of cement skin and appearance of cement slurry at surface. Manually vibration of concrete shall not be allowed.

Whenever vibration has to be applied externally the design of form work and the disposition of vibrators should receive special consideration to ensure efficient compaction and to avoid surface blemishes.

Concrete shall be consolidated by vibration, spading, rodding or forking so that concrete is thoroughly worked around the reinforcement, embedded fixtures and into concrete of

forms eliminating all air or stone pockets which causes honeycombing, pitting or planes of weakness.

Internal immersion vibrators shall have a minimum frequency of 8000 vibrations per minute with sufficient aptitude to consolidate concrete effectively.

Vibrators shall be inserted vertically and withdrawn gradually at points approximately 0.4 m to 0.50 m apart. At each insertion, the duration shall be 5 to 15 seconds which is sufficient to consolidate. The concrete must be disallowed segregation and increase in surface laitance.

Where the concrete is to have coat finish a full layer of mortar shall be brought against the form of vibration process-vibrators shall be operated by competent workman, A space vibrator shall be kept on site of work during all concrete placing operations.

17.0 CONSTRUCTION JOINTS AND COLD JOINTS :-

Joints are a common source of weakness and therefore it is desirable to avoid them. If this is not possible, their number shall be minimized. Concreting shall be carried out continuously up to construction joints. The position and arrangement of which shall be indicated by the designer. Construction joints should comply with IS 11817.

Construction joints shall be placed at accessible locations to permit cleaning out of laitance, cement slurry and unsound concrete, in order to create rough / uneven surface. It is recommended to clean out laitance and cement slurry by using wire brush on the surface of joints immediately after initial setting of concrete and to clean out the same immediately thereafter. The prepared surface should be in a clean saturated surface dry condition when fresh concrete is placed, against it.

In the case of construction joints at location where the previous pour has been cast against shuttering the recommended method of obtaining a rough surface for the previously poured concrete is to expose the aggregate with a high pressure water jet or any other appropriate means.

Fresh concrete should be thoroughly vibrated near construction joints so that mortar from the new concrete flows between large aggregate and develop proper bond with old concrete. Where high shear resistance is required at the construction joints, shear keys may be provided.

Sprayed curing membranes and release agent should be thoroughly removed from joint surfaces.

18.0 CHIPPING AND ROUGHENING OF CONCRETE SURFACE :-

At construction joints where fresh concrete is to be placed on old settled concrete, the surface of construction joints shall be clean rough and dry when covered with fresh concrete. Concrete surface upon or against which fresh additional concrete is to be

placed shall be chipped off and roughened to a depth not more than 2 cm. After being roughened, the surface of the concrete shall be cleaned thoroughly of all loose fragments, dirt, lime and other objectionable materials and shall be sound and hard and in such conditions as to assume good mechanical bond between old and new concrete. All concrete which is not hard, dense and durable shall be removed to the depth required to secure a satisfactory surface. Cost of work of chipping, roughening and all above treatment at construction joints shall be deemed to have been included in the rate tendered for the item of concrete.

19.0 FINISHING :-

The surface of concrete finished against forms shall be smooth and shall be free from projections, honey combing and other objectionable defects. Immediately on the removal of forms all unsightly ridges or lips shall be removed and undesirable local bulging on exposed surface should be remedied by tooling and rubbing, repairs to concrete surface and additions where required shall be made by cutting regular opening in to the concrete and placing fresh concrete to the required lines. All exposed concrete surface shall be cleaned of impurities, lumps of mortar and concrete or grout and unsightly stains.

The concrete shall be finished to an even and smooth surface free from pockets, voids or exposed aggregates. This shall be obtained by careful use of long handled steel trowel, Any remaining roughness spots shall be rendered smooth without any time interval after laying the concrete, with cement mortar of 1:3 proportion.

Concrete proportions and consistency and method of compaction should be such that sufficient mortar is available at the surface for finishing purpose.

Over indeed or too wet or over consolidated mix is likely to be covered with bleed water. They may be corrected for better finishing, such water shall be allowed to drain or absorb or scrap. Sprinkling of dry or a dry mortar should not be permitted. If surface is trowelled too soon a layer of laitance is found, if too late, the partly handed concrete is too hard to be trowelled effectively.

20.0 REPAIRS OF CONCRETE :-

Repairs of concrete shall be performed by skilled workers. Repairs of imperfections in formed concrete shall be completed as soon as practicable within 24 hours after the removal of forms. Concrete that is damaged from any cause and concrete that is honey combed, fractured or other wise defective and concrete with excessive surface depressions must be removed and built up to bring the surface to the prescribed lines or shall be removed and replaced by dry patching mortar or concreting without any extra cost.

Where bulges and abrupt irregularities protrude outside the limits specified on formed surface, the protrusions shall be reduced both by hammering and gridding so that the surface irregularities are brought within the specified limits.

Dry pack filling shall be used for holes that have surface dimensions smaller than the depth of holes left by the removal of fastener from the ends of form tie rods for grout inert holes and for narrow slots, cut for repairs of cracks. Dry pack mortar or concrete filling shall be resorted as directed by Engineer-in-charge.

All patching shall be done with extreme care so that patches will not be noticeable from a distance of 20m colored cement as an ingredient of the patching mortar shall be used if necessary, to produce patches of same colour as the adjoining concrete.

Dry Pack Mortar :-

Repairs operation shall be preceded by a careful inspection to see that the hole is thoroughly clean and lightly wet but with a small amount of free water on the interior surface. The surface shall than dusted lightly and slowly with cement by means of a small dry brush until all surfaces are covered and darkened by the absorption of water by the cement. There shall be no dry cement in the hole when packing begins and such cement if present shall be removed. The hole shall not be painted with neat cement grout.

Dry pack mortar shall consist a mixture of 1 part of cement to 2 part of sand by volume that will pass IS sieve No.120, white cement will be used in sufficient quantity to produce uniform colour matching with that of surrounding concrete at points wherever desired by the Engineer.

For packing concrete holes a lean mix of 1:3 or 1:3 1/2 shall be used only enough water shall be used to produce a mortar which when used will stick together on being moulded in to a ball by slight pressure of hand and will not extrude water but will have the hand dump.

Proper compaction in layer wise shall be carried as directed by Engineer-in-charge. The holes shall not be overfilled and finishing shall be completed at once by the float of a hand wood piece against the fill and striking it several good blows. Finishing tools shall not be used and water shall be used to facilitate finishing.

21.0 CURING :-

Curing is defined as maintenance of humidity and temperature of freshly placed concrete during definite period following finishing assuring satisfactory hydration of cementitious material and proper hardening of the concrete. The curing period depends upon type of cement, weather condition, wind speed, stripping time, sections of concrete, method of curing etc. Improper curing results in formation of surface shrinkage cracks, loss of strength, increase in permeability, spoilage of surface finishing,

decrease durability and quality of concrete is affected. Moist curing, membrane curing are normally used. Former is predominantly used.

- (1) Concrete surface shall be kept moist continuously (day & night for 24 hours a day) for 14 days (curing period 14 days) as prescribed and directed.
- (2) Application of water shall begin after 12 hours of its placement or as directed by Engineer-in-charge.
- (3) Water shall be sprinkled over centering till its removal.
- (4) Cure horizontal surface of concrete with pond formation, Ponds shall be frequently filled of water. Jute soaked in water shall be used for vertical and slant surface of concrete. Water shall be frequently sprinkled over jute (bags or mats)
- (5) Curing arrangement shall be made under direction of the engineer.
- (6) Ensure that all exposed surface including sides, edges, and corners shall continuously moist throughout the curing period.

Curing Protection :-

- (1) All concrete shall be protected against injury until final acceptance.
- (2) Unhardened concrete shall be protected from heavy rains and flowing water.
- (3) No fire or excessive load shall be permitted near or indirect contact with the concrete at any time during curing period.
- (4) All conduits and other opening shall be bulk hided during construction period to prevent free circulation of air and resultant drying of concrete.
- (5) Exposed finished surface of freshly laid concrete shall be protected from direct rays of the sun for at least first three days after placement, such protection shall be made effective as soon as practicable after placing of uniformed concrete or after the removal of forms of formed concrete.
- (6) Exposed concrete shall also be kept moist for at least 72 hours period to the placing of additional concrete up to the joints

22.0 PREVENTING HAIR CRACKS :-

Hair cracks are usually the result of concentration of water finds at the exposed concrete surface caused by over manipulation during finishing operations. Such cracking is aggravated by untimely finishing and by too rapid drying & cooling when the humidity is so low as to cause cracking of the finished surface before it can be covered without damage. The surface shall be moistened and kept temporarily wet with a fine spray of water so as to wash the surface but not to form pools on it. Since chilling of the green concrete increase its tendency to crack, it is desirable that the water used for preliminary moistening not too cold and shall preferably be warmer than concrete.

Over working the surface and the addition of water / cement to aid in finishing shall be

avoided. The resulting laitance will have impaired strength and durability and will be particularly vulnerable to freezing and thawing under wet conditions.

23.0 SEEPAGE WATER ENCOUNTER IN FOUNDATION: (CONCRETING) :-

When seepage water meets in foundation following care shall be taken under direction of Engineer-in-charge. No extra payment shall be made for that.

- (1) Make arrangement of continuously dewatering according to amount of seepage water.
- (2) As far as possible block the seepage way & reduce the flow of water.
- (3) Cofferdam or forms shall be sufficiently tight to ensure still (calm) water if practicable.
- (4) Reduce water cement ratio by adding more cement, cement content shall be at least 350 Kg/m³ of concrete i.e. rich concrete mix shall be used.
- (5) Vibration of very wet mixes (due to seepage water) shall also be avoided.
- (6) Concrete cast under water should not fall freely through the water, otherwise it may be leached and become segregated.
- (7) Concrete shall be deposited continuously until it is brought to the required height (No construction joint allowed) while depositing, the top surface shall be kept as nearly level as possible and the formation of seams avoided.
- (8) The methods to be used for depositing concrete under water shall be one of the as stated in IS: 456-2000 clause-14.2.4 on Page No.28.
- (9) To minimize the formulation of laitance, great care shall be exercised not to disturb the concrete as far as possible while it is being deposited.

24.0 CONCRETING UNDER SPECIAL CONDITIONS :-

- (a) Underwater Concreting: Concreting shall be carried as per above clause under heading "seepage water encounter in foundation".
- (b) Hot weather concreting: Dampen the sub grade and forms, place concrete at the lowest practicable temperature, start curing early, use cold water or ice as a part of mixing water.
- (c) Cold weather concreting : Prevent concrete from freezing, concrete should be placed at temperature not lower than 5°C, maintain curing condition which fosters normal strength development without excessive heat, keep surface at a temperature that may not cause early freezing or seriously prolong hardening.

No extra payment shall be made to contractor for concreting under special condition as stated above.

25.0 RECORDS AND REPORTS :-

A systematic joint record in the form approved by Engineer-in-charge shall be maintain to record the details regarding use of cement, number of mixes of concrete and of mortar used on works, rejected mixes, Location (Name of structure component with chainage and levels) in which concrete or mortar used and quality records like F.M., silt content and gradation of sand, gradation of crushed metal, weight / volume batching, test for fresh concrete (Slumps) and for cube specimens for compressive strength, weight of cubes etc. These records shall be signed by the Engineer or his authorized representative on the site. Compare results with standards if the contractor fails to scrutinize and verify the entries and sign the joint record, the record as scrutinized, verified and signed by the Engineer or his representative shall be taken final and binding on the contractor.

Ensure monthly summary reports giving compliance of instructions recorded in work order book.

26.0 TOLERANCE FOR CONSTRUCTION :-

GENERAL:-

The intent of this paragraph is to establish tolerances that are consistent with modern construction practices, yet governed by the fact that permissible deviation will have no adverse effect on the structural action or operational function of the structure.

Where tolerances are not stated in the specifications or drawing for any individual structure or feature thereof, permissible deviations will be interpreted in conformity with the provision of this paragraph.

The contractor shall construct all concrete structures to the exact lines, grades and dimensions established. However inadvertent variation from the established lines, grades and dimensions will be permitted to the extent set forth herein provided that the Engineer reserves the rights to diminish the tolerances set forth herein for such tolerance which impairs the structural action or operational function of the structure. The notation of the drawings of specific maximum tolerance in connection with any dimension shall be considered as a supplemental to the tolerance specified herein.

Rejected work shall be remedied or removed and replaced at the expense if any by the contractor.

Tolerance in Dam and Appurtenant Works:

1) All Structures:

I) Variation of constructed lines outline from established position in plans.

In 6 m	10 mm
In 12 m	25 mm

- II) Variations of dimensions of individual structural features from established position. In 6 m or more 30 mm
(in buried construction :- Twice the above amount).
- 2) Tolerances for placing reinforcement steel
- (a) Variation of protective covering.
- | | | |
|------|----------------------------------|-------|
| (I) | below 50 mm cover | 5 mm |
| | With 50 mm cover | 10 mm |
| | Above 50 mm cover | 12 mm |
| (II) | Variation from indicated Spacing | 25 mm |

27.0 MEASUREMENT AND PAYMENT :-

Measurement and payment of concrete shall be made on basis of the actual volume of the concrete for the grade as placed within the lines as specified or as otherwise directed by the engineer-in-charge according to all the provisions mentioned above. No deduction shall be made for the space occupied by reinforcement and other metal work, electric conduit line etc. The reinforcement steel and other embedded metal parts shall be separately paid at the rates accepted as per the schedule of prices. No payment shall, however, be made for embedding minor fixtures or providing grooves, block outs, recess etc. for gates and other installations like electric conduits, etc. All labour, materials, plants etc. involved in providing cement slurry and mortar on rock surface and construction joints etc. shall be deemed to be included in the unit rate to be paid for concrete. The work pertaining to labour anchorage for erection of horizontal and vertical of necessary supports, templates etc. will have to be carried out by the contractor as per separate items.

The rate is also inclusive of erection and removal of form work and centering, if any, required for the work due to change in design of the structure etc.

The rate includes concreting with best types for work required in the cases of block out and grooves. No extra payment shall be made for this.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-IV

GENERAL TECHNICAL SPECIFICATION FOR EXCAVATION

0.1 The Contractor shall be liable to pay compensation for injury to life and damage to property if any caused due to any operation connected with items.

0.2 The contractor shall hand over the site of work in neat and clean condition and shall remove all wastages arising from construction.

1.0 CLEARING THE SITE :-

The contractor shall clean the entire areas required for setting out and cutting of all trees, stumps, roots, bush wood, rubbish of all kinds, loose stones and all other objectionable materials. The ownership of all the materials so removed from excavation shall be of Govt. Cutting of the trees, having girth less than 0.5Mt. shall be covered in this item. The roots of trees shall be graded to a depth of 30 Cms. below it. The contractor shall dispose of such material not required to be kept at site in the manner as directed by Engineer-in-charge.

2.0 SETTING OUT :-

2.1 The contractor shall provide necessary material labour and make all necessary arrangement to get the line out from the Engineer-in-charge or his authorized representatives.

2.2 It shall be the responsibility of the contractor to install substantial reference points, bench marks etc., at his own cost and to maintain them during the construction period. The contractor will be held responsible for the correctness or the line out and dimensions of all parts of the work.

2.3 After the site is cleared setting out shall be done as laid down on the plans or as per instructions of the Engineer-in-charge and profile shall be erected accordingly. The alignment shall be properly set up true to lines, curves and grades and section as shown on the plans or as instructed by the Engineer-in-charge of the work.

2.4 The Contractor shall provide all labour and materials such as line, strings, bamboos, pages, nails etc., required for setting up bench marks, erection profiles and fixing such other makes as are necessary for satisfactory completion of the work. The contractor shall be responsible for the proper maintenance of all this during currency of the contract.

3.0 EXCAVATION :-

3.1 The entire lines of excavation shall be clearly marked by pegs and by stones at each chain age or change of direction at shorter intervals on curves, in the beginning. The

final line out will be done by fixing reference stones at $\frac{1}{4}$ Km. On either side the center line beyond the road edges, so that they may not be disturbed during the contract period. The position of these will be marked on the cross section. Soil/murum excavated first and sorted out unusable and usable soft. Out of which unusable soil be stacked outside service road space. Usable soil will be uniformly spreaded in required section and grade.

- 3.1 Pits of such width and depth as may be decided by the Executive Engineer shall first be excavated at intervals of 30m. normally. If any changes in the designed cross section is considered necessary. Further widening and/or deepening to full section shall be done thereafter.
- 3.2 The edges of excavation shall be marked by dog belling after vertical trench is excavated.
- 3.3 The excavation shall be done first by cutting a central trench upto foundation level or any other higher level fixed by Engineer-in-charge with vertical sides and then trimming the slopes and widening the bed widths. if necessary, as per the order of the Engineer-in-charge, depending upon the nature of strata met with in excavation The section of foundation for C.D. work of road thus prepared will be finally dressed exactly to the required dimensions and in perfect line and level.

4.0 EXCESS EXCAVATION :-

No claim of the contractor for the extra rates will be entertained for change of side slopes, grades, depth and alignment of road during construction. In any case C.D. work of road should not be excavated in width or depth greater than shown in the plans and designs, except given under written order by the Engineer-in-charge.

- 4.1 If the excavation is done wider or deeper than necessary, no payment shall be made for such extra excavation and the contractor shall have to right such excavation, if considered necessary in the opinion of the Engineer-in-charge by refilling with 1:2:4 P.C.C. in the manner as specified by the Engineer-in-charge at his own cost and to the entire satisfaction of the Engineer-in-charge. The slope shall be in proper line and level as per drawing and as per instruction of the Engineer-in-charge for which no extra payment shall be made.

5.0 DISPOSAL OF EXCAVATED MATERIALS :-

- 5.1 The excavated materials shall be laid within a lead of 30 meter for earth work in bank, service road or inspection path or spoil banks or all of them as directed the Engineer-in-Charge without extra cost to Govt. Unusable soils shall be deposited near toe of service road or inspection path. Usable soils, murum shall be laid in uniform layer and dressed in required section and grade. Excavated sort rock stuff shall be separately collected &

spread on top of murrum layer, excavated usable. H.R. stuff shall be collected & stacked at site for U.C.R. masonry work and pitching work. By breaking the clods with neatly made slopes and top with a suitable berm left between the toe of the bank and edge of excavated as directed by the Engineer-in-charge. Dressing of service road and I.P. Side is to be done such a way that top width is to be kept 3.60M. of S.R. and 1.20M. of I.P. Top level is to be kept in uniform level for to use as service road. Both side slope of S.R. & I.P. is to be kept 1.50: 1 (H:V) No extra cost will be payable for above work.

5.2 The usable excavated murrum wise materials shall be spread uniformly for earthwork embankment within a lead of 30m. in layers as specified under relevant item for earthwork in embankment for the zones in which the same is used. Spoil banks shall be in proper line and level and properly dressed as directed by Engineer-in-Charge.

5.3 The rate of this item is for excavated in all type of strata including all type like soils, wet and slushy soil, sandy, gravelly texture, gravelly texture, soft murrum, hard murrum, soft rock and hard rock with all depth and lead upto 30M. including depositing the stuff for earth work in bank, service road, inspection path, spoil bank etc. This will also include all excavation done in all strata such as soil, sand, gravel, soft murrum. kanker, hard murrum, soft rock, hard rock and other similar materials. This item also include sorting of useful & unuseful material and uniform measurable stacking of all useful excavated stuff of hard rock for to use in U.C.R. masonry and pitching work and remaining useful hard rock from excavation is to be stack at **Check** dam site in uniform measurable stack without any extra payment.

5.4 The item also includes stacking and shorting of thin jungle cutting and disposing the same as directed.

5.5 **FINISHING :-**

This shall include removal of all pallis, steps etc. provided during construction. the finished section shall be as smooth as possible. unevenness and undercuts shall no exceed limit specified below.

Sr. No.	Type of Soil	Limit of unevenness	Limit Undercut
1.	Soil	2.5 Cm	1.5 Cm
2.	Black cotton soil	5.0 Cm.	2.5 Cm
3.	Soft & Hard rock	7.0 Cm.	4.0 Cm.

In the case of under cuts, the payment will be made on the actual executed excavation. In case of over cut the payment will be made as per designed section.

6.0 SILTING OF C.D. WORKS :-

Contractor shall make his own arrangement at his own cost for the draining of rain water away from the excavated portion and he should maintain the road C.D. work excavation and spoil banks service road etc. In working order and desilt the C.D. work trenches silted by any cause before the work is completed and handed over to the department.

7.0 MODE OF PAYMENT :-

The decision of the Executive Engineer regarding the classification of strata met with shall be binding upon the contractor and shall be final. The rate shall be paid per cum. of excavation done in all strata as above on average rate mentioned in item.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-V

GENERAL TECHNICAL SPECIFICATION OF CEMENT MORTAR

1.0 Cement Mortar :-

The water cement and sand shall confirm to M-1, M-3 & M-6 respectively as per section-V Chapter-II Specification of Materials. The Cement mortar shall consist cement sand in proportion as specified in the item, cement, shall be taken as weighting 1460 Kg. Per 1 Cmt. and each full bag shall be considered 0.034Cmt. by volume. Sand shall be measured by volume in suitable measuring boxes. Some allowances shall be made for bulkage at the time to mixing if the sand is wet. The exact allowance of bulkage shall depend on the quantity of moisture in sand and shall be decided by the Engineer-in-charge.

- (i) The mortar shall be mixed in mechanical mixed of the fitting drum type or by hand mixed. The use of the same mixer for mixing different proportion of mortar consecutively shall be avoided. the first batch of the mortar at the commencement of the work shall be made richer by adding extra 10 percent over and above that required for the particular mix, Mixing time shall normally i.e. 1 ½ minutes for mixture @ 1.60 M3 capacity mixing shall however, be continued for longer period, if proper mixing does not result with the above timings.

Over mixing is objectionable because the grinding action increases fineness which requires more water to maintain consistency of mortar. Also over mixing may driver cut air entertained. It is therefore, recommended that the mixing time should not exceed three times the number of minutes mentioned above.

- (ii) All ingradierits shall be fed to the mixer simultaneously. A portion of water form 5 to 10 percent shall be added and the like quantity shall follow the introduction of other materials. The remaining of water quantity of which is pre determined shall be added uniformly.
- (iii) The wet mortar shall be used within 30 minutes from the time adding water. Mortar remaining unused after above time shall be rejected and shall not be allowed to be used.
- (iv) (a) The Samples shall be taken from fresh cement mortar. The size of each Cube is 5*5*5 cms. Cubes shall be made, cured & Tested at 28 Days as per IS:2250-1981 for establishing of Compressive strength of Cement Mortar. Cubes shall be tested in Govt. Lab. (GERI)/Govt. Approved Private Lab./Field Laboratory or as directed by Engineer-in-charge.

- (b) Three test specimens shall be made for each sample for testing at 28 Days. At least one sample of Test Cube shall be cast per Day, The Day at which Masonary / Plastering / Pointing or work of cement mortar is done.

If the contractors agents fails to remain present, the test cubes taken by the Engineer or his representative shall be considered to be authentic. The contractor shall however be informed of the details of such cubes have been taken. Minimum compressive strength for mortar shall not be less than for the age of 28 days as per below table.

Strength of C.M. Cube in Kg/Cm² (5*5*5 cm)

Proportion	Preliminary (In Lab.)		On Field	
	7 Days	28 Days	7 Days	28 Days
1:8	7 - 15	9 - 18	6 - 12	7 - 15
1:7	13 - 17	18 - 24	11 - 14	15 - 20
1:6	25 - 42	36 - 60	21 - 35	30 - 50
1:5	42 - 62	60 - 90	35 - 52	50 - 75
1:4	> 62	> 90	> 52	> 75
1:3	> 67	> 96	> 56	> 80
1:2	> 72	> 102	> 60	> 85
1:1	> 76	> 108	> 63	> 90

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-VI

GENERAL TECHNICAL SPECIFICATION OF PITCHING WORK

1.0 Materials :-

(i) COARSE AGGREGATE :-

Specification m-4 of specification of material section shall apply.

(ii) WATER :-

Specifications m-1 of section of material shall apply.

(iii) SAND :-

Specificationsm-3 of section of material shall apply. The sand to be used only after screening and shall be of natural sand and shall confirm to IS-2116 also.

The grading of sand shall be as per Table given below.

GRADING OF SAND (IS-2216)

Sr. No.	IS Sieve Size	Percentage Passing by Weight.
1	4.75 mm	100
2	2.36 mm	90 - 100
3	1.18 mm	70 - 100
4	600 Micron	40 - 100
5	300 Micron	5 - 70
6	150 Micron	0 - 15

(iv) STONE :-

Specifications M-8 of material section shall apply. The dimensions of the stones to be used shall not be less than 15 cm on any face. Weight of stone to be used shall not be less than 25 kg. and shall not be more than 40 kg. and percentage of spalls shall not exceed More than 10% of the volume of stone masonry.

(v) HEADER :-

Precast Concrete Header stone of M-15 and size 15x15x60 cms.

2.0 GENERAL :-

First the slope of earth work shall be properly dress to design slope with filling the minor pits in same material including tamping, watering etc. Graded filter shall be constructed upon dressed slope of embankment. Filter shall be of specified thickness and measured normal to the slope. Fine material shall consist of coarse sand passing through a 1/8" square mesh sieve. The filter material shall satisfy std. filter criteria.

Stones to be used for pitching shall be dense, durable, solid, free from cracks, seams, sale particles and other defects. The stone shall be laid in a compact manner being at the bottom of the slope. The stone shall be placed on edge with its broad base down and face normal to the slope with necessary hand packing like manner. Stones and spoils shall be tightly driven in to the interstices to wedge the riprap in place and close direct opening of the underlying surface. Heads shall be provided and fixed normally at the rate shown in the drawing or as directed to penetrate fully across the riprap/pitching. The arrangement of headers shall be as specified in drawing or as directed.

3.0 DRESSING OF STONES :-

The stones shall be set in the work received from quarry after knocking off weak corners and edges with a massive hammer and after cleaning scales of foreign matter, it any for information the contractor, it may be stated that suitable stone quarries are available as shown on the respective drawing.

4.0 FACE STONES :-

The face stones, whenever required, shall be selected from the mass of quarry stones of greater size, broad base, uniform colour and shall be as far as possible without pinning in front. They shall tail back and bind well into work and shall no, be of greater height than either breath on the face, or length of tail in the work. No.face stone shall be less than 0.015 cubic meter. The face stone shall be 0.20 to 0.30 m in height. They shall be practically square on face and the exposed face shall be without uneven projections of more than 4 cm. It should be as per I.S. 8605-1977.

5.0 BACKING STONES :-

A fair proportion of the stones used in the backing shall be of a large size. Thirty percent of them shall exceed 0.015 cubic metre in content.

6.0 MODE OF LAYING :-

Specifications laid down in IS-8605 shall apply.

The stone shall be laid carefully on sand/metal flat bed so as to break joints as far as Possible. The stone shall be pressed & hammered down by a mallet so as to bring out all locked air. If it is required to move a stone after it is placed in position, it shall be lifted clearly and than placed.

The joints shall be filled well with suitable chips & spalls driven into them so as to avoid thick joints. The smaller stones used in the filling shall be carefully selected to fit snugly into the interstices between the longer ones.

7.0 PRECAUTIONS TO OBTAIN DENSE PITCHING :-

In order to obtain dense Pitching, the following precautions shall be taken.

- (i) Under pinning shall be avoided once a stone is laid as it tends to lift the stones and create the air pockets.
- (ii) Insertion of spalls and chips in the intervening space before filling in shall not be permitted.
- (iii) Leveling of Pitching on top of the course by use of spalls and chips shall not be permitted.

8.0 SCOPE OF WORK :-

The scope of work includes dressing the slope of earth work, providing inverted sand and gravel filter of specified thickness and providing stone pitching of specified thickness with header stone of specified size of 15x15x60cms. Of M-15 precast concrete with all materials and labours etc. complete.

9.0 WORKMANSHIP :-

The layer of specified thickness of graded filter shall be laid on the prepared slope to serve as filter bedding for stone pitching as specified in the drawing. The laying of the pitching stone shall be from the lowest elevations to upwards. Job shall be completed with best workman like manner.

GENERAL RULES FOR BETTER WORKMANSHIP :-

General rules for better workmanship are as follow.

- (i) Clean the previous days pitching surface prior to starting new pitching.
- (ii) Avoid under pinning after a stone is laid.
- (iii) Avoid putting flat chips at top.
- (iv) While laying the stone, care shall be taken to have minimum of joints space. Joints should be breaking all direction, so that they are well keyed together.
- (v) After the pitching is done, do not permit it to be disturbed until whole area of pitching completed.
- (vi) Hammering or breaking of stone shall not be permitted.

10.0 WEAK OR DEFECTIVE PITCHING :-

Any portion of pitching found to be weak or defective in construction, shall be removed and rebuilt by the contractor at his own cost.

11.0 QUOINS :-

The quoins stones, otherwise specified, shall be the selected stones neatly dressed with hammer and chisel to form the required angle. No quoins stone shall be less than 0.03 cubic metre in content.

12.0 FILLING :-

Face stone shall be laid without any pinning on the surface and shall be fixed as to form neat and close joints. If necessary, the edges shall be hammered to ensure that the face work is bounded well.

13.0 PAYMENT FOR PITCHING :-

The rate are inclusive of cost of all materials, labour, scaffolding, curing etc. as described. The work shall be measured in square metres basis. Thickness of pitching shall be average thickness with minimum 45cms at any point on the surface. No deduction shall be made for openings not exceeding 0.5 sq.mt. each. The rate shall be for a unit of one square metre.

The rate includes quarrying the materials and manufacturing headers, transporting the same to the site, loading-unloading with all lead and lift No deduction for any voids shall be made.

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SUB SECTION-5(IV)

CHAPTER-VII

GENERAL TECHNICAL SPECIFICATION OF REINFORCEMENT WORK

1.0 MATERIALS :-

1.1 TMT BARS :-

Specification M-5 of section of materials shall apply.

1.2 BINDING WIRES :-

Specifications of M-7 of section of materials shall apply.

2.0 SCOPE OF WORK :-

Scope of work shall includes supplying all materials and labour for cutting, bending, binding, and placing in position steel reinforcement, dowels, anchor, etc. Required quantity of steel shall be procured by the contractor at his own cost.

3.0 REINFORCEMENT WORK :-

Steel reinforcement bars shall be placed in position where concreting is to be done, after cutting & bending as shown in the drawing or as directed. Steel bars shall be cleaned of objectionable foreign substances like rust, scale, dirt, grease, oil, etc before placing in position free from any defects and of proper diameter. Bars shall be accurately placed and secured in position by means of bolts in concrete blocks, metallic chairs, rangers, spacers or other suitable devices at sufficient close intervals as directed so they will neither sag between support nor be displaced during the placing of concrete nor by any operations of work.

Special care shall be exercised to prevent any disturbance of the reinforcement, after being placed in position and it shall be maintained in clean condition until it is completely embedded in concrete to prevent further damage to the concrete or unsightly rust stain on exposed concrete surface.

Reinforcement shall not be straighten or bent in manner that will injure or weaken the material. Bars with kinks or bend not shown in the drawings shall not be used. Bars shall be bent to the shapes and dimensions shown in the drawings or as directed, using a bar bender, operated by hand or power. The radius for bends along the edge of bar shall not be less than 4 times the diameter of the bar. Heating of bars to facilitate bending will not be permitted, except for large diameter of bars. The reinforcement available from rejected concrete shall not be used.

Reinforcement may be fixed in position by means of anchor rods, supporting and hanger, rods as approved by the engineer. In difficult locations, tack welding of bars at isolated spots may be permitted to keep these bars in position

4.0 COVERS :-

Concrete cover to the reinforcement shown in drawing or as directed shall be maintained by providing cement mortar (1:2) blocks of same w/c ratio as the concrete to be used in the particular work.

Sufficient concrete cover shall be provided to protect reinforcement from erosion and shall be as shown in the drawing or as directed. But it shall not be less than 5cms and more than 10cms, depends upon type of structures and exposer condition.

5.0 BINDING :-

Wire for tying reinforcement shall confirm to specifications of materials. All reinforcement bars shall be tied securely by binding wires, so as to transfer the stresses easily. All main bars and distribution bars shall be tied with each crossing, so that spacing of bars remains accurate and cannot displaced during concreting operation.

6.0 SPLICING / DEVELOPMENT LENGTH. :-

Bar splices as indicated in the drawing or as specified by the engineer shall only be allowed The lapped ends shall be placed to ensure full bond on each bar. The development length shall be calculated as per clause no-26.2.1 page no-42 & clause no-26.2.5.1 page no-45 of IS-456-2000.for tension bars / main steel. And for distribution bars / temp. reinforcement bars / skin reinforcement bars, it shall be 30 times the diameter of bars.

Laps splices shall not be used for bars larger than 36 mm, for larger diameters, bars may be welded in cases where welding is not practicable, lapping of bars larger than 36 mm may be permitted, in which case additional spirals should be provided around the laped bars. The bars to be spliced shall be lap or butt welded by electric welding in the manner specified without loss of strength. Suitable means shall be provided for holding the bars accurately in position during the wielding process Welded joints shall be paid in terms of length of bar equal to 40 timed the diameter of the bars. The welded joints shall be staggered as directed. Three percent of the welded joints shall be tested for the tensile strength. Splicing shall not be done in the region of maximum bending moment & splicing of adjacent bars shall be avoided as far as possible. Also splices shall be suitable staggered.

7.0 INSPECTION BEFORE CONCRETE :-

No concreting shall be started unless the reinforcement as laid is finally checked and recorded by engineer in charge or by his representative.

8.0 ANCHOR BARS :-

Anchor bars and rods are required in connection with installation of gates, etc. shall be supplied by the contractor or by department ,as per tender provision, shall be placed in the concrete as shown in the drawing or as directed. No extra payment shall be made for placing of anchor rods

9.0 DOWEL BARS :-

Dowel bars as required for anchoring concrete face to the masonry shall be placed on masonry as shown in the drawing or as directed and included under reinforcement work.

10.0 TESTING :-

Testing of steel shall be done for each size of bars as per provision mentioned in specification of materials in government or government approved laboratory.

11.0 MEASUREMENT AND PAYMENTS :-

The payment for the steel used shall be paid on the basis of the actual length of bars used and placed as shown in the drawing / bar bending schedule including hooks, bends, laps, etc. The length of the bars shall be measured to the nearest 100 mm.

The rate quitted in the schedule of price shall include the cost of supplying, cutting, bending binding, cleaning, straightening, placing, fixing and maintaining in position, including binding wires or welding etc All steel shall be paid on the basis of the unit weight per running meter for different diameter of bars computed as specified in relevant IS-1786/as specified in Table-D given in specification of materials No separate payment shall be made for supplying and fixing metal wire, ties, supports, separators, chairs, anchor rod, pins, binding wire, random tack weld, etc. used for tying the bars.

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SUB SECTION-5(IV)

CHAPTER-VIII

GENERAL TECHNICAL SPECIFICATION OF EARTHWORK

1.0 PREPARING OF WORK AREAS :-

Clearing and grabbing operation shall be performed in the excavation areas, embankment areas, borrow areas or any other areas as described by the Engineer-in-Charge including a 6.25 meter (20 Ft.) wide strip measured beyond and continuous to the limit line of the areas. The site should be cleared of all the trees stumps, roots, bush, rubbish and all other objectionable matter. All such materials shall be removed from site of burnt, if directed, so as not to interfere with the construction operation and maintenance of project works and shall be disposed off or stacked as directed by the Engineer-in-Charge. All trees shall be cut down to at least (two feet) 0.65 Mt. below the ground level and cut trees including stumps shall be carted and deposited as suitable place as directed by the Engineer-in-Charge, All the necessary precautions shall be taken for protection of persons, the work and private property.

- 1.1 Clearing the site including removing, fencing, trees, bushes etc. complete for the bund seat area.
- 1.2 The department will indicate the specific areas which needs to cleared and the decision of the Engineer-in-charge in this connection shall be final and binding to the contractor. Completed bund seat area as per approved layout for the full length of bund including earth dam etc. is included in the item.
- 1.3 All holes and hollow in the seat of bund whether originally existing or produced by digging up roots shall be carefully filled in with suitable earth well rammed and leveled for up to general surrounding ground level without any extra payment.

2.0 STRIPPING :-

The extra entire area of embankment including 3.00 Mt. wide strip beyond and continuous with the area of embankment proper as shown in the drawing shall be stripped to a sufficient depth as directed to remove all unsuitable materials. The unsuitable materials shall include all debris top spoil, otherwise acceptable but loose and such as can not be economically compacted in situ vegetable matter including roots, loose rock organic silt swampy materials that are unsuitable for use in permanent construction the might interfere with the proper bounding with the embankment or that may be otherwise objectionable. The stripping shall be kept for enough in advance of the other items of works to ensure that no undesirable materials will become mixed with approved embankment materials and to allow for inspection and measurement. The

materials from stripping operation shall be wasted in suitable soil disposal area, as specified, while stripping operations be either's carried, manually or by mechanical means, without adversely affecting the base area and materials Generally, the stripped material shall be spread in uniform layer near the toe of earthen bund, so that material so dumped will form level surface to act as toe road.

3.0 BORROW AREA :-

3.1 GENERAL :-

All materials required for the embankment which are available from the designated borrow area.

- 3.2 Borrow areas shall be stripped by the contractor at his own cost to a depth necessary to obtain materials of desired quality. Borrow areas shall not be opened within a distance of 150 Mt. or to the edge of the U/s. blanket if provided or naturally available up to the required depth.

Borrow areas shall be operated so as not to impair the usefulness or the appearance of any part of the work or any other property. The surface of wasted materials shall be left in a reasonably smooth and even condition. The materials should be excavated and lifted; so that the other useful borrow area may be not spoiled.

- 3.3 All borrow areas shall operated with certain amount of regularly having regard to convenience of the work during execution and the safety and appearance of the work after its completion.

- 3.4 Temporary quarry haul roads leading to and from the borrow areas to site of embankment where the materials are to be deposited shall be constructed and maintained by the contractor at his expenses.

3.5 PREPARATION OF BORROW AREAS :-

All areas required for borrowing earth for embankment shall be cleared of all trees and stumps, roots, bushes, rubbish and other objectionable materials particulars care shall be taken to exclude all the organic matter from the materials shall completely burnt to ash. The cleared areas shall be maintained free of vegetable growth during the progress of the work.

3.6 STRIPPING :-

Borrow areas shall be stripped as required of top unsuitable soil, and any other materials which are unsuitable purpose, for which the borrow areas is to be excavated materials from stripping shall be disposed of in existed borrow area or in approved areas.

No payment shall be made for the clearing and stripping done for the borrow areas for the information of the tendered. It may be stated that investigation carried out by the department indicate that the stripping should not be exceed 0.30 Mt. (average).

4.0 BUND EMBANKMENT GENERAL :-

For the purpose of these specifications, the terms, "Bund Embankment" include all portions of embankment as follows :-

1. The earth fill designated in the drawing.
2. The pitching on the U/s. slopes of bund embankment, profile. The embankment shall have broad section, so that after dressing, the surface, embankment surface shall be of design section.

- 4.1 The embankment shall be constructed to the lines and grades shown on the drawings. Placement of fill shall be performed in an orderly sequence and in an efficient and workman like manner. The geometry of embankment shall be maintained by erecting bamboo and string profile. The embankment shall have broad section, so that after dressing the surface, the embankment surface shall be of design section only.
- 4.2 No bush roots, seeds or other perishable or unsuitable materials shall be places in the embankment. The suitability of each part of the foundation for placing embankment materials there on. The embankment for earthen bund shall be maintained in continuous and approximately horizontal layers in each programming for construction in the season.

5.0 DEMARCATION LINES :-

Before commencing the work of embankment toe lines making the extreme ties of embankment shall be marked with respect to a reference base line. The base line shall be demarcated by pucca concrete or masonry pillars with chainages, levels etc. property inscribed on them.

6.0 EARTH FILL MATERIALS :-

The materials for the embankment shall be obtained form designated borrow area.

In general, all materials from particular borrow area shall be mixture of materials obtained for the full depth of the cut, where it is not practicable to obtain a mixture of the material, finest and the most clay material shall be placed in the central portion of the embankment. The intermediate materials shall be placed between the center and slopes of embankment and the coarser materials shall be placed near the other slopes of the embankment.

7.0 PITCHING WORK ON UP-STREAM SLOPS OF EMBANKMENT :-

Pitching shall be hand packed on the U/S slope of bund embankment. The thickness of the pitching shall be as indicated in the drawing. The thickness shall be as measured normal to slope of the embankment. The pitching material shall consist of the white or Black hard stone of approved quality. The individual stone shall be dense, free from cracks, seams, and other defects. No stone shall weight less than 15 kg. or as directed by

Engineer-in-charge. The stone shall be placed on edge with its broad base down and face normal to the necessary hand-packing in workman like manner. Rock fragments and spoils shall be tightly driven into the interstices to wedge the pitching in place and close direct opening to the under laying stones shall be laid in compact manner beginning at the bottom of the slope. Necessary filled dressing and trimming of slopes, removing excess materials on slopes etc. will have to be removed as directed without any extra charges being included in the work.

- 7.1 Pitching shall be placed simultaneously with the fill so that a minimum of break down will occur during placing and spreading etc.

8.0 MODE OF MEASUREMENT AND PAYEMENT :-

For the purpose of measurement (based on cross sections) initially, survey by levels shall be carried out of the whole area of bund seat along cross section spaced 30 Mt. apart or at closed intervals if found necessary by the Engineer-in-Charge. The levels shall be taken every 30 Mt. long these cross sections thus establishing a level grid of 30 x 10 Mt. with levels at such corner in the presence of contractor or his authorized representative without fail. Cross chainages zero will be at the axis Benchmarks established for these cross-sections shall be maintained-through out works by permanent pillar and these grids will form the basis for all embankment measurement, unless same other method is acceptable to be directed by the Engineer-in-Charge in any particular locations of the works.

In case of the works as carried out by department or other agency, before commencement or the work for the present tender, the cross section shall be taken for such work done, as stated above, and this levels grid will form the basis for the measurements in the area where it is applicable.

The quantities shall be computed from the cross section areas of the compacted fill to specified density by the trapezoidal formula only. The contractor shall have to sign the cross sections in token of the acceptance and correctness of the work and also at the end of the work in token of the correctness of the respective final levels of the work as executed. Any failure to do is will be at the risk and cost of contractor Engineer's records shall be binding for all purposes of deciding admissible payments etc. in such cases if any from total quantities the shrinkage in earthwork of 15% shall be deducted from gross quantity of earth work if earthwork is completed before monsoon & measurement recorded before monsoon & 10% of measurements recorded after monsoon, to arrive at excavation measurement.

The measurement and payment for the different item involved shall be made under the respective items and the basis of cross section taken at the start of the work,

and also as and when the source of the work and also as and when the source of material changes.

9.0 PART PAYMENT :-

The tendered rates of respective item represent complete work with all lift payment of all running bill shall be based on 97% of the quantity measured and payment from time to time for embankment works. There will be an additional retention in amount of work payable over and above other securities etc. as an safeguard to complete earth work up to final height of bund.

The percentage of work carried out shall be on the basis of works stated in schedule "B" of the tender. However, if there is any increase or decrease in the quantum of work to be carried out the Engineer-in-Charge shall intimate in writing to the contractor, the revised quantity of work to be carried out by him when such revision is intimated the percentage shall be computed on the revised quantities. 100% if the work shall mean the final completion of the item of work, for which the Engineer-in-Charge shall certify that the item of works shall be operated no more.

10.0 FINAL MEASUREMENT :-

The final measurements shall be recorded on cross section basis as specified above. These will be paid after 15% shrinkage deductions for future settlements etc

11.0 LEAD AND LIFTS :-

All work condition shall be executed as per leads and lifts specified under the different items and detailed specifications, where the items of earth work specify "Prescribed or specific lead" the same shall be taken as the lead involved in carrying out the earth work from the borrow areas demarcated and annexed to the tender lead provided for all embankment work is up to 1.00 Km. lead and lifts, unless specified otherwise. If due to some reasons it becomes necessary to borrow earth from areas outside the designed boundaries prescribed, the contractor shall be bound to do so. In such cases, the contractor or beyond the leads mentioned in the items as directed by the Engineer-in-Charge, before operating any further borrow areas beyond the specified basis leads in case of earth work due to actual non availability of such materials within the specified basic leads all efforts must be made by contractor to borrow maximum possible quantities as directed by the Engineer and a written permission must be obtained from the Executive Engineer for operation of new borrow area involving extra leads and cost payable as below. Any unauthorized borrowings from longer leads than specified basic leads shall not be payable to contractor.

In case of other items of embankment like pitching work items etc. leads have been specified in detailed specifications which be binding for the purpose of work,

payment and execution. Authentic records will have to be maintained for all materials borrowed for use in works as directed by the Engineer. No borrowings from other sources involving additional lead than specified lead of the item shall be done unless directed in writing by the Executive Engineer.

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SUB SECTION-5(IV)

CHAPTER-IX

PRECAST CONCRETE PIPES & COLLARS

- 1.1 Reinforced Cement Concrete pipes & collars shall confirm in the I.S. Specifications 458-2003 or its latest version.

1.2 **CLASSIFICATION :-**

For the purpose of various use concrete pipes shall be classified as under.

Class	Description	Condition where Normally used
NP 1	Un reinforced concrete non Pressure Pipe	For Drainage and Irrigation use, above ground or in shallow trenches.
NP 2	Reinforced concrete light Duty non pressure pipe	For Drainage and Irrigation use, for culverts carrying light traffic
NP 3	Reinforced concrete Heavy duty non pressure pipe	For Drainage and Irrigation use, for culverts carrying heavy traffic.

- 1.3 For precast concrete pipes materials requirements shall be as under.

1.3.1 **CEMENT**

Cement used for the manufacture of un reinforced and reinforced concrete pipes shall confirm to I.S. 12269-1987 or I.S. 1489-1976 or I.S. 8112-1989 or its latest version.

1.3.2 **AGGREGATE :-**

Aggregate used for the manufacture of un reinforced and reinforced concrete pipe shall confirm to I.S. 383-1970 or its latest version as per chapter No. II Material. The maximum size of the aggregate should not exceed one third the thickness of the pipe of 20mm whichever is smaller.

1.3.3 **REINFORCEMENT :-**

Reinforcement used for the manufacture of reinforced concrete pipe shall be mild steel grade 1 or medium tensile steel bars confirming to I.S. 432 (Part-2) 1982 or structural steel (Standard Quality) bars confirming to I.S. 226-1975. Where soft grade wire is used, it shall confirm to I.S. 280-1978.

The reinforcement in the reinforced concrete pipe shall extended through out the length of the pipe and shall be so designed that it shall be readily placed and maintained to design shape and manufacturing process. The circumferential and longitudinal reinforcement shall be adequate to satisfy the requirement

The pitch of circumferential reinforcement shall be confirming to I.S. 458-1988 of its latest version as shown in Table-2.

1.3.4 CONCRETE OR MORTAR :-

Concrete used for manufacture of unreinforced and reinforced concrete pipe and collars shall confirm to I.S. 456-2003 as mentioned in Chapter-V for Concrete work.

1.3.5 ENDS OF PIEPS COLLARS :-

The ends of concrete pipes shall be suitable for flush, collar, socket and spigot, roll on joints or confirmed gasket joints as per I.S. 458-2003 or its latest version.

The dimension of collars and reinforcement shall be as per Table-2-3.31 the ends of the collar reinforcement shall have a full ring at both ends and longitudinal reinforcement shall be provided to the length of collar.

1.3.6 COVER :-

The minimum clear cover for reinforcement in pipes and collars shall be as given below :

Minimum Clear Cover

a)	Barrel Thickness	
1.	Upto & including 25mm	6 mm
2.	Over 25mm & upto & incl. 30mm	8 mm
3.	Over 30mm & upto & incl. 75mm	10 mm
4.	Over 75mm	15 mm
b)	At Spigot Steps	4 mm
c)	At end of Longitudinal	5 mm

1.3.7 The contractor shall have to procure the pipes manufactured such that the forms and dimension of the finished pipes are accurate within the limits specified in I.S. 458-2003 or its latest version. The surface and edges of the pipe shall well define and true and their ends shall be square with the longitudinal axis.

1.3.8 TEST CERTIFICATE :-

The contractor shall have to procure a certificate of manufacture that the pipes supplied by them are confirming to I.S. 458-2003 or its latest version.

A random sample from lot of pipe supplied by the contractor shall be checked in the presence of Engineer-in-charge or its conformity to requirement of steel and diameters as per I.S. 458-2003 or its latest version.

1.3.9 Excavation for laying the pipes in the trenches shall be carried out as per requirement. The excavation shall be done in all type of materials. The excavated materials shall be used for back filling around the pipes and rest materials shall be deposited as directed by the Engineer-in-Charge.

1.3.10 The R.C.C. pipes of dimension mentioned in the drawing shall be laid in the excavated trenches true to line and position as per gradient. The necessary joints shall be carried out by providing collars and finished nearly with cement mortar 1:2.

1.3.11 HANDLING AND LAYING OF PIPES :-

Loading, transporting and unloading of R.C.C. NP-3 Class Pipe from the store factory shall be done carefully. Handling shall be done such as to avoid impact. No damaged or cracked pipes shall be used in the work. It shall be removed immediately from site of work. Pipe shall be lowered in to the trenches already prepared. If the trenches are found insufficient in width or lacking in proper slopes as required, the same shall be widened, deepened by the contractor to get proper sub-grade and working width as shown in drawing or as per direction of Engineer-in-Charge. The pipe shall be laid true to line and level as specified. The collars be slopped on before next pipe is laid.

1.3.12 PREPARING JOINTS :-

R.C.C. pipe shall be joined with collars of sufficient size so that mortar in 1:2 (Cement : Sand) be inserted thoroughly to have leak proof joint. The adjacent to edge of collar and pipe shall be filled with mortar like filling of fillet welding.

The caulking space of joints shall have to be filled with mortar (1:2 Cement : Sand) having proper workability.

1.3.13 CURING OF JOINTS :-

Every joint shall be kept wet for 3 days for maturing the section of the pipe line laid and joint shall be protected and covered with wet gunny bags.

1.3.14 MAKING :-

The following information shall be clearly marked on each pipe.

1. Name of manufacture or its brand name
2. Class & Size of pipe
3. Date of Manufacture

Signature of Contractor

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SUB SECTION-5(IV)

CHAPTER-X

GENERAL TECHNICAL SPECIFICATION OF MASONRY WORK

1.00 Preparing foundation including mapping and covering :-

1.01 Cleaning of foundation with air and water jets, etc.

Immediately before masonry is started, the foundation shall thoroughly be cleaned of all loose materials, including all chips and dirt and even the slightest film of oil or grease, which may need to be cleaned by detergent. This shall be done with help of stiff wire brooms, hammers, picks, jets of water & compressed air at high pressure and/or wet sand blasting followed by thorough washing. The whole surface and particularly corners, crevices and joints shall be cleaned by air and water jet close to it. Water for such cleaning shall be supplied at not less than 15 meter head. The process shall be accompanied by thorough scrubbing with stiff wire brush. Thin joints in rock or shale and loose patches which might have gone unnoticed previously while sounding with hammers, shall be carefully removed. The remains of blast holes shall be carefully cleaned up. The work is covered under the item of foundation preparation including all costs of mapping and removal of all loose and hard strata (on account of blasting cracks, joints etc.). Such removal shall be carried out manually with the use of wedging, chiselling or as directed upto 0.60 meter (average) depth from the final hard rock excavation levels accepted as such by the engineer.

1.1.1 The payment shall be made in the relevant item for such removal or excavation work if actually required. No deduction in the tendered rate will be done if no such removal or excavation upto 0.60 meter depth is required for the function of the preparation item, either fully or partially of foundation area. All costs of materials for Geological mapping of foundation prior to final cleaning and covering work for starting masonry is also to be provided by the contractor under this item. Required final cleaning, washing with compressed air and water jets, dewatering, knocking of depression and corners, removal of any weak or loose formation, as directed by the Quality Control organization, shall have to be fully attended to by the contractor under this item. Initial levels for allowing the quantity of masonry work will then be taken and further covering work permitted as described below for applying initial slurry and rich mortar which are covered under the cost and scope of tendered masonry work.

1.1.2 The washing and scrubbing shall be continued until the wash water is clean and entirely free from dirt. In the final cleaning all water shall be removed and the foundations shall be made dry.

1.2 Foundation to be kept completely dry during construction :-

The foundation shall be kept completely dewatered during construction and till such time as would be required for the masonry to set. Where pumping is resorted to, care shall be taken to see that it does not disturb the work already done. However, prior to placing the masonry, foundation shall normally be kept moistened for twenty four hours, unless where the foundation is required to be covered within 24 hours.

1.3 **Covering the foundation with cement slurry, mortar and starting masonry :-**

As per the I.S. 8605-1977, before laying masonry over the finally prepared surface of the foundation as above, the foundation shall be coated by brush with thick cement slurry (1 cement to about 2/3 water by volume). A layer of 50 to 75 mm thick rich cement sand mortar of proportion 1:3 (by weight) shall be laid over slurry before laying masonry. This mortar shall be spread into all irregularities of the rock surface by trowels to ensure good adhesion and bond. Over this, masonry of specified proportion in cement sand mortar (by weight) shall be laid. The masonry rate is inclusive of applying slurry and rich mortar etc. without any extra payment.

MATERIAL FOR MASONRY WORK :-

1.4 **STONE QUALITY :-**

1.4.1 All stones to be used on the works under these specifications, shall be obtained from the quarries approved by the Engineer and shall be sound, hard, durable, free from veins, flaws, cracks, earth cover, zeolite etc. Stones with permissible stained surface shall be allowed in the masonry. Such stains shall mean oxide coatings which can be washed off or removed by wet scrubbing. criteria for quality of the stone shall continue as per I.S. code No. 1597 (P-I) 1967 and 1121 (part-IV,) 1974 Weathered skin maximum upto 1/16" thickness shall be allowed on only one face of stones which shall not be more than 33% of total number of stones used in the masonry. Such stones with skins on one face shall be stacked separately. The water absorption of stone shall not exceed 5% as specified in I.S. Code No.1124 (1974) after being kept under water for 24 hrs.

1.4.2 The contractor may also be allowed to use the stones obtained from excavation for which the engineer may direct and approve of. The contractor shall pay to the Govt, for such stones at Rs.68.25 (Rs. Sixty Eight & Ps. Twenty five only) per cum. based on gross stack measurements. The selection and sorting of these stones shall be done according to the direction of the engineer, free of charge by the contractor.

1.4.3 **STONE SIZE :-**

The dimensions of the stones to be used shall not be less than 15cm on any face. No stone shall weigh less than 25 kg. Stones and spalls shall be stacked separately as directed by the engineer-in-charge. The percentage of spalls shall not exceed more than

10% of the volume of stone masonry. It shall be seen that spalls are not concentrated at one place only.

1.5 SAND :-

1.5.1 The sand to be used after screening will be the natural sand. The maximum size shall be limited to 4,75mm.

1.5.2 The detailed gradation charts for sand at different locations in the river bed can be seen in the office of the engineer-in-charge of the project. It may be pointed out that all the sand available in natural conditions may require screening and/or blending without any extra claim to meet the specifications. The contractor may, however, consider the alternative of bringing sand from outside source which may meet with the specifications without any extra cost to department.

1.5.3 QUALITY :-

The sand shall consist of hard, dense, durable, uncoated siliceous gritty material, iron, rock fragments, etc. It shall be free from injurious amounts of dust, lumps, soft and flaky particles, shale, organic matter, loam, mica and other deleterious substances. The maximum percentage of each of the deleterious substances in sand as delivered to the mixers shall not exceed the following values as per I.S. code 383-1970 :

Material passing from 4.75 mm I.S. Sieve :-

Clay Lumps 1% by weight.

Clinders & clinkers 0.5% by weight

Mica 2% by weight.

Total of deleterious substances such as alkali, mica, coal, organic particles, soft and flaky particles, loam, etc. shall not exceed 5% by weight. The silt content shall not exceed 3%.

1.5.4 The sum of the percentage of all deleterious materials listed above in para 4.05.3, however, shall not exceed 5 percent by weight. The sand shall be free from injurious amounts of organic impurities and sand producing a colour darker than the standard colorimetric test for organic impurities shall be rejected.

1.6 GRADING :-

The sand shall be well graded and the F.M. shall be within the range specified below.

1.7 FINENESS MODULUS :-

The sand shall have a fineness modulus ranging between 2.1 and 3.2 subject to the same being well graded. The modulus shall be computed by adding cumulative percentage of sand retained on the standard screens from sieves 4.75 mm, 2.40 mm, 1.18 mm, 600, 300,150 micron of the specifications and dividing the sum by 100. Any deviations from the specified range of fineness modulus shall not be permitted without the written permission of the Engineer.

1.8 CEMENT :-

Supply of cement shall be as per the special condition laid down in the Section IV.

1.9 Ordinary portland cement shall be used for the entire work.

1.10 WATER :-

1.10.1 Water used for mixing mortar, grout and also for washing the stone and curing masonry shall conform to the requirement of I.S. 456-1964.

1.11 MORTAR :-

1.11.1 The cement mortar shall be obtained by thoroughly mixing cement, sand and water in mechanically operated mixer in the required proportion by weigh batching.

1.11.2 SPECIFICATIONS FOR INGREDIENTS :-

The ingredient going to form the finished product of mortar shall comply individually with the specifications separately laid down in details for each of time as per I.S.

1.11.3 PROPORTION OF INGREDIENTS :-

Mortar shall consist of cement and sand in the proportion as specified by weight.

Weigh batching alone would be permitted. Suitable weight scale of required capacity and measuring steel boxes with adjustable bottom shall be used in weighing sand corresponding to the weight of cement as approved by the Engineer. However, the Engineer-in-charge may allow volume batching after conversion depending upon the circumstances for unavoidable locations of work.

10% stock of the cement bags on site will be weighed on the weight scale in advance and if any shortfall in the standard weight of 50 kg is found, all the stock on site shall be weighed and short fall shall be corrected suitably by addition of the cement by the contractor in each bag after such weighing at free of cost.

1.12 MIXING :-

1.12.1 The mortar shall be mixed in a suitable type of mixer required for the job. The use of the same mixer for mixing different proportion of mortar consecutively shall be avoided. The first batch of mortar at the commencement of work shall be made richer by adding of extra cement over and above that required for the batch of a particular mix. Mixing time shall be commensurate with the R.P.M. and capacity of mixer used as per I.S. 2250-1981.

1.12.2 Mixing shall be continued till proper mix is done as desired and minimum mixing time shall be as specified in the I.S. 8605-1977.

1.12.3 Over-mixing is objectionable, because the grinding action increases fineness which requires more water to maintain consistency of mortar. Also over-mixing may drive out entrained air. It is recommended that mixing time should not exceed three times the normal times. The Engineer's decision regarding normal time for a particular mixer shall

be final and binding to the contractor. Mixing equipment should be so designed that the mixing can be discontinued and resumed with a full load in the mixer.

1.12.4 In mixing following points shall be carefully attended to :

- (i) The ingredients shall be fed into the mixer simultaneously.
- (ii) Five to ten percent of the total quantity of water required for mixing, shall be introduced before the other ingredients and thereafter all dry ingredients shall be simultaneously ribboned into the mixer in such a manner that the period of flow for each ingredient is about the same. Eighty to ninety percent of the total quantity of water required for mixing shall be added along with the dry ingredients. The remaining quantity of water shall be added after all the ingredients are in the mixer. Addition of water must be made by mechanical device with calibrations attached to each mixer or as directed by the engineer-in-charge.
- (iii) In order to obtain the required workability during construction, water cement ratio and/or other proportion of the mix shall be changed as desired by the Engineer-in-charge.

1.13 TIME OF USE :-

Mortar shall be used in masonry within 30 minutes from the time of adding water. Wherever mixing is done at a higher elevation, the chutes formed of plain G.I. sheets shall be provided. Inclination of the chute should be so adjusted that segregation does not take place. Baffles and hoppers shall be washed and cleaned as and when necessary.

1.14 COMPRESSIVE STRENGTH :-

1.14.1 At least one set of test cubes at every 100 m³ of masonry laid or for part thereof per day shall be taken. The set of test cubes shall consist of 3 cubes each for crushing strength at 7 days & 28 days.

1.14.2 The strength of the test cubes 5cm x 5cm x 5cm shall be examined as under :-

Preliminary mortar cubes for testing from the design mortar mix at suitable intervals using the approved material will be cast in the laboratory and their strength found out. These strengths shall be deemed as the "standard strength" for the mortar. The compressive strength of the preliminary test cubes cast in laboratory at 28 days shall be within the range specified for that mix, as per I.S. 8605-1977 and I.S. 2250-1981.

For the field mortar cubes, the compressive strength shall not be less than 80% of the above compressive strength of preliminary test cubes at 28 days or minimum as specified in the I.S. 2250-1981 for the particular grade of mortar and the higher of above two shall be the applicable criteria. However, the strength of test cubes at 7 days shall be taken to watch the gain in the strength of mortar with, respect to time. Here the

comparison of test cube strength shall be made with respect to the standard strength obtained for the age in the laboratory. All laboratory testing work shall be carried by the department as per the relevant Indian standards and the contractor will be permitted to watch tests if he so desires. The cost of testing shall be governed by the provisions made under special conditions No. 2 Section- IV.

- 1.14.3 In case the results fail to fulfill the above strength requirements, the respective portion of the work shall be got removed and redone by the contractor at his own cost as directed by the engineer-in-charge. If it is impossible to remove the sub standard work as per the prevailing circumstances, the rate for such class of work shall be reduced suitably by the Engineer-in-charge, which shall be binding on the contractor.

- 1.15 Preliminary tests to be carried out in advance.

- 1.15.1 Preliminary tests for mortar shall be carried out in laboratory. Results of experiments, any, so far carried out in this connection can be seen from the Executive Engineer-in-charge of the project. The deptt. is in no way bound for any conclusions that may be drawn by the contractor from a study of these results.

1.16 MASONRY (GENERAL) :-

1.16.1 CLASSIFICATION OF MASONRY :-

Masonry is classified as per the type of mortar that shall be used :-

- i. Cement mortar of nominal mix (1:5) masonry of the proportion shall be used in the hearting of spillway, abutment, key, training walls and other works as directed.
- 1.16.2 Notwithstanding the locations as given above, the department may change the locations of the type of masonry previously proposed for which no extra claims shall be entertained.
- 1.16.3 Masonry shall to be done as per the approved working design. The work shall be done square, plumb, curved or battered as may be required to meet with the design requirements and shall be carried out in a workman like manner with the aid of molds, templates, centering, scaffolding etc. Preparing of masonry on all the faces of masonry is also included in the work without any extra cost.
- 1.16.4 Block outs and slots to be provided by contractor.
- All block outs etc. required for embedded foundation bolts and other embedded parts for gauge instruments for measuring behavior of dam and construction joints etc. shall be provided by the contractor without any extra cost.
- 1.16.5 Stones are to be weighed before use. All stones, chips etc. shall be cleaned and shall be free from dust or mud to ensure bond with mortar and shall be wetted before being laid. For this purpose the stones that are to be used immediately shall be kept sprinkled with

good clean water. There shall be adequate collection of stones and spalls within the reach of each mason to enable proper selection of stones for the individual locations while laying, and the stones shall be continuously replenished.

1.16.6 MODE OF LAYING :-

The stones shall be laid carefully in mortar on their natural flat bed so as to break joints as much as possible. The stones shall be pressed and hammered down by a mallet so as to bring out all excess water and locked air from mortar in sides and bed. If it is required to move stone after it is placed in position, it shall be lifted carefully and then placed.

No joints shall exceed 20mm in thickness nor shall it be less than 12mm in thickness. The joints shall be filled well with mortar and suitable chips and spalls driven into them so as to avoid thick beds of joints. The smaller stones used in the filling shall be carefully selected to fit snugly into the interstices between the longer ones. Mortar to be added to the intervening places be well worked by trowels and the light hand bar 12mm dia and sufficiently long without bullet nose to ensure proper mixing and blending with the bottom mortar, Care shall be taken to see that joints in masonry already laid are not disturbed, while handling or moving stones. The masonry surfaces shall be kept as rough as possible to secure a good bond between the successive layers and shall be wire brushed on the next day to remove all excess mortar etc.

1.16.7 Limit on height of masonry to be done in a day.

No fresh course shall be laid over masonry previously laid before 24 hours of the laying. The maximum height of masonry allowed to be constructed at a time shall be 0.6 m in one or more layers. Thickness of each layer of masonry shall not be more than 20 cm average.

1.16.8 Masonry surface which remained exposed for more than 28 days due to delays in construction or any other reasons, shall be prepared in the same manner as the rock foundation after raking (vide para 4.01) the mortar joints to a depth of 15mm including applying cement slurry as mentioned in para 4.03 except that only 1st layer of masonry should be stone in rich mortar.

1.17 Precautions to obtain dense masonry :-

1.17.1 In order to obtain dense masonry, the following precautions shall be taken :-

- (i) Under pinning shall be avoided once a stone is laid, as it tends to lift the stones and create the air pockets.
- (ii) Insertion of spalls and chips in the intervening space before filling in with mortar shall not be permitted.
- (iii) Leveling of masonry on the top of the course by use of spalls and chips shall not be permitted. All chips shall be driven as the masonry which will, help to

squeeze and compact at the joints.

1.18 GENERAL RULES FOR BETTER WORKMANSHIP :-

1.18.1 General rules for better workmanship will be as under. Decision of Engineer-in charge shall, however, be final.

- (i) Clean the previous day's masonry surface by wire brush prior to starting masonry. Chipping should be resorted to only in extreme cases.
- (ii) Do not place mortar which bleeds excessively.
- (iii) Thoroughly and efficiently broom into the old surface a layer of mortar and build the masonry course on it immediately.
- (iv) Shake the mortar well by vibrating the stone by hand bar to ensure that the excess mortar water and the entrapped air come out and are not trapped at the bottom before driving in chips. The stones shall then be hammered down by a wooden mallet (10 to 12 lb. or as directed in weight) and press towards the adjacent stones at the same time without touching it.
- (v) Inadequate supply of spalls in different sizes would lead to excessive use of mortar.
- (vi) Avoid under pinning after a stone is laid as it tends to lift the stones and leave air pocket.
- (vii) Avoid putting flat chips at top as these tend to get dislodged easily and will affect level up the surface also. Drive in all the chips on ends only which will further squeeze the mortar at the joints.
- (viii) Keep the masonry surface as rough as possible to secure good bond between the successive layers.
- (ix) After the masonry is done once, do not permit it to be disturbed until it has attained sufficient strength to withstand traffic and omit the initial clean up consisting of cutting the surface layer and exposing a clean surface before the final set is attained. Hammering or breaking of stone on fresh masonry shall not be permitted.
- (x) Wire brush the masonry surface after the mortar has set finally i.e. after 8-12 hrs. to remove all laitance, excess mortar, etc. Too much delay in cleaning may lead to difficulty and insufficient cleaning unless carefully and persistently insisted on.
- (xi) Work shall be so distributed that fresh layers of masonry are started every alternate day.
- (xii) Keep the surface continuously moist until the next layer is placed after the necessary time interval. Layers and the exposed surface shall be kept moist for

21 days as per I.S. 8605-1977.

- (xiii) Notwithstanding about general rules, the instructions for attaining better workmanship, issued by the authorities from time to time during the execution of the work in different stages, shall be attended to by the contractor without any extra claim.

1.19 QUANTITY OF MORTAR :-

Full efforts shall be put in to ensure that sufficient quantity of mortar is used in the masonry. The quantity of mortar used shall be not less than 40% and not more than 48 percent by volumes of the masonry laid.

1.20 CURING OF MASONRY:-

All masonry, as in progresses, shall be kept well watered on the top and sides and both the faces for a period of not less than 21 days from the date of building. At the close of the day's work or for other period of recess of work, the top of all masonry is to be kept well watered. The masonry shall be kept moist during the period of initial and final setting of mortar. Curing by way of ponding shall be started only after the period of final set of mortar.

1.21 WEAK OR DEFECTIVE MASONRY :-

- 1.21.1 Any portion of masonry found to be weak or defective in construction, shall be removed and rebuilt by the contractor at his own cost. As an alternative and at the discretion of the engineer, such masonry shall be sufficiently grouted by the contractor at his cost in a manner specified by the engineer to his entire satisfaction.

1.22 Permeability test :-

Permeability tests shall be carried out on the constructed masonry according to the following procedure, and as per I.S. 11216-1985.

- 1.22.1 The test holes 50mm (or nearest commercial) size in diameter shall be core drilled at the Every 5.00 Mt. height at the rate of two per 20m center to centre or as directed one on the upstream side, the other on the downstream duly staggered and to a depth extending 1.5 metre in the old masonry work 1.5m in foundation when masonry in the previous season has been started from the foundation. The exact location of holes shall be as directed by the Engineer-in-charge. The water intake shall be tested for various lifts along the holes by packers in stage as may be directed by the engineer. The test pressure shall be 1.4 kg/cm² (20 PSI) at the top of hole under test.

The water intake shall not be more than 1.5 litres per minute per sq m of peripheral surface area of the hole for the portion of the hole passing through masonry with richer mortar (1:3) and 3 liter per minute per sq m of peripheral area of the hole for the portion of the hole passing through masonry with leaner mortars (1:4) and (1:5).

Length passing through concrete and foundation shall be taken equivalent to that in masonry with richer mortar.- If the leakage observed is within the specified limits, the holes drilled shall be grouted and no separate payment for drilling, grouting and permeability test shall be made.

1.22.2 Remedial Measures :-

If the leakage during permeability tests exceeds the values specified above, systematic drilling and grouting shall be carried out as directed by the Engineer-in-charge to achieve the required degree of impermeability. Such remedial drilling and grouting shall be executed by the contractor at his cost, failing which it shall be got done by the department at the contractor's cost. Even after carrying out such remedial measures or even though the result of test is found satisfactory, appropriate recovery shall be made from the contractor for any significant leakage through the gallery and shaft or on D/s face of the dam unless the contractor carries out immediately further drilling and grouting and such other remedial measures at his cost and corrects the defects. The decision of the Engineer-in-charge as to the extent of recovery and as to what constitutes as significant leakage shall be final.

1.22.3 Relaxation notwithstanding the provision of paragraph above.

The Engineer-in-charge at his discretion may relax permeability standards provided that the measurements of discharge through the masonry in the gallery after the pointing on the U/s, indicates satisfactory imperviousness of the masonry for a sufficient period.

1.22.4 Payment of part Rate :-

Deduction of Rs.50/- (Rupees Fifty only) per cubic metre of masonry shall be made for all masonry work of the dam section. If the permeability tests at every five meter indicates satisfactory impermeability and/or that adequate grouting, if found necessary has been done by the contractor at his cost, a refund of Rs.25/- (Rupees Twenty Five only) per cubic metre shall be made for such masonry quantity which is found to be adequately impermeable or satisfactorily grouted. The balance of Rs.25/- (Rupees Twenty Five only) per cubic metre of masonry shall be treated as additional security deposit and shall be retained by government until such time as the lake water is raised upto full reservoir level to facilitate adequate observation of percolation through the dam and pore pressures in the body of the dam. This additional security deposit will be refunded when the leakage through the gallery and the pore pressure on the body of the dam are found within the acceptable limits as decided by the engineer-in-charge. The decision shall be taken within 12 months of the lake being raised upto the full reservoir level. If the contractor desires, the above additional security deposit can be inverted into bank guarantee in acceptable form at suitable intervals as decided by the Engineer-in-

charge. The bank guarantee shall be valid for at least one year after the date of completion of the whole contract work and shall be subsequently extended till the reservoir is charged upto full reservoir level and till the above criteria is fulfilled.

1.23 SCAFFOLDING TO BE DONE BY CONTRACTOR :-

1.23.1 The cost of providing and maintaining scaffolding required for the work shall be considered- o have been included in the rates quoted for the item of masonry.

1.24 ARRANGEMENTS FOR JOB TRAFFIC :-

1.24.1 Adequate plank ways or other suitable arrangement shall be provided properly for the use of necessary job traffic.

1.25 WORK DAMAGED DUE TO FLOODS, GOVT; IS NOT RESPONSIBLE :-

1.25.1 When restarting the work of masonry after monsoon, the surface of all masonry work shall be cleaned thoroughly as specified in para 7.01 above, by raking out joints to depth as directed by engineer. All loose and doubtful patches of masonry shall be removed. Damages done to masonry by floods passing over the work shall be set right by the contractor at his own cost and no extra claims shall be entertained on this account.

1.26 FACE WORK FOR CONTRACTION JOINTS :-

Plastering over one of the faces with 20mm thick cement sand Plaster of proportion 1:3 by weight shall form the face of contraction joints. For this purpose the construction of the masonry block with plastered face shall be so planned as to be higher than the adjacent face at least 1,0m to 1,20m. The plaster of cement and sand mortar (1:3) shall be applied as per the detailed specifications under the section 6. The work of such plaster construction joints is to be paid separately as per the respective tender item.

1.27 U.C.R. MASONRY :-

1.27.1 DRESSING OF STONES :-

The stones shall be set in the work received from quarry after knocking off weak corners and edges with a massive hammer and after cleaning scales of foreign matter, if any for information the contractor, it may be stated that suitable stone quarries are available as shown on the respective drawing.

1.27.2 Laying the masonry shall be as detailed in para 7.16.6.

1.27.3 For ensuring good bond, masonry shall be constructed uneven at the top.

1.27.4 FACE STONES :-

The face stones, whenever required, shall be selected from the mass of quarry stones of greater size, broad base, uniform colour and shall be laid as far as possible without pinning in front. They shall tail back and bind well into the work and shall not be of greater height than either breadth on the face, or length of tail in the work. No face stone shall be less than 0.015 cubic metre. The face stone shall be 0.20 to 0.30 m in height.

They shall be practically square on face and the exposed face shall be without uneven projections of more than 4 cm. It should be as per I.S. 8605-1977.

1.27.5 BACKING STONE :-

A fair proportion of the stones used in the backing shall be of a large size. Thirty percent of them shall exceed 0.015 cubic metre in content.

1.27.6 QUOINS :-

The quoins stones, otherwise specified, shall be the selected stones neatly dressed with hammer and chisel to form the required angle and laid header and stretcher alternate.. No quoins stone shall be less than 0.03 cubic metre in content.

1.27.7 Face work would be done with the stones as per para 7.27.4 and 0.6m thick and would be from selected and approved stones.

1.27.8 No face stone shall be less in breadth than height or shall tail into the work to a length not less than the height. A Header stone having at about 3 times its height shall be used. This stones shall have star mark for easy identification and shall tail into the work in each course at every six feet length.

1.27.9 PINNING :-

Face stone shall be laid without any pinning on the surface and shall be fixed as to form neat and close joints. If necessary, the edges shall be hammered to ensure that the face work is bonded well into the masonry.

1.27.10 BOND STONES :-

For good bond, stones having a tail of not less than 0.45m (1'6") shall be used at the rate of one per square metre of the face work except where the header stones themselves tail into masonry more than 5 to 20 cm.

1.27.11 QUOINS :-

The quoins shall be 20cm to 30cm in height and shall be formed of stones at least 30 cm long and shall be laid as header and stretcher alternately. They shall be laid square on bed neatly to present nearly square bedding. ; .

1.27.12 JOINTS :-

The joints in the face work shall not be more than 20mm and the stones shall be arranged to break joint as far as possible. Long vertical lines of joints shall be avoided.

1.27.13 FLUSH POINTING :-

For flush pointing, no lines shall be pressed on the joints but the joints shall instead be merely rubbed smooth with trowel as soon as the mortar has begun to set. The extra mortar on the edges shall be carefully scraped off to give neat appearance.

1.27.14 FINAL FINISH OF JOINTS :-

The joining shall be neat, well defined and practically of uniform width. The joints shall

not be raised over the surface of masonry.

1.27.15 CURING :-

The work pointed shall be kept wet upto 21 days after pointing work is completed.

1.27.16 One face of the construction joints shall be plastered with cement sand mortar plaster of (1.3) proportion by weight which is exclusive of cost of masonry work.

1.28 POINTING :-

1.28.1 All pointing shall be done with cement sand mortar of (1:2) proportion by weight. The sand to be used shall be fine. It shall pass through A.S.T.M. 16 mesh or 120 I.S.S. mesh. The sand shall conform in all other respects to specifications under the relevant paras 7.06 and 7.05 above.

1.28.2 RAKING JOINTS :-

The raking of joints in masonry to be carried out for pointing for a minimum depth of 20mm within 24 hours when mortar is firm but not set. The refilling and pointing shall be done as early as possible so as to ensure good adhesion between the two mortars.

1.28.3 CLEANING JOINTS :-

Before starting pointing, the raked joints shall be thoroughly cleaned of dirt or any loose material. Adhering cement mortar shall be washed properly and thoroughly wetted.

1.28.4 FILLING JOINTS :-

The joints shall be filled with cement sand mortar of (1:2) prop, {by weight) as specified above which shall be thoroughly pressed by Nayla and caulked into joints. The mix shall neither be too dry nor too wet when used. The mortar shall have just enough water to stick together on being moulded into a ball by light pressures of hand but not too much as to release free water when so pressed. Pointing shall be carried out as rapidly as possible and, shall not be touched again after the mortar has once started to set.

1.28.5 FINAL FINISH OF JOINTS :-

This shall be as detailed in para 7.27.14.

1.28.6 CURING :-

This shall be as per para 7.27.15.

1.29 PAYMENT FOR MASONRY WORK :-

The tender rate for masonry work shall represent rate for the work to be done under the item' to its full height including any dewatering, if required during construction work. Part payment shall, therefore, be made on running bills at rates shown below

Percentage of Masonry work done in each block	Percentage of tendered rate to be paid for the work done up to
Until 50% of Masonry is done	90%

Percentage of Masonry work done in each block	Percentage of tendered rate to be paid for the work done up to
More than 50% but not less than 95% of masonry is done	95%
More than 95% but less than 100% of masonry is done	99%
When 100% Masonry is done	100%

For the purpose of this clause, complete length along with spillway will be divided into suitable blocks between the construction joints. Quantity of masonry works for such blocks will be taken as 100% work in each block. Quantities for each block will be determined as per actual execution and as per the designed crest level. Part payment will be regulated on this basis as per above table of payment in case of ogee spillway, and top level for non-overflow and key.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(IV)

CHAPTER-XI

MATERIAL TEST SCHEDULE

Name of work : **WAGADIA WATER RESOURCES PROJECT**
Construction of Simtal Road along river Nani Fulzar at village : Wagadia Tal. & Dist. Jamnagar.

Sr. No.	Description of Item No.	Materials to be tested	Name of Laboratory Test	Frequency of Tests	Total No. of Test	Remarks.
1	Water use for all item	Water	Chemical analysis	1 Test for each source of supply per season	1 or more as required.	
2	Cement use for all item	Cement (722.40 MT)	Physical Test	Upto 50 M.T. 1 Test	As per material receipt on site. Minimum one Test for consignment of less than 50 M.T.	
			(a) Consistency (b) Setting time (c) Compressive Strength (d) Soundness (e) Specific Gravity (f) Fineness Test	50 to 100 M.T. 2 Test 100 to 200 M.T. 3 Test 200 to 300 M.T. 4 Test 300 to 500 M.T. 5 Test 500 to 800 M.T. 6 Test 800 to 1300 M.T. 7 Test		
3	Sand for all items pertaining to sand	Sand	Chemical Analysis	1 Test / 10 Physical Test	1 or more as required.	
			(a) Fineness Modular (b) Specific gravity (c) Silt Content (d) Water absorption (e) Gradation Test (f) Deleterious Material	1 Test / Working season or change of river / source per 150 Cum. of Concrete work.		

Sr. No.	Description of Item No.	Materials to be tested	Name of Laboratory Test	Frequency of Tests	Total No. of Test	Remarks.
4	Crushed Metal for all item pertaining for C.S. Metal	C.S. Metal 40 to 20mm, 20 to 10mm, 10 to 4.75mm Nominal size.	(a) Specific Gravity (b) Water absorption (c) Flakiness Index (d) Impact Value (e) Gradation Test	1 Test for working season for C.C. or R.C.C. work and change of quarry per 150 Cum. of Concrete work.	1 or more as required.	
5	M-15 & MSA-40 mm	C.C. Cube	(1) Compressive strength @ 7 and 28 days	As Per IS : 456-2000 (or it's Latest Revision) Clause No.15.2	As required	
6	TMT Bar FE-500	TMT Bar (16.90 MT)	(1) Tensile Strength (2) Elongation (3) Bend and Rebend Test (4) Yield Stress (5) Dimension Test (6) Chemical Composition	One test per 40 M.T. of each category supplied on site and change of brand minimum one test for each consignment and every categories.	As required	
7	Stone for Pitching work	Stone	(a) Compressive Strength Test (b) Water absorption (c) Specific Gravity	1 Test for working season / change of source.	1 or more as required.	
8	Cement Mortar (C:M) 1:2	C:M Cube	(1) Compressive Strength Test	1 Sample Per Day	1 or more as required.	

Sr. No.	Description of Item No.	Materials to be tested	Name of Laboratory Test	Frequency of Tests	Total No. of Test	Remarks.
9	Earthwork for embankment	Earthwork for embankment	1. Density test (IS 2720 Part-VII) 2. Moisture content (IS 2720 Part-II)	One test per every 300 Cum. of soil One test per every 300 Cum. of soil	42 test 42 test	
10	R.C.C. NP-3 Pipe 1200 mm	R.C.C. NP-3 Pipe	As per I.S. 458-1971	Test Certificate from pipe manufacturer to be obtained	1 Test	
11	Soil / Murrum	Soil	(1) Gradation (2) Swelling Index (3) Atterberg's Limit (4) I.S. Classification (5) Standard Procter Test	For Borrow Area : 1 Test for 1000m ³ For Field : 1 Test for 300m ³	1 or more as required.	

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar

SUB SECTION-5(V)

DETAILED ITEMWISE SPECIFICATION

Name of work : **WAGADIA WATER RESOURCES PROJECT**
**Construction of Simtal Road along river Nani Fulzar at village :
Wagadia Tal. & Dist. Jamnagar.**

Item No.1 :- **Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth upto 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials. (D) By Mechanical means in area of thorny jungle.**

1.0 GENERAL :-

This work shall consists of cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, top organic soil not exceeding 300mm in thickness, rubbish etc. which in the opinion of the engineer are unsuitable for incorporation in the works, from the area of road land containing road embankment, drains, cross-drainage, structure and such other areas as may be specified by the Engineer. It shall include necessary excavation, back-filling of pits resulting from uprooting of trees and stumps to required compaction, handling, salvaging, and disposal of cleared materials. Cleaning and grubbing shall be performed in advance of earthwork, operations and in accordance with the requirement of this specification.

2.0 Preservation of property / Amenties :-

Road side trees, shrubs and other plants, pole, lines, fences, signs, monuments, buildings, pipe lines, sewerages and all highway facilities within or adjacent to the highway which are not to be disturbed shall be protected from injury or damage. The contractor shall provide and install at his own expense suitable safeguards approved by the Engineer for this purpose.

During clearing and grubbing, the contractor shall take all adequate precautions against soil erosion, water pollution etc. and where required undertake additional works to that effect as per Clause 306 of MORTH specification booklet for Roads and Bridge. Before start of operations, the contractor shall submit the engineer for approval, his work plan including the procedure to be followed for disposal of waste materials etc., and the schedule for carrying out temporary and permanent erosion control works as stipulated in Clause 306.3 of MORTH specification booklet for Roads & Bridges.

3.0 Methods, Tools and Equipments :-

Only such methods, tools and equipments as are approved by the Engineer and which will not affect the property to be preserved shall be adopted for the work. If there is thick vegetation / roots / trees a crawler or pneumatic tyred dozer adequate capacity may be

used for clearance purpose. The dozer shall have ripper attachments for removal of three stumps. All trees, stumps etc. falling within excavation and fill lines shall be cut to such depth below ground level that in no case these fall within 500mm of the sub-grade. Also, all vegetation such as roots, under-growth, grass and other deleterious matter unsuitable for incorporation in the embankment / sub-grade shall be removed between fill lines to the satisfaction of the Engineer. On areas beyond these limits, tress and stumps required to be removed as directed by the Engineer shall be cut down to 1 m below ground level so that these do not present an unsightly appearance.

All branches of trees extending above the roadway shall be trimmed as directed by the Engineer.

All excavation below the general ground level arising out of the removal of trees, stumps etc. shall be filled within suitable materials and compacted thoroughly so as to make the surface at these points conform to the surrounding area.

4.0 Disposal of materials :-

All materials arising from clearing and grubbing operation shall be the property of the government and shall be disposed by the Contractor as herein after provided or as directed by the Engineer-in-charge.

Trunks, branches and stumps of trees shall be cleared of limbs and roots and stacked. Also boulders, stones and other materials usable in road construction, shall be neatly stacked as directed by the Engineer. Stacking of stumps, boulders, stones etc. shall be done at specified spots with all lead and lifts.

All products of clearing and grubbing which in the opinions of the Engineer, cannot be used or auctioned shall be cleared away from the road sides in a manner as directed by the Engineer. Care shall be taken to see that unsuitable waste materials are disposed of in such a manner that there is no likely hood of these getting mixed up with the materials meant of embankment, sub-grade and road construction.

5.0 Mode of Measurement :-

Clearing and grubbing for road embankment, drains and cross drainage structure shall be measured on area basis in terms of Hectares. Clearing and grubbing of borrow area shall be deemed to be a part of works preparatory to embankment construction and shall be deemed to have been included in the rates quoted for the embankment construction item and no separate payment shall be made for the same. Cutting of tress upto 300mm in girth including removal of stumps and roots, and trimming of branches of trees extending above the roadway shall be considered incidental to the clearing and grubbing operations. Removal of stumps left over after trees have been cut at any other agency shall also be considered incidental to the clearing and grubbing operations.

6.0 Rates :-

The contract unit rate for this item of clearing and grubbing shall be payment in full for carrying out the required operations including full compensation for all labour, materials, tools, equipments and incidentals necessary to complete the work. These will also include removal of stumps of trees less than 300mm in girth as well as stumps left over after cutting of trees carried out by another agency, excavation and back-filling to required density, where necessary, and handling, salvaging, piling and disposing off the cleared materials with all lead.

The contractor unit rate for cutting (including removal of stumps and roots) of trees of girth above 300mm shall include excavation and back-filling to required compaction, handling, salvaging, piling and disposing of the cleared materials with all lead and lift.

Where a contract does not include separate items of clearing and grubbing the same shall be considered incidental to the earthwork items and contract unit prices for the same shall be considered as including clearing and grubbing operations.

Item No.2 :- Excavation in all sort of strata and formations incl. depositing the unuseful excavated stuff as and where directed incl. sorting and stacking useful materials as directed upto 200 mt lead and all lift etc. complete incl. dewatering. (A) IN OVER BURDEN HARD MURRUM.

The excavation is to be done in all types of strata including soil, hard-murrum, soft rock & Hard Rock. The trenches shall be excavated to exact width and depth as per drawing and the sides shall be made plumb and bottom shall be made level where the nature or the strata admits it. All foundation trenches shall be at one level unless otherwise directed by the engineer-in-charge and shall be dressed perfectly in level before any concrete or masonry is to be done, and shall be watered and thoroughly rammed.

Any shorting and stacking required during excavation shall be deemed to be covered by the rates quoted for this item. All the foundation pits shall be refilled at the sides of masonry or concrete to the original surface of ground with approved excavated stuff, which will be well watered and rammed. The filling shall be done in such a way so as not to cause under thrust on any part of the structure.

The excavated materials shall be sorted and stacked as and where directed by the Engineer-in-charge without extra payment within a lead of 30 Mt.

If the excavated foundation pits got silted due to the intervening floods, slips or any other cause the contractor shall excavate and restore the foundation trenches to the

required dimensions without any extra cost.

The rate shall include all lift of excavation, cost of all sorting, keeping the excavation trenches free of water while the masonry / concrete is in progress and back filling in foundation. The decision regarding classification of strata shall lie with the Executive Engineer & shall be binding to the contractor.

The work shall be carried out and completed in proper line and level as directed by Engineer in charge. As per Govt. of Gujarat N.W.R.W.S. and Kalpsar Dept. Order No.MI Cell /2010 /17 /(2) K-1, Dt.05/10/2019 for the hard rock, which is excavated from the work will be allotted to the agency. Hard Rock utilized for the work will be recovered rate Rs.481.81 per Cum Hard Rock not utilized for the work will be recovered rate Rs.224.08 per Cum (SOR Year 2024-25). In addition, necessary royalty for these materials have to be paid by the agency as per prevailing rules and regulation to the Mines & Geology Dept. according to classification of materials.

The whole stuff of hard rock irrespective of voids or quarry spalls, shall be taken by the contractor. This fact should be kept in mind while quoting the tender rates of these items.

The measurement shall be taken as per excavated depth and width of designed level as shown in drawing.

The payment for the work done for this item shall be paid Cum. basis.

Item No.3 :- Providing, cutting, bending, binding and fixing in position as per drawing TMT BAR, reinforcement for R.C.C. works and anchor bars incl. cost of black annealed 16 to 18 BWG M.S. Wire etc. complete with all lead and lift.(B) Fe-500

The TMT Bar shall conform with I.S. specification as amended from time to time. Relevant all Material shall conform detail specification of Principal Material specified in Section-5(IV) M-5.

The item shall include cutting, bending, binding and fixing in position steel reinforcement.

Steel reinforcement bars & fabrics shall be placed in the concrete as shown in the drawing or as directed before steel reinforcement is placed in position the surface of the reinforcement shall be cleaned of rust scale dirt and grease and objectionable foreign substances before the reinforcement bars are fixed in position it shall be verified that they are of the specified sizes and are cut and bent in accordance with plans and specification they shall be accurately placed and secured in position by means of built in concrete work, metallic chairs hangers spacers or other suitable devices at sufficiently close intervals so that they will not sag between supports nor be displaced during the

placing of the concrete or by any operation of fork, the reinforcement after being placed in position shall be maintained in a clean condition until it is completely embedded in concrete to prevent further damage to the concrete or unsightly rust stains on exposed concrete surface.

Reinforcement shall not be straightened or bent in manner that will injure or weaker the materials, nailing or the bars to facilitate banding will not be permitted however such heating needs is shall be after only permission of Engineer-in-charge. Over topping shall be as per prevailing I.C. Codes T S permissible in certain condition as decided by EIC.

The looped ends shall be placed to ensure full bend reach bars splicing shall not be done in the region of maximum bending moment and splicing of adjacent bars shall be avoided as far as possible.

Welding of bars for splices may be permitted at the decision of Engineer-in-charge and only electric welding all welding shall be confirmed to the standard welding code of practice as per specification.

Sufficient concrete coverage shall be provided to protect reinforcement from corrosion.

No concreting shall be started unless the reinforcement is fully checked by Engineer-in-charge.

The rate shall be paid per Metric Tonne for the complete work as specified above.

Item No.4 :- Prov. & Laying in position cement concrete using cement, sand and crushed metal coarse aggregate by mass and machine mix for PCC/RCC including necessary formworks compaction by vibrator, curing as directed with all lead & lift etc complete. (Excluding cost of steel) FOR BODY WALL, APRON, TRAINING WALL, SIDE WALL, SPLAY WALL, KEY WALL, CUT OF WALL ETC. (C) Controlled Concrete Grade M-15 & MSA-40mm

1.0 MATERIALS :-

(i) CEMENT :-

Specification M-2 of Specification of Principal Material section shall apply.

(ii) WATER :-

Specification M-1 of Specification of Principal Material section shall apply.

(iii) SAND :-

Specification M-3 of Specification of Principal Material section shall apply.

(iv) COARSE AGGREGATE :-

Specification M-4 of Specification of Principal Material section shall apply.

2.0 GENERAL :-

The material to be used for concrete M-15 & MSA-40mm grade shall be applicable as per specification of principal materials laid under respective section of tender. The General Technical Specification of Concrete (Chapte-III) shall be apply. The proportion and gradation of all material shall be as proposed in concrete mix design M-15 fianlized by Govt. Lab. / Govt. Approved Pvt. Lab. General specification of concrete shall apply. Concrete work shall have to be carried out as per detailed drawing and instruction of Engineer-in-charge.

3.0 SCOPE OF WORK :-

The scope of work of doing R.C.C. under this item includes concrete M-15 with use of water, cement, sand and coarse aggregates with all labours, use of equipments and machineries etc. along with necessary centering, form work erecting and compaction with use of needle vibrators with finishing the exposed surface of concrete work to obtain dense and compact surface and curing upto specified period etc. complete.

4.0 MODE OF MEASUREMENT & PAYMENT :-

The Payment shall be made on Cum. basis for complete item.

Item No.5 :- Providing, supplying, Lowering and laying ISI Standard R.C.C. NP-3 Class pipes in standard lengths of following Diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to Site, and jointing in proper position, grade and alignment at all level as level as directed by Engineer-in-charge including all labour, giving hydraulic testing as per ISI code. (G) 900mm Dia
NOTE :- One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.

1.0 The work shall consist of furnishing and installing reinforced cement concrete pipe of the **900mm** diameter and length required at the location shown on the drawings or as ordered by the Engineer-in-charge.

2.0 Reinforced concrete pipe shall be NP-3 type conforming to the requirement of IS: 458 and shall be of dia as specified in the item. Each consignment of cement concrete pipes shall be inspected, if necessary and approved by the Engineer-in-charge, either at the place of manufacture or at the site before their incorporation in the work. Relevance Specification of Section-5(IV), Chapter IX Shall apply.

NP-3 pipes are used for R.C.C. Pipes. Where testing of pipes will not be feasible the contractors will have to produce a certificate from the manufacturers on company's latter head the given hereinafter form.

Production of such certificate will not however relieve the contractor from his responsibility of supplying pipes of required standard and will have to bear the loss or damage caused to the work on account of defects found subsequently during the execution. It will also be necessary to purchase these pipes from manufacturer having standard equipments for carrying out various test as per IS: 458 at his factory. The work is payable on Rmt. basis of the completed item.

FORM OF CERTIFICATE FOR NP-3 PIPES

We _____ manufacturer of R.C.C. pipes produce R.C.C. pipes as per the requirement of IS: 458 and also carry out the required test at our place. We have acquired equipments for carrying out test and are prepared to carryout test at our factory sites.

We have experience of manufacturing of pipes of _____ years. The pipes supplied by us to M/s. _____ satisfy the requirement of IS:458.

Date : _____

Place : _____

Manufacturer's sign _____

- 3.0 No pipe shall be placed in position until the foundations have been approved by the Engineer-in-charge. Where two or more pipes are to be laid adjacent to each other, they shall be separated by a distance equal to at least half the diameter of the pipe subject to minimum of 450mm. The laying of pipes on the prepared foundation shall start from the outlet and proceed towards the inlet and be completed to the specified lines and grades. The pipes shall be fitted and matched so that when laid in works they form a culvert with a smooth uniform invert. Any pipe found defective or damaged during laying shall be removed at their cost of Contractor.
- 4.0 The pipes shall be jointed either by collar joint or by lush joint. In the former case, the collars shall be of R.C.C. 150 to 200mm wide and having the same strength as the pipes to be jointed. Caulking space shall be between 13 and 20mm according to the diameter of the pipes. Caulking material shall be slightly wet mix of cement and sand in the ratio of 1:1 rammed with caulking irons. Before caulking the collar shall be so placed that its center coincides with that of pipe and an even annular space is left between the collar and the pipes. Flush joint may be haped to form a self centering joint with a joining space 13cm wide. The joining space shall be filled with cement mortar. 1 cement to 1 sand, mixed sufficiently dry to remain in position when forced with a trowel or rammer. Care shall be taken to fill all voids and excess mortar shall be removed. All joints shall be made with care so that their interior surface is smooth and consistent with the interior surface of the pipes. After finishing, the joint shall be kept covered and damp for at least four days.

- 5.0 R.C.C. pipe shall be measured along their center between their inlet and outlet ends in linear meter.
- 6.0 The rate for the pipes shall include the cost of pipe including loading, unloading, handling storing laying in position and jointing complete.

The payment shall be made on Rmt. basis for completed item as per item description or as directed.

Item No.6 :- Earthwork in embankment using excavated stuff including spreading in uniform layers breaking clods and dressing to design section for all sorts of soil and soft murrum hard murrum for different leads as under and all lifts above GL etc. complete but with rolling & watering. (A) Lead upto 200 Mt.

Earth work for embankment shall be done as directed by the Engineer in charge. Whole surface of old embankment shall be cleared of all excavated stuff before placing the earthwork. Materials for the embankment shall be of approved quality and brought from within a lead as above and all lift and shall be laid in even layers of not more than 30 Cms. depths clods shall be broken to minimum 5 Cms. size only suitable materials shall be used in the bank as directed.

When new embankment is to be joined with old one, the surface of the old work is to be removed by cutting the same to an approved slope and the key trenches of the required dimension shall be executed in the old work to obtain good bond with the new work.

Measurements of work done shall be taken at 30 Mt. interval or interval if necessary. .

The usable material available from the item of excavation or desilting suitable for earth work within a lead as above shall be used and quantity shall be deducted from this item and payment be made for this deducted quantity.

Shrinkage at 15% shall be deducted if the consolidation is not done from the total measured quantity for payment purpose. The measurement and payment of earth work shall be paid on cum. basis of the completed work as started above.

Item No.7 :- Earthwork for embankment including breaking clods, dressing with all lead and lift and including watering rolling and consolidation of subgrade in layers at O.M.C. to required dry density including filling the depression which occur during the process using power roller 8T to 10T. (E) From Borrow area within 3.0 KM. lead.

- 1.0 The land width on which the earth work is to be done shall be cleared of all trees having a girth of 30cm and less, loose, stones, vegetation, bushes, stumps and all other

objectionable materials. Useful material shall be arranged in convenient stacks along the road boundary or as directed at places within 50 metres lead, and handed over to the department in convenient section. Unsuitable material shall be burnt or otherwise disposed off by the contractor at his own cost without causing any nuisance, inconvenience or damage to the works properly or people in the neighborhood. In all cases, the materials shall be disposed off in a neat manner.

- 2.0 After clearing the site, the alignment of the road shall be properly set out true to line, curves, slopes, grades and sections as shown on the plan or directed by the Engineer-in-Charge. The contractor shall provide all labours and materials such as lime, strings, pegs, nails, bamboos, stone, mortar concrete etc. required for setting out, establishing Bench Marks and giving profiles. The contractors shall be responsible for maintaining the B.Ms. profiles, alignments and other marks as long as they are required for the work in the opinion of the Engineer-in-Charge. If the contractor defaults in this respect, they may be restored by the department at the cost of the contractor.
- 3.0 The soil to be used for embankment shall be free from trees, stumps, roots, rubbish or any other objectionable materials. Only material considered suitable by the Engineer-in-Charge shall be used for the construction and that considered unsuitable shall be disposed off as directed by him. The embankment shall consist of earth available from road-side borrow pits on either side with lead and all lifts, and within land-width.
- 4.0 The department will extend all necessary Co-Operation in helping the contractor to get borrow area from nearby Government or Panchayat land, if available. However, the department is not responsible if no such area is made available to the contractor and in that case, the contractor will have to make his own arrangement to get borrow area for borrowing earth of the approved quantity even by making temporary arrangement with the private land owners.
- 5.0 The embankment shall be constructed in uniform layers not exceeding 250mm in loose thickness. The soil shall be spread uniformly over the entire width of the embankment unless otherwise directed by the Engineer-in-charge. The consolidation, including watering and rolling of earthwork, shall be carried out by the Contractor. The operation of laying the successive layer of earth shall have to be suitably synchronized with the consolidation work. If the soil as delivered to the road bed is too wet, it shall be dried by exposure to the sun till the moisture content is acceptable for compaction. All clods of hard lumps of earth shall be broken to have a maximum size of 15cm. When being placed in the embankment, a maximum of size 5 cm shall be allowed when being placed in the top 45cm of the embankment. The work of next layer shall be allowed only after the first layer below it has been thoroughly compacted to the density specified.

- 6.0 The earthwork measurements shall be paid on cross sectional measurements and computing the volumes of earthwork in cubic metres by average area method. The contractor shall sign day to day leveling work and also original cross section longitudinal section etc. in token of his acceptance. The working sections both longitudinal and cross of the ground shall be taken by the Engineer-in-charge before the actual work is started. The contractor or his authorized representative shall attend day to day leveling work and sign with date the field book daily, in token of his acceptance. If this is any disagreement the contractor shall inform of it in writing to the officer concerned with specific reference to the sectioned before starting further work. Once the work is started, no-cognizance of any complaint will be taken. Merely not signing of level book shall not be deemed as disagreement. The Executive Engineer shall also verify leveling work to be extent of 5% before commencement of earth work and on finalization. The contractor shall maintain the embankment by filling in cuts, rain cuts, depression due to shrinkage etc. to proper formation and grade till this item is finally measured and accepted by the Department. The measurements shall be taken on compacted earth work. No deduction for shrinkage shall be made from gross measured quantity of compacted earth work. However the contractor shall have to bear loss of quantity due to all settlements as well as other types of deformations etc. If any, that might have taken place at the time of taking the final measurements of this item.
- 7.0 The payment of this item shall be made on cubic metre basis.
-

Item No.8 :- Providing & laying dry rubble stone pucca pitching with panel (of size not more than 10 Sqmt.) of stone masonry 45cm thick wall in C.M. 1:5, without base, inverted filter and header stone but with 10 cms thick murrum layer (for Base) incl. hand packing and trimming and dressing slopes etc. (C) 23 Cms thick stone pitching with pointing in C.M.1:2

The work includes preparing slope of the earthen dam, providing sand and gravel filter layer and then dry rubble pitching with good quality of stones along without providing stone headers. The work includes all required operation of dry rubble pitching with 10 cm thick murrum layer.

The work should be carried out as per specification of general technical specification of PWD hand book.

The materials like stones, murrum shall be of approved quality and stone shall be in proper size as per drawings, designs and shall conform specification of Materials M-8 instruction of Engineer in charge or his supervisory staff.

The works should be done in line & level with good workmanship. If the work does not confirm to the plans and specifications, the work, shall be removed and rebuilt

by the contractor without extra cost. The thickness of pitching shall be 23 cm as item for work is applicable.

Cement mortar 1:2 (1-Cement:2-fine sand) shall be used for pointing work.

The measurement and rate shall be paid on square meter bases of the completed work.

Item No.9 :- Providing & fixing Guard stone of Precast C.C. M-15 I.R.C. standard & design 75 x 20 x 20 Cm. including white washing etc. complete. (a) In Earth

The boundary stone shall be of approved quality and of 75 x 20 x 20cm size and its length shall not be less than 75 cms. The top portion shall be rounded. The top 38 cm shall be chisel dressed on all sides. The size shape and dimensions of the boundary stones shall be exact and shall be neatly dressed and finished.

The contractors will have to produce a Test Certificate from the Manufacture on Company's letter head.

The boundary stone shall be fixed in position as directed by the Engineer-in-charge in earth concrete. If the boundary stone shall be fixed in concrete, the equivalent volume covered by the guard stones shall be deducted from the gross measured quantity of wearing coat. The exposed part of the boundary stones shall be given three coats of white wash. Any excavation necessary for fixing of the boundary stones shall be done by the contractor at his own cost. The measurement for payment shall be per number of boundary stone.

The rate of boundary stone includes the cost of all materials, labours, tools, fixing & white washing as directed by the Engineer-in-charge.

In case of Deep/Causeway the boundary stone shall be fixed in masonry of head wall as directed by Engineer-in-charge.

The completed work shall be paid in numbers basis. The rate includes cost of materials labours and fixing etc with all lead and lift.

Signature of Contractor

Executive Engineer
Und Irrigation Division
Jamnagar