



BID Document

For

Construction of Anicut cum causeway at Banas river near
Village Kanwarawas GP Kanwarawas PS Todaraisingh
District Tonk & Construction of Anicut cum Causeway near
Village Sentiawas at Banas river Tehsil Todaraisingh District
Tonk

NIT No.02/2026-27

COST:Rs 3682.65 Lacs

**OFFICE OF THE ADDITIONAL CHIEF ENGINEER,
WATER RESOURCES ZONE, JAIPUR (RAJASTHAN)**

INDEX

S.No.	Contents	Page No.
	Notice Inviting Bids	
Section-1	Instructions to Bidders	
1.1	General	
1.2	Contents of Bidding Document	
1.3	Preparation of Bids	
1.4	Submission and Opening of Bids	
1.5	Evaluation and Comparison of Bids	
1.6	Award of Contract	
1.7	Grievances handling procedure during Procurement Process (Appeals)	
1.8	Appendix A : Grievance Handling Procedure during Procurement Process (Appeals)	
Section-2	Bid Data Sheet	
2.1	Introduction	
2.2	Bidding Documents	
2.3	Preparation of Bids	
2.4	Submission and Opening of Bids	
2.5	Evaluation and Comparison of Bids	
2.6	Award of Contract	
2.7	Redressal of Grievance (Appeals)	
2.8	Government Order of Bid Declaration	
Section-3	Evaluation and Qualification Criteria	
Section-4	Bidding Forms	
4.1	Technical Bid Check List	
4.2	Letter of Bid	
4.2.1	Bid Security (Bank Guarantee Unconditional)	
4.2.2	Bid Securing Declaration	
4.3	Bill of Quantity	
4.4.1	Form PER-1	
4.4.2	Equipment	
4.5.1	Form ELI-1	
4.5.2	Form ELI-2	
4.5.3	Form LIT-1	
4.5.4	Form FIN-1	

4.5.5	Form FIN-2	
4.5.6	Form FIN-3	
4.5.7	Form FIN-4	
4.5.8	Calculation of Available Bid Capacity	
4.5.9	Form EXP-1	
4.5.10	Form EXP-2	
4.6	Sample format for evidence of access to or availability of credit facilities	
4.7	Declaration by the Bidder under Sections 7 and 11 of the Act	
Section-5	Procuring Entity's Requirements (Scope of work)	
5.1	Scope of work	
5.2	Technical Specifications	
Section-6 A	General Conditions of Contract	
Section-6 B	Special Conditions of the Contract Part-II	
Section-7	Contract Forms	
Section-8	G Schedule	

Section I: Instructions to Bidders

Section-1: Instructions to Bidders

Important Instruction:- The Law relating to procurement “The Rajasthan Transparency in Public Procurement Act, 2012” [hereinafter called the Act] and the “Rajasthan Public Procurement Rules, 2013” [hereinafter called the Rules] under the said Act have come into force which are available on the website of State Public Procurement Portal <http://sppp.rajasthan.gov.in> Therefore, the Bidders are advised to acquaint themselves with the provisions of the Act and the Rules before participating in the Bidding process. If there is any discrepancy between the provisions of the Act and the Rules and this Bidding Document, the provisions of the Act and the Rules shall prevail.

1. General			
1.1	Scope of Bid	1.1.1	In support of the Invitation to Bid indicated in the Bid Data Sheet (BDS), the Procuring Entity as indicated in the BDS, issues this Bidding Document for the procurement of works as named in the BDS and as specified in Section V, Procuring Entity's Requirements.
1.2	Interpretation	1.2.1	Throughout this Bidding Document: <ul style="list-style-type: none"> i. the term “in writing” means communicated in written form through letter, fax, e-mail etc. with proof of ii. if the context so requires, singular means plural and vice versa; and iii. “Day” means a calendar day
1.3	Code of Integrity	1.3.1	Any person participating in the procurement process shall: <ul style="list-style-type: none"> (i) not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process; (ii) not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation; (iii) not indulge in any collusion, bid rigging or anticompetitive behavior to impair the transparency, fairness and progress of the procurement process; (iv) not misuse any information shared between the Procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process; (v) not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process; (vi) not obstruct any investigation or audit of a procurement process; (vii) disclose conflict of interest, if any; and (viii) disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other Procuring Entity.
		1.3.2	Conflict of Interest: A conflict of interest is considered to be a situation in which a party has interests that could improperly

			<p>influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.</p> <p>A Bidder may be considered to be in conflict of interest with one or more parties in this bidding process if, including but not limited to:</p> <ul style="list-style-type: none"> (i) have controlling partners/ shareholders common or received or (ii) receive or have received any direct or in direct subsidy from any of them, or (iii) have the same legal representative for purposes of this Bid or (iv) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Entity regarding this bidding process; or (v) the Bidder participates in more than one Bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or (vi) the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Works that are the subject of the Bid; or (vii) the Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as Engineer-in-charge/ consultant for the Contract.
		1.3.3	The Bidder shall have to give a declaration regarding compliance of the Code of Integrity prescribed in the Act, the Rules and stated above in this Clause along with its Bid, in the format specified in Section IV, Bidding Forms.
		1.3.4	Breach of Code of Integrity by the Bidder: - Without prejudice to the provisions of Chapter IV of the Rajasthan Transparency in Public Procurement Act, in case of any breach of the Code of Integrity by a Bidder or prospective Bidder, as the case may be, the Procuring Entity may take appropriate action in accordance with the provisions of sub-section (3) of section 11 and section 46 of the Act.
1.4	Eligible Bidders	1.4.1	<p><u>Joint Venture: Not Allowed</u></p> <p><i>*(A Bidder may be a natural person, private Entity, Government-owned Entity or, where permitted in the Bidding documents, any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture [JV], Consortium or Association.</i></p>

			<i>In the case of a Joint Venture, Consortium or Association: - all parties to the Joint Venture, Consortium or Association shall sign the Bid and they shall be jointly and severally liable; and a Joint Venture, Consortium or Association shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the Joint Venture, Consortium or Association during the Bidding process. In the event the Bid of Joint Venture, Consortium or Association is accepted, either they shall form a registered Joint Venture, Consortium or Association as company/ firm or otherwise all the parties to Joint Venture, Consortium or Association shall sign the Agreement.)</i>
		1.4.2	A Bidder, shall have the nationality of India. A Bidder shall be deemed to have nationality of a country if the Bidder is a citizen or constituted or incorporated, and operates in conformity with the provisions of the Laws of that country. This criterion shall also apply to the determination of the nationality of proposed Sub - Contractors or suppliers for any part of the Contract including related services
		1.4.3	A Bidder should not have a conflict of interest in the procurement in question as stated in the Rule 81 and this Bidding document.
		1.4.4	A Bidder debarred under section 46 of the Act shall not be eligible to participate in any procurement process undertaken by any Procuring Entity, if debarred by the State Government; and a Procuring Entity, if debarred by such Procuring Entity
		1.4.5	The Bidder must be an enlisted Contractor in appropriate class with the Department/ Organization. He shall furnish necessary proof for the same.
		1.4.6	<p>Any change in the constitution of the firm etc., shall be notified forth with by the Bidder in writing to the Procuring Entity and such change shall not relieve any former partner/ member of the firm, etc from any liability under the Contract.</p> <p>No new partner/partners shall be accepted in the firm by the Bidder in respect of the contract unless he/they agree to abide by all its terms, conditions and deposit with the Procuring Entity a written agreement to this effect. The Bidder's receipt for acknowledgement or that of any partners subsequently accepted as above shall bind all of them and will be sufficient discharge for any of the purpose of the Contract.</p> <p>iiiThe status of the lead partner/ representative of the Joint Venture, Consortium or Association as a major stake holder shall not change without the consent of the Procuring Entity. New major stake holder must agree to abide by all terms and conditions of the Contract.</p>
		1.4.7	Bidders shall provide such evidence of their continued eligibility satisfactory to the Procuring Entity, should the Procuring Entity request.

		1.4.8	In case a prequalification or empanelment or registration process has been conducted prior to the bidding process, this bidding shall be open only to the pre-qualified, empaneled or registered Bidders.
		1.4.9	Each Bidder shall submit only one Bid except in case of alternative bids, if permitted.
		1.4.10	No Bidder who is not registered under the GST Act prevalent in the State of Rajasthan or any other state of India as per GST rules shall bid. The GST Registration Number should be quoted and a GST Registration certificate from the Concerned Taxes Officer of the Circle concerned shall be submitted without which the Bid is liable to be rejected. He is also required to provide proof of Permanent Account Number (PAN) given by Income Tax Department.
2. Contents of Bidding Document			
2.1	Sections of the Bidding Document	2.1.1	<p>The Bidding Document consists of Parts I, II, and III, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB Clause 2.3 [Amendment of Bidding Document].</p> <p>Part I: Bidding Procedures Section I. Instructions to Bidders (ITB) Section II. Bid Data Sheet (BDS) Section III. Evaluation and Qualification Criteria Section IV. Bidding Forms</p> <p>Part II: Requirements Section V. Procuring Entity's Requirements.</p> <p>Part III: Contract Section VIA -General Conditions of Contract [GCC] Section VI B. Special Conditions of Contract [SCC] Section VII. Contract Forms Section VIII. G Schedule</p>
		2.1.2	The Invitation for Bids (NIB) issued by the Procuring Entity is also part of the Bidding Document.
		2.1.3	The Bidding Document shall be uploaded on the e-procurement portal, http://eproc.rajasthan.gov.in along with the Notice Inviting Bids. The complete Bidding Document shall also be placed on the State Public Procurement Portal, http://sppp.rajasthan.gov.in The prospective Bidders may download the bidding document from these portals. The price of the Bidding Document and processing fee of e-bidding shall have to be paid to the Procuring Entity in the amount and manner as specified in Bid Data Sheet and e-procurement portal.
		2.1.4	The Procuring Entity is not responsible for the completeness of the Bidding Document and its addenda, if they were not downloaded correctly from the e-procurement portal or the State Public Procurement Portal.

		2.1.5	The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Document. Failure to furnish all information or authentic documentation required by the Bidding Document may result in the rejection of the Bid.
2.2	Clarification of Bidding Document and Pre-Bid Conference	2.2.1	The Bidder shall be deemed to have carefully examined the conditions, specifications, size, make and drawings, etc. of the Works and Related Services to be provided. If any Bidder has any doubts as to the meaning of any portion of the conditions or of the specifications, drawings etc., it shall, before submitting the Bid, refer the same to the Procuring Entity and get clarifications. A Bidder requiring any clarification of the Bidding Document shall contact the Procuring Entity in writing or e-mail at the Procuring Entity's address indicated in the BDS. The Procuring Entity will respond in writing or e-mail to any request for clarification, within seven days provided that such request is received no later than twenty-one (21) days prior to the deadline for submission of Bids as specified in ITB Sub-Clause 4.2.1[Deadline for Submission of Bids]. The clarification issued, including a description of the inquiry but without identifying its source shall also be placed on the State Public Procurement Portal and should the Procuring Entity deem it necessary to amend the Bidding Document as a result of a clarification, it shall do so following the procedure under ITB Clause 2.3 [Amendment of Bidding Document] through an addendum which shall form part of the Bidding Document.
		2.2.2	The Bidder or his authorized representative is invited to attend the Pre- Bid Conference, if provided for in the BDS. The purpose of the Pre- Bid Conference will be to clarify issues and to answer questions on any matter related to this procurement that may be raised at that stage. If required, a conducted site visit may be arranged by the Procuring Entity.
		2.2.3	The Bidder is requested, to submit questions in writing, to reach the Procuring Entity not later than 7 Days before the date of Pre-Bid Conference
		2.2.4	Minutes of the Pre-Bid Conference, including the text of the questions raised, and the responses given, without identifying the source, will be transmitted promptly to all Bidders who attended the Pre-Bid Conference and shall also be placed on the State Public Procurement Portal and the e-procurement portal. Any modification to the Bidding Document that may become necessary as a result of the Pre-Bid Conference shall be made by the Procuring Entity exclusively through the issue of an addendum (part of Bidding document) and not through the minutes of the Pre-Bid Conference.
		2.2.5	At any time prior to the deadline for submission of the Bids, the Procuring Entity, Suo motto, may also amend the Bidding Document, if required, by issuing an addendum which will form

			part of the Bidding Document.
		2.2.6	Non-attendance at the Pre-Bid Conference will not be a cause for disqualification of a Bidder.
2.3	Amendment of Bidding Document	2.3.1	Any addendum issued shall be part of the Bidding Document and shall be uploaded on the State Public Procurement Portal and the e-procurement portal.
		2.3.2	To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Entity may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB Sub-Clause 4.2 [Deadline for Submission of Bids], under due publication on the State Public Procurement Portal and the e-procurement portal and newspapers.
3.0	Preparation of Bids		
3.1	Cost of Bidding	3.1.1	The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Procuring Entity shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
		3.1.2	<p>The Bidder shall furnish the scanned attested copies of following documents with its Bid: -</p> <ul style="list-style-type: none"> i. Partnership Deed and valid registration certificate issued by the Registrar of Firms in case of Partnership Firms. Power of Attorney in favor of the partner signing the Bid, authorizing him to represent all partners of the firm. ii. GST registration and clearance certificate from the concerned Commercial Taxes Officer and Permanent Account Number (PAN) given by the Income Tax Department. iii. Address of residence and office, telephone numbers e-mail address in case of sole Proprietorship. iv. Certificate of Registration and Memorandum of Association issued by Registrar of Companies in case of a registered company. In case of any other statutory or registered body, certificate of incorporation or registration issued by concerned authorities. Power of attorney in favor of the person signing the Bid. v. Where permitted to bid as Joint Venture, Consortium or Association, letter of formal intent to enter in to an agreement or an existing agreement in the form of a Joint Venture, Consortium or Association. vi. Copy of Registration with the Department. vii. Scanned copy of payment of Bid fee, Bid security and RISL processing fee.
3.2	Language of Bid	3.2.1	The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Procuring Entity, shall be written in English/ Hindi or a language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied

			by an self-attested accurate translation of the relevant passages duly accepted by the Bidder in English/ Hindi or the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.
3.3	Documents Comprising the Bid	3.3.1	The Bid shall comprise of two covers, one containing the Technical Bid/ Proposal and the other the Financial or Price Bid/ Proposal. One more cover containing scanned copies of proof of payment in form specified in Bid Data Sheet, of the price of Bidding Document, processing fee and Bid Security/ Bid Securing Declaration shall be enclosed separately.
		3.3.2	The technical bid/proposal shall content following: <ul style="list-style-type: none"> i. Technical Bid/ Proposal Submission Sheet and Technical Bid containing the filled-up Bidding Forms and Declarations related to Technical Bid, possession of required qualifications and Code of Integrity given in Section IV [Bidding Forms]; ii. proof of payment of price of Bidding Document, processing fee and Bid Security in accordance with ITB Clause 3.10; iii. written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 3.11; iv. documentary evidence in accordance with ITB Clause 3.7 establishing the Bidder's eligibility to bid; v. documentary evidence in accordance with ITB Clause 3.8 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; vi. Drawings/ designs in support of the Works to be executed; vii. the Notice Inviting Bids; viii. any other document required in the BDS; and ix. Others considered necessary to strengthen the Bid submitted.
		3.3.3	The Financial Bid/ Price Proposal shall contain the following: Financial Bid/ Price Proposal Submission Sheet and the applicable Price Schedules, in accordance with ITB Clauses 3.4, 3.5; Any other document required in the BDS.
3.4	Bid Submission Sheets and Price Schedules	3.4.1	The Bidder shall submit the Technical Bid and Financial Bid using the Bid Submission Sheets provided in Section IV [Bidding Forms]. These forms must be completed without any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
		3.4.2	The Bidder shall submit as part of the Financial Bid, the Price Schedules for Works, using the forms provided in Section IV [Bidding Forms].
3.5	Bid Prices	3.5.1	(i) In case of Item Rate Contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Procuring Entity but will

			<p>have to be executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.</p> <p>(ii) In case of Percentage Rate Contracts, combined single percentage above or below the total amount of the Bill of Quantities must be quoted by the Bidder for all items.</p> <p>(iii) In case of Lump Sum Contracts, only Total Price which the Bidder wants to charge for the entire Works with all its contingencies in accordance with drawings and specifications shall be quoted by the Bidder. A Schedule of Rates shall be specified in the Bid Data Sheet in order to regulate the amount to be added to or deducted from the fixed sum on account of additions and alterations not covered by the Contract. Payments shall be linked to various stages of completion of the Works specified in Activity Schedule given in Bid Data Sheet.</p>
		3.5.2	Prices quoted by the Bidder shall be fixed during the Bidder's Performance of the Contract and not subject to variation on any account, unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected, pursuant to ITB Clause 5.7 [Responsiveness of Bids]. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.
		3.5.3	All duties, taxes and other levies payable by the Bidder under the contract, or for any other cause, shall be included in the rates and prices, and the total Bid Price shall be submitted by the Bidder.
3.6	Currencies of Bid.	3.6.1	The unit rates and the prices shall be quoted by the Bidder entirely in Indian Rupees unless otherwise specified in BDS. All payments shall be made in Indian Rupees only, unless otherwise specified in the BDS.
3.7	Documents Establishing the Eligibility of the Bidder	3.7.1	<p>To establish their eligibility in accordance with ITB Clause 1.4 [Eligible Bidders], Bidders shall:</p> <p>complete the eligibility declarations in the Bid Submission Sheet and Declaration Form included in Section IV [Bidding Forms];</p> <p>if the Bidder is an existing or intended Joint Venture [JV], Consortium or Association in accordance with ITB Sub-Clause 1.4.1 [Eligible Bidders], it shall submit a copy of the Agreement, or a letter of intent to enter into such Agreement. The respective document shall be signed by all legally authorized signatories of all the parties to the existing or intended JV, Consortium or Association as appropriate; and the existing or intended JV shall authorize an individual/ partner in one of the firms as lead partner of the JV to act and commit all the partners of JV for the Bid.</p>
3.8	Documents Establishing	3.8.1	To establish its qualifications to perform the Contract, the Bidder shall submit as part of its Technical Proposal the documentary

	the Qualifications of the Bidder		evidence indicated for each qualification criteria specified in Section III, [Evaluation and Qualification Criteria].
3.9	Period of Validity of Bids	3.9.1	Bids shall remain valid for 120 days or the period specified in the BDS, after the Bid submission deadline date. A Bid valid for a shorter period shall be rejected by the Procuring Entity as non-responsive.
		3.9.2	In exceptional circumstances, prior to the expiration of the Bid validity period, the Procuring Entity may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. The Bid Security or a Bid Securing Declaration in accordance with ITB Clause 3.10 [Bid Security] shall also be got extended for thirty days beyond the dead line of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security or a Bid Securing Declaration. A Bidder granting the request shall not be permitted to modify its bid
3.10	Bid Security	3.10.1	Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, a Bid Security for the amount specified in the BDS.
		3.10.2	Bid Security shall be 2% of the value of the Works indicated in the NIB. For bidders registered with the Procuring Entity, the bid security shall be 0.5% of the value of works indicated in the NIB. The bid security shall be in Indian Rupees, if not otherwise specified in the BDS.
		3.10.3	The Bid Security may be given in the form of a banker's Cheque or demand draft or bank guarantee or electronic bank guarantee (e-BG) of a Scheduled Bank in India in specified format, in favor of the Executive Engineer Water Resources Div. Tonk, or deposited through eGRAS/ net banking, if permitted.
		3.10.4	In lieu of Bid Security, a Bid Securing Declaration shall be taken from Government Departments and State Government Public Sector Enterprises, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the State Government, Public Sector Enterprises of Central Government. For the Bid Securing Declaration, the Bidder shall use the form included in Section IV [Bidding Forms]. Bid Securing Declaration is not accepted.
		3.10.5	Scanned copy of Bid Security instrument or a Bid Securing Declaration shall necessarily accompany the sealed Bid. Any Bid not accompanied by Bid Security or Bid Securing Declaration, if not exempted, shall be liable to be rejected.
		3.10.6	Bid Security of a Bidder lying with the Procuring Entity in respect of other Bids awaiting decision shall not be adjusted towards Bid Security for this Bid. The Bid Security originally deposited may, however be taken into consideration in case Bids are re-invited.

		3.10.7	The issuer of the Bid Security and the confirmer, if any, of the Bid Security, as well as the form and terms of the Bid Security, must be acceptable to the Procuring Entity.
		3.10.8	Prior to submitting its Bid, a Bidder may request the Procuring Entity to confirm the acceptability of a proposed issuer of a Bid Security or of a proposed confirmer, if different than as specified in ITB Clause 3.10.3. The Procuring Entity shall respond promptly to such a request.
		3.10.9	The bank guarantee presented as Bid Security shall be got confirmed from the concerned issuing bank. The confirmation of the acceptability of a proposed issuer or of any proposed confirmer does not preclude the Procuring Entity from rejecting the Bid Security on the ground that the issuer or the confirmer, as the case may be, has become insolvent or is under liquidation or has otherwise ceased to be creditworthy.
		3.10.10	The Bid Security of unsuccessful Bidders shall be refunded soon after final acceptance of successful Bid and signing of Contract Agreement and submitting Performance Security by successful Bidder pursuant to ITB Clause 6.4 [Performance Security].
		3.10.11	<p>The Bid Security taken from a Bidder shall be forfeited in the following cases, namely:</p> <ul style="list-style-type: none"> (i) when the Bidder withdraws or modifies its Bid after opening of Bids; or (ii) when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] after issue of letter of acceptance/ placement of Work order within the specified time period; or (iii) when the Bidder fails to commence the Works as per Work Order within the time specified; or (iv) when the Bidder does not deposit the Performance Security in accordance with ITB Clause 6.4 [Performance Security]; in the prescribed time limit after the work order is placed; (v) if the Bidder breaches any provision of the Code of Integrity prescribed for Bidders in the Act and Chapter VI of the Rules or as specified in ITB Clause 1.3 [Code of Integrity]; or (vi) if the Bidder does not accept the correction of its Bid Price pursuant to ITB Sub-Clause 5.5 [Correction of Arithmetical Errors].
		3.10.12	In case of the successful bidder, the amount of Bid Security may be adjusted in arriving at the amount of the Performance Security, or refunded if the successful bidder furnishes the full amount of Performance Security. No interest will be paid by the Procuring Entity on the amount of Bid Security.
		3.10.13	<p>The Procuring Entity shall promptly refund the Bid Security of the Bidders at the earliest of any of the following events, namely:</p> <ul style="list-style-type: none"> (i) the expiry of validity of Bid Security;

			<p>(ii) the execution of agreement for procurement and Performance Security is furnished by the successful bidder;</p> <p>(iii) the cancellation of the procurement process; or</p> <p>(iv) the withdrawal of Bid prior to the deadline for presenting Bids, unless the Bidding Document stipulates that no such withdrawal is permitted.</p>
		3.10.14	The Bid Security of a Joint Venture, Consortium or Association must be in the name of the Joint Venture, Consortium or Association that submits the Bid. If the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, the members of the proposed consortium or JV shall enter in to an Agreement that they shall form a legally constituted JV after the issue of Letter of Acceptance/ Letter of Intent to them and shall also declare a partner as the lead partner in whose name the Bid Security may be submitted. NOT Allowed
3.11	Format and Signing of Bid	3.11.1	All pages of the Technical and Financial Bid shall be digitally signed by the Bidder or authorized signatory on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid. In case of a Joint Venture, Consortium or Association, if the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, all the members of the proposed Joint Venture, Consortium or Association shall digitally sign the Bid.
4. Submission and Opening of Bids			
4.1	Sealing and Marking of Bids	4.1.1	Bidders shall submit their Bids to the Procuring Entity only electronically on the e-procurement portal, http://eproc.rajasthan.gov.in In submission of their Bids, the Bidders should follow the step-by-step instructions given on the e-procurement portal.
		4.1.2	The Bidder shall enclose the Technical Bid and the Financial Bid in separate covers. The scanned copies of proof of payment of price of Bidding Document, processing fee and Bid Security shall be enclosed in third cover. The price of Bidding Document and Bid Security shall be paid in the name of the Procuring Entity while the processing fee shall be paid in the name of M.D., R.I.S.L.
4.2	Deadline for Submission of Bids	4.2.1	Bids shall be submitted electronically only up to the time and date specified in the Notice Inviting Bids and BDS or an extension issued thereof.
4.3	Withdrawal, Substitution and Modification of Bids	4.3.1	A Bidder may withdraw, substitute or modify its Bid after it has been submitted by submitting electronically on the e-procurement portal a written Withdrawal/ Substitutions/ Modifications etc. notice on the e-procurement portal, duly digitally signed by the Bidder or his authorized representative, and shall include a copy of the authorization in accordance with ITB Sub-Clause 3.11.1 [Format and Signing of Bid]. The corresponding Withdrawal, Substitution or Modification of the Bid must accompany the respective written notice. All notices must be received by the

			Procuring Entity on the e-procurement portal prior to the deadline specified for submission of Bids in accordance with ITB Sub-Clause 4.2. [Deadline for Submission of Bids].
		4.3.2	No Bid shall be withdrawn, substituted or modified in the interval between the deadline for submission of the Bids and the expiration of the period of Bid validity specified in ITB Clause 3.9.[Period of Validity of Bids] or any extension thereof.
4.4	Bid Opening	4.4.1	The electronic Technical Bids shall be opened by the Bids opening committee constituted by the Procuring Entity at the time, date and place specified in the Bid Data Sheet in the presence of the Bidders or their authorized representatives, who choose to be present.
		4.4.2	The Bids opening committee may co-opt experienced persons in the committee to conduct the process of Bid opening.
		4.4.3	The Bidders may choose to witness the electronic Bid opening procedure online.
		4.4.4	The Financial Bids shall be kept unopened until the time of opening of the Financial Bids. The date, time, and location of electronic opening of the Financial Bids shall be intimated to the bidders who are found qualified by the Procuring Entity in evaluation of their Technical Bids.
		4.4.5	The Bids opening committee shall prepare a list of the Bidders or their representatives attending the opening of Bids and obtain their signatures on the same. The list shall also contain the representative's name and telephone number and corresponding Bidders' names and addresses. The authority letters brought by the representatives shall be attached to the list. The list shall be signed by all the members of Bids opening committee with date and time of opening of the Bids.
		4.4.6	<p>First, covers marked as "WITHDRAWAL Technical Bid" shall be opened, read out, and recorded and the covers containing the corresponding Technical Bids and Financial Bids shall not be opened. No Bid shall be permitted to be withdrawn unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is readout and recorded at Bid opening. If the withdrawal notice is not accompanied by the valid authorization, the withdrawal shall not be permitted and the corresponding Technical Bid shall be opened.</p> <p>Next, covers marked as "SUBSTITUTION Technical Bid" shall be opened, read out, recorded. The covers containing the Substitution Technical Bids and/ or Substitution Financial Bids shall be exchanged for the corresponding covers being substituted. Only the Substitution Technical Bids shall be opened, read out, and recorded. Substitution Financial Bids will remain unopened in accordance with ITB Sub-Clause</p> <p>No Bid shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at Bid opening.</p>

			Covers marked as “MODIFICATION Technical Bid” shall be opened thereafter, read out and recorded with the corresponding Technical Bids. No Technical Bid and/ or Financial Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, readout, and recorded at the opening. Financial Bids, both Original as well as Modification, will remain unopened in accordance with ITB Sub-Clause 4.4.4.
		4.4.7	<p>All other covers containing the Technical Bids shall be opened one at a time and the following read out and recorded-</p> <ul style="list-style-type: none"> i. the name of the Bidder; ii. whether there is a modification or substitution; iii. whether proof of payment of Bid Security or Bid Securing Declaration, if required, payment of price of the Bidding Document and processing fee have been enclosed; iv. any other details as the Bids opening committee may consider appropriate. <p>After all the Bids have been opened, their hard copies shall be printed and shall be initialed and dated on the first page and other important papers of each Bid by the members of the Bids opening committee.</p>
		4.4.8	Only Technical Bids shall be read out and recorded at the bid opening and shall be considered for evaluation. No Bid shall be rejected at the time of opening of Technical Bids except Alternative Bids (if not permitted) and Bids not accompanied with the proof of payment of the required price of Bidding Document, processing fee and Bid Security.
		4.4.9	The Bids opening committee shall prepare a record of opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, modification, or alternative offer (if they were permitted), any conditions put by Bidder and the presence or absence of the price of Bidding Document, processing fee and Bid Security. The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
		4.4.10	After completion of the evaluation of the Technical Bids, the Procuring Entity shall invite Bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified, to attend the electronic opening of the Financial Bids. The date, time, and location of the opening of Financial Bids will be intimated in writing by the Procuring Entity. Bidders shall be given reasonable notice of the opening of Financial Bids.
		4.4.11	The Procuring Entity shall notify Bidders in writing whose

			Technical Bids have been rejected on the grounds of being substantially non-responsive and not qualified in accordance with the requirements of the Bidding Document.
		4.4.12	The Bids opening committee shall conduct the electronic opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids and have qualified in evaluation of Technical Bids, in the presence of Bidders or their representatives who choose to be present, at the address, date and time specified by the Procuring Entity.
		4.4.13	<p>All covers containing the Financial Bids, including Modified and Substituted Financial Bids, if any, shall be opened one at a time and the following read out and recorded-</p> <ul style="list-style-type: none"> i. the name of the Bidder; ii. whether there is a modification or substitution; iii. the Bid Prices; iv. any other details as the Bids opening committee may consider appropriate. <p>After all the Bids have been opened, their hard copies shall be printed and shall be initialed and dated on the first page of each Bid by the members of the Bids opening committee. All the pages of the Price Schedule and letters, Bill of Quantities attached shall be initialed and dated by the members of the committee. Key information such as prices, completion period etc. shall be encircled and unfilled spaces in the Bids shall be marked and signed with date by the members of the Bids opening committee.</p>
		4.4.14	The Bids opening committee shall prepare a record of opening of Financial Bids that shall include as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification, the Bid Price, any conditions, any discounts and alternative offers (if they were permitted). The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
5. Evaluation and Comparison of Bids			
5.1	Confidentiality	5.1.1	Information relating to the examination, evaluation, comparison, and post-qualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
		5.1.2	Any attempt by a Bidder to influence the Procuring Entity in its examination of qualification, evaluation and comparison of the Bids or Contract award decisions may result in the rejection of its Bid, in addition to the legal action which may be taken by the Procuring Entity under the Act and the Rules.
		5.1.3	Notwithstanding ITB Sub-Clause 5.1.2, from the time of opening the Bid to the time of Contract award, if any Bidder wishes to contact the Procuring Entity on any matter related to the Bidding

			process, it shall do so in writing.
		5.1.4	In addition to the restrictions specified in section 49 of the Act, the Procuring Entity, while procuring a subject matter of such nature which requires the procuring Entity to maintain confidentiality, may impose condition for protecting confidentiality of such information.
5.2	Clarification of Technical or Financial Bids	5.2.1	To assist in the examination, evaluation and comparison of the Technical or Financial Bids, the Bid evaluation committee may, at its discretion, ask any Bidder for a clarification regarding its Bid. The committee's request for clarification and the response of the Bidder shall be in writing.
		5.2.2	Any clarification submitted by a Bidder with regard to its Bid that is not in response to a request by the Bid evaluation committee shall not be considered.
		5.2.3	No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetical errors discovered by the Bid evaluation committee in the evaluation of the financial Bids.
		5.2.4	No substantive change to qualification information or to a submission, including changes aimed at making an unqualified Bidder, qualified or an unresponsive submission, responsive shall be sought, offered or permitted.
5.3	Deviations, Reservations and Omissions in Technical or Financial Bids	5.3.1	During the evaluation of Technical or Financial Bids, the following definitions apply: <ul style="list-style-type: none"> i. Deviation" is a departure from the requirements specified in the Bidding Document; ii. Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and iii. Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
5.4	Nonmaterial Non conformities in Technical or Financial Bids	5.4.1	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may waive any nonconformities (with recorded reasons) in the Bid that do not constitute a material deviation, reservation or omission.
		5.4.2	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may request the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Request for information or documentation on such nonconformities shall not be related to any aspect of the Financial Proposal of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
		5.4.3	Provided that a Technical or Financial Bid is substantially

			responsive, the Procuring Entity will rectify nonmaterial nonconformities or omissions (with recorded reasons).
5.5	Correction of Arithmetical Errors in Financial Bid	5.5.1	<p>Provided that a Financial Bid is substantially responsive, the Bid evaluation committee shall correct arithmetical errors during evaluation of Financial Bid on the following basis:</p> <ul style="list-style-type: none"> i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and iii. if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.
		5.5.2	If the Bidder that submitted the lowest evaluated Bid does not accept the correction of arithmetical errors, its Bid shall be disqualified and its Bid Security shall be forfeited or its Bid Securing Declaration shall be executed.
5.6	Preliminary Examination of Technical or Financial Bids	5.6.1	The Procuring Entity shall examine the Technical or Financial Bids to confirm that all documents and technical documentation requested in ITB Sub-Clause 3.3 [Documents Comprising the Bid] have been provided, and to determine the completeness of each document submitted.
		5.6.2	<p>The Procuring Entity shall confirm, following the opening of the Technical or Financial Bids, that the following documents and information have been provided:</p> <ul style="list-style-type: none"> i. Bid is signed, as per the requirements listed in the Bidding Document; ii. Bid has been submitted as per instructions provided in the Bidding Document and e-procurement portal; iii. Bid is valid for the period, specified in the Bidding Document; iv. Bid is accompanied by Bid Security or Bid Securing Declaration; v. Bid is unconditional and the Bidder has agreed to give the required Performance Security; vi. Price Schedules in the Financial Bid are in accordance with ITB Clause 3.4 [Bid Submission Sheets and Price Schedules]; vii. written confirmation of authorization to commit the Bidder; viii. Declaration by the Bidder in compliance of Section 7 and 11 of the Act; and ix. other conditions, as specified in the Bidding Document are fulfilled.

5.7	Responsiveness of Technical or Financial Bids	5.7.1	The Procuring Entity's determination of the responsiveness of a Technical or Financial Bid is to be based on the contents of the Bid itself, as defined in ITB Sub-Clause 3.3 [Documents Comprising the Bid].
		5.7.2	A substantially responsive Technical or Financial Bid is one that meets without material deviation, reservation, or omission to all the terms, conditions, and specifications of the Bidding Document. A material deviation, reservation, or omission is one that: (a) if accepted, would- I. affect in any substantial way the scope, quality, or performance of the Works; or II. limits in any substantial way, inconsistent with the Bidding Document, the Procuring Entity's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
		5.7.3	The Procuring Entity shall examine the technical aspects of the Bid in particular, to confirm that requirements of Section V [Procuring Entity's Requirements] have been met without any material deviation, reservation, or omission.
		5.7.4	If a Technical or Financial Bid is not substantially responsive to the Bidding Document, it shall be rejected by the Procuring Entity and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation, or omission.
5.8	Examination of Terms and Conditions of the Technical or Financial Bids	5.8.1	The Procuring Entity shall examine the Bids to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.
		5.8.2	The Procuring Entity shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 3.3 [Documents Comprising the Bid] and to confirm that all requirements specified in Section V [Procuring Entity's Requirements] of the Bidding Document and all amendments or changes made by the Procuring Entity in accordance with ITB Clause 2.3 [Amendment of Bidding Document] have been met without any material deviation or reservation.
5.9	Evaluation of Qualification of Bidders in Technical Bids	5.9.1	The determination of qualification of a Bidder in evaluation of Technical Bids shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 3.8 [Documents Establishing the Entity shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 3.3 [Documents Comprising the Bid] and to confirm that all requirements specified in Section V

			[Procuring Entity's Requirements] of the Bidding Document and all amendments or changes made by the Procuring Entity in accordance with ITB Clause 2.3 [Amendment of Bidding Document] have been met without any material deviation or reservation Qualifications of the Bidder] and in accordance with the qualification criteria indicated in Section III [Evaluation and Qualification Criteria]. Factors not included in Section III, shall not be used in the evaluation of the Bidder's qualification.
5.10	Evaluation of Financial Bids	5.10.1	The Procuring Entity shall evaluate each Financial Bid, the corresponding Technical Bid of which has been determined to be substantially responsive.
		5.10.2	To evaluate a Financial Bid, the Procuring Entity shall only use all the criteria and methodologies defined in this Clause and in Section III [Evaluation and Qualification Criteria]. No other criteria or methodology shall be permitted.
		5.10.3	To evaluate a Financial Bid, the Procuring Entity shall consider the following: i. the Bid Price quoted in the Financial Bid; ii. price adjustment for correction of arithmetical errors in accordance with ITB Clause 5.5 [Correction of Arithmetical Errors];
5.11	Comparison of Bids	5.11.1	The Procuring Entity shall compare all substantially responsive Financial Bids to determine the lowest-evaluated Financial Bid in accordance with ITB Sub-Clause 5.10 [Evaluation of Financial Bids].
5.12	Negotiations	5.12.1	To the extent possible, no negotiations shall be conducted after the pre-Bid stage. All clarifications needed to be sought shall be sought in the pre-Bid stage itself.
		5.12.2	Negotiations may, however, be undertaken only with the lowest Bidder under the following circumstances- (i) when ring prices have been quoted by the Bidders for the subject matter of procurement; Or (ii) when the rates quoted vary considerably and considered much higher than the prevailing market rates.
		5.12.3	The Bid evaluation committee shall have full powers to undertake negotiations. Detailed reasons and results of negotiations shall be recorded in the proceedings.
		5.12.4	The lowest Bidder shall be informed about negotiations in writing either through messenger or by registered letter and e-mail (if available). A minimum time of seven days shall be given for calling negotiations. In case of urgency, the Bid evaluation committee, after recording reasons, may reduce the time, provided the lowest Bidder has received the intimation and consented to holding of negotiations.
		5.12.5	Negotiations shall not make the original offer made by the Bidder inoperative. The Bid evaluation committee shall have option to consider the original offer in case the Bidder decides to increase

			rates originally quoted or imposes any new terms or conditions.
		5.12.6	In case of non-satisfactory achievement of rates from lowest Bidder, the Bid evaluation committee may choose to make a written counter offer to the lowest Bidder and if this is not accepted by him, the committee may decide to reject and re-invite Bids or to make the same counter-offer first to the second lowest Bidder, then to the third lowest Bidder and so on in the order of their initial standing in the bid evaluation and work order be awarded to the Bidder who accepts the counter offer.
		5.12.7	In case the rates even after the negotiations are considered very high, fresh Bids shall be invited.
5.1 5	Procuring Entity's Right to Accept Any Bid, and to Reject Any or All Bids	5.13.1	The Procuring Entity reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract award without assigning any reasons thereof and without there by incurring any liability to the Bidders.
6. Award of Contract			
6.1	Procuring Entity's Right to Vary Quantities	6.1.1	If the Procuring Entity does not procure any subject matter of procurement or procures less than the quantity specified in the Bidding Document due to change in circumstances, the Bidder shall not be entitled for any claim or compensation except otherwise provided in the Bidding Document.
		6.1.2	Order for additional quantity of an item of the Works up to 50 percent of the original quantity of that item in the Bill of Quantities and for extra items not provided for in the Bill of Quantities may be given but the amount of the additional quantities and extra items, taken together, shall not exceed 50 percent of the Contract Price.
6.2	Acceptance of the successful Bid and award of contract	6.2.1	The Procuring Entity after considering the recommendations of the Bid Evaluation Committee and the conditions of Bid, if any, financial implications, samples, test reports etc., shall accept or reject the successful Bid.
		6.2.2	Before award of the Contract, the Procuring Entity shall ensure that the price of successful Bid is reasonable and consistent with the required specifications.
		6.2.3	A Bid shall be treated as successful only after the competent authority has approved the procurement in terms of that Bid.
		6.2.4	The Procuring Entity shall award the contract to the Bidder whose offer has been determined to be the lowest in accordance with the evaluation criteria set out in the Bidding Document if the Bidder has been determined to be qualified to perform the contract satisfactorily on the basis of qualification criteria fixed for the Bidders in the Bidding Document for the subject matter of procurement.
		6.2.5	Prior to the expiration of the period of validity of Bid, the Procuring Entity shall inform the successful Bidder in writing, by

			registered post or email, that its Bid has been accepted.
		6.2.6	If the issuance of formal letter of acceptance (LOA) is likely to take time, in the meanwhile a Letter of Intent (LOI) may be sent to the Bidder. The acceptance of an offer is complete as soon as the letter of acceptance or letter of intent is posted and/ or sent by email (if available) to the address of the Bidder given in the Bidding Document.
6.3	Signing of Contract	6.3.1	In the written intimation of acceptance of its Bid sent to the successful Bidder, it shall also be requested to execute an agreement in the format given in the Bidding Document on a non-judicial stamp of requisite value at his cost and deposit the Performance Security or a Performance Security Declaration, if applicable, within a period specified in the BDS or where the period is not specified in the BDS, then within fifteen days from the date on which the LOA or LOI is dispatched to the Bidder. In case the successful bidder is a JV still to be legally constituted, all parties to the JV shall sign the Agreement.
		6.3.2	If the Bidder, whose Bid has been accepted, fails to sign a written procurement contract or fails to furnish the required Performance Security or Performance Security Declaration within the specified time period, the Procuring Entity shall forfeit the Bid Security of the successful bidder/ execute the Bid Securing Declaration and take required action against it as per the provisions of the Act and the Rules.
		6.3.3	The Bid Security, if any, of the Bidders whose Bids could not be accepted shall be refunded soon after the contract with the successful Bidder is signed and his Performance Security is obtained. Until a formal contract is executed, LOA or LOI shall constitute a binding contract.
6.4	Performance Security	6.4.1	Performance Security shall be solicited from the successful Bidder except State Govt. Departments and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are Owned or controlled or managed by the State Government and undertakings of Central Government. However, a Performance Security Declaration shall be taken from them. The State Government may relax the provision of Performance Security in particular procurement.
		6.4.2	(i) The amount of Performance Security shall be Ten percent, or as specified in the BDS, of the amount of the Work Order. The currency of Performance Security shall be Indian Rupees, if otherwise not specified in BDS. (ii) If the Bid, which results in the lowest evaluated bid price, is seriously unbalanced or front loaded in the opinion of the Procuring Entity, the Procuring Entity may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After

			<p>evaluation of the price analysis, taking into consideration the schedule of estimated Contract payments, the Procuring Entity may require that the amount of the performance security be increased (to a maximum of 20% of the bid value of such items) at the expense of the Bidder to a level sufficient to protect the Procuring Entity against financial loss in the event of default of the successful Bidder under the Contract.</p> <p>(iii) In addition to Performance Security as specified in rule 75, an Additional Performance Security shall also be taken from the successful bidder in case of unbalanced bid. The Additional Performance Security shall be equal to fifty percent of Unbalanced Bid Amount. The Additional Performance Security shall be deposited in lump sum by successful bidder before execution of Agreement. The Additional Performance Security shall be deposited through e-Grass, Demand Draft, Banker's Cheque, Government Securities or Bank Guarantee (Inserted by Finance Department Order Dated October 22, 2021)</p> <p>a) Explanation: For the purpose of this rule, -</p> <p>i. Unbalanced Bid means any bid below more than fifteen percent of Estimated Bid Value.</p> <p>ii. Estimated Bid Value means value of subject matter of procurement mention in bidding documents by Procuring Entity.</p> <p>Unbalanced Bid Amount means positive difference of eighty five percent of Estimated Bid Value minus Bid Amount Quoted by the bidder.</p> <p>b) The Additional Performance Security shall be refunded to the contractor after satisfactory completion of entire work. The Additional Performance Security shall be forfeited by the Procuring Entity when work is not completed within stipulated period by the contractor. Provision for Unbalanced Bid and Additional Performance Security shall be mentioned in the Bidding Documents by the Procuring Entity.</p>
		6.4.3	<p>Performance Security shall be furnished in one of the following forms as applicable-</p> <p>i. Deposit through eGRAS; or</p> <p>ii. Bank Draft or Banker's Cheque of a Scheduled Bank in India; or</p> <p>iii. National Savings Certificates and any other script/ instrument under National Savings Schemes for promotion of small savings issued by a Post Office in Rajasthan, if the same can be pledged under the relevant rules. They shall be accepted at their surrender value at the time of Bid and formally transferred in the name of the Procuring Entity with the approval of Head Post Master; or</p> <p>iv. Bank guarantee or electronic bank guarantee (e-BG). It shall be got verified from the issuing bank. Other conditions</p>

			<p>regarding bank guarantee shall be same as specified in ITB Sub-Clause 3.10 [Bid Security]; or</p> <p>v. Fixed Deposit Receipt (FDR) of a Scheduled Bank. It shall be in the name of the Procuring Entity on account of Bidder and discharged by the Bidder in advance. The Procuring Entity shall ensure before accepting the Fixed Deposit Receipt that the Bidder furnishes an undertaking from the bank to make payment/ premature payment of the Fixed Deposit Receipt on demand to the Procuring Entity without requirement of consent of the Bidder concerned. In the event of forfeiture of the Performance Security, the Fixed Deposit shall be forfeited along with interest earned on such Fixed Deposit.</p> <p>vi. The successful Bidder at the time of signing of the Contract agreement, may submit option for deduction of Performance Security from each running and final bill @ 10% of the amount of the bill.</p>
		6.4.4	<p>Performance Security furnished in the form of a document mentioned at options i. to v. of Sub-Clause 6.4.3 above, shall remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the Bidder, including defect liability period, operation and/ or maintenance period, if any.</p>
		6.4.5	<p>Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Procuring Entity may either cancel the procurement process or if deemed appropriate, award the Contract at the rates of the lowest Bidder, to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Procuring Entity to be qualified to perform the Contract satisfactorily.</p>
		6.4.6	<p>I. Forfeiture of Performance Security: Amount of Performance Security in full or part may be forfeited in the following cases: -</p> <p>a. when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] within the specified time; after issue of letter of acceptance; or</p> <p>b. when the Bidder fails to commence the Works as per Work order within the time specified; or</p> <p>c. when the Bidder fails to complete Contracted Works satisfactorily within the time specified; or</p> <p>d. when any terms and conditions of the Contract is breached; or</p> <p>e. Failure by the Bidder to pay the Procuring Entity any established dues under any other contract; or</p> <p>f. if the Bidder breaches any provision of the Code of Integrity as specified for the Bidders in the Act, Chapter VI of the Rules and this Bidding Document.</p>

			Notice of reasonable time will be given in case of forfeiture of Performance Security. The decision of the Procuring Entity in this regard shall be final.
7. Grievance Handling Procedure during Procurement Process (Appeals)			
7	Grievance handling procedure during procurement process	7.1	Any grievance of a Bidder pertaining to the procurement process shall be by way of filing an appeal to the First or Second Appellate Authority, as the case may be, as specified in the BDS, in accordance with the provisions of chapter III of the Act and chapter VII of the Rules and as given in Appendix A to these ITB.

Note:- The Complete Bidding Document including all Annexure should be completely filled (wherever necessary) duly signed and sealed by the Bidder.

Annexure A: Compliance with the Code of Integrity and No Conflict of Interest

Any person participating in a procurement process shall -

- (a) not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process;
- (b) not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation;
- (c) not indulge in any collusion, bid rigging or anti-competitive behavior to impair the transparency, fairness and progress of the procurement process;
- (d) not misuse any information shared between the procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process;
- (e) not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process;
- (f) not obstruct any investigation or audit of a procurement process; (g) disclose conflict of interest, if any; and
- (h) disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other procuring entity.

Conflict of Interest: -

The Bidder participating in a bidding process must not have a Conflict of Interest.

A Conflict of Interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

i. A Bidder may be considered to be in Conflict of Interest with one or more parties in a bidding process if, including but not limited to:

- a. has controlling partners/ shareholders in common; or
- b. receives or have received any direct or indirect subsidy from any of them; or
- c. has the same legal representative for purposes of the Bid; or
- d. has a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Entity regarding the bidding process; or
- e. the Bidder participates in more than one Bid in a bidding process. Participation by a

Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or

- f. the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Goods, Works or Services that are the subject of the Bid; or
- g. Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as engineer-in-charge/ consultant for the contract.

Above directions- accepted

Date:

Signature of bidder

Place:

Name:

Designation:

Address:

Annexure B: Declaration by the Bidder regarding Qualifications

Declaration by the Bidder

In relation to my/our Bid submitted to for procurement of **Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk& Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonk** in response to their Notice Inviting Bids **No 02/2026-27**, I/we hereby declare under Section 7 of Rajasthan Transparency in Public Procurement Act, 2012, that:

1. I/we possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entity;
2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the Union and the State Government or any local authority as specified in the Bidding Document;
3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of legal proceedings for any of the foregoing reasons;
4. I/we do not have, and our directors and officers not have, been convicted of any criminal offence related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into a procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Date:

Signature of bidder

Place:

Name:

Designation:

Address:

Annexure C: Grievance Redressal during Procurement Process

The designation and address of the First Appellate Authority is **Chief EngineerWRD Rajasthan, Jaipur.**

The designation and address of the Second Appellate Authority is **Additional Chief Secretary WR GoR, Jaipur.**

1. Filing an appeal

If any Bidder or prospective bidder is aggrieved that any decision, action or omission of the Procuring Entity is in contravention to the provisions of the Act or the Rules or the Guidelines issued thereunder, he may file an appeal to First Appellate Authority, as specified in the Bidding Document within a period of ten days from the date of such decision or action, omission, as the case may be, clearly giving the specific ground or grounds on which, he feels aggrieved:

Provided that after the declaration of a Bidder as successful the appeal may be filed only by a Bidder who has participated in procurement proceedings:

Provided further that in case a Procuring Entity evaluates the Technical Bids before the opening of the Financial Bids, an appeal related to the matter of Financial Bids may be filed only by a Bidder whose Technical Bid is found to be acceptable.

2. The officer to whom an appeal is filed under para (1) shall deal with the appeal as expeditiously as possible and shall endeavor to dispose it of within thirty days from the date of the appeal.
3. If the officer designated under para (1) fails to dispose of the appeal filed within the period specified in para (2), or if the Bidder or prospective bidder or the Procuring Entity is aggrieved by the order passed by the First Appellate Authority, the Bidder or prospective bidder or the Procuring Entity, as the case may be, may file a second appeal to Second Appellate Authority specified in the Bidding Document in this behalf within fifteen days from the expiry of the period specified in para (2) or of the date of receipt of the order passed by the First Appellate Authority, as the case may be.

4. Appeal not to lie in certain cases

No appeal shall lie against any decision of the Procuring Entity relating to the following matters, namely: -

- a. determination of need of procurement;

- b. provisions limiting participation of Bidders in the Bid process;
- c. The decision of whether or not to enter into negotiations;
- d. Cancellation of a procurement process;
- e. Applicability of the provisions of confidentiality.

5. Form of Appeal

- a. An appeal under para (1) or (3) above shall be in the annexed Form along with as many copies as there are respondents in the appeal.
- b. Every appeal shall be accompanied by an order appealed against, if any, affidavit verifying the facts stated in the appeal and proof of payment of fee.
- c. Every appeal may be presented to First Appellate Authority or Second Appellate Authority, as the case may be, in person or through registered post or authorized representative.

6. Fee for filing appeal

- a. Fee for first appeal shall be rupees two thousand five hundred and for second 'appeal shall be rupees ten thousand, which shall be non-refundable.
- b. The fee shall be paid in the form of bank demand draft or banker's cheque of a Scheduled Bank in India payable in the name of Appellate Authority concerned.

7. Procedure for disposal of appeal

- a. The First Appellate Authority or Second Appellate Authority, as the case may be, upon filing of appeal, shall issue notice accompanied by copy of appeal, affidavit and documents, if any, to the respondents and fix date of hearing.
- b. On the date fixed for hearing, the First Appellate Authority or Second Appellate Authority, as the case may be, shall-
 - i. Hear all the parties to appeal present before him; and
 - ii. peruse or inspect documents, relevant records or copies thereof relating to the matter.
- c. After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.
- d. The order passed under sub-clause (c) above shall also be placed on the State Public Procurement Portal.

**Memorandum of Appeal under the Rajasthan Transparency in Public Procurement
Act, 2012**

Appeal No of

Before the (First, I Second Appellate Authority)

1. Particulars of appellant:

(i) Name of the appellant:

(ii) Official address, if any:

(iii) Residential address:

2. Name and address of the respondent(s):

(i)

(ii)

(iii)

3. Number and date of the order appealed against and name and designation of the officer I authority who passed the order (enclose copy), or a statement of a decision, action or omission of the Procuring Entity in contravention to the provisions of the Act by which the appellant is aggrieved:

4. If the Appellant proposes to be represented by a representative, the name and postal address of the representative:

5. Number of affidavits and documents enclosed with the appeal:

6. Grounds of appeal:

.....

..... (Supported by an affidavit)

7. Prayer:

.....

Place.

Date.

Appellant's Signature

Annexure D : Additional Conditions of Contract

1. Correction of arithmetical errors

Provided that a Financial Bid is substantially responsive, the Procuring Entity will correct arithmetical errors during evaluation of Financial Bids on the following basis:

- i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- iii. if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.

If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be dis-qualified, and its Bid Security shall be forfeited or its Bid Securing Declaration shall be executed.

2. Procuring Entity's Right to Vary Quantities

- (i) At the time of award of contract, the quantity of Goods, works or services originally specified in the Bidding Document may be increased or decreased by a specified percentage, but such increase or decrease shall not exceed twenty percent, of the quantity specified in the Bidding Document. It shall be without any change in the unit prices or other terms and conditions of the Bid and the conditions of contract.
- (ii) If the Procuring Entity does not procure any subject matter of procurement or procures less than the quantity specified in the Bidding Document due to change in circumstances, the Bidder shall not be entitled for any claim or compensation except otherwise provided in the Conditions of Contract.
- (iii) In case of procurement of Goods or services, additional quantity may be procured by placing a repeat order on the rates and conditions of the original order. However, the additional quantity shall not be more than 50% of the value of Goods of the original contract and shall be within one month from the date of expiry of last supply. If the Supplier fails to do so, the Procuring Entity shall be free to arrange for the balance supply by limited Bidding or otherwise and the extra cost incurred shall be recovered from the Supplier.

3. Dividing quantities among more than one Bidder at the time of award (In case of procurement of Goods)

As a general rule all the quantities of the subject matter of procurement shall be procured from the Bidder, whose Bid is accepted. However, when it is considered that the quantity of the subject matter of procurement to be procured is very large and it may not be in the capacity of the Bidder, whose Bid is accepted, to deliver the entire quantity or when it is considered that the subject matter of procurement to be procured is of critical and vital nature, in such cases, the quantity may be divided between the Bidder, whose Bid is accepted and the second lowest Bidder or even more Bidders in that order, in a fair, transparent and equitable manner at the rates of the Bidder, whose Bid is accepted.

Section II: Bid Data Sheet

1. Introduction

ITB 1.1.1	NIT No: 02/ 2026-27 The Procuring Entity is: Additional Chief Engineer Water Resources Zone Jaipur (Rajasthan).
ITB 1.4.1	The Joint Ventures are not permitted.
ITB 1.4.2	Bidder shall be an Indian Firm.
ITB 1.4.3	The Bidders shall have to submit copies of a GST Registration Certificate, Latest GST return submitted, valid Taxes clearance certificate from the concerned Taxation Authority and the Permanent Account Number (PAN) issued by Income Tax Department of India.
ITB 2.1.3	The price of Bidding document is Rs. 10,000/- (Rs Ten Thousand Only) and it has to be paid in the following manner: Bidding Document Price Rs 10,000.00 being non-refundable in the form of deposit through online e-GRAS Challan in favor of Executive Engineer WR Division Tonk, payable at Tonk (Code- 826) under head 0075-00-800-52-01 Processing fee of Rupees 2,500/- being non-refundable in the form of deposit through online e-GRAS Challan in favor of Managing Director Rajasthan Comp Info Services Limited (MD RISL). Under head 8658-00-102-16-02
ITB 2.2.1	For clarification purposes only, the Procuring Entity's address is: Additional Chief Engineer Water Resources Zone, Jaipur (Rajasthan) PIN Code 302017 Telephone Email address: acejpr.wr@gmail.com
ITB 2.2.2	(i) The pre bid conference will take place on date (as per NIB) in the Office of Additional Chief Engineer Water Resources Zone, Jaipur (ii) Bidders will visit the site at his own expenses before uploading of tender document.

2. Contents of Bidding Documents

3. Preparation of Bids

TB 3.2.1	The language shall be English/Hindi.
ITB 3.3.2	The Bidder shall submit the following additional documents with its Technical Bid: <ul style="list-style-type: none"> i. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in English language attested & authenticated by competent authority in India/or an agency appointed by GoI/GoR/other State Government for such certified translation works. ii. If the Bidder has submitting any documents, created or originating from outside the Republic of India, such as work experience certificate(s), financial detail(s), power of attorney(s), undertaking(s), documentary evidence(s), qualifying document(s), etc. (collectively "Foreign Documents") then the Bidder, before any such Foreign Document(s) are sent to India for the purpose of applying towards this Project, shall be required to get each and every page of such Foreign Document(s), duly authenticated/ embossed/ legalized/ notarized from the Indian Embassy/Indian High Commission situated in the country from where such

	<p>Foreign Document(s) were created or are originating from. Such authentication/ embossment/ legalization/ notarization from the Indian Embassy/Indian High Commission shall also apply to all such document(s) that are in a language other than English, which shall compulsorily be required to be translated (as the true translated copies of the original) by a duly certified/ authorized /qualified Translator, supported by the affidavit of the said translator, certifying the correctness of the English translation. In case of any inconsistency between the original Foreign Document and its English translation, the latter shall prevail and be held binding on such Bidder.</p> <p>iii. However, in the case of Foreign Document(s) created or originating from countries that have signed, ratified and have made operational the Hague Convention abolishing the requirement of legalization for foreign public documents, 5 October, 1961 - "Hague Legalization Convention, 1961", the Bidders may affix an 'Apostle" sticker on each and every page of their Foreign Document(s) [including all commercial document(s) duly notarized]. Thereafter, the Bidder shall be compulsorily required to get all such "Apostilled" Foreign Document(s) approved, certified and attested from the Indian Embassy /Indian High Commission in that country where the 'Foreign Document(s)' were created or are originated from or the Ministry of External Affairs, Government of India, New Delhi and the Bidder/s shall follow any other norms/guidelines laid by the Ministry of External Affairs, Government of India, New Delhi.</p> <p>iv. For the purpose of interpretation and evaluation of the Bid, the certified English language translation shall prevail.</p> <p>Technical Schedules:</p> <p>i. Tech Schedule-1: Method Statement</p> <p>ii. Tech Schedule-2: Construction Schedule</p> <p>iii. Tech Schedule-3: Sub Contracting for Sub Contractors</p> <p>vi. Tech Schedule-4: Quality Assurance and Quality Control Plan</p> <p>v. Tech Schedule-5: Safety Plan</p> <p>vi. Tech Schedule-6: Environmental Quality Management Plan</p>
ITB 3.3.3	The amount quoted by bidder shall include all expenses for performing any activity to rectify the defects during the defect liability period of this scheme is five year after completion of work
ITB 3.4.1	The Bidder shall submit the technical bid using the bid Submission Sheets provided in Section IV (Bidding Forms) and Financial Bid using G schedule as per section VIII and both are mandatory to be filled by the bidder.
ITB 3.5.1	In case of Percentage Rate Contracts, combined single percentage above or below the total amount of the Bill of Quantities must be quoted by the Bidder for all items.
ITB 3.5.2	The prices quoted by the bidder shall be fixed.
ITB 3.6.1	The unit rates and the prices may be quoted only in INR
ITB 3.9.1	The bid validity period shall be 120 days from deadline for submission of bids.

ITB 3.10.1/ 3.10.2	<p>A Bid Security / Bid- Securing Declaration shall be required.</p> <p>(i) For Registered eligible contractor with the department shall required to deposit 1/2% of estimated cost of the work as bid security while bidding. (as per NIB)</p> <p>(ii) For eligible registered contractor with other department, 2% of estimated cost bid security shall be required to be deposited as bid security while bidding. (as per NIB)</p> <p>(iii) Bid- Security shall be deposited through DD/BG/BC/Insurance Surety Bond/e-gras challan in head 8443-00-108-00-00 in favour of Executive Engineer water Resources Division Tonk (code 826) Payable at Tonk.</p>
ITB 3.11.1	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Registered Power of Attorney on Judicial Stamp Paper

4. Submission and Opening of Bids

ITB 4.2.1	The deadline for bid submission is: (as Per NIB)
ITB 4.5.1	<p>The bid opening shall take place at:</p> <p>Office of: - Additional Chief Engineer, Water Resources Zone, Jaipur (Rajasthan) Jaipur (Rajasthan) PIN Code – 302017 Telephone Email address: acejpr.wr@gmail.com</p>

5. Evaluation and Comparison of Bids

6. Award of Contract

ITB 6.4.2	The period within which the Performance Security is to be submitted by the successful Bidder and the Contract Agreement is to be signed by him from the date of issue of Letter of Acceptance is 10 Days.
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7. Redressal of Grievances (Appeals)

ITB 7.1.1	<p>The designation and complete address of the First Appellant Authority is:</p> <p>1. Chief Engineer Water Resources Department, Jaipur PIN Code – 302005 Telephone – 0141-2227042 Email address: ce.wr@rajasthan.gov.in</p> <p>The designation and complete address of the Second Appellant Authority is:</p> <p>2. Additional Chief Secretary Water Resources Department, Government of Rajasthan, Jaipur Telephone 0141- 2227459 Email address: osd.wrd@gmail.com</p>
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SECTION-III: EVALUATION AND QUALIFICATION CRITERIA

Section III: Evaluation and Qualification Criteria

3.0 The criteria to evaluate the financial bids of qualified bidders of this scheme shall be as under, no other methods, criteria and factors shall be used. The bidder shall provide all the information requested in the forms included in Section IV (Bidding Forms) and G Schedule in Section-VIII.

3.1 Financial Evaluation

Addition to the sub clause of ITB 5.10 the following criteria shall apply for evaluating the price bid of the bidders:

3.1.1 Financial Bid:

Bidder shall be required to quote percentage rates in G schedule/ BOQ for implementing the project as per detailed in work profile and Scope of work.

3.1.3 The successful Bid

Successful Bid will be the lowest evaluated responsive Bid which qualifies in technical evaluation.

3.2 Technical Evaluation / Qualification

3.2.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail.

3.2.2 Qualification Criteria

1. Eligibility:

Criteria	Requirement	Compliance Requirement	Documents submission/ requirements
i. Nationality	Nationality in Accordance with ITB sub-Clause 1.4.2	Must Meet requirement	As per forms ELI 1, ELI 2 With attachments
ii. Conflict of Interest	No conflicts of interest in accordance with ITB Sub-clause 1.4.3	Must Meet requirement	Letter of Bid, Annexure A&B
iii. Debarment/Transgression by any Procuring Entity	Must Declare ITB Sub- Clause 1.4.4 shall prevail	Must Declare	Declaration form given in the bidding document

2. Pending Litigation:

Criteria	Requirement	Compliance Requirement	Documents submission/ requirements
Pending Litigation	Continuous pending litigation history means litigation initiated before a court of law with in last 7 years (01.06.2019 to 31.05.2026) , ending on the date last day of previous month (31st May 2026) prior to date of invitation of NIB.	Must meet requirement by itself or as partner to past or existing JV	Form LIT - 1

Note: - In case of pending litigation for 3 or more different works with respect to agreements, such bidders shall be treated as non – responsive.

3. Financial Requirement:

5. Financial Requirement.

Criteria	Requirement	Compliance Requirement	Documents submission/ requirements																											
1. Historical Financial Performance (Positive net worth)	Submission of audited accounts for the last 7 financial years (2019-20 to 2025-26) to Demonstrate the current soundness of the Bidders financial position and its prospective long-term profitability. As a minimum, a Bidder's net worth calculated as the difference between total assets and total liabilities must be positive.	Must meet requirement	Form FIN-1 with attachments																											
2. Average Annual Turn over	<div>a. Average Annual Turnover over the last 7 financial years should not be less than 35% of bid value i.e. Rs. 1288.93 Lakh, Total financial turnover during last 7 financial years (FY 2019-20 to 2025-26)on current price level shall be worked out as under:</div> <table><tr><th>Financial Year</th><th>Annual Turn Over</th><th>Annual Turnover at 2024-25 on current year price level</th></tr><tr><td>2019-20</td><td>A</td><td>1.6 A</td></tr><tr><td>2020-21</td><td>B</td><td>1.5 B</td></tr><tr><td>2021-22</td><td>C</td><td>1.4 C</td></tr><tr><td>2022-23</td><td>D</td><td>1.3 D</td></tr><tr><td>2023-24</td><td>E</td><td>1.2 E</td></tr><tr><td>2024-25</td><td>F</td><td>1.1 F</td></tr><tr><td>2025-26</td><td>G</td><td>1.0 G</td></tr><tr><td>Total</td><td></td><td></td></tr></table>	Financial Year	Annual Turn Over	Annual Turnover at 2024-25 on current year price level	2019-20	A	1.6 A	2020-21	B	1.5 B	2021-22	C	1.4 C	2022-23	D	1.3 D	2023-24	E	1.2 E	2024-25	F	1.1 F	2025-26	G	1.0 G	Total			Must meet requirement	Form FIN-2
Financial Year	Annual Turn Over	Annual Turnover at 2024-25 on current year price level																												
2019-20	A	1.6 A																												
2020-21	B	1.5 B																												
2021-22	C	1.4 C																												
2022-23	D	1.3 D																												
2023-24	E	1.2 E																												
2024-25	F	1.1 F																												
2025-26	G	1.0 G																												
Total																														

	<p>b. The applicant shall have experience of successfully / satisfactorily completion, as contractor or sub-contractor duly authorized by the department, to the contract(s) of a nature and complexity comparable to the proposed contract within last 7 years (01.06.2019 to 31.05.2026) ending on the last day of previous month (31st May 2026) prior to date of invitation of NIB. Present value of work (Bid) shall be updated to current value which will be worked out which is as under: -</p> <table><tr><th>Year</th><th>Value of work</th><th>Present value of work at 2025-26 currentprice level</th></tr><tr><td>2019-20</td><td>A</td><td>1.6 A</td></tr><tr><td>2020-21</td><td>B</td><td>1.5 B</td></tr><tr><td>2021-22</td><td>C</td><td>1.4 C</td></tr><tr><td>2022-23</td><td>D</td><td>1.3 D</td></tr><tr><td>2023-24</td><td>E</td><td>1.2 E</td></tr><tr><td>2024-25</td><td>F</td><td>1.1 F</td></tr><tr><td>2025-26</td><td>G</td><td>1.0 G</td></tr><tr><td>Total</td><td></td><td></td></tr></table> <p>Specific Construction experience:</p> <p>i. One similar nature completed work costing not less than 35% of bid value i.e. Rs. 1288.93 Lakhand quantities for work as per following table at 3(II)(c).</p> <p>Or</p> <p>ii. Two similar nature completed work cumulative costing not less than 40% of bid value (provided no work shall be less than 15% amount of Bid value i.e. 552.40Lakh) i.e. Rs. 1473.06 Lakh and cumulative quantities for works as per following table at 3(II)(c).</p> <p>Or</p> <p>iii. Three similar natures completed work cumulative costing not less than 50% of bid value (provided</p>	Year	Value of work	Present value of work at 2025-26 currentprice level	2019-20	A	1.6 A	2020-21	B	1.5 B	2021-22	C	1.4 C	2022-23	D	1.3 D	2023-24	E	1.2 E	2024-25	F	1.1 F	2025-26	G	1.0 G	Total			Must meet requirement	Must meet requirement
Year	Value of work	Present value of work at 2025-26 currentprice level																												
2019-20	A	1.6 A																												
2020-21	B	1.5 B																												
2021-22	C	1.4 C																												
2022-23	D	1.3 D																												
2023-24	E	1.2 E																												
2024-25	F	1.1 F																												
2025-26	G	1.0 G																												
Total																														

	<p>no work shall be less than 15% amount of Bid value i.e. 552.40Lakh) i.e. Rs 1841.33Lakh and cumulative quantities for works as per following table at 3(II)(c).</p> <p>With in last 7 years (01.06.2019 to 31.05.2026), ending on the date last day of previous month (31st May 2026) prior to date of invitation of NIB, which have been completed works of similar nature complexity and methodology.</p>		
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c. Construction Experience in key Activities

From the above or other completed contracts of similar nature and complexity executed during **last seven years (01.06.2019 to 31.05.2026)**, ending on the date last day of previous month (31st May 2026) prior to date of invitation of NIB, a minimum construction experience is desired in the following key activities:

Table clause 3(II)(c):

S.no	Description	Unit	Quantity	Qualifying Quantity criteria in EITHER of these alternates		
				Qty executed under Single Completed work	Cumulative Qty executed under Two completed works.	Cumulative Qty executed under Three completed works.
				35% of col. No 4	40% of col. No 4	50% of col. No 4
1	2	3	4	5	6	7
i	Cement Concrete / RCC (all types of Cement Concrete)	Cum	50248.08	17586.83	20099.23	25124.04
ii	MS Reinenforcement/ Steel	KG	416079.80	145627.93	166431.92	208039.90
iii	Earthwork/ Embankment	Cum	54517.12	19080.99	21806.85	27258.56
iv	Wire Crates	Sqm	6600.00	2310.00	2640.00	3300.00
v	Filling wire crates with stone/boulders filling	Cum	6002.40	2100.84	2400.96	3001.20

Note:

1. In case allotted work is not completed within stipulated time period and the delay has been attributed to contractor as per time extension sanctioned by compeyent authority, the eligible cost and quantity of such work(s) shall be considered as 75% value of the work(s).
2. Works which have been substantially completed i.e. physically and financially completion is more than 75% of allotted work within stipulated time period or when the delay is not attributable to the contractor shall be considered as completed for the evaluation purpose.

3. Completion Certificate issued by not below the rank of Executive Engineer or equivalent of State Government / Central Government / PSU, giving time wise detail of contract completed successfully/ satisfactorily should be appended. The status of time extension granted if any and delay attributed to contractor should be clearly mentioned in the certificate. For works as per note no 2 (which have been substantially completed 75%), the relevant certificate has to be verified & counter signed by concerned Superintending Engineer.
4. The bidder shall identify & submit statement of completed works so as to establish itemwise fulfillment of the above mentioned qualification criteria (Form no EXP – 2(a)& 2(b)).
5. For specific construction experience (Clause 3 (II)(b&c)), nature and complexity is further clarified as below:-
 - a. In case of earthwork for embankment the work shall be treated of similar nature and complexity which involve watering and compaction.
 - b. Concrete (PCC/RCC/PCC block) executed in canal lining, dams, spillways, anicuts, WHS, canal aqueduct, syphon and its components as any other water retaining structures will be treated of similar nature.
 - c. In case of item of excavation in hard rock requiring blasting/ control blasting the quantities executed for excavation of foundation of dams, spillways, anicuts, WHS, canal aqueduct, syphon and its components as any other water retaining structures will be treated of similar nature.
 - d. For excavation of tunnel work quantities executed for tunnel excavation shall be considered.
 - e. For Masonry work: - Masonry work of Spillway, retaining wall, non overflow, CD works, Dams, anicuts, WHS, canal aqueduct, syphon and its components as any other water retaining structures will be treated of similar nature.
6. Any specified item will only be considered as key component if its estimated cost is at least 10% value of whole work.
7. For pressure distribution pipe network experience of Pressure Distribution Network (PDN) both irrigation and water supply work shall be considered as similar nature work.
8. For laying, jointing, testing and commissioning HDPE /DI/ MS pipes for main pipe line, experience of laying main pipe line both irrigation and water supply work shall be considered as similar nature work.
9. For steel gate work, experience of fabrication and installation of gates of spillway/ sluice/ regulator/ CD shall be considered as similar nature work.
10. The cost and quantum of work executed as a JV partner shall be considered only to the extent of percentage proportion and share as in respective JV agreement.
11. MoU: - Bidder may submit MoU with manufacturer having experience in supply, installation, commissioning and successfully/ satisfactorily operation record of at least 2 years for specified works i.e. SCADA, pumps, solar etc, when such provision has been specifically kept in the bid document.

Criteria	Requirement	Compliance Requirement	Documents submission/ requirements
3. Financial Resources	<p>Using Form FIN – 3 and FIN –4 in section IV (Bidding Forms) the bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, line of credit, and other financial means, other than any contractual advance payments to meet:</p> <p>The bidder must have access to bank credit limit (fund and non-fund based) to the extent of minimum Rs. 460.33 Lakh (estimated cost*3/Completion period in month). The certificate of credit limit issued by bank shall be of period within 3 months from date of submission of pre- qualification bid.</p> <p>The bidder/ Joint Venture Partner (in case of JV) shall be a profitable firm at least 5 out of 7 financial years. Also, the bidder/ each JV partner shall not be under Corporate Debit Restructuring/ Statutory Debit Restructuring during last 7 Financial years. A declaration duly certified & signed by the Chartered Accountant shall be submitted by the bidder along with the bid.</p>	Must Meet Requirement	Form FIN-3 and FIN-4
	<p>Net worth (Latest)</p> <p>The Bidder/one Partner must have a minimum positive net worth of Rs 368.27 (10% of Bid Amount). A declaration duly certified and signed by Chartered Accountant shall be submitted.</p>	Must Meet Requirement	

4. Experience:

Criteria	Requirement	Compliance Requirement	Documents submission/ requirements
1. General Construction Experience	Experience under Contracts in the role of contractor and sub contractor for at least the last Seven year (01.06.2019 to 31.05.2026) , ending on the last day of previous month (31 st May 2026) prior to date of invitation of NIB.	Must meet requirement	From EXP - I

5. Bid capacity:

Bidders who meet the minimum qualification criteria shall be qualified only if their available bid capacity at the time of bidding is more than the total estimated cost of the works for which bid is submitted. The available bid capacity shall be calculated as under:

Assessed Available Bid Capacity: $(A \times N \times 2 - B)$

Where,

A= Maximum value of works executed in any one year during the last Seven years (updated to the current price level 2024-25) taking into account the completed as well as works in progress;

N = completion period of the Works for which the bid has been invited in number of years, and

B = Value at current price level of the existing commitments and ongoing works to be completed during the next N year.

3.2.3 Personnel Capabilities:

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

S. No	Position required	Educational Qualifications	Total Experience (In years)	Experience (in years)	Number of personal Required
1	Project manager	Graduate/ post graduate	7	5 years on various Engineering works.	2
2	Site Engineer	Graduate/ post graduate in Civil Engineering	5	5 years on various Engineering works.	2
3	Surveyor	Diploma in Civil Engineering	5	3 years on various engineering works	2

Note:- Copy of qualification Degree should be attached

3.2.4 Equipment Capability:

The applicant should own, or have assured access to (through hire, lease, purchase, agreement availability of manufacturing capacity, or other means). The following key items of equipment in full working order, and must demonstrate that, based on known commitments; they will be available for use in the proposed contract. The applicant may also list alternative equipment, which he would propose for the contract together with an explanation of the proposal.

S. No.	Equipment type & Characteristics	Minimum Number Required.
1	Sheep foot roller /Pneumatic tyred compactor	1 No
2	Transit Mixer (3 cum)	6 Nos
3	Dumpers	8 Nos
4	Trucks/ Tractors	8 Nos.
5	J.C.B. Machine/ Excavator (0.9 cum)	4 Nos.
6	Hydraulic excavator capacity 1.2 to 3.0 Cum	2 Nos.
7	Compressor – 450 Cum	2 Nos.
8	Plate Vibrator/Needle Vibrator	2 Nos.
9	Water Tanker	8 Nos.
10	Roller (8-10 Tonne)	2no
11	Auto level	4 No
12	Centering and shuttering	10000 sqm

Section IV: Bidding Forms

Section IV: Bidding Forms

Contents

S. No	Particulars	Page No.
4.1	Technical Bid Check List	
4.2	Letter of Technical Bid	
4.2.1	Bid Security (Bank Guarantee Unconditional)	
4.2.2	Bid Securing Declaration	
4.3	Bill of Quantities	
4.4	Personnel and Equipment	
4.4.1	Form PER-1 and PER – 2	
4.4.2	Equipment	
4.5	Bidder's Qualification forms	
4.5.1	Form ELI-1	
4.5.2	Form ELI-2	
4.5.3	Form LIT-1	
4.5.4	Form FIN-1	
4.5.5	Form FIN-2	
4.5.6	Form FIN-3	
4.5.7	Form FIN-4	
4.5.8	Calculation of Available Bid Capacity	
4.5.9	Form EXP-1	
4.5.10	Form EXP-2(a)	
4.5.11	Form EXP-2(b)	
4.6	Sample format for evidence of access to or availability of credit	
4.7	Declaration by the Bidder under Sections 7 and 11 of the Act	
4.8	Letter of Financial Bid	
4.9	Bill of Quantities / Activity Schedule	

4.1 Technical Bid [With reference to Section III] Check List

The Technical Bid/ Proposal must necessarily contain scanned copies of all the filled-up forms of Technical Bid along with attested copies of the relevant referred documents as proof:

1.	Letter of Technical Bid.
2.	Details of Registration/ Incorporation of the Bidder as firm/ company/ society etc. including complete address, telephone/ fax/ mobile numbers, e-mail address etc. (enclose copies of certificate of registration/ incorporation issued by concerned authority like Registrar of Firms, Registrar of Companies, Registrar of Societies, etc., Memorandum of Association/ Partnership Deed/ By-laws/ others.
3.	Power of Attorney/ Authority authorizing the person signing the Bid.
4.	Enlistment details with address and contact details of the enlisting authority (enclose copy of Enlistment Certificate of appropriate class).
5.	Permanent Account Number (PAN) Card issued by Income Tax Department.
6.	Valid GST Registration Certificate
7.	If Joint Ventures are allowed, document specifying formal intent to enter into an agreement or an existing agreement in the form of JV.JV Not applicable under this contract
8.	Instrument of Bid Security.
9.	Receipt/ instrument of cost of Bidding Document.
10.	Receipt/ instrument of bid processing fee.
11.	Audited Statements of Accounts for the past 7 Financial Years.
12.	Declaration by the Bidder regarding Code of Integrity, Conflict of Interest, Qualification and Eligibility.
13.	Bid capacity statement.
14.	Financial details (except the Financial Bid) of the Bidder, as requested.
15.	List of key personnel
16.	List of mechanical and other equipment (owned or leased), as required, with proof of ownership or confirmed lease.
17.	Qualifying works experience.
18.	All Technical Bidding forms duly completed and signed.
19.	Others considered necessary to strengthen the bid.

Signature of Authorized Signatory

4.1 Letter of Bid

Technical Bid Submission Sheet

Date: _____

NIB No.: 02/2026-27 _____

Alternative No., if permitted:

To: _____

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda No.
- (b) We declare that we fulfill the eligibility and qualification criteria in conformity with the Bidding Document and offer to execute the following Works as per designs, drawings, specifications, terms and conditions:
 - I Our Bid shall be valid for a period of 120 days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (d) If our Bid is accepted, we commit to obtain a Performance Security in the number of percent of the Contract Price, or get it deducted from our running and final bills, or shall submit a Performance Security Declaration, as the case may be, for the due performance of the Contract;
- (e) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities of India or other eligible countries;
- (f) We are not participating, as Bidder, in more than one Bid for this Works in this bidding process, other than alternative offers, if permitted, in the Bidding Document;
- (g) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, have not been debarred by the State Government or the Procuring Entity;
- (h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed;
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive;
- (j) We agree to permit Government of Rajasthan or the Procuring Entity or their representatives to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by them;
- (k) We declare that we have complied with and shall continue to comply with the provisions of the Code of Integrity including Conflict of Interest as specified for Bidders in the Rajasthan Transparency in Public Procurement Act, 2012, the Rajasthan Transparency in Public Procurement Rules, 2013 and this Bidding Document during the procurement process and execution of the Works till completion of all our obligations under the Contract;
- (l) Other comments, if any:

Name: _____

In the capacity of: _____

Signed: _____

Date: _____

Duly authorized to sign the Bid for and on behalf of:

Complete Address _____

Tel: _____ Fax: _____ E-mail: _____

4.2.1 Bid Security (Bank Guarantee Unconditional)

Form of Bid Security

[insert Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: *[insert Name and Address of Procuring Entity]*

Date: *[insert date]*

BID GUARANTEE No.: *[insert number]*

We have been informed that **[insert name of the Bidder]** (hereinafter called “the Bidder”) has submitted to you its bid dated **[insert date]** (hereinafter called “the Bid”) for the execution of **[insert name of contract]** under Notice Inviting Bids No. **[insert NIB number]** (“the NIB”).

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we **[insert name of Bank]** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of –

-----**[insert amount in figures] [insert amount in words]** upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

- (a) has withdrawn or modified its Bid after deadline for submission of bids, during the period of bid validity specified by you in the Bid Data Sheet (hereinafter “the BDS”); or
- (b) having been notified during the period of bid validity specified in the BDS, about the acceptance of its Bid by you,
 - 4.. failed or refused to execute the Contract Agreement within the time period specified in the BDS, or
 - (ii) failed or refused to furnish the performance security, in accordance with the Instructions to Bidders (hereinafter “the ITB”) within the time period specified in the BDS, or
- (c) has not accepted the correction of arithmetical errors in accordance with the ITB; or
- (d) has breached a provision of the Code of Integrity specified in the RTPP Act, RTPP Rules and the ITB.

In occurrence of above instances, Engineer in charge shall be sole judge to revoke the Bank guarantee.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the contract signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; and (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of the Bidder’s bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

Signed: _____

[insert signature of person whose name and capacity are shown]

Name: _____

[insert complete name of person signing the Bid Security]

In the capacity of: _____

[insert legal capacity of person signing the Bid Security]

Duly authorized to sign the Bid Security for and on behalf of

[insert name of the Bank]

Dated on day of ,

[insert date of signing]

Bank's Seal _____

[affix seal of the Bank]

[Note: In case of a Joint Venture, the Bid-Security must be in the name of all partners to the Joint Venture that submits the bid.]

J.V. NOT Applicable

4.2.2 Bid Securing Declaration

Form of Bid Securing Declaration

Date: *[insert date (as day, month and year)]*

Bid No.: *[insert number of bidding process]*

Alternative No, if permitted.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name and address of Procuring Entity]*

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with you, *[insert designation of the Procuring Entity]*, for the period of time of *[insert number of months or years, as required by the Procuring Entity]* starting on *[insert date]*, if we are in breach of our obligation(s) under the bid conditions, more specifically, if we:

- (a) withdraw or modify our Bid after deadline for submission of bids, during the period of bid validity specified in the Bid Data Sheet (hereinafter “the BDS”); or
- (b) having been notified during the period of bid validity specified in the BDS, about the acceptance of our Bid by you,
 - 4.. fail or refuse to execute the Contract Agreement within the time period specified in the BDS,
 - (ii) fail or refuse to furnish the performance security, in accordance with the Instructions to Bidders (hereinafter “the ITB”) within the time period specified in the BDS,
- (c) not accept the correction of arithmetical errors in accordance with the ITB; or
- (d) breach a provision of the Code of Integrity specified in the RTPP Act, RTPP Rules and the ITB.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) thirty days after the expiration of our Bid.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) thirty days after the expiration of our Bid.

Signed: _____

[insert signature of person whose name and capacity are shown]

Name: _____

[insert complete name of person signing the Bid-Securing Declaration]

In the capacity of: _____

[insert legal capacity of person signing the Bid-Securing Declaration]

Duly authorized to sign the bid for and on behalf of: _____

[insert complete name and address of the Bidder]

Dated on day of ,

[insert date of signing]

Corporate Seal _____

[affix corporate seal of the bidder]

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid.]

J.V. NOT Applicable

4.3 Bill of Quantities:

1. The Bill of Quantities (BOQ) shall be read in conjunction with the provision of contract viz Conditions of Contract (General and Special), Technical Specifications (including BIS and IRC), scope of work, design and Drawing etc.
2. The quantities given in the Bill of Quantities are provisional, and are given to provide a common basis for bidding, The basis of payment will be the actual quantities of work engineered and carried out by the Contractor and as measured and verified by the Engineer- in-charge and valued at the rates and prices tendered in the Bill of Quantities. Contractor shall perform detailed engineering including but not limited to survey, investigation designs etc and got all engineering vetted from owners consultant and approved from owner or his designated representative.
3. Any person, who submits **percentage rate tender**, shall fill up the usual printed form stating at how much percent above or below the rate specified in schedule G, he is willing to undertake the work. Only one rates of percentage more, or less, on all the estimate' rates/ scheduled rates shall be mentioned. Tender, which propose any alteration in the work, specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection.

Signature of Authorized Signatory

4.4.1 Personnel

(a) Form PER – 1

(Must be submitted by the bidder on Non Judicial Stamp Paper of Rs.100/- duly notarized)

Declaration by the Bidder regarding Personnel

In relation to our Bid submitted to [enter designation and address of the procuring entity] for procurement of [insert name of the Works] in response to e-NIB No..... Dated I/we hereby declare that I/We have following personnel Staff on payroll in our firm. The following staff we be available for the proposed contract.

S. No	Position required	Name of Person	Educational Qualifications	Total Experience (In years)	Experience on similar work (in years)
1	Project manager				
2	Site Engineer				
3	Surveyor				

I/We are submitting Resume of above personnel in the Form PER – 2: (Resume of Personnel). Copies of qualification Degree/Diploma are also being submitted.

Signature of Bidder

(b) Form PER – 2: Resume of Personnel

Position		
Personnel information	Name	Date of birth
	Professional qualifications (<i>attach a copy of Degree/Diploma</i>)	
Present employment	Name of Procuring Entity	
	Address of Procuring Entity	
	Telephone	Contact (Manager /Personnel officer)
	Fax	E-mail
	Job title	Years with present Procuring Entity

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project: -

From	To	Company / Project / Position / Relevant technical and management experience

Signature of Personnel

Countersigned by the Bidder

4.4.2 Equipments:-

**(Must be submitted by the bidder on Non Judicial Stamp Paper of
Rs.100/- duly notarized)**

Declaration by the Bidder regarding Equipments

In relation to our Bid submitted to [enter designation and address of the procuring entity] for procurement of [insert name of the Works] in response to e-NIBNo..... Dated I/we hereby declare that I/We have following Equipments in the form of Own/lease/on agreement. The following equipments are in full working Condition & these will be available for use in the proposed contract.

S. No.	Equipment type & Characteristics	Minimum Number Required.	(Mark in which form equipment is available)		
			Own	Lease	On Agreement
1	Sheep foot roller /Pneumatic tired compactor	1 No			
2	Transit Mixer (3 cum)	6 Nos			
3	Dumpers	8 Nos			
4	Trucks/ Tractors	8 Nos.			
5	J.C.B. Machine/ Excavator (0.9 cum)	4 Nos.			
6	Hydraulic excavator capacity 1.2 to 3.0 Cum	2 Nos.			
7	Compressor – 450 Cum	2 Nos.			
8	Plate Vibrator/Needle Vibrator	2 Nos.			
9	Water Tanker	8 Nos.			
10	Roller (8-10 Tons)	2Nos.			
11	Auto level	4 Nos			
12	Centering and shuttering	1000 sqm			

In addition to above required equipment will made available during the execution of work through hire, lease, purchase, agreement availability of manufacturing capacity, or other means.

Date:

Signature of Bidder

Place:

Name:

Designation:

Address:

4.5 Bidder's Qualification

To establish its qualifications to perform the contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

4.5.1 Form ELI – 1: Bidder's Information Sheet

BIDDER'S INFORMATION	
Bidder's legal name	
Bidder's country of constitution.	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
Mobile No. of Bidder's authorized representative	
e-mail of Bidder	
Attached are attested copies of the following original documents: <ul style="list-style-type: none">(i) In case of single entity, certificate of registration/ incorporation and memorandum of association or constitution of the legal entity named above.(ii) Authorization to represent the firm or JV named in above.(iii) In case of JV, letter of intent to form JV or JV agreement.	

Signature of Authorized Signatory

4.5.2 Form ELI – 2: JV Information Sheet*(JV Not Allowed)

Attach the Letter of Intent to form JV or certificate of registration/ incorporation and memorandum of association or constitution of the legal entity, if JV is already in existence.

Each member of a JV must fill in this form

JV / SPECIALIST CONTRACTOR'S INFORMATION	
Bidder's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's financial share in the JV	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are attested copies of the following original documents: <ol style="list-style-type: none">1. Certificate of registration/ incorporation and memorandum of association or constitution of the legal entity named above.2. Authorization to represent the firm named above.	

Signature of Authorized Signatory

4.5.3 Form LIT 1- Pending Litigation

Each Bidder or member of a JV must fill in this form

Pending Litigation		
<ul style="list-style-type: none">• In case there is no pending litigation history in accordance with Section III (Evaluation and Qualification Criteria), then NO/NIL must be written.• In case of some pending litigation history in accordance with Section III (Evaluation and Qualification Criteria), then the same must be provided as under:-		
Year	Matter in Dispute	Value of Pending Claim in INR

Declaration

I/We do here by declare that the information provided above is true to the facts and belief and nothing has been concealed therein; I/We are well aware of the fact that if this information is found/proved false, action would be taken accordingly by the PE.

Signature of Authorized Signatory

4.5.4 Form FIN - 1: Financial Performance

Each Bidder or member of a JV must fill in this form
(To be certified by the statutory auditors of the Bidder)

A. Financial Data for Past 5 years in Rupees					
Year/Item	Year 1:	Year 2:	Year 3:	Year 4:	Year 5:

Information from Balance Sheet in Rupees

Note:

(In case of bidders and JV partners from outside India, data to be converted at the exchange rate prevailing 28 days prior to the deadline of submission of the bids)

Total Assets				
Total Liabilities				
Net Worth				
Current Liabilities				
Other as required				

Information from Profit & Loss Account/ Income & Expenditure Statement

Total Operating Revenues / Income				
Profit /Excess of Income over Expenditure before Taxes				
Profit /Excess of Income over Expenditure after Taxes				
Charges as required				

Attached are attested copies of audited financial statements (balance sheets including all related notes, and Profit & Loss Account/ Income & Expenditure Statement) for the last years, as indicated above, complying with the following conditions:

- All such documents reflect the financial situation of the Bidder or partner to a JV, and not sister or parent companies.
- Historic financial statements must be audited by a chartered accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited. (No statements for partial periods shall be requested or accepted).

B. Declaration

(Duly certified & signed by the Chartered Accountant and bidder)

This is to certify that the bidder/ Joint Venture Partner (in case of JV) is/are a profitable firm at least 5 out of 7 financial years. It is also Certify that the bidder/ Joint Venture Partner (in case of JV) is/are not under Corporate Debt Restructuring/ Statutory Debit Restructuring during last 7 Financial years.

Seal and Signature of the Chartered Accountant

Signature of Authorized Signatory

4.5.5 Form FIN – 2: Average Annual Turnover in Rupees

Years, as indicated above, complying with the following conditions Historic financial statements must be audited by a chartered accountant.

form

(To be certified by the statutory auditors of the Bidder)

Annual Turnover Data for the last 7 years	
Year	Amount-Rupees
2019-20	
2020-21	
2021-22	
2022-23	
2023-24	
2024-25	
2025-26	
Average Annual Turnover	

The information supplied should be the Annual Turnover of the Bidder or each member of a JV in terms of the amounts billed to clients for each year for work in progress or completed, at the end of the period reported. For JV partners from other countries, the conversion to Rupees shall at the rates prevailing on the 31st. March of that year.

Seal and Signature of the chartered accountant

Signature of Authorized Signatory

4.5.6 Form FIN – 3: Financial Resources - Rupees

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract as indicated in Section III (Evaluation and Qualification Criteria).

FINANCIAL RESOURCES		
S. No	Source of Financing	Amount in Rupees

Signature of Authorized Signatory

4.5.7 Form FIN- 4: Current Contract Commitments / Works in Progress

Bidders should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

CURRENT CONTRACT COMMITMENTS					
S.No.	Name of Contract	Procuring Entity's Contact Address, Tel., Mobile, Fax, e-mail id	Value of Outstanding work in Rupees	Estimated Completion Date	Average Monthly Invoicing during Last 6 months (Rupees per month)

Signature of Authorized Signatory

Note: Be confirmed & provide accurate & correct information before submission of tender

4.5.8 Calculation of Available Bid Capacity

Using the following formula, the Bidder must calculate his available Bid Capacity: -

Assessed Available Bid Capacity: $(A * N * 2 - B)$

Where

A= Maximum value of works executed in any one year during the last Seven years (updated to the current price level) taking into account the completed as well as works in progress;

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

B = Value at current price level of the existing commitments and ongoing works to be completed during the next N years

Signature of Authorized Signatory

4.5.9 Form EXP – 1: General Construction Experience of last 7 years (from 01.1.19 to 31.12.2025)

Each Bidder must fill in this form

GENERAL CONSTRUCTION EXPERIENCE				
Starting Month Year	Ending Month Year	Years	Contract Identification and Name Name and Address of Procuring Entity Brief Description of the Works Executed by the Bidder	Role of Bidder

Signature of Authorized Signatory

4.5.10 Form of Works Eligibility

Category- ONE WORK

Name of work					
Aggrement No & Date					
Office Name,Address& Mail Id					
Work order date					
Work order amount					
Work start date					
Work completed date		Stipulated	Actual		
Executed Quantitie					
S.No	Item	Unit	Required	Executed	Excess/Short
i	Cement Concrete / RCC (all types of Cement Concrete)	Cum	17586.83		
ii	MS Reinenforcement/ Steel	KG	145627.93		
iii	Earthwork/ Embankment	Cum	19080.99		
iv	Wire Crates	Sqm	2310.00		
v	Filling wire crates with stone/boulders filling	Cum	2100.84		

Note:- The bidder shall submit the proof of work completion certificate duly issued by the competent authority equivalent to Executive Engineer, or higher Government officer for all above.

Signature of Bidder / Authorized Signatory

Category-TWO WORKS

Name of work							
Aggrement No & Date							
Office Name,Address& Mail Id							
Work order date							
Work order amount							
Work start date							
Work completed date		Stipulated		Actual			
Executed Quantities							
S.No	Item	Unit	Required	Executed One Work	Executed Two Work	Total Executed	Excess/Short
i	Cement Concrete / RCC (all types of Cement Concrete)	Cum	20099.23				
ii	MS Reinenforcement/ Steel	KG	166431.92				
iii	Earthwork/ Embankment	Cum	21806.85				
iv	Wire Crates	Sqm	2640.00				
v	Filling wire crates with stone/boulders filling	Cum	2400.96				

Note:-The bidder shall submit the proof of work completion certificate duly issued by the competent authority equivalent to Executive Engineer, or higher Government officer for all above.

Signature of Bidder / Authorized Signatory

Category-THREE WORKS

Name of work								
Aggrement No & Date								
Office Name,Address& Mail Id								
Work order date								
Work order amount								
Work start date								
Work completed date		Stipulated					Actual	
		Executed Quantities						
S.No	Item	Unit	Required	Executed One Work	Executed Two Work	Executed Three Work	Total Executed	Excess/Short
i	Cement Concrete / RCC (all types of Cement Concrete)	Cum	25124.00					
ii	MS Reinenforcement/ Steel	KG	208039.90					
iii	Earthwork/ Embankment	Cum	27258.56					
iv	Wire Crates	Sqm	3300.00					
v	Filling wire crates with stone/boulders filling	Cum	3001.2					

Note:-The bidder shall submit the proof of work completion certificate duly issued by the competent authority equivalent to Executive Engineer, or higher Government officer for all above.

Signature of Bidder / Authorized Signator

4.5.11 Form EXP – 2(a): Specific Construction Experience

Note: Please fill up one sheet per contract

CONTRACT OF SIMILAR SIZE AND NATURE		
Contract Noof.....		Contract Identification
Award Date		Completion Date
Role in Contract	Contractor / Management Contractor	
Total Contract Amount	INR	
If partner in a JV or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Procuring Entity's Name, Address, Telephone Number, Fax Number, E-mail address		
Description of the in accordance with Criteria 3.2.2(c) of Section 3 Description of Similarity in accordance with criteria 3.2.2(c)Note, Section III		
Similarity, size, nature complexity [The Procuring Entity should insert here contract size, complexity, methods, technology or other characteristics as described in Section VI (Procuring Entity 's Requirements) against which the Bidder demonstrates similarity in the box on the right-hand-side.]		

Signature of Authorized Signatory

4.5.12 EXP - 2(b): Specific Construction Experience in Key activities

CONTRACT WITH SIMILAR KEY ACTIVITIES		
Contract No..... of.		Contract Identification
Award Date		Completion Date
Role in Contract	Contractor / Management Contractor / Subcontractor	
Total Contract Amount	INR	
If partner in a JV or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Procuring Entity's Name, Address, Telephone Number, Fax Number, E-mail address		
Description of nice with Criteria 3.2.2(c) of Section 3		
Description of the similarity in accordance with Criteria 3.2.2(c) Note of Section 3		
[The Procuring Entity should insert here production rate(s) for the Key activities in the subject contract against which the Bidder demonstrates in the box on the right-hand-side. production rate(s) achieved by him on previous contracts)		

Signature of Authorized Signatory

4.6 Sample format for evidence of access to or availability of credit facilities

SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES
(to individual firms or each partner of a JV by his bank)

BANK CERTIFICATE

Name of the Bank with Branch address

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

If the contract for the work, namely Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk & Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonkis awarded to the above firm, we shall be able to provide overdraft/ credit facilities to the extent of **Rs. 460.33 Lakh** to meet their working capital requirements for executing the above contract.

Date:

Sd/-
Name of Bank
Senior Bank Manager
Address of the Bank
Phone no -

Seal of the Bank _____

4.7 Annexure-B- Declaration by the Bidder in compliance of Section 7 & 11 of the Act

**(Must be submitted by the bidder on Non Judicial Stamp Paper of
Rs.100/- duly notarized)**

Declaration by the Bidder

In relation to our Bid submitted to *[enter designation and address of the procuring entity]* for procurement of **Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk& Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonk***[insert name of the Works]* in response to their Notice Inviting Bids **No 02/2026-27** we hereby declare under Section 7 and 11 of the Rajasthan Transparency in Public Procurement Act, 2012, that:

1. We are eligible and possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entity;
2. We have fulfilled our obligation to pay such of the taxes payable to the Central Government or the State Government or any local authority, as specified in the Bidding Document;
3. We are not insolvent, in receivership, bankrupt or being wound up, not have our affairs administered by a court or a judicial officer, not have our business activities suspended and are not the subject of legal proceedings for any of the foregoing reasons;
4. We do not have, and our directors and officers not have, been convicted of any criminal offence related to our professional conduct or the making of false statements or misrepresentations as to our qualifications to enter into a procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. We do not have a conflict of interest as specified in the Rajasthan Transparency in Public Procurement Act, the Rajasthan Transparency in Public Procurement Rules and this Bidding Document, which materially affects fair competition;
6. We have complied and shall continue to comply with the Code of Integrity as specified in the Rajasthan Transparency in Public Procurement Act, the Rajasthan Transparency in Public Procurement Rules and this Bidding Document, till completion of all our obligations under the Contract.

Date:

Signature of Bidder

Place:

Name:

Designation: Address:

4.8 Letter of Financial Bid

Financial Bid Submission Sheet

Date: _____

NIB No.: 02/2026-27 _____

Alternative No., if permitted: _____

To: _____

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Document, including Addenda No.: -

(b) We offer to execute in conformity with the Bidding Document the following Works:

(c) The total Price for our Bid, excluding any discounts offered, if permitted, in item (d) below is:

(d) The discounts offered, if permitted, and the methodologies for their application are

(e) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.

(f) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(g) Other comments, if any:

Name: _____

In the capacity of: _____

Signed: _____

Duly authorized to sign the Bid for and on behalf of: ____

Complete Address _____

Date: _____

Tel: _____ Fax: _____ E-mail: _____

Section – V: Procuring Entity's Requirements

Section VA: General Description of work, Site Condition and Scope of work (Project Profile)

Section VB: Technical Specification

Section VA: Project Profile

GENERAL DESCRIPTION OF WORK AND SITE CONDITIONS

- 1. General Description of work.**
Work construction following main works according to design and drawing-
- 1.01 Scope of work:- Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk.**

Construction of Anicut cum causeway at Banas river near Village Kanwarawas is new Project. As per demand of public and public representatives the construction of this anicut cum causeway is proposed to meet the requirement of domestic and other livelihood requirement of water for irrigation and drinking purpose in near by areas it will also help in recharging of ground water which in term will increase water table and causeway will also provide facility to connect Kanwarawas village to Dooni via Saroli mod to save the rip rain rights to the inhabitants situated surrounding the bank of the rivers, open well and tube wells also recharge, ultimately encouragement of lift irrigation through drip sprinkler system. The Storage capacity of the anicut cum causeway is 3.25 Mcum Length of this anicut cum causeway is 840 meter and height of anicut cum causeway is 1.50 meter from lowest river bed level.

Provision taken in this estimate are –

- Construction of Head wall in plum concrete (1:3:6) with providing Lemina in M-20 and D/S Apron with C.C. (1:3:6)
- M-15, M-20 with nominal reinforcement has been taken to make the structure water tight.
- The structure is gated with barrel size 1.0 meter to 0.50 meter to pass the water during rainy season.
- Provision for construction of wing wall and abutment have also taken in plum concrete.

- 1.02 Scope of work:Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonk.**

The Sentiwas causeway cum anicut is micro irrigation cum groundwater recharge structure is situated near village-Sentiawas of gram panchayat Khareda of Panchayat Samiti- Todarasingh oftehsil-Todaraisingh of district-Tonk. This is about 17.00 km away from Tehsil- TodaraisinghHq. The latitude & longitude of the project at dam site is 25°59'18.68"N & 75°34'29.92"E respectively. The inflow in the Anicut

is from Banasriver& from local catchment between downstream of Bisalpura dam and Sentiawas village.

Reason & Provision taken in this estimate are –

Every year villagers used to contribute and build earthen embankment to store water for agriculture purpose and the earthen embankment serve the purpose of road between two villages on both side of banks of river. The proposed scope of work will eliminate the losses of water, water logging & salinity problem and to improve the productivity and consequently improve the economic status of cultivators. Causeway cum anicut will also serve connectivity between the two banks of the river.

- New construction of Causeway including abutment, Slab in M-25 A20
- Construction of Cistern in M-20 over plum concrete 1:3:6 & End sill in M20.
- Provision of box culvert with gated opening.
- Construction of Abutment, Wingwall & keywall.
- Boulder filling in wire crates for Apron.

General Condition

2.01. The Site:

It shall be presumed that the contractor has satisfied himself as to the nature and location of the work in general and local conditions particularly those bearing on quarries for sand, gravel and other construction material, handling and storage of material, disposals of spoil, availability of labour, weather conditions, nallah stages etc. and has estimated his cost accordingly.

Government will bear no responsibility for any lack of such acquaintance with site conditions and the consequence thereof to the contractor.

The information and data shown in the drawings and mentioned therein and in this document is furnished for information only and, the Government will not be responsible for the accuracy thereof for any deduction, interpretation or conclusion drawn there from by the contractor.

2.02. Climatic Condition:

The rainy season commences from about middle of June and lasts upto about end of September. Beyond September sporadic showers cannot be ruled out. Normal rainfall of district is 480 mm.

The maximum temperature in summer may go upto 48⁰ C and the minimum temperature in winter may go down about 5⁰ C. May and June are generally the warmest months and December and January the coldest.

2.03. Availability of Labour:

Unskilled labour may be available locally. Some Skilled labour may also be available in the project area. The contractor must, however, make his own enquiries.

2.04.Towns:The proposed work is situated at tehsil Toda district Tonk. Kanwarwas site and Sentiawas site is about 40 Km and 35 Km from Tonk District HQ respectively.

2.05.Accesses:

The proposed work is situated at tehsil Toda district Tonk. Kanwarwas site and Sentiawas site is about 40 Km and 35 Km respectively from Tonk District on Tonk–Kota Road.

2.06.Houses:

No local housing is likely to be available and the contractor should arrange for suitable housing for the staff and labour.

2.07.Water supply and drainage:

The contractor will make his own arrangements for water supply and drainage for works as well as for the labour colony.

2.08.The contractor shall be responsible for maintaining good order in his camp and on his work and to that and shall employ such officers, watchmen or other persons as required. Un authorized 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 any employees or any agent of the contractor misbehaves or causes obstructions in the proper execution of the work or otherwise makes himself undesirable, the contractor shall on receipt of instruction from the Engineer to do so remove him from the premises within twenty-four hours. He shall not be allowed to enter the working area.

2.09.Medical Aid:

The Government is running a hospital / dispensary at Todawhich is about 15 Km from these site. Services will be available to the contractor's staff and labour on the same terms and conditions as in other Government hospitals and dispensaries subject to local rules, if any.

The contractor, however, shall provide at his own cost first aid arrangements at the work spots in accordance with labour laws and regulations and as directed by the Engineer-in-charge.

2.10.Post, Telegraphs and Telephone:

Postal facilities are available at Todawhich is about 15 Km from these site. These facilities are available at the usual terms and conditions of post and telegraph department.

2.11.Electric Power for construction purpose:

At present no electric power is available at site, hence the contractor will have to make his own arrangements for electric power both for work and domestic requirements.

2.12. Utilities and Amenities:

The utilities and amenities mentioned herein above under 2.10 and 2.11 shall be available on terms and conditions specified or, as may be in force from time to time and subject to availability. The government will attempt to maintain these services uninterrupted but no claim of compensation shall be made against the Government for any breakdowns, interruptions, stoppages, reductions, accidents etc.

2.13. Other contractors:

In the matter of dumps, haul roads approaches to the work areas drainage, diversion and the like each contractor shall take into consideration the needs and requirements of the department and other contractor if any working in the vicinity. Further no contractor shall take or disturbance to the work, labour or arrangements etc. of the department and other contractors in the project.

2.14. Inconveniences to Public:

The Contractor shall not deposit materials on any site, which will seriously inconvenience to the public. The Engineer-in-charge may require the contractor to remove any materials, which are a danger or inconvenience to the public or cause them, to be removed at the contractor's cost.

Signature of Contractor

sd
Additional Chief Engineer
WR Zone, Jaipur

Section VB: Technical Specification of Works

LIST OF INDIAN STANDARDS:

Following are the various standards relevant to concrete works (Revision to be referred)-

For all item of concrete in any portion of the structure or its associated works-controlled concrete shall be used unless otherwise specified. Normal / ordinary concrete mix as shown on the drawing or as directed by the Engineer-in-charge may be used.

The provision of the latest revision of the following IS Codes shall form a part of this specification to the extent they are relevant.

IS-226	Specification for structural steel (standard quality).
IS-269	Specification for ordinary and low heat Portland cement
IS-280	Specification for mild steel wire for general engineering purpose.
IS-303	Plywood for general purposes.
IS-383	Specification for coarse and fine aggregate.
IS-432	(All Parts) Specifications for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement.
	Part-I – Mild steel and medium tensile bars.
	Part-II – Hard drawn steel wire.
IS-455	Specification for Portland blast furnace slag cement.
IS-456	Code of practice for plain and reinforced concrete (IS:456-2000)
IS-460	Specification for test sieves.
IS-516	Methods of test for strength of concrete.
IS-650	Standard sand for testing of cement.
IS-1139	Hot rolled mild steel, medium tensile steel and HYSD bars for concrete reinforcement.
IS-1199	Sampling and analysis of concrete.
IS-1489	Specification for Portland pozzolana cement.
IS-1542	Sand for plaster.
IS-1732	Dimensions for round & square steel bars for structural & general engineering purposes.
IS-1786	Specification for high strength deformed steel bars & wires for concrete reinforcement.
IS-1791	Batch type concrete mixers.
IS-2062	Specification for structural steel (fusion welding quality)
IS-2386	(All Parts) Method of test for aggregates for concrete.
IS-2502	Code of practice for bending and fixing of bars for concrete reinforcement 41
IS-2505	Immersion type concrete vibrators.
IS-2506	Screed board concrete vibrators.
IS-2751	Code of practice for welding of M.S. bars.
IS-4656	Form vibrators for concrete.
IS-5525	Recommendation for detailing of reinforcement in reinforced concrete works.
IS-5640	Method of test for determining aggregate impact value of soft, coarse aggregate.
IS-8112	Specifications for high strength ordinary Portland cement.
IS-9103	Admixtures for concrete.

OTHER CODES AND SPECIFICATIONS:

Other IS codes pertaining to the items of cement concrete work in structural work not listed above shall also be deemed to come under the purview of this clause. All Indian Roads Congress Standards, specifications and codes of practice also come under this purview.

NOTE:- All works to be carried out as per Quality Control Manual and standards of WRD and according to IS Codes India and International.

A: GENERAL REQUIREMENTS

1. Inspection of Sites and Conditions for Construction

The Site shall mean the minimum extent of each such public and private lands in each of the sub-projects as in the opinion of the Engineer-in-charge is necessary or practicable for the rehabilitation and construction works under the Contract.

The Contractor shall take due consideration of the site conditions in estimating his rates for the various types of work and in preparing his work programmes and establishing the requirements for a safe and proper execution of the Works. The Contractor shall be deemed to have inspected the Site before preparing his Tender and to have taken into account all the different conditions of the Site of the various parts of the Works and the various sub-projects. The Contractor will not be entitled to any additional payments whatsoever as a result of site conditions.

The Contractor shall be deemed to have taken into account all possible weather conditions when preparing his Tender and his programme of Works, and he will not be entitled to any additional payments whatsoever as a result of monsoon rains and other meteorological phenomena and the working conditions thus affected.

The Contractor shall make all suitable arrangements to protect the Works, temporary works, constructional plant and materials stored on site against the effects of the weather.

No work shall be performed by the Contractor when in the opinion of the Engineer-in-charge such work is liable to be affected by the weather. The Contractor shall not be entitled to any additional payment on account of loss alleged to have been incurred as a result of the Engineer-in-charge declining to permit such work to start or to continue or ordering any work which has been affected by the weather to be removed and re-executed, or made good.

The Contractor shall make records to be agreed by the Engineer-in-charge of the condition of the surfaces of the various sites of work immediately before entering upon them for the purpose of construction of the Works.

2. Roads, Sites, Pollution and Damages

Public Roads

The Contractor shall take every precaution and make adequate provisions to prevent excavated material or other debris from being deposited on public roads, and shall maintain safe use 24 hours per day of all roads through or around any part of the Works. No work that will in any way inconvenience the travelling public shall be started until adequate provision, satisfactory to and approved by the Authority concerned and the Engineer-in-charge, has been made to divert or by-pass traffic in safety and comfort. A road shall only be closed with the written permission of the Authority concerned. All diversions shall be maintained in good condition by the Contractor and shall be at least 6 m wide. All diversions shall be to the satisfaction of the Engineer-in-charge, and where existing private or public roads are used as diversions, they shall be maintained and left in a good condition upon completion of the re-routing activity.

The Contractor will be held responsible for any accidents relating to roadways, structures, services, stream crossings and for the proper direction of traffic in a manner approved by the Highway Authority, Police and by the Engineer-in-charge. It shall be the Contractor's responsibility to obtain the permissions required.

Entry to Private Land

Where it is necessary to enter on privately owned land for the purpose of making temporary road diversions, or for any other reason, the landowner or occupier shall first be consulted by the Contractor and his written permission obtained.

The Contractor shall ensure that, in case the landowner or occupier refuses access, the Engineer-in-charge is informed at least 6 weeks before the intended start of work in the area concerned.

Care shall be taken that no undue damage is caused to the land, and at the completion of the work, the land shall be left in a tidy and restored (if appropriate) condition to the satisfaction of the landowner or occupier and the Engineer-in-charge.

Sites to be kept clean Each individual site must be kept clean during the work and must be thoroughly cleaned up on completion.

Pollution of Drains and Waterways

The Contractor shall take all necessary precautions to secure the efficient protection of all waterways against pollution including spillage of oil or concrete mixer wastes, site drainage or any other harmful materials. The Contractor shall seek the Engineer-in-charge's approval before discharging any substance that may degrade groundwater quality. If nevertheless, such spillage occurs, the Contractor shall clean the waterway at his own expense, and keep the Employer indemnified against any claim arising from such pollution during the execution of the Works and the Period of Guarantee.

Damage to Public Services

Existing public services being affected by the construction activities have to be adequately secured in co-ordination with the respective entities.

The Contractor will be held responsible and shall pay all costs related to damages to private property or roads, bridges, pipes, electric cables, lines or services of any kind caused by him or any of his sub-Contractors during the execution of the Works.

The Contractor shall make good or arrange to make good at his own expense any damage without delay, and shall carry out any further remedial work ordered by the Engineer-in-charge.

3. Standards

Reference is made throughout the Specifications to BIS (Bureau of Indian Standards) which shall apply in full to all works executed, whether specifically mentioned or not.

4. Level, Bench Marks and Setting-out of Works**Bench Marks and Levels**

It shall be the Contractor's responsibility to obtain from the Engineer-in-charge before commencing the work coordinates and levels of bench marks (B.M.s) which have already been established by the Employer during the SID works. The Contractor shall use these B.M.s to establish additional temporary bench marks as necessary throughout the sub-project areas at his own cost. These shall be of a form approved by the Engineer-in-charge and maintained until the completion of the Works.

The levels and coordinates of the bench marks and control points will be determined on Site and approved as necessary by the Engineer-in-charge. The levels and coordinates shall be based on the data of bench marks provided by the Engineer-in-charge.

Setting-out of Works

The Contractor shall be responsible for the setting out of the Works. All dimensions and levels shown on the Drawings or referred to in any document forming part of the Contract shall be verified by the Contractor on Site. He shall be responsible for pointing out promptly any discrepancy or error in such dimensions or levels.

The Contractor shall prepare detailed setting out drawings and data sheets as necessary and submit them to the Engineer-in-charge for approval. Any modification of these drawings or data sheets required by the Engineer-in-charge shall be made by the Contractor and resubmitted for final approval.

5. Temporary Utility Supplies**(i) Water Supply (Temporary)**

The Contractor shall provide at his own expense a temporary supply of potable and other water required as prescribed in the Conditions of Contract for any portion of the Works. He shall provide, operate and maintain the supply throughout the duration of the Works. Quality of water shall be to the satisfaction of the Engineer-in-charge.

(ii) Electricity Supply for Power and Lighting (Temporary)

The Contractor shall arrange for and pay all costs in connection with the temporary supply of electricity he may need for the duration of the Contract. If the Contractor intends to provide his own electricity supply, the regulations of the Armenian Electric Authority are to be observed and the permission of this Authority is to be obtained.

(iii) Haul roads

The contractor shall have to provide and maintain quarry for the construction materials and temporary roads for conveying the material, at his own cost.

(iv) Other Services

The Contractor shall make his own arrangements for and shall provide and pay for any services required during the duration of the Contract.

6. Materials

Quality of Materials and Workmanship

All materials to be provided by the Contractor for use in the Permanent Works shall be new and conforming to the required specifications. The workmanship shall also be of the specified quality, all to the approval of the Engineer-in-charge.

Approval of Suppliers of Materials

Before entering into any sub-Contract for the supply of any materials or goods the Contractor shall obtain the Engineer-in-charge's approval in writing of the sub-Contractor from whom he proposes to obtain such materials or goods. Should the Engineer-in-charge at any time be dissatisfied with such materials or goods or with the methods of operation carried out at such sub-Contractor's works or place of business, he shall be empowered to cancel his previously given approval of such sub-Contractor and to specify any other suppliers whom he may choose or to approve another sub-Contractor for the supply of such materials or goods. The Contractor shall then obtain the said materials or goods from such other supplier and shall bear any additional cost thereof.

Copies of Orders

The Contractor shall provide the Engineer-in-charge with three copies of all orders for the supply of materials and goods required for the Works.

Samples

In addition to specific provisions for sampling and testing of materials in various clauses, the Contractor shall submit to the Engineer-in-charge, as he may require, samples of all materials which he proposes to use in the Works. When approved, these will be retained by the Engineer-in-charge.

Samples to be submitted shall be accompanied by an approved form on which all information about specification, description, location of use, manufacturer etc. are stated.

The Engineer-in-charge may reject any materials or goods which in his opinion are inferior to the samples submitted.

The Engineer-in-charge's approval of manufacturers or material for the Works, whenever required by the Specifications, shall not relieve the Contractor of his responsibilities under the Contract.

Tests

The Engineer-in-charge may examine and may require testing of any materials or goods provided by the Contractor for use in the Works. The Contractor shall give the Engineer-in-charge unrestricted access to his and his sub-Contractor's premises and suppliers for such purposes at all times.

The Contractor shall afford the Engineer-in-charge all facilities, assistance, labour and appliances necessary for the convenient examination, testing, weighing or analysis of all materials and goods provided by the Contractor. The Contractor shall prepare test samples which the Engineer-in-charge may require.

Tests carried out off the site shall not relieve the Contractor of the responsibility of ensuring that the materials pass any required tests when they are incorporated in the Works.

The costs for all tests prescribed in the Specifications are to be borne by the Contractor and are deemed to be included in his Contract prices. The costs for any additional tests required by the Engineer-in-charge shall be borne by the Employer.

Test Certificates

Where so specified, the Contractor shall obtain Test Certificates from his supplier and forward three copies of such certificates to the Engineer-in-charge. Such certificates shall certify that the materials or goods have been tested in accordance with the Specifications and relevant Standards, and shall state in detail the results of the tests which have been carried out

The Contractor shall provide adequate means on site to identify the materials or goods with their respective test certificates.

7. Drawings

Contract Drawings

The Contractor shall verify all dimensions, quantities and details shown on the Drawings or other data received from the Engineer-in-charge, and shall notify him immediately of any error, discrepancy or conflict found therein. Failure to discover such errors, discrepancies or conflicts shall not relieve the Contractor of full responsibility for unsatisfactory work, nor from rectifying such work at his own expense.

The designs of all structures and installations as shown on the Drawings are in conformity with structural requirements according to the relevant I.S. standards, the site conditions and loads applied for the function and purpose designed. However, the Contractor shall be responsible to check and verify the suitability of the design with regard to stability and structural requirements.

The Engineer-in-charge reserves the right to issue additional drawings throughout the progress of the Works and these will constitute complementary Contract Drawings.

Survey Records and As-Built Drawings

After clearing the Site, the Contractor shall take and record levels in the manner directed by and in the presence of the Engineer-in-charge of the Site and Works. Such levels, when approved by the Engineer-in-charge, shall be recorded by the Contractor on drawings and/or schedules which shall be signed as a true record by the Contractor and the Engineer-in-charge and shall form the basis of the measurement of the Contractor's work.

Excavation works shall not commence before such records are certified by the Engineer-in-charge.

Parallel to the completion of individual items of work, the Contractor shall prepare sketches/copies of the Drawings with all as-built information to the satisfaction of the Engineer-in-charge, which shall serve as basis for the preparation of as-built drawings by the Employer.

Prior to handing over of completed works and issue of the Completion Certificate, the Contractor shall have prepared and submitted such as-built information to the satisfaction of the Engineer-in-charge.

8. Contractor's Monthly Reports

Progress Reports

The Contractor shall report monthly progress to the Engineer-in-charge on charts submitted in triplicate showing actual work done superimposed on copies of his agreed programme. He shall provide an explanation for any deviation from his programme and shall in the case of delays propose strategies for improving progress.

The reports shall be delivered to the Engineer-in-charge within one week after the end of each month.

Labour and Plant Returns

The Contractor shall, his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport, as specified in sub-clause 52A.

The Contractor shall deliver to the Engineer-in-charge a monthly return in detail at the end of each month, in such form as the Engineer-in-charge may prescribe, showing the staff and the numbers of the several classes of labour employed from time to time by the Contractor on the Site and such other information as the Engineer-in-charge may require.

The Contractor shall include with his monthly reports details of all plant, (including their values) and labour force employed on the Site together with a description of their deployment. He shall also provide a list of all materials intended for use in the Permanent Works delivered to the Site.

9. Compliance with Labour Regulation

During continuance of the Contract, the Contractor and his sub Contractors shall abide at all times by all existing labour enactments and rules made there-under, regulations, notifications

and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification 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 construction industry are given further 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 non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer-in-charge/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer-in-charge shall also have 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.

10. Quality Control

The Contractor, at his own cost is required to provide all facilities, equipment, tools and other means necessary to the proper selection of soils and materials, production of mortars and concrete mixes and construction of all works as specified.

Quality control will follow the 'Quality Control Manual' prepared by the Department and the relevant IS standards. The Contractor has to facilitate and assist as required in sampling and the execution of tests as specified in the various Sections of the Specifications and as required in the Manual and from time to time requested by the Engineer-in-charge and by the Quality Control Unit.

11. Safety Measures and Services

The Contractor shall be responsible for the safety and health of all workmen and other persons in or around the Works, to the satisfaction of the Engineer-in-charge. Such measures shall include, but not be limited to, the following:

- Provision of proper safety and emergency regulations; fire, gas and electric shock prevention, stretchers and first aid box together with rescue facilities generally at each place of work;
- Adequate supports and braces for all excavations;
- Provision of sufficient safety helmets for all personnel including the Engineer-in-charge, his staff, and any authorized visitor to the Site;
- Safe control of water including the provision of standby pumping plant;
- Provision and maintenance of safe, sound ropes, slings, pulleys and other lifting equipment, each having an up-to-date test certificate;
- Provision and maintenance of safe and sound mechanical frames, hoists, cranes, and vehicles for transporting and handling of pipes, materials and equipment with an up-to-date test certificate for each item;
- Provision of good and safe access to the Works;
- Provision of warning notices to the public

The Contractor shall ensure that employees are available at each site to administer emergency first aid and that all employees are aware of their names. The Contractor shall provide for the transport of serious cases to hospital. All medical facilities shall also be to the satisfaction of any properly appointed medical officer authorized by the Government of Rajasthan to inspect medical facilities at the Site.

The Contractor shall ensure that all his employees are fully conversant with the regulations and emergency procedures, and shall enforce the rule that any employee committing a serious breach of such regulations shall be immediately dismissed and shall not be re-employed.

12. Sanitary Arrangements

The Contractor shall provide and maintain sufficient sanitary conveniences for all operatives and site staff engaged on the Works. These shall be in accordance with any requirements and

regulations of the Government of Rajasthan and subject to the approval of the Engineer-in-charge. The ground shall be thoroughly disinfected at the end of the Contract.

13. Protection of the Environment

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

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

B: SITE CLEARANCE AND PREPARATORY WORKS

1. Site Clearance

General

The Contractor shall examine the Site and familiarize himself with the nature of the ground, excavation methods to be applied and physical obstructions and conditions on Site that may affect his work and prices. His rates shall allow for all operations and costs required and encountered when carrying out the Works in accordance with the Contract. Claims due to lack of knowledge of site conditions will not be entertained.

The Contractor shall not execute any earthwork or excavation without having the Engineer-in-charge's prior approval to the methods which he proposes to employ. He shall not thereafter modify such methods without the Engineer-in-charge's consent.

Clearing Site

The Contractor shall remove overburden and vegetation, fell trees, cut down hedges and bush and grub up roots, all as required by the Works and as directed by the Engineer-in-charge. No material or trees shall be removed from the site without prior approval from the Engineer-in-charge. All rubbish and material unsuitable for re-use must be removed from the site to an approved disposal area provided and paid for by the Contractor and all work that has been disturbed must be made good.

Felling Trees

Where directed by the Engineer-in-charge, trees with a trunk exceeding 0.15 m diameter shall be uprooted and holes shall be filled with approved material and well compacted. Rates for removal shall allow for haulage not exceeding 2 km.

2. Demolitions and Alterations

General

The work shall be carried out in such a manner as to cause as little inconvenience as possible to any premises or adjoining premises and the public.

The Contractor must provide all necessary requisite shoring, needling and strutting or other supports incidental to the demolition and/or alteration work and alter and adapt all such temporary works as may be necessary from time to time, and finally clear away and make good all that which is disturbed.

Where materials from the demolitions and dismantling are described as "remove from site" they shall become property of the Contractor. He shall include in his rates for the disposal of such materials together with all associated costs and he shall adjust his rates for any credit which he is prepared to allow on such materials.

Any structures to be demolished shall be taken down to a depth of 1.0 m below the ground or formation level as per the directions of the Engineer In-charge, the excavation properly cleaned out and filled with approved material.

Demolition of Structures

Monolithic structures (R/C) are demolished by breaking out holes into the concrete and cutting-off the naked reinforcement after the concrete edges have sufficiently been separated. Concrete may be demolished in huge blocks if this cannot cause damage.

3. Contractor's Right of Way and Reinstatement

Right of Way shall be the area(s) allocated to the Contractor to enable execution of the Works in accordance with the Contract. Due to physical statutory other special conditions the working width of Right of Way may be restricted (including restricted access to working sites). The Contractor is deemed to have included in his Contract Price all costs encountered for complying with such restrictions.

In general, the maximum working width (Right of Way) for any section of canal work in agricultural land shall be not more than 15 m. For access to the site of Works the working width shall be not more than 6 m. For isolated compact sites an all around width of 12 m beyond the net sizes of the units will be allowed, unless the area is otherwise defined by the Engineer-in-charge.

In case the Contractor requires areas outside the allocated Right of Way he may, with the prior agreement of the Engineer-in-charge, negotiate these on his own behalf and shall be

responsible for all costs involved and for the reinstatement after completion of permanent works.

Before commencement of construction of new works the Contractor shall carefully strip the top soil from any agricultural land, garden and the like to the depth as directed by the Engineer-in-charge and over the entire working width. Top soil shall be deposited separately from other excavated material for reuse. After completion of works and before placing top soil, the entire area affected by the Contractor's activities shall be scarified to a depth of 450 mm and shall be made up to the required level to receive top soil.

All fences, walls, structures, buildings, etc. affected by the Contractor's work shall be reinstated to the satisfaction of the owner and the Engineer-in-charge.

Trees within the Right of Way may be cut down only after having received the owner's and the Engineer-in-charge's permission. Any damage to trees, whether accidental or otherwise, shall be reported to the Engineer-in-charge.

Where the Contractor's operations have resulted in disturbances to soils, trees, gardens, vegetation, fence, property, etc., the Contractor shall reinstate the condition to a satisfactory "pre-works" condition. No additional payment will be made for any works associated with reinstatement of soils, agricultural lands, fences, property, etc. After completion of reinstatement works, the Engineer-in-charge shall carry out an inspection of the completed works in the presence of the Contractor's representative, advise the Contractor whether in the opinion of the Engineer-in-charge, the Contractor has reinstated the condition satisfactorily to the pre-works condition. In case of deficiencies, the Contractor shall execute further reinstatement works to the Engineer-in-charge's satisfaction.

The Completion Certificate, as per Clause 6 of the Conditions of Contract, for any section of works completed will be issued to the Contractor only after an inspection by the Engineer-in-charge has established that all disturbances have been made good through proper clean up, reinstatement of soils, agricultural lands, fences, property, etc.

C: EARTHWORK FOR DAM EMBANKMENT (EXCAVATION AND EARTHFILL)

1. Terminology

Borrow area:	The source of construction materials required for earth and rockfill dams.
Horizontal filter:	A layer of uniform or graded previous material placed horizontally.
Inner longitudinal drain:	A trench filled with material and laid along the downstream toe of the core of the dam to collect it and discharge to the toe drain.
Inner cross drain:	A trench filled with filter material to collect seepage from the inner longitudinal drain and carry it to the toe drain.
Rock toe:	A zone of free material provided at the toe of the dam.
Toe drain:	A trench with filter material laid along the downstream toe of an earth or rock fill dam to collect seepage from the horizontal filter or the inner cross drain and take it to the natural drainage.

A- Excavation

1. Line Out

All materials such as pegs, bamboos, strings and templates for marking out excavation and labour required for line-outs shall be provided by the contractor at his own cost. The centerline of excavation shall be clearly marked by pegs or by stones at each 30 meters or change of direction or at short intervals on curves, in the beginning. The final layout will be done by fixing reference stones at suitable distances on either side of the centerline, so that they are not disturbed during construction period. The position of these stones shall be marked on the cross-sections.

2. Cross Sections to be taken

Immediately prior the beginning of the work, cross-sections of the existing ground level at suitable intervals, normal to the axis of the dam, canal alignment and other channels, sluice, waste-weir or other masonry structures etc. shall be taken, over the base and seating of the dam, channels or other structures etc. for sufficient distance outside the limits. Levels on these cross-sections shall be suitable interval not exceeding 6m or as directed by the Engineer-in-charge.

3. Classification of Strata

Classification of soils shall be as follows:-

- (i) **Soft or Ordinary Soil:** Generally any soil which yields to the ordinary application of pick and shovel or to spade, rake or other digging implement, such as vegetative or organic soil, turf, gravel, sand, silt, loam, clay peat etc.
- (ii) **Hard Soil:** Includes all materials which can be removed with shovel or spade after loosening with pick axe such as clay soil mixed with lime kankar, black cotton soil for earthen bund, soft moorum, etc.
- (iii) **Hard Moorum and Moorum mixed with boulders:** Generally, any materials which require the close application of picks, jumpers or scarifiers to loosen such as hard and compact moorum and soft shale. Moorum or soil mixed with small boulders not exceeding 25% in quantity and each less than 0.014 m³ (300 mm dia.) but more than 0.004 m³ in size.
- (iv) **Mud** – A mixture of soil and water in fluid or weak solid state
- (v) **Soft/ Disintegrated Rock (not requiring blasting)** - rock or boulder which may be quarried or spilt with crow bars. This will also include laterite and hard conglomerate
- (vi) **Hard rock (requiring blasting)** – any rock or boulder for excavation of which blasting is required
- (vii) **Hard Rock (blasting prohibited)** – Hard rock requiring blasting as described above but where blasting is prohibited for any reason and excavation has to be carried out by chiseling, wedging or any other agreed method.

Note: Boulders are rock fragments usually rounded by weathering, disintegration or exfoliation or abrasion by water or ice, found lying loose on the surface or embedded in river bed, soil talus, slope wash and terrace materials of dissimilar origin.

4. Clearing, Grubbing and Preparation of Works Area

All excavation areas and dam embankment area including a 6 m wide strip measured beyond and contiguous to the limit line of the area as shown on the Drawings shall be cleared and any roots etc. completely removed as specified. All trees, down timbers, fencing, bush, rubbish, other objectionable materials and vegetation shall be cleared, excavated and removed. All roots over 50 mm in diameter shall be removed to a depth of 90 cm below the original ground surface or as directed by the Engineer-in-charge. Materials thus removed will be burnt or completely removed from the site. All felled timber and fuel wood shall be properly stacked and handed over to the Department, when asked for the Engineer-in-charge. Pilings for burning shall be done in such location where burning does not create any harm and where it can be reduced to ashes. Special precautions shall be taken to prevent fire from spreading to the areas beyond limits of the area specified and suitable equipment and supplies for preventing and suppressing fire shall be available at all times.

No trees shall be cut from outside of the areas designated unless instructed in writing by the Engineer-in-charge and all trees designated outside of the areas actually occupied by the works shall be protected carefully from the damage.

5. Stripping and Benching of Areas Coming under Dam Embankment

The entire area of the dam embankment or any area required for strengthening of existing embankments shall be stripped or benched to a sufficient depth as directed to remove all unsuitable materials including a 3 m wide strip beyond and contiguous with the area or embankment proper as shown in the Drawings. The unsuitable materials to be removed shall include loose rock, vegetation, top soil, sod, organic silt, swamp materials and rubbish and any other objectionable materials below the ground surface.

At locations where a river or stream crosses the embankment site, loose sand and gravel and loose boulders shall also be removed as directed.

Stripped materials shall be disposed off in a manner as may be directed by the Engineer-in-charge and in such a way as not to detract from the finished appearance of the project.

6. SHORING AND STRUTTING

MAINTENANCE OF EXCAVATION SLOPES

Any shoring and strutting required during construction shall be deemed to be covered in the rates quoted for the items. The contractor shall be responsible for the adequacy and stability of the excavated slopes. If at any particular locations the contractor considers it necessary in the interest of safety to provide berms he shall forthwith bring the same to the notice of the Engineer-in-charge and obtain orders thereon. Such additional excavation shall be paid for at the rate accepted for the particular class of material.

7. SLIPS

Every precaution shall be taken to prevent slips. But should slips occur, the slipped material shall be removed to slopes as directed. No compensation shall be paid to the contractor because of mishaps/problems arising out of slips.

8. PREPARING AND CHECKING EXCAVATION

Rough excavation completed to the required depth is to be further cleaned and finished as below. The scaling and trimming operations, for the removal of all pieces loosened during excavation or partly separated from the main rock mass by seams or cracks shall be carried out to satisfaction of the Engineer-in-charge.

9. TREATMENT OF WEAK LOCAL SPOTS

All weathered or partly decomposed pieces of rock shall be removed so as not to leave on the foundation, any rock other than that which is an integral part of rock mass. Area of low bearing capacity seams, joints, crevices, steep / inclined seams, weak zones or such other defects shall be corrected by excavation of open trenches to the lines, depth and dimensions as directed by the Engineer-in-charge.

10. FINAL FINISHED SURFACE OF EXCAVATION

The finally prepared excavated profile as per approved drawing shall present a rough surface or shall be properly roughened to provide good bond to concrete / masonry / earthwork.

The excavated stuff shall be dumped in the dumping area shown in the drawing or as directed by the Engineer-in-charge.

11. DISPOSAL OF EXCAVATED STUFF

12. DEPOSITION OF EXCAVATED STUFF CLEAR OFF TRAFFIC LINE ETC.

Before any excavation is started the deposition of the spoil shall be carefully planned, so as not to obstruct transport of the construction materials. It shall be dumped sufficiently clear off the edges of the excavation so as not to endanger stability of the slopes of the excavation and also permit ample space for movement of traffic and haulage, lorry/truck/tipper, installations of lifting and pumping devices, stacking of construction materials etc.

13. SORTING OF EXCAVATED MATERIALS

The excavated materials shall be carefully sorted, so as to separate the materials useful for various works, e.g. excavated rock materials shall be carefully sorted and stacked for use in masonry as directed by the Engineer-in-charge.

14. MODE OF STACKING USEFUL MATERIALS

The useful materials shall be stacked in separate area with reference to the nature of the materials. Stock piles shall be of regular shapes, allowing easy measurements. No stock pile shall measure more than 6 metre and less than 1.25 metre in length, unless specifically permitted.

15. MODE OF DEPOSITING WASTE MATERIALS

The waste materials shall be stacked in spoil banks in regular shapes with suitable slopes as directed and properly trimmed, so as to present a neat appearance or they may be deposited in other approved locations. The spoil banks shall be located in such a way that they will not interfere with the natural flow of the river or nalla.

No materials shall be wasted where it will detract from the appearance or interfere with the accessibility of the completed structures. Excavated materials shall not be carelessly thrown over the entire premises of the work but shall be deposited directly in permanent position consistent with proper execution of the work.

16. BLASTING

OBSERVING RULES REGARDING BLASTING

In conducting blasting operations proper precautions shall be taken for the protection of persons, works and property. All Government laws and the relevant laws for explosives relating to the designs and locations of explosive magazines including those for storage detonators, transport and handling of explosives and other measures enacted for the prevention of accidents shall be strictly observed. Warning signals shall be given for each blast.

16.1 STORING OF EXPLOSIVES

Explosives shall be stored in the magazines building / portable magazine (of proper specifications), to be provided by the contractor under the special care of security personnel, to prevent any accidents/damages to works/property/human lives. Explosives, detonators and fuses shall each be separately stored.

16.2 RESTRICTIONS ON BLASTING

- a. No blasting which may disturb or endanger the stability, safety or quality of the foundation will be permitted.
- b. Blasting within 30 metres of main work in progress/ existing of a permanent structure shall not be permitted.
- c. Progressive blasting shall be limited to two third of the total remaining depth of excavation.
- d. No large scale blasting operations will be resorted to when the foundation excavation reaches the last one metre, and only small charges may be allowed so as not to shatter the foundation.
- e. The last blast shall not be more than ½ metre in depth. Thereafter, for finishing the excavation work and in special locations (only in rock) where specifically indicated use of explosives shall be discontinued and excavation completed by bars, by

wedging, chiseling or other suitable methods approved or as directed and cost of such work will be deemed to have been included in the tendered rate.

16.3 CONTROLLED BLASTING

This item includes excavation in hard strata / rock by controlled blasting duly approved by the Engineer-in-charge and stacking the material as directed including all leads and lifts.

Where the item of control blasting is not included in tender and where due to proximity of building, electrical lines and telephone lines near the work space, the excavation in hard rock will have to be done with controlled blasting with prior approval of Chief Engineer.

All the specifications of the item of excavation in Hard rock by ordinary blasting shall be applicable to this item. In addition to this, following specification shall also apply.

The portion where the controlled blasting is to be carried out shall be covered with M.S. plates, M.S grill and sufficiently loaded with R.S.J., sand-bags, so that large pieces of rock fragments, small chips etc. will not fly and endanger or damage any public or private property, human or animal life.

The details such as depth and spacing of blast holes, quantity of explosive per hole and number and location of holes to be blasted at a time shall be decided by the contractor in consultation with Engineer-in-charge to ensure desired safety to the nearby structures.

Even after all the precautions which are necessary and/or as ordered by the Engineer-in-charge, are taken, any accident takes place due to blasting operations, resulting into damage to any property and /or life, and/or if there are any injuries to life and/or there are any deaths it will be the entire responsibility of the contractor to pay compensation and/or face the consequences thereof. The piece worker / contractor shall execute this item entirely at his risk.

The area of controlled blasting will be specified by the Engineer-in-charge.

16.4 RULES FOR BLASTING OPERATIONS

16.4.1 GENERAL

1. The contractor shall acquaint himself with all applicable laws and regulations concerning storing, handling and the use of explosives. All such laws, regulations and rules etc. as are prevalent from time to time shall be binding upon the contractor.
2. The provisions detailed in these rules are supplementary to the above laws, rules and regulations etc., and are applicable except where they conflict with the aforementioned laws etc. from time to time and also subject to modifications, alterations or new instructions given from time to time. The contractor shall comply with the same without these being made a cause for any claims.

16.4.2 MATERIALS

1. All materials such as explosives, detonators, fuses, tamping materials etc. that are proposed to be used in the blasting operations shall have the prior approval of the Engineer-in-charge.
2. Black powder and safe explosives (as commonly current in India) shall preferably, be used wherever possible. Explosive with nitro glycerin (special gelatin etc.) and detonators shall only be used with the prior approval of Engineer-in-charge.
3. The use of the fuse with only one protective coat is prohibited. The fuse shall be sufficiently water resistant as to be unaffected when immersed in water for thirty minutes. The rate of burning of the fuse shall be uniform and less than 4 seconds per 2.5 cm of length with 10% tolerance on either side.
4. Before use, the fuse shall be inspected and moist, damaged or broken ones discarded. The rate of burning of all new types of fuses or when they have been in stock for long, shall be tested before use.
5. The detonators used shall be capable of giving effective blasting of explosives. Moist or damaged detonators shall be discarded.

16.4.3 PERSONNEL

1. Excavation by blasting will be permitted only under personal supervision of competent and licensed persons and trained workmen.
2. All supervisors and workmen in charge of making up, handling storage and blasting work, shall be adequately insured by the contractor.

3. The storage shall be in charge of a very reliable approved person. Police inquiries being made as to his reliability, antecedents etc. The contractor shall have to produce a security for the person in charge of explosives if and as required by the Engineer-in-charge or the civil authorities of the District.
4. The contractor shall make sure that his supervisors and workmen are fully conversant with all the rules to be observed in storing, handing and use of the explosives. It shall be assured that the supervisor in charge, is thoroughly acquainted with all the details of the handing of the blasting operations

16.4.4 STORAGE OF EXPLOSIVES

1. The contractor shall build a magazine for storing the explosives. The site of the magazine, its capacity and design shall be subject to approval by the Engineer-in-charge and the inspector of Explosives before the construction is taken up. As a rule, the explosives should be stored in a clean, dry, well ventilated, bullet-proof and fire-proof building on the isolated site.
2. The Explosives, detonators and fuses shall each be separately stored.
3. A careful and day-to-day account of the use of explosives shall be kept by the contractor in an approved register and in an approved manner. The register shall be produced by the contractor for the inspection when so required by the latter. The Engineer-in-charge may also pay a surprise visit to the storage magazine. In case of any unaccountable shortage of explosives or if the account is not found to have been maintained in a manner prescribed, the contractor shall be liable to be penalized with forfeiture of the Security deposit lodged by him with the Government or his tender shall be liable to be cancelled, in which case he shall not be entitled to any compensation for the losses etc. The action taken under this clause shall be in addition to that which might be taken by the competent civil authorities in court of law.
4. The magazine shall at all times be kept scrupulously clean.
5. No un-authorized person shall at any time be admitted inside the magazine.
6. The magazine shall when not in use of authorized person, be kept securely locked.
7. The magazine shall on no account be opened during or at the approach of thunderstorm and no person shall remain in the vicinity of the magazine during such period.
8. Magazine shoes without nail shall, at all time be kept in the magazine and wooden tub or cement trough about 30 cm high and 45 cm in diameter filled with water shall be fixed near the door of the magazine.
9. Persons entering the magazine must put on the magazine shoes which shall be provided by the contractor for the purpose and be careful.
 - i) Not to put their feet on the clean floor unless they have the magazine shoes on.
 - ii) Not to allow the magazine shoes to touch the ground outside the clean floor.
 - iii) Not allow any dirt or grits to fall on the clean floor.
10. Persons with bare feet, shall, before entering the magazine, dip their feet in water and then step direct from the tub over the barrier (if there be one) on the clean floor.
11. A brush or broom shall be kept in the lobby of the magazine for cleaning out the magazine on each occasion it is opened, for the receipt, delivery or inspection of explosives.
12. No matches or inflammable material shall be allowed in the magazine. Light shall be obtained from an electric storage battery lantern.
13. No person having articles of steel or iron on him shall be allowed to enter the magazine.
14. Workmen shall be examined before they enter the magazine to see that they have none of the prohibited articles in their possession.
15. Oily cotton rags / waste and articles liable to spontaneous ignition shall not be allowed inside the magazine.
16. No tools or implements other than those of copper, brass, gunmetal or wood shall be allowed inside the magazine. All tools shall be used with extreme gentleness and care.
17. Boxes of explosives shall not be thrown down or dragged along the floor and shall be stocked on wooden trestle. Where there are white ants, the legs of the trestles should rest in shallow

copper, lead or brass bowls, containing water, open boxes of dynamite shall never be exposed to the direct rays of the sun.

18. Empty boxes of loose packing material shall not be kept inside the magazine.
19. The magazine shall have a lightening conductor, which shall be got tested at least once a year, by an officer authorized. The testing fee, as applicable, shall be a charge on the contractor. The contractor shall within 15 days comply with all the recommendations made by the officer, testing the lightening conductor failing which, they shall be got complied with, at the contractor's expense which shall not be open to question and any action that may be considered fit shall be taken.
20. A notice shall be hung near the store prohibiting entrance of un-authorized persons.
21. The following shall be hung in the lobby of magazine :-
 - i. A copy of rules both in English and in the languages which the workers concerned are familiar with.
 - ii. A statement showing the up-to date stock in the magazine.
 - iii. A certificate showing the last date of testing the lightening conductor.
 - iv. A notice that smoking is strictly prohibited.
 - v. The magazine will be inspected at least twice a year by the officer authorized who will see that all the rules are strictly observed. He will notify all omissions etc. to the contractor, who shall rectify the defect within a period of 15 days from the date of receipt of the notice failing which action as considered suitable, will be taken.

16.4.5 USE OF EXPLOSIVES

1. For the transport of the explosives and detonators between the stores and the site, closed and strong container made of soft material such as timber, zinc, copper, leather and like shall be used. Specially manufactured "explosive vans" should be deployed by the contractor to transport explosives. Detonators should be transported separately in the other explosive van.
2. Explosives and detonators shall be carried in separate boxes and transported separately. For the conveyance of primers, special containers shall be used.
3. The boxes and containers used shall be kept properly closed.
4. Explosives shall be stored and used chronologically to ensure that the once received earlier are used first.
5. A make up house shall be provided at each working place in which cartridges will be made up by an experienced man as required. The makeup house shall be separated from other buildings. Only electric storage battery lamps shall be used in this house.
6. No smoking shall be allowed in the magazines, explosives vans.

16.4.6 DISPOSAL OF DETERIORATED EXPLOSIVES.

All deteriorated explosives shall be disposed off in an approved manner. The quantity of the deteriorated explosives to be disposed off shall be intimated to the Engineer-in-charge prior to its disposal.

16.4.7 PREPARATION OF PRIMERS

The primers shall not be prepared near open flames or fires. The work of preparation of primers shall always be entrusted to the same persons. Primers shall be used as soon as possible after they are ready.

16.4.8 CHARGING OF HOLES

1. The work of charging shall not commence before all the drilling work at the site is completed and the supervisor has satisfied himself to that effect after actual inspection. While charging, open lamps shall be kept away. For charging with powdered explosives, naked flames shall not be allowed.
2. Only wooden tamping rods, without any kind of metal on them shall be allowed to be used.
3. Bore holes must be of such a size that the cartridges can easily pass down them.
4. Only one cartridge shall be inserted at a time and gently pressed home with the tamping rod. The sand, clay or other tamping material used for filling the hole completely shall not be tamped too hard.

16.4.9 BLASTING

1. Blasting shall be carried out during fixed hours of the day which shall be got approved. The blasting hours once fixed shall not be altered without the prior written approval.
2. The site of blasting operations shall be prominently demarcated by red danger flags. The order to fire shall be given only by the Supervisor-in-charge of the work and this order shall be given only after giving the warning signal threetimes, so as to enable all the labour, watchmen etc. to reach to safe shelter and after having ascertained that nobody is within the danger zone.
3. A bugle or a siren with a distinctive note shall be used to give the warning signals. This bugle shall not be used for any other purposes. All the labour shall be made acquainted with the sound of the bugle and shall be strictly warned to leave their work immediately at the first warning signal and to make for safe shelter and not to leave the shelter until the clear signal has been given.
4. All the roads and footpaths leading to the blasting area shall be watched.
5. In special cases suitable extra precautions shall be taken. Blasting for underground excavation without restriction of fixed time may be permitted provided that proper precautions are taken to give sufficient warning to all concerned and that the work of other agencies on the site is not unduly hampered.
6. For lighting the fuse a lamp with a strong flame such as a carbide lamp shall be used.
7. The supervisor shall watch the time required for firing the fuses and shall see that all the workmen are under safe shelters in good time.

16.4.10 ELECTRICAL FIRING

1. Only the Supervisor-in-charge shall keep the key of the firing apparatus and he shall keep it always with himself.
2. Special apparatus shall be used as a source of current for the blasting operations such as a blasting battery. Power lines shall not be tapped for the purpose.
3. All the detonators shall be checked before use.
4. For blasts in one series only detonators of the same manufacturer and of the same group of electrical resistance shall be used.
5. Such of the electrical lines as could constitute danger for work of charging shall be removed from the site.
6. The firing cable shall have a proper insulating cover so as to avoid short circuiting due to contact with water or metallic part or rock.
7. The use of earth as a return line shall not be permitted.
8. The firing cable shall be connected to the source of current, only after ascertaining that nobody is in the area of blasting.
9. Before firing, the circuit shall be checked by the suitable apparatus.
10. After firing whether with or without an actual blast the contact between firing cable and the source of current shall be cut off, before persons are allowed to leave the shelters.
11. During storms, charging with electrical detonators shall be suspended. The charges already placed into the holes shall be cut off as quickly as possible, after taking all safety precautions and giving necessary warning signals. If this is not possible the site shall be abandoned till the storm has passed.

16.4.11 PRECAUTION AFTER BLAST AND MIS-FIRES

1. If it is suspected that part of the blast has failed to fire or is delayed. Sufficient time shall be allowed to elapse before entering the danger zone. When fuses and blasting caps are used, a safe time should be allowed and then the Supervisor alone shall leave the shelter to see misfire.
2. Drilling near the hole that has misfired shall not be permitted until one of the two following operations have been carried out by the supervisor:-
 - (i) The supervisor should very carefully (when tamping is of damp clay) extract the tamping with a wooden scraper or jet of water or compressed air (using a pipe of soft material) and withdraw the fuse with the primer and detonator attached. A fresh primer and detonator with fuse shall then be placed in this hole and fired.

- (ii) The supervisor shall get one foot of the tamping cleared off and indicate the direction by placing a stick in the hole. Another hole may then be drilled at 230 mm away and parallel to it, this hole should then be charged and fired. The balance of the cartridges and detonators found in the rock shall be removed.
- 3. Before leaving his work, the Supervisor should inform the Supervisor of the relieving shift of any case of misfire and shall point out the position with the Red Cross denoting the same and also state what action, if any he has taken in the matter.
- 4. The Supervisor shall at once report to the office all cases of misfire, the cause of the misfire and the steps taken in connection therewith.
- 5. The names of the Supervisor-in-charge of day or night shift shall be noted daily in the contractor's office.
- 6. If misfire has been found to be due to defective detonator or dynamite the whole quantity of box from which the defective article was taken must be returned to the authority as may be directed by the Engineer-in-charge for inspection to ascertain whether the whole box contains defective material.
- 7. Re-drilling the holes that have misfired either wholly or partly shall not be permitted.

16.4.12 PRECAUTIONS AFTER BLASTING

- 1. After the blast, the Supervisor shall carefully inspect the work and satisfy himself that all the charges have exploded.
- 2. After the blast has taken place in underground works, the workmen shall not be allowed to enter till all toxic gases are evacuated from the face

16.4.13 TESTING FINAL FINISHED SURFACE OF FOUNDATIONS SCALING AND TRIMMING OF FOUNDATION

After rough excavation to the required depth is completed, all pieces loosened during rough excavation or partly separated from the main rock mass by seams or cracks shall be removed by scaling, trimming as directed.

The finished foundation shall present sufficiently rough surface to afford proper bond with masonry or concrete.

17 BORROW AREA

17.01 GENERAL

All materials required for the construction of embankment and backfill for cut-off trench and around the structures which are not available from canal excavation, excavation for structure or from excavation of other ancillary works shall be obtained from the borrow areas after stripping as shown on drawing or as designated by the Engineer-in-charge in consultation with field laboratory. The depth of cut in all borrow areas shall be designated by the Engineer-in-charge and the cuts shall be made up to such designated depths only. Shallow cut will be permitted in the borrow areas. Each designated borrow area shall be fully exploited before switching over to the next designated borrow area. Haphazard exploitation of borrow pits shall not be permitted. The type of equipment used and the operations in the excavation of materials in borrow areas shall be such as to produce the required uniformity of the mixture of materials for the embankment. The contractor has to arrange borrow earth at his own cost and responsibility. No compensation whatsoever for change in limits and locations of the borrow areas and depth of cut for getting suitable earth shall be paid to the contractor. The borrow area shall not be designated within a distance of five times the height of embankment from the outer toe. **The Contractor has to arrange/procure borrow areas at his own cost.**

- a) Where earth is transported from canal or from borrow area for deposit in canal embankment or disposed-off on stock piles, or waste banks, the leads shall be measured as horizontal distance between the vertical central lines of the pit cross-section and the bank which is formed with the excavated earth.
- b) The contractor shall provide such facility as may be necessary for procuring, representative samples free of cost in numbers decided by the engineer-in-charge, testing thereof and obtaining results from the designated laboratory. No separate payment shall be admissible to the contractor against the cost of exploration of borrow area, sub-grade material and testing of soils. The cost of such operations shall be deemed to have been included in cost of the items in BOQ.

17.02. PREPARATION OF THE BORROW AREAS

All areas required for borrowing earth for embankment shall be cleared of all tree stumps, roots, bushes, rubbish and other objectionable materials. Adequate lighting arrangement should be provided by the contractor.

Particular care shall be taken to exclude all organic matter from the materials to be placed in the embankment. All cleared organic materials shall be burnt to ashes or disposed of as directed. The cleared areas shall be maintained free of vegetable growth during the progress of the work. No payment shall be admissible for preparation of the borrow areas indicated above as this is deemed to have been included in unit bid price of earthwork in the bill of quantities.

17.03. STRIPPING OF BORROW AREAS

Borrow areas shall be stripped of top soil, sod and any other objectionable materials to the required depth as directed by Engineer-in-charge. The work may be done manually or with suitable machine. Stripping operations shall be limited only to designated borrow areas. Materials from stripping shall be disposed of in exhausted borrow areas or in the approved adjacent areas as directed. No extra payment shall be admissible for stripping the borrow areas as this is deemed to have been included in the unit bid price for earthwork in the bill of quantities.

17.04. BORROW AREA WATERING AND DE-WATERING

Borrow area watering shall be done by the contractor at his own cost wherever necessary preferably 48 hours in advance, so that materials may be carried with adequate moisture and in the manner specified by the Engineer-in-charge.

The initial moisture content of the material in the borrow areas shall be estimated with the help of field laboratory tests. The optimum moisture content required for the material in any particular borrow area shall be obtained from the field laboratory. The additional moisture requirements as determined by the laboratory test shall be introduced into the borrow areas by watering well in advance of the excavation to ensure uniformity of moisture content. All care shall be taken to reduce excessive moisture in any of the locations of a borrow area before or during excavation to secure the materials with moisture content close to the optimum. To avoid formation of pools in the borrow areas during excavation operation, drainage

ditches from borrow areas to suitable outlets shall be excavated, wherever necessary. Upon exhausting of all materials or abandoning the borrow areas, the pits shall be fully drained to ensure no ponding of water.

18.0 COMPACTING EARTH MATERIALS

Where compaction of earth materials is required, the materials shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing moistening and compacting operations shall be such that the materials will be uniformly compacted to the required density throughout the required section, and will be homogeneous, free from lenses, pockets, streaks, voids, laminations or other imperfections.

Before the materials for the 1st layer of embankment is placed, the foundation of the embankment shall be prepared as provided in Para 5.3 & 5.4. and shall be moisture and compacted in the manner hereinafter specified for each layer of compacted embankment to be placed thereon. The embankments shall be compacted to the elevation and to the top widths and side slopes shown on the drawings or prescribed by the Engineer-in-charge.

The layers shall be placed in rows approximately parallel to the axis of the bank. The base of embankment at every height is to be made to its full width of each zone as shown in the drawing plus offsets of not less than 0.45 metres beyond the finished profile on either side for compaction. **No payment will be made for the offsets or for the subsequent removal and unit price quoted for the banking is deemed to include this. No additions will be allowed to the slope for full design section of the bank after the bank is raised.** The embankment shall be compacted to 95% Proctor's density using pneumatic Tampers, frog rammers or vibratory plate compactor or power roller

Having decided on the filling materials to be used standard compaction test will be conducted on the materials proposed for embankment to indicate best type of equipment to be used and the moisture content at which compaction should be done, thickness of layer and number of passes etc.

Since the canals of sub-projects will be used for carrying water for Rabi and Kharif Irrigation every year, all embankment shall be compacted approved mechanical method of compaction only. No compaction, until specifically mentioned in the specification or needed at the site shall be allowed to compact manually or by paddling.

18.01. COMAPCTING CLAY AND SILTY MATERIALS

Where compaction of earth materials containing appreciable amount of clay or silt is required the compaction shall be carried out in accordance with clause 6.6. of I.S. 4701-1982. The materials shall be deposited in horizontal layers. The thickness of each horizontal layer before compaction shall not be more than 25 centimeters (loose layer) and the layer shall be to full width of the embankment. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure the highest practicable density and best

impermeability and stability. If the surface of any compacted layer of earth fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or scarified in an approved manner to provide a satisfactory bonding surface before the next succeeding layer is placed. All the rollers used on any one layer of fill shall be of the same type and same weight.

Prior to and during compaction operations, the embankment materials shall possess optimum moisture content as required in clause 6.6.4 of I.S. 4701 -1982. The embankment materials shall have optimum moisture content required for the purpose of compaction and this moisture content shall be fairly uniform throughout the layer. In so far as practicable the moistening of the material shall be performed at the site of excavation but such moistening shall be supplemented as required by sprinkling water at the site of compaction, if necessary. If the moisture content is greater than optimum for compaction, the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content or to the level directed by Engineer-in-charge. The moisture content of soils shall be determined in accordance with I.S. 2720 {Part - III} 1982.

Where hand or power tampers are used to compact soils in confined areas such as under pipes and at the joints of bank connections with the structures, they shall be equipped with suitably shaped heads to obtain the required density.

The dry bulk density of the soil portion in compacted embankment materials shall be not less than 95 % of the maximum dry bulk density at optimum moisture content obtained in accordance with I.S.2720 (Part - VII} 1980 Indian Code of Practice for determination of moisture content, dry density relation using light compaction.

The dry density of soil in field shall be determined in accordance with I.S. 2720 (Part - XXVIII) 1974. Indian Code of Practice for determination of dry density of soil in place by sand replacement or by I.S. 2720 (Part - XXIX) 1975 Indian Code of Practice for determination of dry density of soils in place by the core cutter method.

Moisture content of soil shall be determined in accordance with I.S. 2720 (Part - II) 1973 Indian Code of Practice for determination of moisture content.

The optimum moisture content is the moisture content that corresponds to the laboratory maximum dry density determined in accordance with I.S. 2720 (Part - VII) 1973.

The above compaction tests will be conducted by contractor in the presence of departmental officers and the contractor shall ensure compaction, till the Engineer-in-charge or his authorized representative is satisfied that the maximum dry density at optimum moisture content is obtained, and permits the laying of next layer.

18.02. COMPACTING COHESIONLESS MATERIALS

Where compaction of cohesion less, free draining materials, such as sands and gravels is required, the materials shall be deposited in horizontal layers and compacted in accordance with IS: 4701-1982. The excavating and placing operation

shall be such that the materials when compacted will be blended sufficiently to secure the best practicable degree of compaction and stability. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

The thickness of the embankment layer shall not exceed 25 centimeters (loose layer) before compaction and it should be spread over the full width of the embankment and compaction shall be done by tampers or crawler tractors or vibrating rollers. If the compaction is performed by Treads of crawler type tractor, surface vibrators or similar equipment the thickness of the layer before compaction shall not be more than 30 centimeters. If compaction is performed by Internal vibrators the thickness of the layer shall not be more than the penetrating depth of the vibrator.

All compaction tests as indicated in Para 5.14.1 above shall be conducted in accordance with relevant I.S. Code of Practice. The relative density of the compacted material shall not be less than 70 % when tested in accordance with I.S. 2720 (Part - XIV) 1 983 Indian Code of Practice for determination of density Index (relative density) of cohesion less soils.

18.03. COMPACTING COHESIONLESS MATERIALS CONTAINING CLAY & SILT

This sub-paragraph applies only to cohesion less materials and not to cohesive materials. Cohesion less materials containing clay and silt may not be free draining. When compaction of cohesion less materials containing clay and silt is required, the materials shall be compacted to a dry density in accordance with either sub-paragraph (i) and (ii) below, using whichever test that results in higher dry density of the compacted material in the placement

- (i) Dry density determined using procedure enunciated in I.S. 2720 {Part - VII) 1965 (Indian Code of Practice for determination of moisture content dry density relation using light compaction): -Prior to and during compaction operation the material shall possess optimum moisture content as determined in accordance with clause 6.6.4 of I.S. 4701-1982 and the moisture content shall be uniform throughout each layer. Provided that the moisture content is ensured as required in clause 6.6.4 of I.S. 4701-1982, the dry density of the soil portion in the compacted material shall not be less than 95 % of the laboratory maximum soil dry density. The field dry density shall be determined in accordance with I.S. 2720 (Part - XXVIII) 1974 or I.S. 2720 (Part - XXIX) 1975.
- (ii) Dry density using the relative density test as described in I.S. 2720 (Part - XIV) 1 983 Indian Code of Practice for determination of density Index (relative density) of cohesion-less soils: - The relative density of the compacted material obtained shall be not less than 70 %, determined in accordance with I.S. 4701-1982, the moisture content shall be maintained as per clause 6.6.4 of I.S. 4701-1982

18.04 ROLLERS AND OTHER COMPACTING EQUIPMENTS

The improved compaction equipments as may be suitable to the prevailing site conditions and the program of construction, shall be used. Also the equipments as detailed in Appendix-C of IS-4701:1982 may be used for compacting the earth.

The compacting equipment shall conform to relevant Indian specification below: -

1. Smooth wheeled roller should conform to I.S.5502-1969.
2. Pneumatic tyred roller should conform to I.S. 5501-1969.
3. Vibratory plate compactor should conform to I.S. 5889-1970.
4. Vibratory roller should conform to I.S. 5500-1977.
5. The methods of compaction shall conform to clauses 7 of I.S. 4701-1995
6. All compactors should be facilitated with intelligent sensors for getting dimension and grade control. All the activity logs of compactors should be stored in the electronic form, so that employers or his representative can access to the logs at site or remotely.

18.05 ROLLING

When each layer of material has been prepared to have the proper moisture content uniformly distributed throughout the material, it shall be compacted by passing the tamping roller. The exact number of passes for each layer to obtain specific density shall be designated by Field Laboratory tests and tests conducted on the borrowed material. The layers shall be compacted in strips over lapping not less than 0.6 M. Rolling shall commence at edges and progress towards centre longitudinally. The rollers of loaded vehicles shall travel in a direction parallel to the axis of the canal. Turns should be made carefully to ensure uniform compaction. Rollers shall always be pulled

18.06 TEMPING

Rollers will not be permitted to operate within one meter of concrete and masonry structures. In the following locations where compaction of the earth fill materials by means of roller is impracticable or undesirable the earth fill shall be specially compacted as specified further below: -

- (i) Portions of the earth fill in embankment adjacent to masonry structures and embankment foundations designated on the drawing as specially compacted earth fill.
- (ii) Earth fill in embankment adjacent to steep abutments
- (iii) Earth fill at specially designated locations.

Earth fill for tamping shall be spread in layers of not more than 10 (ten) cm in thickness when loose and shall be moistened to have the required moisture content, as specified. When each layer of materials has been conditioned to have the required moisture content, it shall be compacted to the specified density by special rollers, pneumatic/hand tampers or by other approved methods. The moisture control and compaction shall be equivalent to that obtained in the earth fill actually placed in the embankment in accordance with the specifications.

18.07 TESTING

Density tests shall be carried out after rolling to ascertain the state of compaction which should be measured in terms of dry density. Standard proctor density tests shall be carried out at regular intervals to account for variations in the borrow area material. Not less than three tests shall be conducted to indicate variation in the standard proctor density attained in the laboratory.

Density test shall be conducted from time to time at site to ascertain whether compaction is attained as specified. For every 1500 cum of compacted earth fill, at least one field density test shall be conducted. However, minimum four density tests shall be made per day irrespective of quantity of earth work. In case the tests show that the specified densities are not attained, suitable action shall be taken either by moisture correction or by additional rolling, so as to obtain the specified density which shall be checked again by taking fresh tests at the same locations. The test locations should be so chosen as to represent the whole layer under test. Each layer should be tested for proper compaction before a fresh layer is allowed over it.

The density to be attained after compaction should be at least 95% of Proctor density pre-determined by Laboratory tests.

19.0 RECORDING OF CROSS SECTION

Initial cross sections shall be taken at every 30 m interval or closer depending on nature of the ground up to sufficient distance outside the limit of work. Levels on these cross sections shall be taken at 5 m. or closer intervals as directed by the Engineer-in-charge and recorded in the field and level books in the presence of the contractor or his authorized agent who shall sign the field book/level book in the token of acceptance. These cross sections shall form the basis of all future measurements and payments.

D: CONCRETE MIXES

1. Cement

1.1 General Requirements

The cement used shall be any of the following types subject to the approval of the Engineer-in-charge:-

- (a) Portland Pozzalona cement
- (b) 43 Grade ordinary Portland cement conforming to IS 8112/IS.
- (c) 53 Grade ordinary Portland cement conforming to IS 12269.

The Contractor shall make his own arrangements to procure cement of specified/required specifications for the works from Major cement producing factories to the satisfaction of the Engineer-in-charge. He shall produce the test certificates issued by the manufactures. He shall make his own arrangements for transportation and adequate storage of cement.

No cement procured by the Contractor shall be used by him in any work until the Engineer-in-charge is satisfied that the requisite test results are satisfactory.

The Contractor shall forthwith remove from the work area any cement that the Engineer-in-charge may disallow for use on account of (a) failure to meet with the required quality and standard, (b) determination due to inadequate or unduly long storage; and the Contractor shall replace it by cement complying with relevant Indian Standards.

The Engineer-in-charge and his authorized representative shall have free access to the cement stores of the Contractor at all times for inspection.

The Contractor shall create a suitable and adequate infrastructure for handling, storing and conveying bulk or bagged cement procured by him with advance planning of work to be done during the next 2 weeks to 4 weeks, duly approved by the Engineer-in-charge. Bagged cement shall be stored above the ground level in perfectly dry and leak-proof sheds and shall be stacked not more than 8 bags high. Cement more than 3 months old shall invariably be tested to ascertain its suitability for use in terms of acceptability requirements.

1.2 Physical Requirements: -

Fineness

When tested for fineness by "Blains' air permeability analysis method" (IS 4031, part 2-1988) the specific surface of cement shall not be less than $2250 \text{ cm}^2/\text{g}$ ($225 \text{ m}^2/\text{kg}$). For determination of fineness the fineness by dry sieving (as per IS 4031 – Part-I 1998), the residue should not exceed 10%.

Soundness

When tested by 'Le-Chateleir' method (IS 4301, part 3-1988) and autoclave method (for cement having a moisture content of more than 3%), the un-dried cement shall not have an expansion of more than 10 mm and 0.8 %, respectively.

Consistency

Normal consistency is about 30%.

Setting Time

When tested by Vicat apparatus method (IS 4031, part 5-1988) the setting time of cement shall conform to the following requirements:-

- (a) Initial setting time not less than 30 minutes
- (b) Final setting time not more than 600 minutes

The ratio of final penetration measured after 5 minutes of completion of mixing period to the initial penetration measured exactly after 20 seconds of completion of mixing period shall be not less than 50 percent.

Compressive Strength

The average compressive strength of 43 grade OPC cement tested as per IS 4031 part 6 -1988 shall be as follows:-

- (a) 71 ± 1 hour not less than 230 kg/cm^2 (16 MPa)
- (b) 168 ± 2 hours not less than 330 kg/cm^2
- (c) 672 ± 4 hours (28 days) not less than 430 kg/cm^2 (43 MPa)

Corresponding figures for 33 grade OPC shall be: 160 kg/cm^2 ; 220 kg/cm^2 ; and 330 kg/cm^2 .
The 28-day compressive strength for 53 grade OPC shall be not less than 530 kg/cm^2 .

The cement shall show a continuous increase in strength from the strength at 72 hrs.

1.3 Chemical Requirements

When tested in accordance with the method given in IS:4032-1985 the ordinary Portland cement shall comply with the chemical requirements as given below:-

- | | | |
|-------|--|--------------------------------------|
| (i) | Total loss on ignition | not more than 5 % |
| (ii) | Total sulphate content | not more than 2.5 % |
| (iii) | Magnesia (by mass) | not more than 6 % |
| (iv) | Insoluble residue (by mass) | not more than 5 % |
| (v) | Ratio of percentage of
aluminum to that from oxide | not less than 0.66 |
| (vi) | Ratio of percentage of lime to
silica, aluminum to iron oxide | between 0.66 and 1.02, respectively. |

1.4 Handling

Storage

The cement shall be stored in such a manner as to permit easy access for proper inspection and in a suitable weather-tight building to protect from dampness.

Delivery

The cement shall be packed in bags bearing manufacturers name or his registered trademark. The words 33 grade or 43 grade or 53 grade, as the case may be (or the trade mark of other type of cement, as approved by the Engineer-in-charge) ordinary Portland cement and nominal average net mass of cement shall be legibly marked on each bag. Bags shall be in good condition at the time of inspection.

Sampling (IS 3535 – 1986):

The samples shall be taken within three weeks of the delivery and the tests as considered necessary by the Engineer-in-charge, shall be commenced within one week of sampling.

When it is not possible to test the sample within one week the samples shall be packed and stored in airtight containers.

The suppliers shall provide all facility for taking and packing the samples for testing.

1.5 Testing

The sample of cement to be used in works shall be tested for fineness, soundness consistency, setting time, and compressive strength in order to exercise proper control on quality in the manner as per following Indian Standards:-

Test	IS specification
Fineness by dry sieving	4031 (Part-I) – 1998
Fineness, Blain air permeability method	4031 (Part-II) – 1998
Soundness by:	4031 (Part-III) – 1998
(i) Le-Chatelier method	
(ii) Autoclave method	
Consistency	4031 (Part-IV) – 1998
Setting time	4031 (Part-V) – 1998
Compressive strength	4031 (Part-VI) – 1998

The temperature for testing shall be 27 ± 20 C as far as possible.

Rejection

Cement may be rejected if it does not comply with the Indian Standard requirements.

Cement in bags stored for more than 3 months shall be retested before use and may be rejected and shall not be used on works if it fails to confirm to any of the requirements.

Tolerances in Weight

Average net mass of cement packed in bags in a sample shall be equal to or more than 50 kg.

The number of bags in a sample shall be as given below:

100 to 150 bags	20 samples
151 to 280 bags	32 samples
281 to 500 bags	50 samples
501 to 1200 bags	80 samples
1201 to 3200 bags	125 samples

3201 and above 200 samples
The bags in a sample shall be selected at random.

1. Sand (Fine Aggregates)

Sand shall be tested for grain size, specific gravity, water absorption, fineness modulus, petro-graphic analysis, deleterious constituents etc. The presence of impurities, if any, is to be tested by chemical analysis. Quick colour test shall also be conducted in the field to determine the presence of any harmful organic impurities in the sand with 3% solution of sodium hydroxide (caustic soda), as under:-

- A colourless liquid indicates clean sand free from organic matter;
- A straw coloured liquid indicates some organic matter but not enough to be seriously objectionable;
- A dark colour will mean that the sand contains injurious amount of organic impurities and shall not be used unless it is washed and a retest then shows that it is satisfactory.

Sand to be used shall be well graded with maximum size limit to 4.75mm. Well-graded sand is essential to impart good workability and good finish. The gradation requirement of sand for concrete work is indicated below.

(a) Grading

Fine aggregate (sand) for concrete work shall as per IS 383-1970 – zone-II as follows:

Grading of Sand for Concrete

IS Sieve size	% passing by weight	
	for Zone-II	for Zone-I
10.00 mm	100	100
4.75 mm	90 - 100	90 - 100
2.36 mm	75 - 100	60 - 95
1.18 mm	55 - 90	30 - 70
600 micron	35 - 59	15 - 34
300 micron	8 - 30	5 - 20
150 micron	0 - 10	0 - 10

Sand shall have FM between 2.2 to 3.0 %. The sand content shall be proportioned to be around 33 to 35% of total aggregate. However, the actual proportioning shall be fixed on the basis of laboratory tests. It shall, preferably be natural sand and conform to IS: 2116-1965. It shall be got approved from the Engineer-in-charge before use. The Engineer-in-charge may allow the use of crusher fines/crushed stone sand with natural sand after his full satisfaction that the mixture meets the specified criteria.

(b) Deleterious Substances

The amount of deleterious substances shall not exceed the percentage given below:

Deleterious substances	Percentage not more than
Shale	1.0
Coal and lignite	1.0
Clay lumps	1.0
Cinders and clinkers	0.5
Material passing 75-micron sieves	3.0
Alkali, mica and coated grain	2.0

The sum of the percentages of all deleterious substances shall not exceed 5% by weight. The sand shall also be sound and free from any amounts of organic impurities.

(c) Specific Gravity

The sand shall have a minimum specific gravity of 2.6 g/cm³.

(d) Quality

The sand shall consist of hard, dense, durable, unquoted rock fragments and shall be free from dust, lumps, soft or flaky particles, shale, alkali, loam, mica and other deleterious substances.

The contractor shall ensure to use M-Sand (minimum 25% of total quantity of sand required for construction of work) as per direction issued by Chief Secretary, Government of Rajasthan vide letter No. प.14(10)खान/मुप-2/2018 पार्ट dated 16.3.2021 and Chief Engineer Water Resources Rajasthan Jaipur letter No. F-4(5) CEWR/SE(W)/Gen. Misc/Part VII/793-802 dated 26.3.2021.

2. Coarse Aggregates

The coarse aggregate to be used shall be hard and well graded to produce a dense concrete of the specified strength and constancy that will work readily into position without segregation. It shall be tested for specific gravity, water absorption, deleterious materials, crushing impact, and abrasion values. Representative samples shall also be got tested for any alkali - aggregate reaction potential. Minimum specific gravity shall be 2.6 g/cm^3 .

Size

The nominal maximum size of aggregate shall be as large as possible within the limits specified but in no case greater than one-fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corners of the form work. For most works, 20 mm aggregate shall be used and where there is no restriction to the flow of concrete into sections, 40 mm size (MSA) shall be used. For any heavily reinforced concrete members, the nominal maximum size of aggregate shall usually be restricted to 5 mm less than the minimum cover to the reinforcement or 5 mm less than the minimum clear distance between the main bars.

Coarse aggregate shall comprise of all aggregate particles of size greater than 4.75 mm. The rubble from which coarse aggregate is crushed shall have a crushing strength of not less than 750 kg/cm^2 . The aggregate shall conform to IS 383-1970 clause 3.1, 3.2 and 3.2.1 (Table-I).

The different tests and the zone of acceptability limits are given below:

Tests and Acceptance Criteria for Coarse Aggregate

Name of Test	IS Code	Acceptance Criteria
Sieve analysis	IS 2386 – Part-I – 1963	As per concrete design
Deleterious materials	IS 2386 – Part-II – 1963	Less than 5%
Specific gravity	IS 2386 – Part-III – 1963	$2.5 \text{ to } 3.0 \text{ g/cm}^3$
Absorption value	IS 2386 – Part-III – 1963	Less than 5% by weight
Aggregate crushing value	IS 2386 – Part-IV – 1963	For wearing surface, less than 30%; for concrete other than wearing surface less than 45%
Impact value	IS 2386 – Part-IV – 1963	As above
Abrasion value	IS 2386 – Part-IV – 1963	For wearing surface, less than 30%; for concrete other than wearing surface less than 50%
Soundness (Sodium sulphate method)	IS 2386 – Part-V – 1963	Less than 12%
Petrographic examination	IS 2386–Part-VIII – 1963	Deleterious constituents plus silt shall not exceed 5%

Grading

The coarse aggregate as delivered to the mixer, shall be well graded as per IS specification. Maximum size of aggregate used for the work shall be 20mm or 40mm or as specified in items in the bill of quantities and it shall conform to IS:383-1970, clause 4.2 (Table-2). However, the exact gradation required producing a dense concrete of specified strength and the Engineer-in-charge shall decide desired workability as per laboratory test.

Coarse aggregate for use in concrete shall be well graded and shall conform to IS:383-1970 requirements as per table given below:

Grading Requirement of Coarse Aggregate

IS Sieve	% Passing by weight for graded aggregate of nominal size			
	40mm	20mm	16mm	12.5mm
63 mm	100	-	-	-
40 mm	95 - 100	100	-	-
20 mm	30 - 70	95 - 100	100	-
16 mm	-	-	90 - 100	100
12.5 mm	-	-	-	90 - 100
10.0 mm	10 - 35	25 - 55	30 - 70	40 - 85
4.75 mm	0 - 5	0 - 10	0 - 10	0 - 10

Storage

Aggregate shall be stacked in such a way as to prevent the intrusion of any foreign materials such as soil, rubbish, vegetation etc. Heaps of fine and coarse aggregate shall be kept separate. When different sizes of fine and coarse aggregates are procured separately, they shall be stored in separate stockpiles, so that they do not get intermixed.

The aggregate shall be stock piled near to the mixer site/B&M plant so as to require minimum re-handling when conveyed to the mixer.

The aggregate shall be placed on a dry hard patch of ground if available, otherwise a platform or plain galvanized iron sheets or alter natively a floor of dry bricks shall be prepared, or a floor of thin layer of lean concrete.

To minimize moisture variations the stock piles shall be as large in area as possible but left low and fairly uniform in height preferably 1.25 to 1.5 m and the lowest layer of about 30 cm height shall be allowed to act as drainage layer and not be used till the end.

3. Water

The water used in concrete shall be clean and free from objectionable quantities of silt, salts, organic matter, alkali and other impurities. Normally potable water is considered satisfactory for mixing concrete. As a guide, the following concentration represents the maximum permissible values:-

To neutralize 100 ml sample of water, using phenolphthalein as an indicator, it should not require more than 5 ml of 0.02 normal NaOH. The details of test are given in Section 8.1 of IS 3025 (Part-22).

- (a) To neutralize 100 ml sample of water, using mixed indicator, it should not require more than 25 ml of 0.02 normal H₂SO₄. The details of test shall be as given in Section 8 of IS 3025 (Part-23).

- (b) Permissible limits for solids shall be as given in the following table:

Percentage of solids should not exceed the following:

		Test as per
Organic	200mg/liter	IS:3025(Part - 18)
Inorganic	3000mg/liter	IS:3025(Part - 18)
Sulphates	400mg/liter	IS:3025(Part - 24)
Chlorides (as Cl)	2000mg/liter for concrete not containing embedded steel, 500 mg/liter for reinforced concrete work	IS:3025(Part - 32)
Suspended matter	2000mg/liter	IS:3025(Part - 17)

- (c) pH value of water shall be not less than 6.0 and be within the range 6.0 to 8.5.

Water found satisfactory for mixing concrete is also suitable for curing the concrete. However, water used for curing should not produce any objectionable stain or unsightly deposit on the concrete surface.

E: PLAIN AND REINFORCED CONCRETE**1. Proportioning and Batching**

Design mix concrete (controlled concrete) shall be used for concrete of grade M13.5 and higher. Nominal mix concrete (as per table below) may be used for lean concrete mix (viz. concrete mix of grade lower than M10 viz. M5, M7.5). In proportioning concrete, the quantity of both cement and aggregate shall be determined by mass. Water shall be either measured by volume in calibrated tanks or weighed. Concrete shall be manufactured in mechanical mixers either in batching mixing plants or mechanical mixers of various capacities (14/10 or 10/7). Alternatively, mobile self-loading weigh batching – mixing and transporting mixers of suitable drum capacity can be used, both for mixing and transporting concrete. Where the total concrete to be laid (M15 and above grade) is more than 1000 cum on main structure i.e. dam and canal lining only batching and mixing plants of suitable capacity shall be deployed for batching and mixing of the concrete and the ingredients of concrete be added by weight only. The mix proportions shall be such as to ensure the workability of the fresh concrete and when concrete is hardened, it shall have the required strength, durability, and surface finish.

Proportions for Nominal Mix Concrete

Grade of concrete	Total quantity of dry aggregates by mass per 50kg of cement to be taken as the sum of the individual masses of fine and coarse aggregates (kg.)	Proportion of fine aggregate to coarse aggregate (by mass)	Quantity of water per 50kg of cement, max. in liters.
M5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5	60
M7.5	625		45
M10	480		34

Notes:

- (i) Graded aggregates shall be used.
- (ii) The cement content of the mix shall be proportionally increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, so that the water cement ratio as specified is not exceeded.

2. Design-Mix Concrete**2.1 Grades and Strength of Concrete**

The mix shall be designed to produce the grade of concrete having the required workability and characteristic strength not less than appropriate values given in the table overleaf.

The concrete mix shall be designed for the 'target mean strength'. The target mean strength of concrete mix should be equal to characteristic strength plus 1.65 times the standard deviation:

$$\text{Target Mean Strength} = \text{Characteristic strength (28-day compressive strength)} + 1.65 \times \text{Standard deviation.}$$

Grade and Compressive Strength of Concrete

Grade designation of concrete	Specified characteristic compressive strength of 150 mm cube at 28 days in N/mm ²
M10	10
M15	15
M20	20
M25	25

Where sufficient test results for a particular grade of concrete are not available, the value of standard deviation given below shall be assumed for design mix of concrete in the first instance. As soon as the

results of samples are available, actual standard deviation shall be used and the mix designed accordingly.

Assumed standard deviation (as per IS 456-2000)

Grade of concrete	Assumed standard deviation
M10	3.5
M15	3.5
M20	4.0
M25	4.0

2.2 Cement and Water Content

Cement Weight

The cement weight for various grades of controlled concrete shall be considered as under for the purpose of working out the rates to be quoted in the schedule of quantities (BOQ):

Cement Content of Concrete

S.No.	Grade of concrete	Cement weight in kg/m ³ of concrete	Remarks
1.	M ₁₀	225	as per BSR
2	M _{13.5}	250	
3.	M ₁₅	320	
4.	M ₂₀	430	

Actual cement level required for the aggregates to be used shall be determined by laboratory tests while designing the concrete mix. If pursuant to mix design (and from considerations of durability of concrete), it becomes necessary to use more cement compared to that given in the above table, the Contractor shall do the same without claiming any extra cost for handling of extra cement. In such case, the Contractor shall be paid for only the cost of the quantity of cement used more at the pre-determined price of cement. In case of actual use being less than that stipulated in the above table, the cost of the quantity of cement used less shall be deducted at the pre-determined price of cement.

Cement levels based on the design of mixes (or as per durability consideration, wherever so warranted), duly approved by the Engineer-in-charge, shall be communicated to the Contractor from time to time.

Water/Cement Ratio (W/C)

An appropriate water/cement ratio is one of the key elements for a durable and sound concrete of adequate strength. Accordingly, the water/cement ratio shall be maintained at the correct value. The water contents in both fine and coarse aggregate shall be determined regularly. The amount of added water shall be adjusted to compensate for any observed variation in moisture content. The amount of surface water may be estimated from the following table in the absence of exact data:

Surface water carried by aggregate

Aggregate	Approx. quantity of surface water	
	% by mass	Liter/m ³
Very wet sand	7.5	120
Moderately wet sand	5.0	80
Moist sand	2.5	40
Moist sand/crushed rock	1.25 to 2.5	20 to 40

2.3 Durability of Concrete It is essential that the concrete be durable viz. it should perform satisfactorily in the working environment during its anticipated exposure conditions during service. The materials and mix proportions are to be such as to maintain its integrity, and (where ever applicable), to protect embedded metal/reinforcement from corrosion.

The different environmental exposure conditions are given in the table overleaf.

The minimum cement content and maximum water-cement ratio to be adopted for different exposure conditions for coarse aggregate of 20 mm MSA are outlined in the second table overleaf, as specified in IS:456-2000. Accordingly, the design mix shall be duly checked in consideration of durability of concrete.

The cement contents given in overleaf tables are irrespective of the grades of cement used. The stated cement contents are for the coarse aggregate of maximum nominal size of 20 mm. Adjustments to these minimum cement contents for aggregates other than 20 mm MSA aggregates shall be as per the third table overleaf.

Environmental Exposure Conditions (as per Table 3 of IS 456 : 2000)

Grade	Environment	Exposure conditions
(i)	Mild	<ul style="list-style-type: none"> Concrete surfaces protected against weather or aggressive conditions, except those situated in coastal area.
(ii)	Moderate	<ul style="list-style-type: none"> Concrete surfaces sheltered from severe rain or freezing whilst wet. Concrete exposed to condensation and rain. Concrete continuously under water. Concrete in contact or buried under non-aggressive soil/ground water. Concrete surfaces sheltered from saturated salt air in coastal area.
(iii)	Severe	<ul style="list-style-type: none"> Concrete surfaces exposed to severe rain, alternate wetting and drying, or occasional freezing whilst wet or severe condensation. Concrete completely immersed in sea water. Concrete exposed to coastal environment.
(iv)	Very Severe	<ul style="list-style-type: none"> Concrete surfaces exposed to sea water spray, corrosive fumes or severe freezing conditions whilst wet. Concrete in contact with or buried under aggressive subsoil/ground water.
(v)	Extreme	<ul style="list-style-type: none"> Surface of members in tidal zone. Members in direct contact with liquid/solid aggressive chemicals.

Variation of Cement Requirement with Exposure Condition

Grade	Exposure condition	Plain concrete		Reinforced concrete	
		Min. cement content kg/m ³	Max. free W/C ratio	Min. cement content kg/m ³	Max. free W/C ratio
(i)	Mild	220	0.60	300	0.55
(ii)	Moderate	240	0.60	300	0.50
(iii)	Severe	250	0.50	320	0.45
(iv)	Very severe	260	0.45	340	0.45
(v)	Extreme	280	0.40	360	0.40

Change in Cement Requirement for different Aggregate Size

Nominal maximum size aggregate[mm]	Adjustments to minimum cement contents [kg/m ³]
10	+40
20	0
40	-30

The severity level in works may be assumed severe, generally (concrete surfaces exposed to severe rain, alternate wetting and drying), except in such environment where the concrete work is to be in contact with or buried under aggressive sub-soil/ground water. Severity levels shall be assessed by the Engineer-in-charge in consultation with Chief Engineer, Designs.

2.4 Handling of Concrete

Workability of Concrete

The concrete mix proportions chosen shall be such that the concrete is of adequate workability for the placing conditions of the concrete and can be properly compacted. Following ranges of workability and slump of concrete, measured in accordance with IS 1199, shall be broadly adopted:

Slump Requirement of Concrete

Placing conditions	Degree of workability	Slump (mm)
• Mass concrete,		
• Lightly reinforced sections in slabs, beams, walls, columns;	Low	25-75
• Floors		
• Footings		
• Heavily reinforced sections in slabs, beams, walls, columns.	Medium	50-100

For canal lining, a slump range of 50 to 65 mm is considered adequate. It can be increased up to 75 mm, if considered necessary in particular situations for practical usage.

Mixing

Concrete ingredients shall be mixed thoroughly in the mechanical mixer and the mixing shall be continued until there is a uniform distribution of the ingredients and the mass is uniform in colour and consistency. Minimum mixing time shall be 2 minutes or as determined by the Engineer-in-charge. The accuracy of the measuring equipment shall be within ± 2 percent of the quantity of cement being measured and within ± 3 percent of the quantity of aggregate and water being measured.

Transporting

Concrete shall be transported from the mixer to the form work or site of placement as quickly as possible by methods, which shall prevent the segregation and maintain the requisite workability. Transportation of concrete in ordinary open tippers or trucks shall not be allowed as it causes segregation. Transit concrete mixers can be used for transportation. Self-loading, batching, mixing and transporting mixers can also be used both for mixing and transporting concrete.

Placing

The concrete shall be placed and compacted with vibrators (immersion/needle) before setting of the concrete commences and shall not be subsequently disturbed. Methods of placing shall be such as to avoid segregation. Strict and meticulous care shall be taken to avoid displacement of reinforcement or movement of form work. Concrete shall be fully worked around reinforcement and in the corners of form work. Over vibration resulting into bleeding of concrete shall be strictly avoided. Spare vibrators shall be kept by the Contractor as stand by. Temperature of concrete, as placed, shall preferably be restricted to about 32°C (90°F).

Curing

Curing shall commence as soon as possible after concrete is placed and initial set has occurred but before it has hardened. Curing with water shall be continued for at least 14 days. Exposed surfaces of concrete shall be kept continuously in a damp/wet condition by ponding or by covering with a layer of sacking, canvas, Hessian, or similar materials and kept continuously wet for 14 days.

2.5 Sampling and Strength of Design-Mix Concrete

Sampling of concrete

A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested, viz. the sampling should be spread over the entire period of concreting and cover all mixing units (concrete production units).

Frequency of sampling

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

Concrete Quantities and Sampling

Quantity of concrete in the work, m ³	Number of samples
1-5	1
6-15	2
16-30	3
31-50	4
51 and above	4 plus an additional sample for each additional 50m ³ or part there-of.

At least one sample shall be taken from each shift.

Test Specimen

Three test specimens shall be made for each sample for testing at 28 days. Additional specimens may be taken to determine the strength of concrete at 7 days. Test results of the sample shall be the average of the strength of 3 specimens. The individual variation should not be more than $\pm 15\%$ of the average strength of 3 specimens. If more, the test results of the sample are considered invalid.

Acceptance criteria of compressive strength

The concrete shall be deemed to comply with the strength requirement when both the following conditions are met, as per IS 456-2000:

- The mean strength determined from any group of 4 non-overlapping consecutive test results complies with the appropriate limits in column 2 of the following table.
- Any individual test results comply with the appropriate limits in column 3 of the following table:

Characteristic Compressive Strength Compliance Requirement

Specified grade	Mean of the group of 4 non-overlapping consecutive test results in N/mm ²	Individual test results in N/mm ²
M 15	$\geq f_{ck} + 0.825 \times \text{established standard deviation (rounded off to nearest } 0.5 \text{ N/mm}^2)$ Or $f_{ck} + 3 \text{ N/mm}^2$ whichever is greater	$\geq f_{ck} - 3 \text{ N/mm}^2$
M 20 or above	$\geq f_{ck} + 0.825 \times \text{established standard deviation (rounded off to nearest } 0.5 \text{ N/mm}^2)$ Or $f_{ck} + 4 \text{ N/mm}^2$ whichever is greater	$\geq f_{ck} - 4 \text{ N/mm}^2$

In the absence of established value of standard deviation, the following value may be assumed in the first instance and there-after established values based on the requisite number of test results:-

Grade of concrete	Assumed standard deviation
M ₁₀ and M ₁₅	3.5 N/mm ²
M ₂₀ and M ₂₅	4.0 N/mm ²

fck = Characteristic compressive strength of 150 mm cube at 28 days in N/mm². For M15 and M20 grades, fck is 15 N/mm² and 20 N/mm², respectively.

For M10 concrete, fck is 10 N/mm². In respect of CC lining with a minimum cement level of 250 kg/m³, minimum fck envisaged is 13.5 N/mm². Based on the assumed standard of deviation values of 2 N/mm² and 2.5 N/mm² for concrete M10 and M13.5, respectively, its acceptance criteria of compressive strength can be envisaged as stated in the table overleaf.

It is to be noted that the minimum cement level of 250 kg/m³ for plain cement concrete lining derives from the durability consideration and not on the 28 day characteristic strength basis alone.

Acceptance Criteria of Compressive Strength

Specified grade	Mean of the group of 4 non-overlapping consecutive test results in N/mm ²	Individual test results in N/mm ²
M10	$\geq fck + 0.825 \times \text{standard deviation.}$	$\geq fck - 2 \text{ N/mm}^2$
M13.5 (CC lining with minimum cement level of 250 kg/m ³)	$\geq fck + 0.825 \times \text{standard deviation}$	$\geq fck - 2.5 \text{ N/mm}^2$

Standard Deviation

This is calculated from the following equation:

$$Sd = \sqrt{[(X - \bar{X})^2 / (n-1)]}$$

with

n = number of samples (30 samples are generally considered)

\bar{X} = sum of the mean value of 3 test specimens of each sample divided by the number of samples, viz. overall average strength.

X = difference between overall average strength and the mean strength of 3 test specimens of each sample.

2.6 Frequency of Tests

The various tests and their frequencies for concrete work shall be carried out as per the following table:

Frequency Requirement of Concrete Tests

S.No	Name of test	Frequency	Purpose	Indian standard
1.	Coarse Aggregates:			
	Sieve analysis	One test for every 150m ³ or less	To know the gradation	IS 2386-Part-I 1963
	Specific gravity, bulk density, moisture content and absorption	-do-	To assess the suitability of aggregate and to utilized data for mix design	IS 2386-Part-III 1963

S.No	Name of test	Frequency	Purpose	Indian standard
	Soundness (Sodium sulphate method)	-do-	To assess the quality of materials	IS 2386-Part-V 1963
	Abrasion, impact & crushing values	-do-	-do-	IS 2386-Part-IV 1963
	Organic impurities	-do-	-do-	IS 2386-Part-II 1963
	Petrographic byanination	Twice in one season	To know the extent of deleterious materials & silt content	IS2386-Part-VIII 1963
2.	Fine Aggregate			
	Screen analysis	One test for every 150m ³ of sand used in concrete	To know grainsize and fineness modulus of sand	IS 2386-Part-I 1963
	Unit weight and bulkage	-do-	To know suitability of sand and to utilize data for mix design	IS 2386-Part-III 1963
	Organic impurities	-do-	To assess the quality	IS 2386-Part-II 1963
	Specific gravity, moisture content	-do-	To utilize data for mix design	IS 2386-Part-III 1963
3.	Cement:			
	Fineness test	One test for each brand of cement used during the working season, preferably at 3 months interval	To know the quality of cement used in construction	IS 4031-1988
	Normal consistency	-do-	-do-	IS 4031-1988
	Setting time	-do-	-do-	IS 4031-1988
	Soundness	-do-	-do-	IS 4031-1988
	Compressive strength	-do-	-do-	IS 4031-1988
	Chemical analysis	-do-	-do-	IS 4032-1988
4.	Finished concrete:			
	Slump test	One test in each shift or at frequent	To check workability of concrete/water cement ratio	IS 1199-1959

S.No	Name of test	Frequency	Purpose	Indian standard
		intervals to check workability		
	Compressive strength	Refer sampling & strength of designed mix concrete.	To know the strength of concrete	IS 516-1959

F. FORM WORK FOR CONCRETE STRUCTURES

1. General

Forms shall be used, wherever necessary, to confine the concrete and to shape it to the required lines. Normally, all exposed concrete surfaces having a slope steeper than 2 horizontal to 1 vertical shall be formed.

The condition of forms influences not only the appearance of the structure but also the quality. Use of good form material and proper form construction and maintenance is very important in field control. The use of steel form work enhances the appearance of placed concrete. It should be recognized that it is not particularly economical to use poor quality form. Too often any savings from use or injudicious re-use of poor timber form are negated by manual labour in repairs and final dressing of the structure to an acceptable appearance.

Tolerances

The form work shall be designed and constructed to the shapes, lines, and dimensions shown on the Drawings within the following tolerances:

- A. Linear Outline.
 - (a) in any 6 m of length ± 12 mm
 - (b) in any 12 m of length ± 18 mm
- B. Plumb, specified batter, or from the curved surfaces of all structures including the lines and surfaces of columns, walls, piers, buttresses etc.
 - (a) in 3m of height ± 12 mm
 - (b) in 6m of height ± 18 mm
 - (c) in 12m of height or greater ± 30 mm
- C. Deviations from specified dimensions of cross-section of columns and beams $+ 12$ mm, $- 6$ mm
- D. Deviation from dimensions of footings.
 - (a) Dimensions of plan $+ 50$ mm,
 $- 12$ mm
 - (b) Eccentricity 0.02 times the width of the footing in the direction of deviation but not more than 50mm.
- (c) Thickness ± 0.05 times specified thickness.

Note: These tolerances apply to concrete dimensions only, and specified thickness not to the positioning of vertical reinforcement steel.

2. Workmanship, Cleanliness and Strength of Formwork

2.1 General Requirements

The formwork shall be of well seasonal timber, steel, or such suitable material or combination of such materials. Where timber forms are used, these shall, preferably, be lined with M.S. sheet, which offers a smooth faced non-absorbent material. Supports may be of timber or steel. Suitable wedges in pairs be provided to facilitate adjustment and subsequent releasing of forms. The Contractor shall furnish the details of his proposed formwork to the Engineer-in-charge for his approval before erection thereof.

All rubbish, particularly chippings, shavings, saw dust and grout etc. should be removed from the interior of forms before these are erected. Cleanliness of forms shall be again checked after the forms are in place and before the concrete is placed. The face of the formwork, which is to be in contact with the concrete shall be cleaned and treated with suitable form oil or release agent. The form oil shall be applied so as to provide a thin uniform coating to the forms without coating the reinforcement.

Forms shall have sufficient strength to withstand all pressure resulting from concrete placement and vibration without deflection from the prescribed lines during and after the placement of concrete and shall be maintained rigidly in position. Where form vibrators are to be used, it shall be ensured that the formwork is adequately rigid to effectively transmit energy from the form vibrators to the concrete without damaging or altering the positions of forms. The forms shall be made sufficiently rigid by use

of ties and bracings to prevent any displacement or sagging. Suitable struts or stiffeners shall be used wherever considered necessary. The forms shall be made mortar tight.

After the forms for concrete structures have been erected to line and grade, they shall be meticulously inspected as to their adequacy. **If the forms are not tight, there will be a loss of mortar which shall result in honey-combing of concrete or a loss of water which shall cause sand streaking.** If the inspection reveals that the forms are not strong enough to hold the concrete or are not braced sufficiently to stay in alignment, the Engineer-in-charge shall immediately notify the Contractor to set right the deficiencies and concrete shall not be placed before the forms are re-inspected and found in proper condition. It shall also be checked during inspection that the formwork, as erected, conforms to the line, grade, and alignment to the specified tolerance limits. Fully adequate rigidity of forms is of paramount importance since the **tolerance limits specified are for finished concrete** and not for the forms. Use of internal vibrators requires that the forms be tight and strong.

Stability is a very important consideration in the construction of forms. Everyone concerned including the Contractor has to understand that the common deficiencies resulting in form failure are:-

- (i) inadequate cross bracing of shores;
- (ii) inadequate horizontal bracing;
- (iii) failure to regulate the rate of placement of concrete in the forms;
- (iv) poor regulation of the horizontal balance of the form filling;
- (v) abnormal form displacements during and after concrete placement;
- (vi) no provision for lateral pressures; and
- (vii) lack of adequate inspection of form work;

In form construction, it is very important that ready access be provided for proper placement, working, and vibration, and for inspection of these operations.

The surface of formwork shall be made such as to produce surface finishes as specified and the joints shall be tight enough to prevent loss of liquid/slurry/mortar from concrete. Joints between the form work and the previous lift shall be grant tight.

2.2 Horizontal Construction Joints

A very common blemish on formed concrete surfaces is the off-set often found at horizontal construction joints where the forms have given way a fraction of couple of centimetres at the bottom of the new lift. For surfaces where appearance and alignment are of considerable importance, these off-sets shall be prevented by so setting the forms as to fit snugly against the top of concrete in the previous lift and then securing them so as to remain in tight contact during the concrete placing operations. The anchoring shall be done by using an ample number of ties and bolts, above and within a few centimetres of the construction joint. The ties in the top of previous lift cannot be relied on to prevent a slight spreading of the forms at the joint. Forms shall overlap the hardened concrete in the lift previously placed by not more than about 50 mm, though 25 mm lap is considered sufficient. Utmost care shall, thus, be taken by the Contractor to ensure that the construction joints are smooth, free from sharp deviations, projections, or edges.

2.3 Finishing of Concrete Surfaces

Spalling from the Face of Concrete

Occasionally, spalling may occur from the face of the concrete when forms are removed. Rough spots on the forms where mortar adheres strongly enough to overcome the tensile strength of the green concrete often cause this. Such areas on the forms shall be cleaned, polished, and then covered with suitable form oil. Wire brushing of timber forms shall be done very carefully to remove the set mortar as else it may aggregate the situation.

Filling of Bolt Holes (she-bolts) or Holes of Ties and Rods

The holes left by the concrete surfaces by she-bolts or rods etc. shall be reamed, cleaned, and filled with “dry pack mortar” within a reasonable period of the removal of formwork. Such filling shall be made flush with the concrete surface.

2.4 Handling and Re-use of Formwork

Re-use of Forms

The forms required to be used more than once shall be maintained in a good condition and shall be thoroughly cleaned and repaired (if required) before reuse. Where metal sheets are used for lining the

forms, the sheets shall be placed and maintained in the forms without lumps or other imperfections. All forms shall be checked for proper shape, cleanliness, and strength before re-use.

Inspection of Forms

The Contractor shall inform the Engineer-in-charge well in time before commencement of placement of concrete in the forms to enable him or his representative to inspect the formwork as to its adequacy, suitability, alignment, strength, and overall fitness; and such inspection shall not relieve the Contractor of his sole responsibility for the safety of men, materials, equipment and the results obtained.

Quality Assurance

An O.k.-Card System shall be introduced for follow up on the proper execution of all stages of work. The format of o.k.-cards shall be determined by the Engineer-in-charge and the Contractor or his representative shall be required to fill in the first column of the o.k.-cards against all relevant items (as prescribed by the Engineer-in-charge) and sign to indicate that these are in conformity with the Specifications. Thereafter, the Engineer authorized by the Engineer-in-charge shall inspect these items and any defects pointed by him shall be duly rectified by the Contractor. Broadly, the items shall comprise of the following:-

- Preparation of surface of forms, form oil applications;
- Alignment, tolerances;
- Stability, bearing and support adequacy, ties, and spacers;
- Inspection openings, size, spacing, and locations;
- Final clean-up; and
- Final ok for concrete placement.

Stripping of Formwork

The Contractor of his intention to strike/remove any form shall inform the Engineer-in-charge in advance. The forms shall not be removed until the concrete has achieved adequate strength. As per IS 456-2000, the concrete should have achieved strength of at least twice the stress to which the concrete may be subjected at the time of removal of formwork. While this criteria of strength shall be the guiding factor for removal of form work, in normal circumstances, where ambient temperature do not fall below 15°C and where ordinary Portland cement is used and adequate curing is done, the striking periods of forms as listed in the table overleaf shall be adopted, which shall satisfy the above criteria of strength of concrete.

For cements other than OPC and lower temperatures, the stripping time specified above shall be suitably modified by the Engineer-in-charge. The Contractor shall ensure and it is his responsibility that 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 to occur during curing or further construction.

Forms shall be removed with care so as to avoid any damage to the concrete. The Contractor as per method of such repairs prescribed/directed by the Engineer-in-charge, if any due to removal of forms, shall promptly repair concrete damages, to the Engineer-in-charge's entire satisfaction.

Minimum Periods of Striking of Formwork

Type of Formwork	Minimum period before striking formwork
(a) Vertical formwork to columns, walls, beams.	16-24 hours
(b) Soffit form work to slabs (props to be re-fixed immediately after removal of formwork)	3 days
(c) Soffit formwork to beams (props to be re-fixed immediately after removal of formwork)	7 days
(d) Props to slabs: Spanning up-to 4.5 m.	7 days

Spanning over 4.5 m.	14 days
(e) Props to beams and arches:	
Spanning up-to 6.0 m.	14 days
Spanning over 6.0 m.	21 days

G. STEEL REINFORCEMENT FOR CONCRETE STRUCTURES

1. General

This section covers specifications for providing steel reinforcement in bridges, aqueducts, super passes, siphons, under tunnels, retaining walls, inlets, outlets, head walls, regulators, off-take sluices, canal side walls, cut-off walls, spillways and other similar concrete structures.

Providing and fixing steel reinforcement consists of furnishing and placing reinforcement of the shape, size/dimensions shown on the Drawings and as specified in the specifications, including cutting, bending, cleaning, placing, binding, welding and fixing in position, as all to be provided by the Contractor under the BoQ items concerning “reinforcement steel”.

A list of applicable Indian Standards is furnished below:-

IS 456 – 2000	Code of practice for plain and Reinforced concrete.
IS 1786 – 1985	Specifications for high strength deformed steel bars and wires for concrete reinforcement.
IS 432 – 1982 (Part-I)	Specifications for mild steel and medium steel bars for concrete reinforcement and hard drawn steel wire.
IS 2502 – 1963	Code of practice for bending and fixing of bars for concrete reinforcement.
IS 9417 – 1989	Recommendations for welding cold worked bars for reinforced concrete construction.
IS 2751 – 1979	Welding of mild steel plain and deformed bars for reinforced construction.
IS 814 – 1996	Electrodes for manual arc welding of carbon and carbon manganese steel.
IS 1278 – 1972	Filler rods and wires and gas welding.

In addition to above IS codes, the specifications of Rajasthan PWD and the Quality Control Manual shall also be referred to wherever so required by the Engineer-in-charge.

2. Material

The Contractor shall make his own arrangements to procure high yield strength deformed (HYSD) bars to IS 432 – 1982, as shown on the Drawings. Only tested quality of steel reinforcement bars shall be used. The requisite I.S.I. test certificates are to be provided to the Engineer-in-charge before any use of reinforcement on the works.

Steel bars shall be stored in such a way as to avoid distortion and to prevent deterioration by corrosion.

The diameters and weight of steel bars shall be as following:-

Steel Bar Diameter and Sectional Weight

S.No.	Diameter of bar	Sectional weight in kg/m (both for plain and HYSD steel bars)
1.	6 mm	0.22
2.	8 mm	0.39
3.	10 mm	0.62
4.	12 mm	0.89
5.	14 mm	1.21
6.	16 mm	1.58
7.	18 mm	2.00
8.	20 mm	2.47

S.No.	Diameter of bar	Sectional weight in kg/m (both for plain and HYSD steel bars)
9.	22 mm	2.98
10.	25 mm	3.85
11.	28 mm	4.83
12.	32 mm	6.31
13.	33 mm	6.71
14.	36 mm	7.99
15.	40 mm	9.86
16.	42 mm	10.88

Note: If any steel bars other than those specified above are used, the weights shall be as per standards steel tables

3. Cutting, Bending and Binding of Reinforcement

Preparation of reinforcement steel for fixing shall conform to the following requirements:-

- Reinforcement steel bars shall conform accurately to the dimensions given in the 'bar bending schedules' shown on the approved lists and drawings.
- Bars shall be bent cold to the specified shape and dimensions by a bar bender by hand or power to attain the proper and specified radii of bends as shown in the drawings.
- Bars shall not be bent or straightened in a manner that would injure the material.
- Bars bent during transport and handling shall be straightened before being used on work. The bars shall not be heated to facilitate bending.
- Reinforcement bars available from any rejected reinforced concrete shall not be used.
- The radii of the bends in the main reinforcement bars shall not be less than 4 times bar diameter for plain mild steel bars or 6 bar diameters in deformed bars. The radii of bends for stirrups shall not be less than twice the diameter of round bar. In the case of bars, which are not round, and in the case of deformed bars, the diameter shall be taken as the diameter of a circle having an equivalent effective area.
- Hooks/stirrups shall be suitably encased to prevent any splitting on concrete.
- Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original positions, care shall be taken to ensure that at no time is the radius of the bend less than 4 bar diameters for plain mild steel or 6 bar diameters for deformed bars. Care must also be taken when bending back bars to ensure that the concrete around the bars is not damaged.

4. Placing of Reinforcement

Placing and fixing of reinforcement shall conform to the following:-

- Before the reinforcement is placed, the surface of bars and the surfaces of any metal bar supports shall be cleaned of rust, loose mill scale, dirt, grease, and any other objectionable matter.
- All reinforcement bars shall be accurately placed in exact position shown on the drawing, and shall be securely held in position during placement of concrete by annealed bending wire, and by using stays, blocks, or metal chairs, spacers, or other approved devices at sufficiently close intervals.
- Wire for binding reinforcement shall be soft and annealed mild steel of 16 SWG and shall conform to IS 280 – 1978. Binding wire shall have tensile strength of not less than 5600 kg/cm² and a yield point of not less than 3850 kg/cm².
- Bars shall not be allowed to sag between supports. These shall not be allowed to be displaced during concreting or any other operation during the work.

- (e) The Contractor must ensure that there is no disturbance caused to the reinforcing bars already placed in the concrete.
- (f) All devices used for positioning of bars shall be of non-corrodible material. Metal supports shall not extend to the surface of concrete, except where shown in the drawings. **Pieces of broken stone, or brick, or wooden blocks must not be used.**
- (g) Placing on layers of freshly laid concrete as work progresses for adjusting of bar spacing shall not be allowed.
- (h) Spacer bars, pre-cast concrete blocks or other approved devices allowed by the Engineer-in-charge, shall separate layers of bars.
- (i) Reinforcement bars after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be taken to prevent any displacement of reinforcement in concrete already placed.
- (j) It must be ensured that concrete cover as indicated in the drawings, is meticulously provided.
- (k) All bars protruding from concrete and to which other bars are to be spliced, and which are likely to be exposed for a long period, shall be protected by a thick coat of neat cement grout.
- (l) Bars crossing each other, where required, shall be secured by binding wire (annealed) of size not less than 1 mm diameter and conforming to IS 280 – 1978 in such a manner that they do not slip over each other at the time of fixing and concreting.
- (m) The minimum distance between individual bars shall conform to IS 456 – 2000, which requires the following spacing of bars:-
 - (A) The horizontal distance between two parallel main reinforcing bars shall usually be not less than the greatest of the following:
 - (i) The diameter of the bar if the diameters are equal;
 - (ii) The diameter of the larger bar if the diameters are unequal;
 - (iii) 5 mm more than the nominal maximum size of coarse aggregate.
 Note: The size of aggregate may be reduced around congested re-inforcement to comply with this provision.
 - (B) Greater horizontal distance than the minimum specified in (A) above should be provided wherever possible. However when needle vibrators are used, the horizontal distance between bars of a group may be reduced to two-thirds the nominal maximum size of coarse aggregate, provided that sufficient space is left between groups of bars to enable the vibrators to be immersed.
 - (A) Wherever, there are two or more rows of bars, the bars shall be vertically in line and the minimum vertical distance between the bars shall be 15 mm or two-thirds the nominal maximum size of aggregate, or the maximum size of bars, whichever is greater.

5. Splicing

Where it is necessary to splice reinforcement, the splices shall be made by lapping, welding, or by mechanical couplings.

When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full strength. Welding of bars shall be done as directed by the Engineer-in-charge and conforming to the requirements of clause 11.4 of IS 456 – 1978, reproduced below:

“Welded joints or mechanical connections in reinforcement may be used but in all cases of important connections, tests shall be made to prove that the joints are of full strength of bars connected. Welding of reinforcement shall be done in accordance with the recommendations of IS 2751 – 1966 (Code of Practice for welding of mild steel bars used for reinforced concrete construction).”

- If it is proposed to use welded splices in reinforcing bars, the equipment, the material, and all welding and testing procedures shall be subject to the approval of Engineer-in-charge. The Contractor shall also carry out test welds as required by the Engineer-in-charge. No extra payment will be made for welding reinforcement test welds.
- For welded splices for reinforcing bars conforming to IS1786 – 1985 (High strength deformed steel bars), welding shall be done in accordance with IS 9417 – 1979. For the

reinforcing bars conforming to IS 432 (Part-I) – 1982 (mild steel/medium steel), the welding shall be done in accordance with IS 2751 – 1979. The electrodes for manual arc welding shall conform to IS 814 (Part-I) 1974 and IS 814 (Part-II) 1974. Mild steel filler rods for oxy acetylene welding shall conform to IS 1278 – 1972, provided they are capable of giving a minimum butt weld tensile strength of 41 kg/mm².

Electric arc welding shall be used. Ends of bars shall be cleaned of all rust, mill scale, grease, paint, or any other foreign matter before welding.

Reinforcing bars of 28 mm in diameter and larger may be connected by butt welding provided that the lapped devices will be permitted if found to be more practical than butt welding and if lapping does not encroach on cover limitation or hinder concrete or reinforcement placement.

Reinforcing bars of 25 mm in diameter and less may be lapped or butt-welded whichever is considered more practical by the Engineer-in-charge.

Note: Welded pieces of reinforcement shall be tested at the rate of 0.5% of the total number of joints welded or as decided by the Engineer-in-charge. Specimens shall be taken from the actual site of work. Strength of weld provided shall be at least 25% higher than the strength of the bar.

6 Tolerances on Placing on Reinforcement

Unless otherwise specified by the Engineer-in-charge, reinforcement shall be placed within the following tolerances (as per IS: 456-1978, clause 11.3):

- | | | |
|-----|-------------------------------------|--------|
| (a) | for effective depth 200 mm or less | ± 10mm |
| (b) | for effective depth more than 200mm | ± 15mm |

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

7. Nominal Cover to Reinforcement

Definition and General Nominal Cover

Nominal cover is the design depth of cover to all steel reinforcements, including links. It is the dimension used in design and indicated in the Drawings. It shall not be less than the diameter of the bar. For a longitudinal reinforcing bar in a column, the nominal cover shall in any case be not less than 40 mm or less than the diameter of such bar. In the case of columns of minimum dimension of 200 mm or less, which's reinforcing bars do not exceed 12 mm, a nominal cover of 25 mm may be used.

For footings, minimum cover shall be 50 mm.

The following table may be referred to for the concrete cover for reinforcement, unless otherwise specified:

Nominal Cover to Reinforcement

S.No.	Member	Nominal Cover
1.	Thin slabs and walls	Not less than diameter of bar; minimum 15 mm.
2.1	Beam sides	Not less than diameter of bars; minimum 25 mm.
2.2	Beam top and bottom ends	2 times dia. of bars; minimum 25 mm.
3.	Columns	Not less than diameter of bars; minimum 25 mm up to 200 mm sides and minimum 40 mm above 200 mm sides.
4.	Footings	Minimum 50 mm.
5.	Foundations	40 mm.
6.	Water retaining hydraulic structures.	35 mm for concrete of grade M35 or more and 40 mm for concrete for grade less than M35.

Nominal Cover to Meet Durability Requirement:

The Engineer-in-charge, in consultation with WRD headquarters, taking into due consideration the conditions of exposure of the concrete structures (as per clause 8.2.2.1, Table 3 of IS 456-2000), may require the Contractor – in deviation from above stated figures - to provide the following minimum nominal cover of reinforcement to the concrete, as per clause 26.4.2, Table 16 of IS 456-2000, regarding durability considerations:

Nominal cover to Meet Durability Requirements

Exposure	Minimum Nominal Concrete Cover
Mild	20mm
Moderate	30mm
Severe	40mm
Very Severe	50mm
Extreme	75mm

Notes:

1. For main reinforcement up to 12 mm dia. bar, for mild exposure the nominal cover may be reduced by 5 mm.
2. Unless otherwise specified, actual concrete cover should not deviate from the required nominal cover by ± 10 mm.
3. For exposure condition 'severe' and 'very severe' reduction of 5 mm may be made where concrete grade is M35 and above.

8. Payment

The Bid Rate in the bill of quantities for reinforcement includes cost of steel, binding wire or welding material at site of work, its cutting, bending, cleaning, placing, binding/welding and fixing in position as shown on the Drawings and as directed by the Engineer-in-charge. The unit rate shall also include cost of all devices for keeping reinforcement in approved position, cost of jointing as per approved methods and all wastage, overlaps, dowels, binding wire or welding material and spacers of bars and the cost of all incidental operations necessary to complete the work as per specifications.

H - DEWATERING

1 SCOPE

The item shall include providing and maintaining the pumps and equipment required for all dewatering work required in manner herein after specified.

2 Contractor's responsibility for design of cofferdam & protection works

The contractor shall plan, construct, and maintain satisfactorily, necessary diversion channel, other temporary diversion, and protective works, which shall be paid separately under relevant items. Contractor shall furnish, install, maintain and operate all necessary pumping and other plant for dewatering various parts of the work and maintain the foundation, pump sumps, and other parts of the works as free from water as required for approved construction operations.

3 Approval to design etc.:

All protective works and other arrangements proposed to be made shall be got approved from the Engineer-in-charge. On approval of Engineer – in – charge, they shall be constructed and maintained to the satisfaction of the Engineer-in-charge, at the contractor's cost.

4 Contractor to dewater whenever required:

The area under all works and the adjoining areas as necessary shall be maintained free of water, when required.

The areas shall also be maintained free of water after any part of the work is completed, for inspection, safety and installation by Government or for any other reasons determined as necessary by the Engineer – in – Charge. The sumps shall be well lighted and shall be readily accessible for inspection. The contractor shall pump all water from the site of the works, shall keep the foundation free of water, while excavating, concreting and placing masonry and continue to keep the works free from water for a period as may be required for proper setting of mortar or otherwise required for the completion of work.

The contractor shall have to construct and maintain during construction all protective works diversion channels and other diversions or protective works as necessary after approval from the Engineer in-Charge. The contractors shall not be entitled to any claims on accounts of damages due to any amount of water leaking through, under or ground protective works, diversion channels, and other diversion or protective works or over topping of the diversion works.

5 Damages Due To Flood, Rain Etc.:

All damages, if any to pumps or any other works, shall be borne by the contractor.

6 No Claim Due To Change in Design Of Structure:

No claims towards increase in dewatering area of diversion arrangements due to change in the design of structure shall be entertained by the Department.

7 MODE OF MEASUREMENT & PAYMENT

The rates of respective items of excavation, embankment, concrete, masonry as entered in "Bill of Quantities" is inclusive of all dewatering operations and no separate payment because of dewatering operations shall be admissible.

I: STONE MASONRY FOR STRUCTURES AND SIDE WALL LINING

1. Materials

1.1 Stone

The stones used for masonry shall be clean, hard, dense, durable, tough and sound and shall be free from decayed and weathered portions, veins flaws, cracks, soft seams, sharp corners and other defects. Stains on two out of six faces may however be allowed if such stains cannot be removed even after rubbing with hard wire brush. The rubble shall have, as far as possible, uniform colour and texture and shall be quarried from approved quarries. The size of rubble stones shall be such that 75% stones are not less 15 cm in size in any direction and weighing not less 23 kg.

Rejected stone shall be removed from the site within 3 days failing which department will remove the same at the cost of the Contractor. Following IS codes shall generally apply to the stone masonry work.

IS 1597 (part-I) 1992:	Code of practice for construction of stone masonry - Rubble stone masonry.
IS 1127: 1970	Recommendation for dimension and workmanship of natural building stones for masonry work.
IS 5218: 1969	Method of test for toughness of natural building stone.
IS 1124: 1974	Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.
IS 2250: 1981	Code of practice for preparation and use of masonry mortars.
IS 1122: 1974	Method of test for determination of true specific gravity of natural building stones.
IS 1121: 1974	Method of test for determination of strength properties of natural building stones.
IS 2116: 1980	Specifications of sand for masonry mortar.

The stone shall be tested for water absorption, specific gravity, soundness, and compressive strength.

The physical properties of stone shall meet the following requirements: Test

	IS code	Acceptance Criteria
Water absorption (when immersed in water for 24 hours).	IS 1124: 1974	Shall be less than 5%
Specific gravity.	IS 1122: 1974	Greater than 2.5
Soundness.	IS 1126: 1974	Less than 10% (after 5 cycles)

1.2 Sand

1.2.1 General

The sand shall be natural river sand washed and screened and the maximum size of particles being limited to 4.75 mm for mortar. The second screening shall be done at site of work before use and no extra claim shall be entertained on this account.

The sand shall consist of hard, dense, durable uncoated rock fragments and shall be free from injurious amount of dust, lumps of soft or flaky particles, shale, alkali, loam, mica and other deleterious substances. The total percentage of all the deleterious substances shall not exceed 5%. The sand shall also be sound and free from deleterious amounts of organic impurities.

1.2.2 Grading

The sand shall be well graded and the grading shall be controlled in such a way that its fineness modulus ranges between 2.2 to 3.2. It shall not have silt more than 3% by weight.

The grading of the sand shall be controlled by mixing of sand from different sources, if necessary, so that the fineness modulus of at least 9 out of 10 consecutive test samples of finished sand, when samples are taken, will not vary more than 0.20 from the average fineness modulus of the 10 test samples. The Contractor shall stack sand from different sources separately to facilities sampling & testing. At least 3 days stock shall be kept at site of the work to enable the department to take samples and test the material, in advance of its actual use.

The Contractor shall take the approval of the sand stacks in advance. If unapproved sand is used the work shall be rejected and redone at the cost of the Contractor. Sand shall confirm to provisions of IS 2116 : 1980:

Grading of sand for masonry work

IS sieve size	% passing by weight
4.75 mm	100
2.36 mm	90 - 100
1.18 mm	70 - 100
600 micron	40 - 100
300 micron	5 - 70
150 micron	0 - 15

1.3 Cement

Cement shall be 33-grade ordinary Portland cement conforming to IS 269 or 43-grade ordinary Portland cement conforming to IS 8112 or 53-grade ordinary Portland cement conforming to IS 12269, as per approval of the Engineer-in-charge. Initial setting time shall not be less than 30 minutes and final setting time not be more than 600minutes.

1.4 Water

The water used in masonry shall be free from objectionable quantities of silt, organic matter, alkali and other impurities. Normally, potable water is considered satisfactory for mixing and curing.

The percentage of solids shall not exceed the following as per IS 456: 2000:-

Organic	200 ml/litre
Inorganic	3000 ml/litre
Sulphates as SO ₃	400 ml/litre
Suspended Material	2000 ml/litre
Chlorine as CL	2000 ml/litre
pH	Not less than 6 – acceptable range shall be between 6 to 8.5

2. Mortar

2.1 Preparation of Mortar

The cement mortar shall consist of cement and sand each complying with its respective specification and shall be mixed in specified proportions as given in the Drawings and bill of quantities. The code of practice for preparation and use of mortar, IS 2250-1981, shall be followed.

Mortar shall consist of Portland cement and sand in the specified proportion, by volume. Sand shall be natural sand and of grading as may be directed by the Engineer-in-charge. The mortar shall be mixed in suitable sized mixers. The quantity of sand and cement in each mix shall be determined by weight or by conversion, into volume on the basis of bulk density as per directions of the Engineer-in-charge after making due allowance for bulkage of sand.

Only such quantity of mortar shall be prepared at a time as could be completely used up in masonry within thirty minutes of mixing. Mortar that has remained longer, than this period or that has become stiff or set otherwise shall be wasted at the Contractors cost.

The mortar shall be mixed intimately in suitable mechanical mixers (of tilting type). The first batch of mortar at the commencement of work with any mix shall be made richer by mixing 10% more cement over and above that required for the particular mix. The mortar prepared in the mechanical mixer shall be mixed for at least 3 minutes after addition of water.

Hand mixing of mortar shall not be allowed:

Only in exceptional circumstances, such as mechanical breakdown of mixer, or when the quantity of work is very small, hand mixing may be permitted by the Engineer-in-charge for that restricted period and the restricted quantity. This shall be done on a smooth water tight platform large enough to allow efficient turning over of the ingredients before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with water nor does the mixing water flow out. Dry sand and cement shall be mixed thoroughly by turning over to get a mixture of uniform colour. Enough

water shall then be added gradually and mixing continued until mortar of required consistency of 90 to 100mm, as required in clause 9.1.1 of IS 2250-1981 is obtained.

All ingredients shall be fed to the mixer simultaneously. The required quantity of water to achieve the required consistency shall be pre-determined by trial mixes, and portion of water from 5 to 10 percent shall precede and the like quantity shall follow the introduction of other materials. The remainder of water quantity shall be added during mixing operation.

2.2 Mortar Content

As specified herein the mortar content in 1 m³ of the masonry is expected to vary between 0.37 to 0.43 m³, the average being assumed as 0.40 m³ per cubic metre of masonry, viz. 40%. The actual consumption of mortar shall be recorded from day to day as equivalent to the volume of the sand fraction of the mortar before the sand enters the mixer. The mix shall be as per proportions specified/approved by the Engineer-in-charge from time to time.

The following general principles shall be followed:

- (i) The ingredients shall be fed into the mixer simultaneously and in such a manner that the period of flow of each ingredient into the mixer is about the same.
- (ii) A portion of water 5% to 10% shall be fed in the mixer initially and like quantity shall follow the introduction of other ingredients. The remaining of the water would be added uniformly and simultaneously with other ingredients.
- (iii) The thoroughness of mixing and adequacy of the mixing time so as to give a uniform mortar shall be tested at the start of the job and at such intervals as may be considered necessary. The variation in air free unit weights (range between max. and min.) shall not be more than the limits given below for three samples, one each taken from the front, centre and back of the batch:-

For one batch	36.6 kg/m ³
Average for three batches	25.5 kg/m ³
Average of 20 batches	19.1 kg/m ³
Average of 90 batches	14.3 kg/m ³

2.3 Mortar Consumption

Generally, the masonry shall consist of sound, tough, durable and as far as possible, fine or medium grained stone rubble of approved quality embedded in cement mortar. The mix proportion of mortar in the masonry shall be as shown in the Drawings, or of proportion as required by design consideration the later being subject to approval of the Engineer-in-charge from time to time with due allowance for the season of the year and the time of the day when the mortar is used and based on experiments and experience gained. The mortar proportion may be varied if desired by the Engineer-in-charge, which shall not be considered extra items. All stones shall be absolutely free from dirt and scale and well cleaned and washed before being laid. On no account shall masonry be allowed to present a dry surface during the curing period. At the end of the day's work the top shall be kept well flooded. The masonry shall be raised in courses and unless otherwise directed the next course shall not be laid earlier than 24 hours after the laying of the previous course. The rates given in the various items are based on standard consumption for purpose of computation of cement consumption. However, this shall be assumed as an average of 40% of finished masonry. A variation up to $\pm 3\%$ may be allowed in actual consumption on reasonable grounds without any change in rates.

A variation of more than 3% on the lower side will not be permitted and it will be considered as below specification of work. Variation of more than 3% on higher side will be at the risk and cost of Contractor

To keep a check on the quantity of mortar used, record shall be maintained of the cement consumed mortar turned out from the mixers and corresponding quantity of masonry laid.

The joints shall be well filled with mortar and suitable spalls shall be wedged to avoid excessive use of mortar. The stones shall be pressed and tamped.

2.4 Tests on Mortar

Necessary tests to determine compressive strength of the mortar and for its consistency shall be carried out in accordance with IS 2250-1981 (Appendix-A). A minimum of 3 test specimens shall be made for each 120 m³ of each class of mortar. There shall be at least 3 test specimens of mortar for

each day of masonry work even if only a few cubic metre of particular mortar is manufactured and used in a day.

Tests and frequency of testing

Frequency of Testing of Compressive Strength

Material	Test	Frequency of test	Test designation (Indian standard)
Stone for masonry	Compressive strength. Water absorption. Soundness.	One test in each working season of individual quarry.	IS: 1121-1974 IS: 1124-1974 IS: 1126-1974
Cement mortar cubes	Compressive strength after 28-day curing of mortar cubes.	Up to 120m ³ of masonry work per day = one sample per shift per mixer. For every additional 100 m ³ of masonry work per day = one sample per shift per mixer.	IS: 2250-1981

The strength of one sample shall be taken as average of at least 3 test specimens taken from single batch of mortar. The average strength of any 3 consecutive samples shall be equal to or greater than the specified strength. The overall co-efficient of variation for any 10 consecutive samples shall not be more than 15 percent. Not more than 10% of the specimens tested shall have a compressive strength less than 80% of the required and the average strength of all tests shall equal or exceed the required specified strength. The minimum compressive strengths for 1:5 and 1:4 cement mortar mixes shall be 50 kg/sq.cm and 75 kg/sq.cm, respectively.

3. Random Rubble Masonry

3.1 Dressing

The stone shall be set in the work as received from the quarry, after merely knocking-off weak corners and edges with the mason's hammer and after clearing scales of foreign matter, coating if any on the stone. Cleaning and washing of stones as specified earlier shall, however, be done in each case.

3.2 Washing of Rubble

All rubble to be used in masonry shall be thoroughly washed with good clean water. All stones shall be wetted and surface dry while being laid. There must be a good collection of stones, and spalls within easy reach of each mason to enable proper selection of stones to suit the individual locations while laying and these shall be kept continuously replenished.

3.3 Bond and Laying

The stones shall be carefully laid so as to break joints as much as possible and shall be solidly bedded in mortar with close joints. No joint shall exceed 37 mm nor shall be less than 12 mm in thickness. Chips of stone and spalls shall be wedged into the work, wherever necessary to avoid thick beds or joints of mortar and to give maximum density. No dry work or hollow space shall be allowed. Every stone, whether large or small, shall be set flush in mortar, shaken and hammered down by a mallet to sink into it. The smaller stone used in the filling shall be carefully selected to fit snugly into the interstices between the larger ones.

Additional mortar to be added to fill the intervening space shall be well worked by trowel and a light hand bar, 12.5 mm diameter, and 0.60 m long to ensure proper mixing and bonding with the bottom mortar. Disturbing the mortar during the process of setting shall be avoided. After the stone is laid, underpinning shall be avoided, as this tends to lift the stone and leave air pockets. Putting chips in the intervening space, between stones shall not be done before filling it with mortar and shaking it down to the full depth. Flat chips shall not be laid at top. They shall be driven on the ends vertically. The masonry surface shall be kept as rough as possible to secure good bond between successive layers.

3.4 Headers and Stretchers

Vertical headers shall be inserted every 1.5 m to 2 m apart both along and across the masonry monolith. They shall run through the height of at least two courses. Their positions shall be staggered in the successive courses, so that any two courses shall be bonded with such vertical headers. Through stones shall be laid horizontally from the front face to the rear face every 1.5 to 2 m apart. The consecutive stones shall overlap each other at least 15 cm and shall be at least 60 cm long each.

The overlaps shall be staggered as stated herein above, wire brush the masonry to clean between 24 and 36 hrs. after it is laid. In case of long stoppage of work, leave construction joints 2 m wide by 0.5 m deep to serve as cut-off.

Important Requirements of Masonry Construction:-

- No masonry works shall be allowed except in day light.
- Clean the old masonry surface prior to starting of new masonry work.
- Desired consistency of mortar shall be maintained.
- Do not place mortar which bleeds excessively.
- Surface of masonry shall be as rough as possible to secure good bond between successive layers.
- Wire brush the masonry surface after the mortar has set finally i.e. after 8 hr. to 12 hr. to remove excessive mortar.
- Only such quantity of mortar shall be prepared at a time as could be completely used within 30 minutes.

3.5 Plastering With Cement Mortar

All joints in the masonry shall be raked out at least 15 mm deep and shall be full washed and cleaned with fresh water and thoroughly wetted for six hours before plastering is commenced.

The plaster shall be then laid with somewhat more than the required thickness and leveled with flat wooden rule. The finished thickness shall be sufficient to cover all the projections in the stone masonry. The plaster shall be well pressed into the joints and the surface rubbed smooth after floating it with a thick coat of pure Portland/cement. The plaster should be done in two courses.

The mortar shall be stiff enough to cling and hold when laid. To ensure even thickness and true surface, plaster shall be applied in patches of 150 mm x 150 mm, of required thickness at not more than 2 m intervals horizontally/vertically over the entire surface to serve as guides. The mortar shall then be applied to the surface to be plastered between these guides with a trowel.

If the mortar has become set or hardened before being used, it shall be rejected and removed from the work spot by the Contractor at his cost.

The plaster shall be kept constantly water cured for three weeks. To avoid the possibility of cracking of the plaster, the Contractor, shall in all cases obtain instructions regarding the size of the strips or squares to be laid in one operation and complete adjoining strips on different days. Should the mortar crack or perish through neglect of watering or for any other fault of the Contractor, the work shall be removed and redone at the Contractor's expenses or should the Contractor fail to water-cure the work to the satisfaction of the Engineer-in-charge, the latter may deploy the requisite men to water-cure the work properly and charge the cost to the Contractor.

3.6 Grading of Sand for Plaster

Grading of sand for plastering shall generally conform to the following, as per IS 1542-1977.

IS Sieve size	Percentage passing by weight
10 mm	100
4.75 mm	95 - 100
2.36 mm	95 - 100
1.18 mm	90 - 100
600 micron	80 - 100
300 micron	20 - 65
150 micron	0 - 15

3.7 Curing Adequate arrangements shall be made by the Contractor to protect the fresh masonry against rapid drying and to cure the masonry as detailed below. Curing of the masonry shall

commence after about 4 to 12 hours of construction (depending upon weather, atmospheric temperature etc.) and water shall be gently sprayed to avoid damage.

All exposed surface of masonry shall be continuously kept moist for a minimum period of 28 days. All methods used for curing shall leave the surface free from any dislocation or damage. The surface should be cleaned of all the materials after completion of work. Should the masonry in any part deteriorate for want of curing, it shall be pulled down and rebuilt with fresh materials at the cost of the Contractor.

3.8 Measurement of Masonry

Except as otherwise specifically provided in these specifications, measurement of masonry for payment will be made only to the neat lines of the structure as shown on the Drawings or as established by the Engineer-in-charge and on the basis of the thickness shown in the Drawing. Where more than one thickness is shown the average thickness shown on the Drawings will be used as the basis of measurement for payment

Tolerances for Masonry Construction

- (i) Variation of construction line outline from established position in plan:
 - in 5 m length 10 mm
 - in 9 m length 15 mm
- (ii) Variation of dimension to individual structural features from established position:
 - in 25 meters or more 50 mm
 - in buried construction twice the above amount.
- (iii) Variation from the plumb and from the specified batter, for all structures:
 - in 5 m height 20 mm
 - in buried construction twice the above amount

J: PLASTERING

1.1 SCOPE

- i. Erecting, dismantling and removing the scaffolding.
- ii. Preparing the surface to receive the plaster.
- iii. Providing cement plaster of the specified average thickness.
- iv. All labours, materials, use of tools and equipments to complete the plastering.
- v. Curing for 21 days.

1.2 PROPORTION OF MORTAR

All plastering shall be done with cement mortar (1:3) unless otherwise specified. The cement shall conform to the specifications mentioned in Item of concrete. The sand to be used shall be fine. It shall pass through sieve of size No.16 Mesh A.S.T.M. (IS120). The sand shall conform in all other aspects to specifications Item of concrete.

1.3 CONSTRUCTION

All joints in the face work to be plastered shall be raked out to a depth equal to not less than the width of the joints or 2 cm or as directed by the Engineer-in-charge. Smooth surfaces of concrete, old plaster, etc. must be suitably roughened to provide necessary bond for the plaster. The surface to be plastered shall be cleaned and scrubbed with fresh water and kept wet for 6 hours prior to plastering and on rough surface of wall a preliminary coat must be given to fill up the hollow in 2 coats. The thickness of first coat shall be just sufficient to fill up unevenness in the thickness in the surface under treatment. The second coat shall be applied while the first coat is still soft. Plastering should be done from top to downwards. The cement mortar that falls on the ground while applying the plaster shall not be used. Patches of plaster 15 cm X 15 cm shall be put about 1.5 metre apart as gauges to ensure plaster work, mortar shall be firmly applied to the joints and on the surface and rubbed and levelled with a flat wooden rule to give the required thickness. All corners shall be chamfered or rounded as directed by the Engineer-in-charge. The surface shall be finished to plane or curved surface, as directed by the Engineer-in-charge. The work plastered shall be kept wet for 21 days after it is finished.

K: Dismantling

1 SCOPE:

This item includes dismantling the existing structure such as U.C.R. masonry, cement concrete stacking them within the specified lead neatly as directed and disposing off the unsuitable materials.

2 GENERAL

The items provides for the complete removal of the existing structure except such portions as may be required or permitted to be left in place as shown on the drawing or as directed by the Engineer-in-charge, clearing the site, sorting out useful materials and stacking them neatly within a lead of 100 m or on the place indicated by the Engineer in-charge, whichever is more and disposing the non-serviceable material.

3 PRELIMINARIES

If necessary & directed by engineer –in-charge the contractor shall have to erect screens of canvas or other suitable materials and / or to water the structure and area to avoid the nuisance of dust before and during dismantling. Care shall be taken to see that dismantling is done in such sequence and manner so as to prevent all avoidable damage to usable materials and any damage to nearby property or injury to life.

In case of structure, which is to be removed for re- erection, all members shall be properly match marked with paint. The pins, nuts, plates, structural steel members, timber etc shall be similarly marked for identification of their position for entire assembly. All machined surfaces, pinhole, pins, etc, shall be coated with grease. An Inventory of all possible serviceable materials shall be kept on record and signature of the contractor obtained in token of his acceptance. Any doubt or non-agreement with the same shall be reported by the contractor before starting removal.

Portion required to be kept intact shall be clearly marked before starting dismantling.

If no separate provision exists in tender for necessary diversion, the contractor shall nevertheless invariably be responsible for the construction and maintenance of adequate barriers, guards, and/or lights at the end of portions of the roads required to be closed. If the contractor to the satisfaction of the Engineer in shall obtain any further facility of construction permission of the competent authority for the purpose- charge at contractor own cost.

The contractor on the work site to show the day-to-day account of the turn out, salvaged materials, dismantled material is properly stacked or wasted shall open a register. The representative of the contractor and responsible member of the departmental supervising staff shall sign it every day.

4 DISMANTLING AND REMOVAL.

The structure shall be dismantled carefully and the materials removed without causing damage to the serviceable materials to be salvaged, the part of the structure to be retained and any properties or structures nearby. Any avoidable damage to articles to be salvaged and part of the structure to be retained and any damage to nearby property or structure shall be made good by the contractor without extra claims. The contractor shall be responsible for any injury to the workers or the public.

Unless otherwise specified the structure shall be removed up to 45cm. below the ground level and the portion, which interferes in any way with the new construction, shall be removed entirely. Removal of overlying or adjacent materials if required for the dismantling of the structure shall be included in the item.

Where existing bridge is to be extended to otherwise incorporated in the new work, only such part or parts of the existing structure shall be removed as are necessary to provide a proper connection to the new work. The connecting edges shall be cut, chipped and trimmed to the

required lines and grades without weakening or damaging the part of the structure to be retained.

Blasting if required, may be resorted to with the written permission of the Engineer. In such a case blasting shall be carried out as specified. All blasting operations shall be finished before the new construction is commenced. Equipment or methods which might damage members, portions of the structure to be preserved or adjacent construction or structure shall not be used.

5 DISPOSAL

All the materials obtained from the removal of the structure shall be the property of Government. Useful materials shall be stacked neatly in such a manner as to avoid deterioration and in place directed by the Engineer in- charge within a lead of 100m or on the place indicated by the Engineer in- charge whichever is more. Different categories of materials shall be stacked separately.

Unless otherwise provided, excavated materials shall be used in backfilling excavation made in removing the structure, in constructing embankment or otherwise disposed off as directed within 100 metre free of cost.

Useful materials will be issued to the contractor for use in the new work or elsewhere at the rates provided in the tender or when not so provided at the rates agreed upon by the Engineer in- charge and contractor.

Non-useful materials shall be wasted by the contractor without causing any damage or inconvenience.

6 FINAL CLEARANCE.

All rubbish shall be cleared of the site and the ground left clean and clear. Any damage caused during the operation shall be made good.

7 RESPONSIBILITIES

- i. Maintaining a register of the salvaged materials.
- ii. keeping intact the portion not to be removed.
- iii. Avoidable damage to serviceable articles to be salvaged during dismantling conveyance and stacking.
- iv. Blasting operations when necessary.
- v. Stacking neatly and safe custody of the salvaged materials till handing over to the Department.
- vi. Disposing off unserviceable materials and its consequences.
- vii. Damage to nearby property and injury to workers and the public due to these operations.

8 ITEM TO INCLUDE

- i. All labour, materials use of equipment, tools and plant required for
- ii. completing the job satisfactorily.
- iii. Erecting and removing screens and watering when necessary and directed.
- iv. Marking the structure suitably.
- v. Opening register of salvaged materials.
- vi. Providing adequate barricades, signs, lights, etc.
- vii. Removal of the structures.
- viii. Diverting the existing drains, road etc. temporarily and redoing the same if not separately provided.
- ix. Stacking serviceable materials.
- x. Wasting unserviceable materials.
- xi. Clearing site on completion.
- xii. Compensation for damaged properties or injuries to persons.

9 MODE OF MEASUREMENT AND PAYMENT

The work shall be measured and paid at specific rate mentioned in Bill of Quantities

L: DRY STONE PITCHING

1 SCOPE:

This item includes providing and laying dry rubble pitching of specified thickness with large size stones of approved quality including hand packing and filling interstices with quarry spauls, watering with all leads and lifts etc. complete as directed. Thickness of the pitching will be as shown in the drawing or as directed by the Engineer-in-Charge.

2 MATERIALS:

The rubble stones for pitching shall be sound, hard and durable and fairly regular in shape. The depth of the stones shall be about equal to the specified thickness of pitching and each stone shall generally be not less than 10Kg (Stone volume 0.01 Cum) or otherwise ordered by the Engineer-in-charge. The rock fragment reasonably well graded containing at least 60 % of stones weighing 35 Kg or more. The smaller size stones required for packing and wedging shall be brought to the site only to the required extent and they shall not be used in two or more layers to substitute for the stones of full thickness.

1.1 The specification of stones, sand and aggregate mentioned in the item concrete and masonry are applicable to this item.

2 PREPARATION OF THE BASE:

The slopes of the bank shall be made up with murum and trimmed to the required slope and properly moistened and compacted. The profiles shall be put with pegs and strings at required intervals for the pitching to ensure that it is done true to line, curves, levels, thickness and slopes.

2.1 Natural sand layer of specified thickness as shown in the drawing shall be laid on compacted slope in bays of not more than 5 m X 5m, confined by wooden planks, and the sand shall be moistened and consolidated by tamping, etc.

2.2 Quarry spaul layer of specified thickness as shown in drawing shall be laid on sand bed. Quarry spaul shall be well graded and having size from 20 mm to 75 mm or as directed by the Engineer-in-charge. The gradation shall be got approved from Q.C. Wing. Utmost care shall be taken, not to disturb the sand layer below while placing the Quarry Spaul layer.

3 CONSTRUCTIONS:

A line of pin headers shall be provided at the toe to support the pitching. The lowest course of pitching shall be started from the line of pin headers at the toe of the slope and the pitching should be laid on the slope.

4. In case of 30 cm. thick pitching, the stones for pitching shall be used after merely knocking out weak corners & edges with a mason's hammer. The stones shall be laid closely in position on the prepared bed and firmly set with the even face on top. The pitching shall be laid to lines, curves and slopes as indicated in the plans or as ordered by the Engineer-in-charge. Each stone shall cover the full depth of pitching and shall be perpendicular to the sloping bed. For pitching more than 30 cm. thick, minimum 60 % of the stones shall cover full depth and remaining stones shall be laid in not more than 2 layers. The stone shall be laid by breaking joints as far as possible. Additional murum bedding if required for getting proper slope, shall be carried out simultaneously with each course of pitching, if necessary watered and rammed. The interstices in the joints between adjacent stones shall be filled in with spauls of the proper size & wedged in with hammers to ensure tight packing. Such filling shall be carried out immediately after placing larger stones and before the next upper layer is taken in hand.

5 Top surface finish shall be either rip rap or plain as shown in the drawing or as directed by the Engineer-in-Charge.

6 MODE OF MEASUREMENT AND PAYMENT:

Measurement and payment for completed item as below-

- i. Pitching cum or sq-metre as applicable in Bill of Quantities
- ii. Sand layer in cum or sqmetre as applicable in Bill of Quantities
- iii. Quarry spaul layer in cum or sqmetre as applicable in Bill of Quantities.

M: ROCK TOE AND REVETMENT

1 SCOPE:

This item includes furnishing of all tools, equipments, contractors own material and labour required for providing, laying rock toe including foundation cleaning, hand packing, adjusting the sides to correct slopes and performing all operations necessary and ancillary thereto.

2 The rock fill portion of the embankment including the rock toe etc shall consist of suitable free draining mixture of rock fragments, boulders and cobbles from the required excavation, borrow pits or quarries as the case may be. The material shall be fairly well graded consisting principally of rock fragments ranging from 10 kg to 60 kg but with sufficient fine materials, such as rock cobbles and coarse gravels to fill the voids among the larger particles. The materials shall be so selected and hand packed that the large fragments shall be placed near the outer slopes and fine material adjacent to the inside slopes of the rock fill zone. The fill shall be dense and well graded with no large voids or cavities and the surface of the outer slope shall be fairly uniform with approximately, the same slope as that shown in the drawing.

3 The rubble quarries shall be got approved from the Engineer-in-charge. Approval to the quarry shall not be taken to mean that the all rubble available from quarry is also approved. The rubble brought from such quarry shall be used only after it is approved by the Engineer-in charge.

4 Stones of smaller size shall be laid next to the filter materials. The rubble shall be laid simultaneously in regular layers to the designed slopes and with stones being properly hand packed.

5 Specifications of material stone, sand, metal as concrete.

Rock Toe and Revetment shall be constructed to the lines, grades and thickness as per drawing.

6 MODE OF MEASUREMENT:

The measurements for the rock toe shall be on cubic metre basis inclusive of all leads and lifts.

N: DRAINS AND FILTERS

1 SCOPE:

The item includes providing all tools, plant, formwork required if any, labour and materials required for providing and laying approved material in the specified layers including screening and rehandling washing the materials if necessary compaction and all operations necessary and ancillary thereto. The item includes the inclined sand filter as well as the reverse sand filter behind the rock toe.

2 MATERIALS:

a) The materials for filling the drains or drainage mats or slant drains, shall consist of sand, gravel and crushed metal suitably graded to satisfy the filter criteria (1) The coefficient of permeability of draining material should be more than that of base material (2) The graded filter drain shall confirm to the criteria mentioned below (3) The sand shall be well graded.

D 15 (filter) / D-85 (base) < 4 to 5

D 15 (filter) / D-15 (base) > 4 but less than 20

D 50 (filter) / D-50 (base) > 25

Where D-15 represent the diameter of corresponding to 15 % finer.

The gradation curve of sand shall be roughly parallel to that of base material. The sizes of the materials shown on the drawings are tentative and may require modifications, if they are not found to satisfy filter criteria. The contractor shall be bound to carry out such modifications, as directed without any extra cost.

b) SAND:

The sand shall be natural sand. It shall be from hard, dense and durable rock formations. The maximum percentage of materials less than 0.075 mm. size shall not be more than 5% by weight and it should not contain organic materials. The maximum size of particle shall be 10 mm (3/8 inch). The specific gravity of particle shall not be less than 2.60. The sand shall be

well graded, and it should satisfy the filter criteria with the adjoining filter and base materials. The sand may have to be washed or screened without any extra cost.

The sand is to be supplied by the contractor from his own quarries and the item includes all charges of supply and rehandling including collecting, screening, transporting, washing, transporting, stacking etc. with all lead's and lifts involved.

c) GRAVEL:

When gravel is to be used it shall mean natural gravel consisting of clean hard, durable, dense, rock fragments. It shall be well graded subject to clause (a) The percentage of materials below 0.075 mm. size shall be less than 2%. The gravel should not contain any organic matter. The item includes all charges of supplying and rehandling, including collecting, screening and washing, transporting, stacking etc. with all leads and lifts involved.

d) AGGREGATE:

If natural gravel deposits satisfying criteria are not available, the use of aggregate shall be permitted as filter material. The maximum size permissible shall be 80 mm aggregate shall consist of boulder or crushed rock having clean, hard, durable, dense rock pieces. It shall be reasonably well graded with sizes as shown on the drawings. The percentage of materials below 0.075 mm size shall be less than 1 %. The item of aggregate includes all charges of supply and rehandling including breaking, screening, transporting stacking etc. with all leads and lifts involved. The sizes of the aggregate shown on the drawings are tentative and subject to change as required to satisfy the filter criteria with adjacent materials.

e) QUARRY SPALLS

Providing and constructing base of specified thickness for foundation of structures consisting of quarry spalls and sand including laying, packing with all leads and lifts etc. complete as directed.

The quarry spalls shall be perfectly sound, free from weathered pieces, and with good quality known to be satisfactory in use and shall be used as per the directed of Engineer-in-charge. The thickness of quarry spalls shall not be less than 0.15 m. and shall be laid uniformly and the interstices filled with sand of approved quality as per section and detailed drawing or as direction by the Engineer-in-charge

3 PLACING OF MATERIALS:

Trench Drains and Mould Drains:

- a. The excavation for the trench either in natural ground or made up bank work shall be as per designed cross sections or as directed and is covered under the-items of excavation. The surface of excavation shall be cleared of all loose material so as to prevent contamination of the filter materials. Similarly, the surface on which the mould drains are to be laid is to be cleaned of all loose materials.
- b. The filter materials shall then be carefully deposited in different layers to the required thickness and slopes and grades as shown in the drawings. Thickness of individual layers shown on the drawings are tentative and may require modifications, to satisfy filter requirements and the contractor shall be bound to carry out such modifications, as directed by the Engineer in-charge without any extra cost. The coarser materials shall form the core of the drain with an around cover of progressively finer materials. The laying of individual layers shall proceed, in such a way as to preclude as far as possible the mixing of materials of one size with that of the other.

4 MODE OF MEASUREMENTS:

4.1 Trench Drainage and Mould Drains:

The measurements shall be of the volume of the total quantity of filter material placed. The cross sections of drains as finally approved and constructed shall be recorded. In case of trench drain the bottom width levels and side slopes shall be as recorded for the item of excavation. Any materials filled in excavation beyond approved section will not be paid for. The rates include all leads and lifts.

4.2.1 Sloping filter: (Within the dams and behind the rock toe/ pitching)

The work shall be measured on the basis of cross section. The cross section will be taken at every 15 metres or at closer distance as found necessary. The final width or thickness of layers at different levels and location from center line or any reference line shall be recorded on every 1.5 m. vertical interval and at change of section of the filter. The item rate includes all leads and lifts.

5 MODE OF PAYMENT:

The payment of this item shall be made on cubic meter basis.

O: PROVIDING AND LAYING R.C.C. HUME PIPE

1 SCOPE :

This item includes providing, fixing and laying cement concrete pipe of I.S. NP2/NP3 class of various diameters in proper line, level and slope including providing and fixing collars if necessary in cement mortar 1:2 complete.

2 Materials: - Concrete pipes shall be of the class and diameter mentioned in the item and shall comply with I.S. 458-1961.

The collars shall be of the appropriate size for fixing of the concrete pipes specified on the drawing and shall comply with the I.S. 458-1961.

The cement mortar 1:2 shall comply with the relevant I.S. specification.

3 Fixing: -

The handling and laying of the concrete pipes shall comply with I.S. 783-1959 code of practice of laying concrete pipes Joints and bedding shall comply with relevant Para of the said I.S.

The pipes shall be laid to the line and levels shown on the drawings and the slope shall be 1 in 100 towards the downstream unless other slopes are specified on the drawing or as ordered by the Engineer in charge.

The ends of the pipes shall be flush with face of masonry or bell mouthed if so indicated on the drawings or ordered by the Engineer- in-charge. Pipes of non-standard length may be used when standard length pipes do not fit in between the face of walls. Otherwise, extra lengths of standard pipes may be left projecting beyond face of masonry on the downstream.

Diversion of the road if found necessary, shall be provided which shall be paid separately if not included in the item.

The collar joints be cured satisfactorily, until then the filling around shall not be done.

4 Mode of measurement and payment -

The contract rate shall be for providing one metre of the spun concrete pipe, joined and fixed in position. The measurement shall be for the length of pipes including collars if provided.

P: ALUMINIUM GAUGE PLATES

1 SCOPE:

This item includes providing and fixing aluminum gauge plate of required size and thickness.

2 METHOD:

Providing & fixing aluminum gauge plate of 4 mm thick size 0.30m x 2.00 metre with LDPE core laminated between two sheets of aluminum panels with the exterior aluminum panel coated with kynar 500 PVDF (Polyurethane chemical) coating including front side plate with radium pasting for background & computerized cutting of inner band width as per specified colours with specials grade version lamination with advanced PET FILM TECHNOLOGY & hook arrangement for inserting & removing plate. The gauge plate shall be fixed on MS angle (50.50 x 6 mm) frame to the vertical surface with necessary fittings including PU MRF anticorrosive treatment to the fabrication work etc. complete.

3 FEATURES-

1. Aluminum sheet with the exterior coated with Kynar 500 (Min.70%) PVDF coating.
2. Computerized gauge marking with reflective radium pasting.
3. Spray lamination with polyurethane chemical for surface protection.

4 MODE OF MEASUREMENT –

The aluminum gauge plate with LDPE Core & Kynar 500 coating as per item description will be measured and paid in RMT. It shall include all necessary support fabrication and fixtures work, all machinery, tools, equipment and labour.

Q: GSB

5.1.1 GENERAL REQUIREMENTS

1.1 Materials

- i. The material to be used for the work shall be natural sand, moorum, gravel, crushed stone, or combination thereof depending upon the grading required.
- ii. The material shall be free from organic or other deleterious constituents and conform to one of the three gradings given in Table 400-1.
- iii. While the grading in Table 400-1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75mm, 53mm and 26.5 mm, the corresponding grading for the coarse-graded materials for each of the three maximum particle sizes are given in Table 400-2.
- iv. The grading to be adopted for a project shall be as specified in the Contract.
- v. Dismantled tiles and bricks will be used after mixing with GSB for GSB works. No mixing and rolling charges will be paid for lying of dismantled material.
- vi. The moorum shall have plasticity index not less than 6 as determined in accordance with I.S. 2720. It shall be free from all rubbish, dust and organic materials as well as clods of clay / black cotton soil. The moorum should be granular and gritty.
- vii. Material testing has to be done PWD lab before work start. No extra payment will be paid for testing.

1.2 Physical requirements:

The material shall have a 10 percent fines value of 50 or more (for sample in soaked condition) when tested in compliance with BS:812 (Part III). The water absorption value of the coarse aggregates shall be determined as per IS:2386 (Part 3); if this value is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS:383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which be taken as being the density relating to a uniform air voids content of 5 percent.

TABLE 400-1. Grading For Close-Graded Granular Sub-Base Materials

IS Sieve Designation	Percent by weight passing the IS sieve		
	Grading I	Grading II	Grading III
75.0mm	100	-	-
53.0mm	80-100	100	-
26.5mm	55-90	70-100	100
9.50mm	35-65	50-80	65-95
4.75mm	25-55	40-65	50-80
2.36mm	20-40	30-50	40-65
0.425mm	10-25	15-25	20-35
0.075mm	3-10	3-10	3-10
CBR Value (min)	30	25	20

TABLE 400-2. Grading For Coarse Graded Granular Sub-Base Materials

IS Sieve	Percent by weight passing the IS sieve		
Designation	Grading I	Grading II	Grading III
75.0mm	100	-	-
53.0mm	-	100	-
26.5mm	55-75	50-80	100
9.50mm			
4.75mm	10-30	15-35	25-45
2.36mm			
0.425mm			
0.075mm	<10	<10	<10
CBR Value (min)	30	25	20

Note : The material passing 425 micron (0.425 mm) sieve for all the three gradings when tested according to IS : 2720 (Part 5) shall have liquid limit and plasticity index not more than 25 and 6 percent respectively.

1.3 Strength of sub-base

- i. It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished.
- ii. When directed by the Engineer-In-Charge, this shall be verified by performing CBR tests in the laboratory as required on specimens remolded at field dry density and moisture content and any other tests for the “quality” of materials, as may be necessary.

1.4 Construction Operations

- i. Preparation of subgrade: Immediately prior to the laying of sub-base, the sub grade already finished to Clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80-100 KN smooth wheeled roller.
- ii. Spreading and compacting: The sub-base material of grading specified in the Contract shall be spread on the prepared sub grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.
- iii. When the sub-base material consists of combination of materials mentioned in Clause 9.6.2.1, mixing shall be done mechanically by the mix-in-place method.
- iv. Manual mixing shall not be permitted. The equipment used for mix-in-place construction shall be a rotator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer-

In-Change, trial runs with the equipment shall be carried out to establish its suitability for the work.

- v. Moisture content of the loose material shall be checked in accordance with IS:2720 (Part 2) and suitably by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 percent above to 2 percent below the optimum moisture content corresponding to IS : 2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotavators until the layer is uniformly wet.
- vi. Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 KN weight may be used. For a compacted single layer up to 225 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 KN static weight with plain drum or pad foot-drum or heavy pneumatic tyre roller of minimum 200 to 300 KN weight having a minimum tyre pressure of 0.7 MN/m² or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional cross fall and super elevation and shall commence at the edges and progress towards the centre for portions having cross fall on both sides.
- vii. Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and cross fall (camber) shall be checked and any high spots or depressions, which become apparent, corrected by removing or adding fresh material. The speed of the rollers shall not exceed 5 km per hour.
- viii. Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS: 2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

1.5 Surface Finish and Quality Control of Work

The surface finish of construction shall conform to the requirements of Clause 902 (MORD.) Control on the quality of materials and work shall be exercised by the Engineer-In-Change in accordance with Section 900.

1.6 Arrangements for Traffic

During the period of construction, arrangement of traffic shall be maintained in accordance with Clause 112. (MORD)

1.7 Measurements

Granular sub-base shall be measured as finished work in position in cubic meters. The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

1.8 Rate

The Contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including full compensation for:

- making arrangements for traffic to Clause 11.2 except for initial treatment to verges, shoulders and construction of diversions;
- furnishing all material to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;
- all labour, tools, equipment and incidental to complete the work to the Specifications
- carrying out the work in part widths of road where directed; and carrying out the required tests for quality control

R. P C C BLOCK 1:2:4 LINING

Standard for reference: I.S. 10646-1991

1.1.1.1. LINING WITH P.C.C. BLOCK IN BED & SIDE SLOPES:

Following are the steps:

- a. Preparation of sub grade for base plaster
- b. Laying of 12 mm thick base plaster in cement mortar (1:6) over the properly prepared and well compacted sub grade, cured at least 24 hr.
- c. Laying of P.C.C. block size 300X150X50 mm in 6 mm thick (1:3) cement mortar filling up the joints of specified thickness flush with the top surface in (1:3) cement mortar.
- d. Spreading of sandwich cement plaster (1:5) in 12 mm thickness over the base plaster, cured at least 24 hours
- e. Laying of P.C.C. block size 300X150X50 mm (1:2:4) in 6 mm thick (1:3) cement mortar filling up the joints of specified thickness flush with the top surface in (1:3) cement mortar.

LINING WITH P.C.C. BLOCK IN BED & SIDE SLOPES

Single PCC BLOCK LINING

Following are the steps:

- a. Preparation of sub grade for base plaster
- b. Laying of 12 mm thick base plaster in cement mortar (1:6) over the properly prepared and well compacted sub grade, cured at least 24 hr.
- c. Spreading of sandwich cement plaster (1:5) in 12 mm thickness over the base plaster, cured at least 24 hours
- d. Laying of P.C.C. block size 300X150X50 mm in 6 mm thick (1:3) cement mortar filling up the joints of specified thickness.

1.1.1.2. SPECIFICATION OF DIFFERENT OPERATIONS:

The sub grade shall be prepared by dressing, watering and tamping the embankment & excavated slope, true of line and level according to the required cross section of the embankment to form a firm compacted sub grade for lining in side slopes. To ensure correct formation of the sub grade, profiles shall be excavated true to side slopes at specific intervals equal to panel lengths. These may be kept closer on curves. Suitable wooden or steel templates should be used to set the profiles.

To ensure the uniformity of the side slopes, a cord shall be stretched across profiles over two spacers and intermediate spacers shall be repeatedly placed at short intervals along the slopes till the surface between two profiles is properly leveled and dressed from top to bottom. Watering of sub grade should be done to moisten it thoroughly without forming water pools.

1.1.1.3. MANUFACTURING PROCESS FOR P.C.C. BLOCKS :

The block shall be manufactured in the near vicinity of site from sound concrete with nominal mix of (1:2:4) of strength 150 Kg./CM². The work shall generally conform to IS code 456-2000. concrete used for manufacture of blocks shall be admixture of cement, sand, coarse aggregate, potable, water, entraining agent well mixed in proportion as specified by Engineer in charge brought out to proper consistency. Well graded aggregates with maximum size of aggregate up to 20 mm. shall be used. The sand must conforming to I.S. code 383-1970. The dimension of the blocks shall be 300 mm x 150 mm x 50 mm. The permissible tolerances in length & breadth shall be ± 2 mm and thickness shall be ± 1.50 mm. The sides should be at right angle to each other. The tapering of block in sides shall be 3 mm.

The potable water, land and power for manufacture of P.C.C. blocks shall be arranged by Bidder at his own cost with the approval of Engineer-in-charge.

1.1.1.4. BATCHING :

- a. The Bidder shall provide such means and equipment as are required to accurately determine and control the relative amounts of the various materials including water, cement admixtures, sand and coarse aggregate up to 10 mm size for the concrete. Such means and the equipment and its operation shall be subjected, at all times, of the approval of the Engineer in charge. The quantity of cement, sand and of coarse aggregate entering each batch of concrete shall be determined by weighing. The amount of water shall be determined by weighing or volumetric measurement. The measuring equipment shall operate within the limits of accuracy specified.
- b. The equipments shall be capable of controlling the delivery of material for volumetric / weight measurement so that the combined inaccuracies in feeding and measuring during normal operations do not exceed 1% for water and 3% for all aggregates. Periodical tests shall be made at least once in every two weeks in the case of equipment for measuring water, cement and admixtures and at least once in every month in case of equipment measuring sand and coarse aggregate. However, this shall not obstruct any surprise checking and testing at any time as desired by the Engineer in charge. Repair, replacement or adjustments shall be made as necessary to secure satisfactory performance.

1.1.1.5. Washing of Aggregates :-

Aggregate shall be washed before use to remove dirt, clay or loose materials to them. No extra payment will be made for washing of aggregate.

Mixing :

- i. Concrete shall be mixed in a automatic batching plant and shall be as dense as possible, plastic enough to consolidate well and stiff enough to say in place.
- ii. Mixing shall be continued until there is a uniform distribution of the material and the concrete is uniform in colour and consistency. The time of mixing shall be as shown in Table-1 of IS-457-1957 reproduced below :

Capacity of Mixer	Minimum time of mixing of aggregate
3 Cum (or 3 cu. Yd) or larger	2½ Minutes
2 Cum (or 2 cu. Yd)	2 Minutes
1 Cum.(or 1 cu. Yd) or less	1½ Minutes

(iii) When initial set has taken place in a batch of concrete before it is placed in position. Such concrete shall be rejected and taken away from site to a distance and disposed off as directed by the Engineer-in-charge. No claim in this respect shall be entertained whatsoever may be the reason.

Consistency :

The amount of water used in the concrete shall be fixed as required from time to time during the course of concreting work to secure concrete of the proper consistency and to adjust for any variation in the moisture content of grading of the aggregates as it enters the mixer. Addition of water to compensate the stiffening of the concrete resulting from over mixing or objectionable drying before placing shall not be permitted. Uniformity in concrete consistency from batch to batch shall be ensured to have a close control of consistency and work-ability of the concrete. The slump test of concrete shall be done in accordance with IS 454-1953. However allowable slump can be modified by Engineer in charge based on laboratory test.

Transporting the mix.

Concrete shall be handled from place of mixing to place of final deposit in casting yard as rapidly as practicable by use of equipment which will prevent initial setting segregation or loss of any of the

ingredients. It shall be transported & compacted in its final position within 30 minutes after mixing. If segregation does occur during transportation, the concrete shall be re-mixed before being placed in position.

Set of Test Cubes

One set of test cubes 15cm X 15 cm X 15 cm shall be taken for every 30 cum or part of concrete subject to minimum of one set for shift work. Sample of concrete for test cubes shall be taken at mixer points & it shall represent the entire batch. The location in the work of batch of concrete shall be noted for future reference. At least 80% of cubes shall give compressive strength not less than 100 Km/ cm² & no test cubes shall give compressive strength less than 80 % of laboratory strength of corresponding mix. In case results fail to fulfill above strength requirement, the respective test of pre-cast blocks where such mix has been used shall be rejected by the Engineer in charge no claims in this respects shall be entertained.

FORMS :

Steel forms shall be used of casting of blocks. Forms shall be rigid and free from distortion and settlement. It shall conform to the shape and dimensions of the block size and be maintained so as to result in production of accurate size of pre cast blocks. For forms general points to be taken care of will be as under, however, Bidder is at liberty to choose his own design/pattern of one or more moulds in set as per direction of the Engineer.

- i. The size of moulds be symmetrically tapered to the required size of tiles. So that the top & bottom surfaces of resultant block would be 302X152 & 298X148 mm respectively.
- ii. All four corners shall be fully welded and shall have sharp bends and in no case have curvature more than that of 1.00 mm radius. The welding at corners may not be necessary if the mould is prepared in press without cutting plates at corners.
- iii. The top edges and bottom surface of moulds as well as supporting angles shall remain in one place and no warping or deformation shall be there after welding.
- iv. Each mould shall be kept separately by a distance of about 25 mm.

VIBRATING TABLE :

The mould filled with concrete shall be placed on a vibrating table and shall be vibrated till a homogeneous and dense concrete mass takes place in the mould.

CURING :

The block shall be cured for 28 days with potable water.

FLEXURAL STRENGTH

The flexural strength for 40 mm tiles shall be as per IS 10646 when tested according the method given below :

- a. For ascertaining the conformity to the requirements for the flexural strength test, one tile from each lot of 500 shall be Selected at random and tested
- b. Lot shall be considered conforming to the requirement of the flexural strength test if the sample passes the requirements of the test. In case it fails to satisfy the requirements of test, two more tiles shall be selected at random from the same lot and tested for the requirements of flexural strength. If any of these two test fails to satisfy the strength requirements the lot shall be rejected

PREPARATION OF CEMENT MORTAR (1:6) FOR THE BASE PLASTER

The mortar will be thoroughly mixed in dry state in mechanical operated mixer using one part of cement and six parts of sand by volume with water to attain desired consistency with slump 50-60 mm. The sand ingredients shall be measured by steel measuring boxes, while cement shall be measured by number of bags. The wet mortar must be used before its initial setting. Any wet mortar lying unused for more than half an hour shall be rejected and removed from the site.

LAYING OF 12 MM THICK BASE PLASTER IN CEMENT MORTAR (1:6) ON SIDE SLOPES :

The laying of base plaster 12 mm thick shall start the lining process. Lining should be started only when at least 30 meters length of earthen bank sub grade is ready duly dressed and properly watered for laying of lining. Between the profiles mortar pans filled with (1:6) cement sand mortar should be overturned on the sub grade. The mortar shall then be spread evenly by trowel in the required thickness of 12 mm with L shaped wooded guides. The slump of mortar should not be more than prescribed limit . Plastered surface in no case be disturbed by movement of labour or material. Plastered surface should be roughed with brooms immediately after its lying. The base plaster shall be cured at least for one day before laying next course over it. After the 12 mm thick base plaster (1:6) is laid and water-cured for at least 24 hours, the sand witch plaster layer of 16 mm thickness (1:3) shall be laid and likewise water cured or at least 24 hours.

2.1.1.1. LAYING OF P.C.C. BLOCK LINING OF SIDE SLOPES :

Finally approved P.C.C. blocks duly washed to remove the dirt shall be laid in cement mortar (1:3) over 6 mm thick cement mortar (1:3). The blocks shall be laid parallel in the centerline of the Diggi. The blocks would have a taper of 4 mm in their top and bottom lengths and these would be spaced with 10 mm to 12 mm joints at the bottom edge.

The joints of blocks shall be staggered by putting half sized blocks in alternate lines (rows). The mortar pans should be immediately overturned before the masons, so that the mortar is spread by mason evenly. The layer of blocks should be carefully laid with vertical joints completely filled with mortar. While placing blocks in position the blocks may be laid on the spread mortar and pushed forwards and left wards in position by hand, so that complete filling of vertical joints is ensured. In case of P.C.C. blocks, trowel may be used to complete filling of joints. The joints shall be raked to ½" (12 mm) depth. The lined surface shall be scrubbed with wire brush to remove any bulging mortar.

CURING OF LINING :

The P.C.C. blocks on side shall be kept wet by sprinkling water over it or by gunny bags. The base plaster should be cured for one day before starting next operation of lining. Curing of side slopes should be ensured for 28 days from the day of laying. The date of laying of P.C.C. block in each panel shall be marked by black paint.

Clearing Site

The area proposed for lining the earthen bank as a whole shall have to be cleared of all objectionable material. Any waste material obtained from such site clearance shall be disposed off in a manner directed by the Engineer-in-charge. The cost of this operation shall be deemed to have been covered under the rates quoted for earthen bank lining.

Trimming the earthen bank section and Preparation of Sub grade for P.C.C. block Lining General

- i. The provisions of this paragraph applied to the preparation of sub grade upon which concrete lining is to be placed.
- ii. The work of trimming the earthen bank section up to the underside of concrete lining and preparing sub grade for concrete lining includes removal of proud.
- iii. The work of trimming the earthen bank section up to and underside of concrete lining and preparing sub grade of this excavation of proud for lining shall be carried out by mechanical trimming machine of adequate capacity to match with the paving machine used for lining immediately prior to laying of the lining but in no case the time interval should exceed 3 days in normal weather conditions and 2 days in adverse weather conditions.
- iv. All along the earthen bank alignment the rain cuts on the banks shall be filled up with approved excavated material and shall be compacted adequately to required line and level. The material required for filling the over excavation in rain cuts if not available during excavation in soil to be done under this item, shall be hauled from spoil bank and placed in position.

- v. Mechanical trimmers shall trim the bed and side slopes to the required section only. Manual trimming shall be permitted in special cases only after getting prior approval of Engineer-in-charge.
- vi. The earthen bank and slopes shall be dressed, watered to a depth of 15 cm or upto an impervious layer which ever is less and compacted by suitable rollers and slope compactors. This item also includes dewatering and or de-silting the canal section as and when required.
- vii. If at any point material has been excavated beyond the payline required to receive the concrete lining, the excess excavation shall be refilled in horizontal layers with selected material moistened, if required, and compacted using rollers and slope compactors.
- viii. Where placing and compacting bedding material is on a sloping foundation, the layers may be placed parallel to the surface of the foundation. If at any point the foundation material is disturbed or loosened during the excavation process or other wise it shall be moistened, if required, and thoroughly compacted by tamping, rolling or other approved methods to form firm foundations for placing the concrete lining.
- ix. Immediately prior to placing the first lift of bedding material, the surfaces of the excavation and embankment to receive the material shall be adequately wetted to a depth of 15 cm or to impermeable material whichever is less as approved by the Engineer-in-charge.
- x. After the canal prism has been shaped to a reasonably true and even surface as described above, bedding material shall be placed on adequately wet surfaces in layers of 15 cm maximum thickness to bring the bedding material to a height where it can be trimmed to form a true and even surface upon which the concrete for lining is to be placed. Each layer of bedding material shall be moistened and thoroughly compacted.
- xi. At the end panels of existing lining against which lining is to be placed under these specifications, all loose material shall be removed and all voids beneath the existing lining shall be refilled and thoroughly compacted.
- xii. At the end of panels of existing lining just before monsoon the Bidder shall take all measures to adequately protect the underneath of lining in slope and bed so as to prevent the monsoon water entering below the lining and damage it.
- xiii. Suitable useful material trimmed from the earthen bank shall be used to complete canal embankments or to construct road embankments or for backfill around structures or to deposit bedding material.
- xiv. Where material suitable for bedding as determined by the Engineer-in-charge is encountered during trimming operations and cannot be placed in one continuous operation, such material shall be stockpiled along the right of way where designated by the Engineer-in-charge.

Tolerances

Excavated profile provides the final base for lining and tolerances i.e. departure from established alignment shall be as indicated here below.

20 mm on straight section

50 mm on tangents

100 mm on curves

Departure from established grade 20 mm

The above tolerance shall be negotiated gradually through smooth transition in a length of 50 m.

Measurement and Payment

Work of preparation of sub grade is inclusive of composite item of P C C Block lining and no separate payment for preparation of sub grade is admissible

Materials for P.C.C. block Lining

Cement

Ordinary Portland Cement (Grade 53 of major plants shall be generally used and procured in bulk by the Bidder.)

Sampling and testing shall be done as per IS: 3535 of 1989 by and at the expense of the contractor. No cement shall be used until notice has been given that the test results are satisfactory.

Cement older than 90 days shall not be used unless the test results satisfy the minimum strength requirements.

Cement shall, for its physical and chemical requirement conform to IS: 269- 1976 where Ordinary Portland Cement is used. The Bidder shall create a suitable and adequate infrastructure for procuring, handling, storing and conveying bulk cement to batching plant at site with advance planning of work to be done in next fifteen days, as approved by the Engineer-in-charge.

Fine Aggregate (Sand)

General

All the aggregates shall conform to IS: 383- 1970, or its latest version and as directed by Engineer-in-charge. Sand to be used shall be natural as obtained from the riverbed and the maximum size shall be limited to 4.75 mm. Fine aggregates will be tested for their gradation, specific gravity, water absorption, fineness modulus, soundness, Petro- graphic analysis, deleterious constituents and alkali aggregate reactivity. Due allowance shall be made if at the time of mixing, the sand is wet. The exact extent of such allowance or bulkage shall depend upon the quantity of moisture in sand and it shall be decided by the Engineer-in-charge. The large quantity of sand is available in the river Luni near Binawas Jodhpur (distance 250km) and Kolayat, Bikaner (distance 110km). The Bidder shall procure approved quality of sand from any other source if required at their own cost.

Quality

Sand shall consist of hard, inert, dense, durable and uncoated siliceous gritty materials. It shall be free from injurious amount of dust, lumps soft and flaky particles, shale, alkali, organic matter, loam and other deleterious substances. The maximum percentage of each of the deleterious substance in sand as delivered to the mixer shall not exceed the following values.

Limits of deleterious material

(i)	Coal & lignite	1.0 percent by weight
(ii)	Clay lumps	1.0 Percent by weight
(iii)	Material finer than 75 micron I.S. sieve	3.0 Percent by weight
(iv)	Shale	1.0 Percent by weight
(v)	Total of percentages of all deleterious material (except Mica)	5.0 Percent by weight

Sand shall be free from injurious amount of organic impurities and sand that are producing a colour (obtained by dissolving 9 grams of chemically pure (c.p.) ferric chloride and 1 gram of c.p. cobalt chloride in 100 ml of water to which one third ml of hydro chloric acid has been added) darker than the standard in the test (organic test) for organic impurities shall be rejected. Sand shall be well graded so as to impart good workability and good finishing. Sieve analysis of natural sand shall conform to the following limit of gradation.

IS sieve	Cumulative percentage of weight passing through sieve
10 mm	100
4.75 mm	90-100
2.36 mm	75-100
1.18 mm	55-90
600 micron	35-59
300 micron	8-30
150 micron	0-10

Deviations from the prescribed limits of cumulative percentage retained on sieve 10 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron and 150 micron IS sieves shall be permitted provided total of such deviations do not exceed 5 percent. No deviation from the prescribed limit shall be permitted for cumulative percentage retained on 600 micron IS sieve.

Fineness Modulus

Sand shall have a fineness modulus between 2.2 to 3.0 subject to the gradation specified in the preceding paragraph. The modulus shall be computed by adding cumulative percentage of sand retained on the standard screens 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron, 150 micron IS sieves and dividing the sum by 100 Gradation of sand shall be so controlled that the fineness modulus of at least 9 out of 10 consecutive test samples of finished sand shall not vary by more than 0.10 from the average of 10 test samples. Sand having any deviation from the specified range of gradation and fineness modulus shall not be permitted to used in work without the written permission of the Engineer-in-charge.

Testing

The following testing frequencies shall be maintained for the same source of fine aggregates:

Name of Test	Minimum number of test specified
Gradation for fineness Modulus	Daily one test. If the variation of daily F.M. values is more than 0.1 then frequencies may be increased.
Silt Contents	Daily one test
Moisture Content	Daily one test
Sp. gravity and water absorption soundness, alkali-aggregate reactivity, Petrographic examination	Twice in a concreting working season.

Storage

All sand shall be stored on the site of work in such a manner as to prevent intrusion of foreign matter.

Coarse Aggregate**General**

Coarse aggregate for concrete shall consist of clean, hard, dense and durable crushed metal or gravel free from vegetable matter. Predominantly flaky aggregates shall not be used. All coarse aggregates shall be washed and/or screened by the Contactor, if required. Coarse aggregates will be tested for their gradation, specific gravity, water absorption, impact and abrasion values, soundness, Petrographic analysis, deleterious constituents, flakiness, elongation and alkali aggregate reactivity. The sum of the percentage of all the deleterious substances shall however, not exceed 5 percent by weight. The coarse aggregate shall satisfy abrasion, soundness, crushing and alkali aggregate reactivity tests and water absorption results as laid down in IS: 383- 1970 and other relevant Indian Standard Specifications.

Source

Natural aggregates are not available in enough quantity nearby, and will not be allowed to be used in any concreting. The crushed aggregates are available in ample quantities near pokran. These are indicative only. The Bidder shall procure approved quality of aggregates and rubble from any other sources for which no extra claim shall be entertained.

Grading

Coarse aggregate shall be well graded and shall have a maximum size of 10 mm. The gradation shall give a dense concrete of the specified strength and consistency that will work readily into position without segregation and without the use of excessive water content. The grading of coarse aggregate shall be in the nominal sizes as mentioned in table.II of IS: 383- 1970.

The percentage passing for graded/normal size aggregate shall be as under:

I.S. Sieve description	% Passing for graded / normal size aggregate
20 mm	100%
12.5 mm	95 to 100%
10 mm	40 to 85%
4.75 mm	to 10%

The material passing through the screen shall be in grade ranging from 20 mm to 4.75 mm. Each grade of material shall be stacked 20 mm to 12.5 mm, 12.5 mm to 10 mm and 10 mm to 4.75 mm. Coarse aggregates shall consist of inert, clean, hard, strong, durable and structurally sound particles of crushed stone or gravel and shall be free from thin elongated soft pieces, organic or other deleterious matter capable of developing good bound with cement paste and weather resisting be unaffected by water. It shall have no adherent coating of clay, silt mud or any other adherent coating. It shall be from a source approved by the Engineer-in-charge. Coarse aggregates shall conform to IS: 383- 1970 and IS: 515-1959. Coarse aggregates shall be washed and screened at the source approved by the Engineer-in-charge. If necessary Bidder shall remove all vegetation and other perishable substances and objectionable amounts of other foreign and deleterious matter. The cost of washing and screening at source shall be borne by the Bidder. In case the coarse aggregate brought to the site of work is not washed and screened at the source the Bidder shall make necessary arrangements for washing and screening at the B&M plant and its cost shall be borne by the Bidder.

Testing

The following testing frequencies shall be maintained for the same source of coarse aggregates.

S.No.	Name of Test	Minimum number of test specified
1	Gradation	Daily one test for each nominal size of Aggregates.
2	Water Content	Daily one test for each nominal size of Aggregates.
3	Silt Content	Daily one test for each nominal size of Aggregates.
4	Sp. gravity and Water Absorption, Impact or Abrasion value, Density, Soundness, Alkali-Aggregate reactivity, Petrographic examination	Twice in a concreting working season.

Storage (Stock Piles)

Aggregate shall be stacked in such a way as to prevent the admixture of foreign materials such as soil, vegetable matter etc. Heaps of fine and coarse aggregates shall be kept separate. When different sizes of fine or coarse aggregate are procured separately, they shall be stored in separate stockpiles, sufficiently away from each other to prevent the materials at the edge of the piles from getting intermixed.

The aggregates shall be stockpiled adjacent to the mixer site so as to require minimum rehandling and labour when conveyed to the mixer. The aggregates shall be placed on a dry hard patch of ground if available otherwise a platform of planks or plain galvanized iron sheets or alternatively on a floor of dry bricks or a thin layer of lean concrete. The aggregates shall be kept continued to be free of dirt, rubbish, papers, vegetable matter and bidi, etc. on the stockpiles by the collection of people. To minimize moisture variations the stockpiles shall be spread over as large in a area as possible but left low and fairly uniform in height preferably 1.25 to 1.50 meter and the lowest layer of about 30 cm height shall be allowed to act as drainage layer and not used till the end.

WATER

Water used for mixing of concrete and mortar shall be free from injurious amounts of deleterious materials. Potable water is generally considered satisfactory for mixing and curing.

Where water is found to contain any sugar or an excess of acid, alkali or salt, the Engineer- in-charge will refuse to permit its use. As a guide the following table presents the maximum

	Percent by weight
Organic	0.02
Inorganic	0.30
Sulphate	0.05
Alkali Chlorides	0.10
pH value	6 to 8

Admixtures

Air entraining agent (AEA) as an admixture shall be added (if required in opinion of EIC) to the concrete batch in solution. It shall be batched by means of mechanical batcher capable of correct measurement and in such a manner as well ensure uniform distribution of the agent throughout the batch during the specified mixing period. The amount of AEA used shall be such as to affect air entrapment from 4 to 6 percent by volume in that portion of the concrete containing aggregate smaller than the 40 mm square mesh sieve after its placement and vibration in the forms. The actual percentage of air shall be as fixed by the Engineer-in-charge and will be changed whenever necessary to meet the varying conditions encountered during construction. Admixture shall be borne by the Bidder and shall be deemed to have been included in the unit rates quoted by the Bidder for relevant items.

Tests

All tests for the evaluation and approval of an admixture shall be made at the expense of the Bidder. The suitability of an air-entraining admixture shall be determined as per the requirement of IS: 9103-latest edition.

DOWEL

30 cm X 46 cm cement concrete in 1:3:6 laid over P C C1:3:6 100 mm thick in Charanwala Branch, for Kharadisty 30 cm X 30 cm cement concrete in 1:3:6 laid over P C C1:3:6 100mm thick, for other minors and sub minors 23 cm X 23 cm cement concrete in in 1:3:6 laid over P C C1:3:6 100 mm thick shall be constructed as per approved drawing.

GRANULAR SUB-BASE (As per Clause 401 of MoRTH)

Scope

This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these Specifications. The material shall be laid in one or more layers as sub-base or lower sub-base and upper sub-base (termed as sub-base hereinafter) as necessary according to lines, grades and cross-sections shown on the drawings or as directed by the Engineer.

Materials

The material to be used for the work shall be natural sand, moorum, gravel, crushed stone, or combination thereof depending upon the grading required. The material shall be free from organic or other deleterious constituents and conform to one of the three gradings given in Table 400-1.

While the gradings in Table 400-1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75 mm, 53 mm and 26.5 mm, the corresponding gradings for the coarse-graded materials for each of the three maximum particle sizes are given at Table 400-2. The grading to be adopted for a project shall be as specified in the Contract.

Physical requirements: The material shall have a 10 per cent fines value of 50 kN or more (for sample in soaked condition) when tested in compliance with BS :812 (Part III). The water absorption value of the coarse aggregate shall be determined as per IS : 2386 (Part 3); if this value is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS : 383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which be taken as being the density relating to a uniform air voids content of 5 percent.

TABLE 400-1.
GRADING FOR CLOSE-GRADED GRANULAR SUB-BASE MATERIALS

IS Sieve	Per cent by weight passing the IS sieve		
Designation	Grading I	Grading II	Grading III
75.0 mm	100	-	-
53.0 mm	80-100	100	-
26.5 mm	55-90	70-100	100
9.50 mm	35-65	50-80	65-95
4.75 mm	25-55	40-65	50-80
2.36 mm	20-40	30-50	40-65
0.425 mm	10-25	15-25	20-35
0.075 mm	3-10	3-10	3-10
CBR Value (min)	30	25	20

TABLE 400-2.
GRADING FOR COARSE GRADED GRANULAR SUB-BASE MATERIALS

IS Sieve	Per cent by weight passing the IS sieve		
Designation	Grading I	Grading II	Grading III
75.0 mm	100	-	-
53.0 mm	-	100	-
26.5 mm	55-75	50-80	100
9.50 mm			
4.75 mm	10-30	15-35	25-45
2.36 mm			
0.425 mm			
0.075 mm	<10	<10	<10
CBR Value (min)	30	25	20

Note : The material passing 425 micron (0.425 mm) sieve for all the three gradings when tested according to IS : 2720 (Part 5) shall have liquid limit and plasticity index not more than 25 and 6 percent respectively.

Strength of sub-base

It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished.

When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remolded at field dry density and moisture content and any other tests for the “quality” of materials, as may be necessary.

Construction Operations

- i. Preparation of subgrade: Immediately prior to the laying of sub-base, the subgrade already finished to Clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80-100 kN smooth wheeled roller.
- ii. Spreading and compacting: The sub-base material of grading specified in the Contract shall be spread on the prepared subgrade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.
- iii. When the sub-base material consists of combination of materials mentioned in Clause 9.6.2.1, mixing shall be done mechanically by the mix-in-place method.

- iv. Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations, as in small-sized jobs. The equipment used for mix-in-place construction shall be a rotator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out to establish its suitability for the work.
- v. Moisture content of the loose material shall be checked in accordance with IS : 2720 (Part 2) and suitably by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 percent above to 2 percent below the optimum moisture content corresponding to IS : 2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotavators until the layer is uniformly wet.
- vi. Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight with plain drum or pad foot-drum or heavy pneumatic tyred roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/m² or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall and super elevation and shall commence at the edges and progress towards the center for portions having crossfall on both sides.
- vii. Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots or depressions, which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour.
- viii. Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS : 2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

Surface Finish and Quality Control of Work

The surface finish of construction shall conform to the requirements of Clause 902(MORD.) Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900.

Arrangements for Traffic

During the period of construction, arrangement of traffic shall be maintained in accordance with Clause 112.(MORD)

Measurements

Granular sub-base shall be measured as finished work in position in cubic metres. The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

Rate

The Contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including full compensation for:

- i. making arrangements for traffic to Clause 112 except for initial treatment to verges, shoulders and construction of diversions;

- ii. furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;
- iii. all labour, tools, equipment and incidentals to complete the work to the Specifications;
- iv. carrying out the work in part widths of road where directed; and carrying out the required tests for quality control.

PLAIN CONCRETE

Scope of Work

The specifications cover the requirements of plain and reinforced concrete for use in structures viz drainage syphon, C.R., H.R., road bridges, super passage canal crossings, roof etc. and its ancillary works such as pipe culvert in road bridge approaches and on canal construction road. The work covered under this section consists of furnishing all materials including form work equipment labour for the manufacture, transport, planning, vibrating, finishing and curing of the concrete for the structures and performing all operations necessary and ancillary thereto including dewatering and desilting as required.

Applicable Publications

All concrete, its constituents, methods and procedures of manufacture shall conform to Indian Standard specifications and other publications listed below unless otherwise specified.

Indian Standard

1	IS: 432 (Part I-1982)	Specification for MILD steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement (third revision)
2	IS: 455 – 1976	Specification for Portland slag cement (third revision) (Amendment No. 1 to 7)
3	IS: 516 – 1959	Method of test for strength of concrete (Amendment No. 1)
4	IS: 883 – 1970	Code of practice for design of structural
5	IS: 2505- 1980	General requirements for concrete vibrators: immersion type
6	IS: 2506 – 1985	General requirements for screed board concrete vibrator
7	IS: 3370 – 1965 (Part I to 4)	Code of practice for concrete structures for the storage of liquids.
8	IS: 3558 – 1983	Code practice for use of immersion vibrators for consolidating concrete.
9	IS: 4656 – 1968	Specification for Form vibrators for concrete
10	ISS: 4990 – 1981	Specification for Plywood for concrete shuttering work (First revision) (Amendment No. 1)
11	IS: 5242 – 1979	Method of test for determining shear strength of metal (First revision)
12	IS: 8959- 1978	Safety code for erection of concrete framed structures.
13	IS: 9077 – 1979	Code of practice for corrosion protection of steel reinforcement in RB and RCC construction.
14	SP: (S&T)- 1980	Design aids for reinforced concrete to IS: 456- 1978

In addition to the above relevant Indian Standards referred in Section-3 shall also apply.

Other Publications

1	Indian Congress	Road	Standard Specifications and Code of practice for Road bridges. Section – I Section – II
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Composition

- a. Concrete shall be composed of cement, fine aggregate (natural sand or manufactured sand or both), coarse aggregates (manufactured or natural gravel), admixtures and water 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.
- b. For all items of concrete in any portion of the structure or its associated works, where specified controlled concrete shall be used.

Materials

Cement

- i. Ordinary Portland Cement / (Grade 43/53) shall be used in all construction of work. Cement must be manufactured by the big plant. Cement shall confirm to IS 12269-2013(Grade 53) IS 8112-2013 (Grade 43) or its latest version and as directed engineer-In-charge.
- ii. Immediately upon receipt at the site of the work, cement shall be stored separately in dry, watertight and properly ventilated structures.
- iii. All storage facilities shall be subject to approval and shall be such as to permit easy access for inspection and identification. Sufficient cement shall be kept in stock for completion of concreting undertaken Cement shall be used in order of receipt and cement older than 90 days shall not be used unless the test results satisfy the minimum strength requirements.

Fine Aggregates

(c) General

All the aggregates shall confirm to IS: 383- 1970, or its latest version and as directed by Engineer-in-charge. Sand to be used shall be natural as obtained from the riverbed and the maximum size shall be limited to 4.75 mm.

Fine aggregates will be tested for their gradation, specific gravity, water absorption, fineness modulus, soundness, Petrographic analysis, deleterious constituents and alkali aggregate reactivity. Due allowance shall be made if at the time of mixing, the sand is wet. The exact extent of such allowance or bulkage shall depend upon the quantity of moisture in sand and it shall be decided by the Engineer-in-charge.

The large quantity of sand is available in the Kolayatthesil District Bikaner. The Contractor shall procure approved quality of sand from any other source if required at their-own cost.

(d) Quality

Sand shall consist of hard, inert, dense, durable and uncoated siliceous gritty materials.

It shall be free from injurious amount of dust, lumps soft and flaky particles, shale, alkali, organic matter, loam and other deleterious substances, The maximum percentage of each of the deleterious substance in sand as delivered to the mixer shall not exceed the following values.

Limits of deleterious material

(i)	Coal & lignite	1.0 percent by weight
(ii)	Clay lumps	1.0 Percent by weight
(iii)	Material finer than 75 micron I.S. sieve	3.0 Percent by weight
(iv)	Shale	1.0 Percent by weight
(v)	Total of percentages of all deleterious material (except Mica)	5.0 Percent by weight

Sand shall be free from injurious amount of organic impurities and sand that are producing a colour (obtained by dissolving 9 grams of chemically pure (c.p.) ferric chloride and 1 gram of c.p. cobalt chloride in 100 ml of water to which one third ml of hydro chloric acid has been added) darken that the standard in the test (organic test) for organic impurities shall be rejected.

(e) Grading

Sand shall be well graded so as to impart good workability and good finishing. Sieve analysis of natural sand shall conform to the following limit of gradation.

IS sieve	Cumulative percentage of weight passing through sieve
10mm	100
4.75 mm	90-100
2.36 mm	75-100
1.18 mm	55-90
600 micron	35-59
300 micron	8-30
150 micron	0-10

Deviations from the prescribed limits of cumulative percentage retained on sieve 10 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron and 150 micron IS sieves shall be permitted provided total of such deviations do not exceed 5 percent. No deviation from the prescribed limit shall be permitted for cumulative percentage retained on 600 micron IS sieve.

(f) Fineness Modulus

Sand shall have a fineness modulus between 2.2 to 3.2 subject to the gradation specified in the preceding paragraph.

The modulus shall be computed by adding cumulative percentage of sand retained on the standard screens 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron, 150 micron IS sieves and dividing the sum by 100 Gradation of sand shall be so controlled that the fineness modulus of at least 9 out of 10 consecutive test samples of finished sand shall not vary by more than 0.10 from the average of 10 test samples. Sand having any deviation from the specified range of gradation and fineness modulus shall not be permitted to used in work without the written permission of the Engineer-in-charge.

(g) Storage

All sand shall be stored on the site of work in such a manner as to prevent intrusion of foreign matter.

Coarse Aggregate

(h) General

Coarse aggregate for concrete shall consist of clean, hard, dense and durable crushed metal or gravel free from vegetable matter. Predominantly flaky aggregates shall not be used. All coarse aggregates shall be washed and/or screened by the Contractor, if required. The percentage of deleterious substance in coarse aggregate shall not exceed the following values.

Material passing 75 micron IS sieve screen	3 percent by weight
Shale NIL percent by weight	1 percentage
Coal and Lignite	
Soft fragments	3 percent by weight
Clay lumps	1 percent by weight

Coarse aggregates will be tested for their gradation, specific gravity, water absorption, impact and abrasion values, soundness, Petrographic analysis, deleterious constituents, flakiness, elongation and alkali aggregate reactivity.

The sum of the percentage of all the deleterious substances shall however, not exceed 5 percent by weight. The coarse aggregate shall satisfy abrasion, soundness, crushing and alkali aggregate reactivity tests and water absorption results as laid down in IS: 383- 1970 and other relevant Indian Standard Specifications.

(i) Source

Natural aggregates are not available in enough quantity nearby, and will not be allowed to be used in any concreting. The crushed aggregates are available in ample quantities near District Jodhpur. These are indicative only. The contractor shall procure approved quality of aggregates and rubble from any other sources for which no extra claim shall be entertained.

(j) Grading

- i. Coarse aggregate shall be well graded and shall have a maximum size of 20 mm.

- ii. The gradation shall give a dense concrete of the specified strength and consistency that will work readily into position without segregation and without the use of excessive water content.
- iii. The grading of coarse aggregate shall be in the nominal sizes as mentioned in table II of IS: 383- 1970.
- iv. (In concrete for canal lining, the percentage of 4.75 to 10 mm fraction shall be reduced to above 5 to 10 percent of the total coarse aggregate) However, the exact gradation required producing a dense concrete of specified strength and desired workability shall be decided by the Engineer-in-charge. The percentage passing for graded/normal size aggregate shall be as under:

I.S.Sieve description	% Passing for graded / normal size aggregate
40 mm	100%
20 mm	95 to 100%
10 mm	25 to 55%
4.75 mm	0 to 10%

- v. The material passing through the screen shall be in grade ranging from 40 mm to 4.75 mm. Each grade of material shall be stacked 40 mm to 20 mm, 20 mm to 10 mm and 10 mm to 4.75 mm.
- vi. Coarse aggregates shall consist of inert, clean, hard, strong, durable and structurally sound particles of crushed stone or gravel and shall be free from thin elongated soft pieces, organic or other deleterious matter capable of developing good bound with cement paste and weather resisting be unaffected by water. It shall have no adherent coating of clay, silt mud or any other adherent coating. It shall be from a source approved by the Engineer-in-charge. Coarse aggregates shall conform to IS: 383- 1970 and IS: 515-1959.
- vii. Coarse aggregates shall be washed and screened at the source approved by the Engineer-in-charge. If necessary contractor shall remove all vegetation and other perishable substances and objectionable amounts of other foreign and deleterious matter. The cost of washing and screening at source shall be borne by the Contractor. In case the coarse aggregate brought to the site of work is not washed and screened at the source the contractor shall make necessary arrangements for washing and screening at the B&M plant and its cost shall be borne by the contractor.

Water

- a. Water used for mixing of concrete and mortar shall be free from injurious amounts of deleterious materials. Potable water is generally considered satisfactory for mixing and curing.
- b. Where water is found to contain any sugar or an excess of acid, alkali or salt, the Engineer-in-charge will refuse to permit its use. As a guide the following table presents the maximum permissible values.

	Percent by weight
Organic	0.02
Inorganic	0.30
Alkali Chlorides	0.10
pH value	to 8

Proportioning Concrete

- a. Concrete mix shall be designed on the basis of preliminary tests. The proportion of ingredients shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with the means available.
- b. Except when it can be shown to the satisfaction of the Engineer-in-charge that supply of properly graded aggregates of uniform quality can be maintained till the completion of the work, grading of aggregate shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions as required.
- c. Different sizes, however, shall be stacked in separate stockpiles. Required quantity of material shall be stockpiled several hours, preferably a day, before use.

- d. Grading of coarse and fine aggregates shall be checked as frequently as possible, frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.
- e. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Water shall either be measured by volume in calibrated tank or weighed.
- f. All measuring equipment shall be maintained in a clean and serviceable condition. Their accuracy shall be periodically checked.
- g. It is most important to keep the specified water cement ratio constant. To this end moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge.
- h. The amount of mixing water shall then be adjusted to compensate for any variations noted in the moisture content. For the determination of moisture content in the aggregate IS: 2386-1977 (Part-III) shall be referred to.
- i. Suitable adjustments shall also be made in the weight of aggregates to allow for variations in weight of aggregates due to variations in their moisture content.
- j. The quantity of water shall be just sufficient to produce a dense concrete of required workability and strength for the job. An accurate and strict control shall be kept on the quantity of water.
- k. In the case of reinforced concrete work, workability shall be such that the concrete surrounds and properly grips all reinforcement. The degrees of consistency, which shall depend upon the nature of work and methods of vibration of concrete, shall be determined by regular slump tests.

Following slumps shall be adopted for different types of works.

S.No.	Type of work	Slumps
1	Mass concrete for RCC foundations, footings and retaining walls	10 mm to 25 mm
2	Beams, slabs and columns	25 mm to 40 mm
3	Thin RCC Section with congested steel	60 mm to 70 mm

Production of Aggregates

- a. Production of aggregates may include quarrying of the raw material and processing viz transporting, crushing, screening and washing.
- b. Water used for washing aggregates shall be clean and free from alkali, salts and other impurities.
- c. After washing, fine aggregates must be stored in stockpiles with a free draining base for at least 3 days to ensure that sand delivered to the batching plant will have reasonably uniform moisture content.
- d. The storage and handling shall be in such a manner as to prevent inter-mingling of various sizes of aggregates required separately for grading purposes. No foreign matter shall be allowed to mixed up with the aggregates.

Batching

- a. The prescribed amount of the various materials of concrete including water, cement, admixtures, the groupings of fine aggregates and each individual size of coarse aggregate shall be measured and controlled within the specified limits of accuracy.
- b. The amount of water, cement and aggregate shall be determined by weighing. In the case of the aggregates, the surface moisture shall be determined in accordance with the method prescribed by Appendix-D of IS:456-2000 and its subsequent amendments or publications.
- c. In the case of coarse aggregates, percentage of free water shall be determined by weighing a representative sample, then surface drying each particle individually with a clean piece of cloth and re-weighing.
- d. The proportions of various materials shall be changed as directed in order to maintain the desired quality of the concrete. The batching equipment shall be constructed and operated so that the combined inaccuracies in feeding and measuring materials shall not exceed 1½ percent for water and cement and 2 percent for each size of aggregate.

- e. The operating performance of each scale or other measuring device shall be checked by test weight and the tests shall cover the ranges of measurements involved in the batching operations.
- f. Tests of equipment in operation shall be made at least once every fortnight and adjustments, repairs or replacement, be made as necessary to meet the specified requirement for accuracy of measurement.
- g. Aggregate shall not be batched for concrete or mortar when free water is dripping from the aggregate.

Mixing

- a. The concrete ingredients shall be mixed thoroughly in batch mixers of satisfactory type and size, which are so designed as to ensure uniform distribution of all the constituent materials throughout the mass at the end of time mixing period.
- b. The plant shall be so designed and operated that all materials entering the mixer can be accurately proportioned and readily controlled.
- c. The entire batch within the mixer shall be discharged before recharging. The volume of mixed materials per batch shall not exceed the rated capacity. A mixer will be considered unsatisfactory, if from three tests of any one batch, a change in slump exceeding 25 mm or a change in air content exceeding one percent is noticed between representative samples taken at different portions of the mixer discharge.
- d. For any one batch, uniformity of fresh concrete weight of air free mortar of two samples, one taken at the front and one at the end of the mixer discharges, when determined in accordance with the provisions of the mixer performance test, designation 265 in the Appendix, concrete Manual- Eighth Edition, Revised- 1981. United States Bureau of Reclamation shall not exceed 1.6 percent of the mean value.
- e. The adequacy of mixing shall also be determined in accordance with "Method of sampling and analysis of concrete" as per IS: 1199- 1959 and its subsequent amendments.
- f. Excessive variation on the unit weight of air free mortar indicates that mixing time should be increased. Mixer efficiency tests shall be made at the start of a job and at such intervals as may be necessary to ensure compliance with the requirements for effective mixing.
- g. The minimum mixing time specified herein may be reduced if mixer efficiency tests conform that the reduced time permits satisfactory mixing.
- h. The first concrete batch at the start of continuous mixing operation or after a lapse of 30 minutes in continuous mixing operation shall be made richer by the addition of extra cement as directed.
- i. For any one batch, the difference between the unit weights of coarse aggregate from concrete samples from the front and end of the mixer or mixer discharge, when determined in accordance with the above mentioned mixer performance test should not exceed 10percent of the mean value.
- j. The mixing of each batch shall continue, for not less than the period stated in Table 1 of IS: 457-1957 Mixing shall be continued until there is uniform distribution of the materials and the concrete is uniform in color and consistency. The time of mixing shall be as shown below:

Capacity of Mixer	Minimum time of mixing	
	Natural Aggregates	Manufactured Aggregates
3m ³ or larger	2 minutes	2½ minutes
2 m ³	1½ minutes	2 minutes
1 m ³ or smaller	1¼ minutes	1½ minutes

- k. Unless test of mixer performance show that variation in the prescribed time is necessary or acceptable. Each mixer shall have a timing device for indicating the completion of the required mixing period.
- l. The actual time of mixing shall be checked at least twice during each shift and the timing device shall be adjusted if there is error. The timing device shall be so interlocked with the

discharge gate of the batch hopper that the timing does not start until the discharge gate is fully closed and all ingredients are in the drum.

- m. A suitable record shall be kept of the average time consumed in charging, mixing and discharging batch during each run.
- n. The full contents of the drum shall be discharged quickly to avoid segregation.
- o. The minimum mixing periods specified are considered on the material being fed into the mixer in a manner, which will facilitate efficient mixing and an operation of the mixer at its designed speed.
- p. The following sequence of charging the mixer may be adopted.
 - i. Five to ten percent of the total quantity of water required for mixing adequate to wet the drum thoroughly shall be introduced before the other ingredients in order to prevent any chalking of the cement on the blades or sides of the mixer.
 - ii. All dry ingredients (Cement and fine and coarse aggregate) shall be simultaneously fed 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 uniformly along with the dry ingredients.
 - iii. The remaining quantity of water shall be added after all the other ingredients are in the mixer.
 - iv. Portion of the coarse aggregate, however, may be added last. This facilitates clearance of the chutes and removes any fine aggregate of cement adhering to the sides.

Excessive mixing, requiring additions of water to preserve the required concrete consistency will not be permitted. Concrete, which has been kept unused for more than 30 minutes after the addition of water shall be rejected unless the concrete is in such a condition that it can be subsequently vibrated in place and its use, is specifically permitted.

When the mixer is stopped, before placing again any ingredients in the mixer, all hardened concrete or mortar shall be removed from the inner surface of the mixer.

The retendering of partially hardened concrete or mortar requiring renewed mixing with or without the addition of cement, aggregate or water shall not be permitted.

Temperature of Concrete and Weather Conditions

The temperature of concrete at the time of placement shall not exceed 32°C. Concreting operations shall be temporarily suspended during excessively hot weather when the air temperature exceeds 45°C or when conditions are such that the concrete cannot be placed at the required temperature. Wherever necessary, exposed surfaces of fresh or green concrete shall be adequately shaded from the direct rays of the sun and protected against premature setting or drying by curing under continuous fine spray of water.

Form work

General

1. Forms shall be used wherever necessary to confine the concrete and shape it to the required lines or to ensure against contamination of the concrete by material caving in or southing from adjacent surface left by excavation or other features of the work. All exposed concrete surface having slope steeper than two horizontal to one vertical shall be formed.
2. Formwork may be of timber, steel or precast concrete panels or of such other suitable materials or combination of such materials. Formwork shall be substantially and rigidly constructed to the shapes, lines and dimensions required, efficiently propped and braced to prevent deformation due to placing, vibrating and compacting concrete other incidental load or the effect of weather.
3. If settlement or deflection of forms under the load of concrete is to be expected, allowance should be made in the original construction of the forms so that the finished lines and dimensions of the structures are in accordance with those specified on the drawings.
4. The surface of formwork shall be made such as to produce surface finishes as specified and formwork joints space, be tight enough to prevent loss of liquid from concrete. Joints between the formwork and existing concrete structures shall also be grout tight.

5. Formwork shall be arranged to facilitate easing and removing of the various parts in correct sequence, without jarring or damaging the concrete. Fixing blocks, bolts or similar devices may be embedded in the concrete, provided they do not reduce the strength or effective cover of any part of the structure below the required standard but the use of through bolts shall be avoided as far as possible. Temporary opening shall be provided at all points necessary in the forms to facilitate cleaning and inspection immediately before placing of the concrete.
6. Forms shall overlap the hardened concrete in the lift previously placed by not more than 75 mm and shall be tightened snugly against the hardened concrete.
7. Particular attention shall be paid in setting and lightening the forms for construction joints so as to get a smooth joint free from sharp deviations or projections.
8. Molding strips shall be placed in the corners of forms so as to produce chamfered edges as required on permanently exposed concrete surface.

Cleaning and Treatment of Forms

At the time the concrete is placed in the forms, the surfaces of the forms shall be free from encrustations of mortar, grout or other foreign material. Before concrete is placed, the surfaces of the forms designated to produce F1, F2 and F4 finishes shall be oiled with commercial form oil that will effectively prevent sticking and will not stain the concrete surface. For steel forms, form oil shall consist of refined mineral oil suitably compounded with one or more ingredients, which are appropriate for the purpose. Care shall be taken to keep form oil out of contact with reinforcement.

Removal of Forms

- a. Except as otherwise provided in this sub clause forms shall be removed as soon as the concrete has hardened sufficiently, thus facilitating satisfactory specified curing and earliest practicable repair of surface imperfections.
- b. Forms on upper sloping surfaces of concrete, such as forms on the watersides of warped transition, shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repair on treatment required on such sloping surface shall be performed at once and be followed immediately by the specified curing.
- c. In order to avoid excessive stresses in the concrete that might result from swelling of the forms, timber forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.
- d. Subject to approval, forms on concrete surface close to excavated rock surface may be left in place provided that the distance between the concrete surface and the rock is less than 400 mm and that the forms are not exposed to view after completion of the works.
- e. The following minimum intervals of time as per specifications in IS:456- 2000 will generally be allowed when using ordinary Portland cement between placing concrete and striking form work but the period shall be modified in case of wet weather and also as per direction of the Engineer-in-charge.

(i)	Walls, columns and vertical faces of all structural members	24 to 48 hours Or as may be directed by the Engineer-in-charge
(ii)	Slabs (Props left under)	3 days
(iii)	Beam Soffits (Props left under)	7 days
(iv)	Removal of props under Slabs Spanning Upto 4.5 m Spanning over 4.5 m	21 days 7-14 days
(v)	Removal of props under beam and arches	
	(1) Spanning Upto 6 m (2) Spanning over 6 m	14 days 21 days

Note: In normal circumstances and where ordinary Portland cement is used forms may generally be removed after expiry of the above period. For other cement, the stripping time recommended for Ordinary Portland Cement may be suitably modified.

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

Curing of concrete

General

All equipment, material, etc. needed for curing and protection of concrete shall be at hand and ready for installing before actual concreting begins. Detailed plans, methods and procedures whereby the various phases of curing and protection shall be firmly established, shall be settled and got approved in writing from the Engineer-in-charge sufficiently in advance of the actual concreting. The equipment and method proposed to be utilized shall provide for adequate control and avoid interruption or damage to the work of other agencies.

Water Curing

Unformed top surfaces of walls and piers shall be moistened by covering with water-saturated material or by other effective means as soon as the concrete has hardened sufficiently to prevent damage by water. These surfaces and steeply sloping vertical formed surfaces shall be kept completely and continuously moist, prior to and during form removal, by water applied on the unformed top surfaces and allowed to pass down between the forms and the formed concrete.

Concrete cured with water shall be kept wet for at least 14 days immediately following placement of the concrete or until covered with fresh concrete by covering with water saturated material or by a system of perforated pipes or mechanical sprinklers or porous houses or by any other suitable method which will keep all surfaces continuously (not periodically) wet. The period of 14 days specified above shall be increased to 21 days when Pozzolana has been used in the concrete as part replacement of cement.

Requirement of concrete construction

General

All concrete construction shall conform to the permissible tolerance and technical provisions as described in this section and to the detailed requirements of the following paragraphs. All structures shall be built in a workmanlike manner or to the lines, grades and dimensions shown in the drawings or as prescribed by Engineer-in-charge. The location of all the construction joints shall be subject to the approval of Engineer-in-charge. The dimension of each structure shown on the drawings shall be subject to such changes as maybe found necessary by the Engineer-in-charge to adopt the structure to the conditions disclosed by the excavation.

Concrete in Various components of Bridges, Regular, Escape Aqueducts etc.

- a. The item of the schedule for concrete in aforesaid structures includes all concrete in the various components of the structure and block outs.
- b. Expansion joints shall be constructed as shown on the drawing or as directed. Pre-molded bituminous fiber type expansion joint material shall be placed in the expansion joints. Lighting recesses shall be constructed in the parapets as directed by the Engineer-in-charge. Open joints or false joints shall be constructed as shown on the drawings or as directed by the Engineer-in-charge. Preformed expansion joint filler shall be placed in the roadway and sidewalls where shown on the drawings or as directed by the Engineer-in-charge.

Construction Joints

- a. Concreting shall be carried out continuously upto the construction joints, the position and details of which shall be as shown on approved drawings or as directed by the Engineer-in-charge.
- b. For vertical construction joints stopping boards shall be fixed previously at a predetermined position and shall be properly stayed for sufficient lateral rigidity to prevent its displacement or bulging when concreting is completed against it. Concreting shall be continued right upon the board. The board shall not be removed before expiry of the specified period for removal of vertical forms.

- c. In all cases, the position and detailed arrangement of all construction joints shall be predetermined and got approved from the Engineer-in-charge.

Tests and Standards of Acceptance

For controlled concrete preliminary tests shall consist of three sets of separate tests and in each set tests shall be conducted on six specimens. Not more than one set of six specimens shall be made on any particular day. Of the six specimens in each set, three shall be tested at seven days and the remaining three at 28 days. The preliminary tests at 7 days are intended only to indicate the strength likely to be attained at 28 days.

General

Testing of concrete shall be carried out at the cost of the department on representative samples taken at the site of laying the concrete in accordance with relevant Indian Standard Specification.

Sampling Procedure and Frequency

- a. **Sampling Procedure:** A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested, i.e., the sampling should be spread over the entire period of concreting and should cover all mixing units.
- b. **Frequency:** The minimum frequency of sampling of concrete of each grade shall be in accordance with the following:

Quantity of concrete m3	Number of Set (Six Samples)
Up to 5	1
6 to 15	2
16 to 30	3
31 to 50	4
51 and above	4 plus one additional sample for each additional 50 m3 or part thereof.

Note: At least one sample shall be taken during each shift.

Test Specimen

Three test specimens shall be made from each set for testing at 28 days. Additional cubes may be required for various purposes, such as to determine the strength of concrete at 7 days or at the time of striking form work, or to determine the duration of curing or to check the testing cubes cured by accelerated methods as described in IS: 9013-1978. The specimen shall be tested as described in IS: 516-1959.

Test Strength of Samples/ Specimen

The test strength of the samples shall be the average of three specimens. Individual variation shall not be more than 15 percent of the average. Contractor shall provide necessary unskilled labour for collection of samples/ cores etc. and facilities for immediate transport of collected samples, cores, etc. from site to laboratory and shall remain present at the time when the samples, cores, etc. are taken. Testing shall be carried out at the testing laboratories set up at the site or at any other laboratory that the Engineer-in-charge may decide up on and the results given thereby shall be considered as correct and authentic and acceptable to the contractor. The Contractor shall be given access to all operations and tests that may be carried out as aforesaid. All testing charges are to be borne by the department.

Acceptance Criteria

- a. The average strength of the group of cubes cast for each day shall not be less than the specified cube strength for the work. About 20 percent of the cubes cast for each day may have values less than the specified strength provided the lowest value is not less than 85% of the specified strength.

- b. In case the concrete does not confirm to the acceptance criteria for strength as specified above, the Engineer-in-charge reserves the right to reject the work or accept the same at a reduced rate derived from tendered rate and as approved by him.
- c. Whenever necessary for the purpose of obtaining economy, workability, density, impermeability, durability or strength on account of variations of the quality and gradation of aggregates or other materials, the Engineer-in-charge shall after testing, make necessary changes in the proportion of mix. Contractor shall have to effect these changes, and shall not be entitled to any compensation on account of such changes.

Tolerance in Concrete Construction

General

- a. Permissible surface irregularities for the various classes of concrete surface finish specified in the relevant portion of the paragraph of "Finished and Finishing of Concrete Surfaces" are defined as finish and area to be distinguished from "Tolerance" as described in this section. Deviation from the established lines, grades and dimensions shall be permitted to the extent set forth in this clause, provided that lesser tolerance than that set forth in this clause may be prescribed at site if such tolerances are considered to impair the structural action or operational action or operational function of the structure.
- b. Where tolerances are not stated in the specifications or drawings for any individual structure or feature thereof, permissible deviations shall be interpreted in conformity with the provisions of this clause.
- c. Concrete work that exceeds the tolerance limits specified in this section shall be either remedied satisfactorily or removed.

Tolerance for Canal Structures

Variation in alignment, grade and dimensions of the structures from the established alignment grade and dimensions shown on the drawings shall be within the tolerances specified below			
(a)	Variation in cross sectional dimensions from those specified for piers, walls, beams and similar parts of bridges structure	Minus Plus	12mm
(b)	Variation from that specified in the thickness of bridges slabs	Minus Plus	3mm 5mm

Concrete Surface Irregularities

- a. General: Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or "Gradual" and are measured relative to the actual concrete surface.
- b. Abrupt surface irregularities, Abrupt surface, irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in timber or other similar forming faults. Abrupt surface irregularities are measured using a short straight edge, at least 150 cm long, held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement.

Measurement and Payment

- a. Except or otherwise especially provided for in the specifications, measurement of concrete for payment shall be made on the basis of the volume of concrete calculated as being contained within the concrete outlines shown on the relevant drawings.
- b. Measurement for payment for the concrete laid in pockets in the foundation shall be made on the basis of the volume of the pockets filled.
- c. No measurements shall be made for the concrete backfill beyond the minimum lines of excavation shown on the drawings except where such payment is specifically authorised.

Measurement of concrete shall be made after deducting the volume of all recesses, passageways, chambers, opening, cavities and depressions, but without deductions for round or beveled edges or space occupied by electrical conduits and reinforcement.

- d. Concrete in bridge, side walls, kerbs and block outs etc. shall be measured on the basis of volume of concrete calculated as being contained within the concrete outlines shown on the relevant drawings and constructed accordingly.
- e. The unit rate for concrete shall include the cost of all materials, labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing as per direction of the Engineer-in-charge.
- f. The unit rate also includes the cost of dewatering, desilting diversion and protection work as may be necessary during and after concreting work.
- g. All expenses likely to be incurred by the contractor in transporting materials supplied to him to the site of work the expenses incurred in improving the quality of materials to acceptable levels (such as screening washing etc.) and the expenses incurred in proper storage of materials as directed by the Engineer-in-charge etc. are deemed to be included in the unit rate.
- h. Payment for the various classes of concrete shall be made on the basis of unit rate per cubic metre entered in respect of items in the Schedule G.
- i. The unit rate quoted by the contractor for the respective item shall be deemed to have included the requirement of cement for miscellaneous operations like priming of mixer, laying of cement slurry for successive layers, finishing of concrete etc. also.

Unacceptable Work

All defective concreting work including but not limited to defects arising out of honey combing, under strength are liable to be demolished and rebuilt by the Contractor at his cost. In the event of such work being accepted by carrying out repairs etc. as specified by the Engineer-in-charge, the cost of repairs shall be borne by the Contractor. Acceptance of such works will be in accordance with the provisions of IS: 456- 2000. In the event of the work being accepted by giving a design concession arising out of but not limited to under sizing and strength by accepting higher design stress in member and accepting materials not fully meeting the specifications etc. the contractor shall be paid for the work actually carried out by him at a reduced rate derived from the tendered rate as approved by the Engineer-in-charge.

STEEL STRUCTURE

All steel structure should be design and got approved by any recognized institutions as per direction of Engineer incharge at the bidder's cost. The construction of steel trusses/steel structure should be carried out as per the relevant Indian standard code of practice and the material used for construction of steel structure like I section/T section/Plate section etc. should strictly comply with relevant Indian standard code of practice. Any bearing arrangement/Roller etc. required for supporting of trusses should be provided as per requirement and no separate cost of such arrangement should be given to the bidder's cost.

BRICKS & BRICK MASONRY

Bricks shall be made from suitable soils. They shall be free from cracks and flaws and nodules of free lime. The bricks shall have smooth rectangular faces with sharp corners and shall be uniform in colour and free from fissures and cracks.

Sizes: The standard sizes of bricks shall be as:

Length	Width	Height
230mm	110mm	70mm

Tolerances (as per IS 1077-1986)

The bricks, when tested, shall be within following limits per 20 bricks, but average of 10 sets of 20 bricks each checked shall have minimum length 450cm, width 220cm, and height 140cm.

Length	:	460 ± 10 cm.
Width	:	220 ± 5 cm.
Height	:	140 ± 4 cm.

Water absorption:

The bricks when tested in accordance with the procedure laid down in IS: 3495 (part-2) – 1976, after immersion in cold water for 24 hours, their water absorption shall not be more than 20% by weight and if found more than this, all the bricks represented by such samples shall be rejected.

The bricks should not disintegrate when kept in water or left in humid condition.

Compressive strength:

Average compressive strength shall not be less than 100 kg/cm² for use in structures, buildings, water tanks etc and shall not be less than 75 kg/cm². The relevant code shall be applicable.

Efflorescence :

The efflorescence when tested in accordance with IS 3495 shall not be higher than “moderate” i.e. not more than 50 percent of area of the brick should be covered with deposit of salt and there shall be no powdering or hacking of the surface.

Sampling :

Sampling and criterion for conformity of well burnt bricks shall be as following :

Size of stacks (No. of Bricks)	:	No. of bricks samples required for testing.
Upto 35000	:	3 to 10
35000 to 50000	:	6 to 15

If required classification of bricks will be carried out as per prevailing practice of IGNP. Rejected bricks will not be allowed to use on works.

SOAKING OF BRICKS

All bricks shall be thoroughly soaked in a tank filled with water for a minimum period of three hour prior to being laid. Soaked bricks shall be removed from the tank sufficiently in advance so that they are skin dry at the time of actual laying. Such soaked bricks shall be stacked on a clean place where they are not contaminated with dirt, earth, etc.

JOINTS

The thickness of joints shall not exceed 10mm. All joints on exposed faces shall be tooled to give concave finish.

LAYING

- All brickwork shall be laid in an English bond, even and true to line, in accordance with the drawing or as directed by the Engineer, plumb and level and all joints accurately kept. Half and Cut bricks shall not be used except when necessary to complete the bond. Closer in such cases shall be cut to the required size and used near the ends of the walls. The bricks used at the face and also at all angles forming the junction of any two walls shall be selected whole bricks of uniform size, with true and rectangular faces.
- All bricks shall be laid with frogs up on a full bed of mortar except in the case of tile bricks. Each brick shall be properly bedded and set in position by slightly pressing while laying, so that the mortar gets into all their surface pores to ensure proper adhesion.
- All head and side joints shall be completely filled by applying sufficient mortar to brick already placed and on brick to be placed. All joints shall be properly flushed and packed with mortar so that no hollow spaces are left.
- No bats or cut bricks shall be used except to obtain dimensions of the different courses for specified bonds or wherever a desired shape so requires.
- The brick work shall be built in uniform layers and for this purpose wooden straight edge with graduations indicating thickness of each course including joint shall be used.
- Corners and other advanced work shall be raked back. Brickwork shall be done true to plumb or in specified batter. All courses shall be laid truly horizontal and vertical joints shall be truly vertical. Vertical joints in alternate courses shall come directly one over the other.

- g. During construction, no part of work shall rise more than one meter above the general construction level, to avoid unequal settlement and improper jointing.
- h. Where this is not possible in the opinion of the Engineer, the works shall be raked back according to the bond (and not toothed) at an angle not steeper than 45 degrees with prior approval of the Engineer. Toothing may also be permitted where future extension is contemplated.
- i. Before laying bricks in foundation, the foundation slab shall be thoroughly hacked, swept clean and wetted. A layer of mortar not less than 12 mm thick shall be spread on the surface of the foundation slab and the first course of bricks shall be laid.

JOINTING OLD AND NEW WORK

- a. Where fresh masonry is to join with masonry that is partially/entirely set, the exposed jointing surface of the set masonry shall be cleaned, roughened and wetted, so as to effect the best possible bond with the new work. All loose bricks and mortar or other material shall be removed.
- b. In the case of vertical or inclined joints, it shall be further ensured that proper bond between the old and new masonry is obtained by interlocking the bricks. Any portion of the brickwork that has been completed shall remain undisturbed until thoroughly set.
- c. In case of sharp corners especially in skew bridges, a flat cutback of 100 mm shall be provided so as to have proper and bonded laying of bricks.

CURING

- a. Green work shall be protected from rain by suitable covering and shall be kept constantly moist on all faces for a minimum period of 28 days. Brick work carried out during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period. The top of the masonry work shall be left flooded with water at the close of the day. Watering may be done carefully so as not to disturb or wash out the green mortar.
- b. During hot weather, all finished or partly completed work shall be covered or wetted in such a manner as will prevent rapid drying of the brickwork.
- c. During the period of curing of brick work, it shall be suitably protected from all damages. At the close of day's work or for other period of cessation, watering and curing shall have to be maintained. Should the mortar perish i.e. become dry, white or powdery through neglect of curing, work shall be pulled down and rebuilt as directed by the Engineer. If any stains appear during watering, the same shall be removed from the face.

SCAFFOLDING

- a. The scaffolding shall be sound, strong and safe to withstand all loads likely to come upon it. The holes which provide resting space for horizontal members shall not be left in masonry under one meter in width or immediately near the skew backs of arches.
- b. The holes left in the masonry work for supporting the scaffolding shall be filled and made good. Scaffolding shall be got approved by the Engineer. However, the Contractor shall be responsible for its safety.

EQUIPMENT

All tools and equipment used for mixing, transporting and laying of mortar and bricks shall be clean and free from set mortar, dirt or other injurious foreign substances.

FINISHING OF SURFACES

General

All brickwork shall be finished in a workmanlike manner with the thickness of joints, manner of striking or tooling as described in these above specifications.

The surfaces can be finished by "jointing" or "pointing" or by "plastering" as given in the drawings.

For a surface which is to be subsequently plastered or pointed, the joints shall be squarely raked out to a depth of 15 mm, while the mortar is still green. The raked joints shall be well brushed to remove dust and loose particles and the surface shall be thoroughly washed with water, cleaned and wetted.

Jointing

In jointing, the face of the mortar shall be worked out while still green to give a finished surface flush with the face of the brick work. The faces of brick work shall be cleaned to remove any splashes of mortar during the course of raising the brick work.

Pointing

- a. Pointing shall be carried out using mortar not leaner than 1:3 by volume of cement and sand or as shown on the drawing.
- b. The mortar shall be filled and pressed into the raked joints before giving the required finish.
- c. The pointing shall be ruled type for which it shall, while still green, be ruled along the centre with half round tools of such width as may be specified by the Engineer.
- d. The super flush mortar shall then be taken off from the edges of the lines and the surface of the masonry shall be cleaned of all mortar. The work shall conform to IS:2212.

Plastering

- a. Plastering shall be done where shown on the drawing. Superficial plastering may be done, if necessary, only in structures situated in fast flowing rivers or in severely aggressive environment.
- b. Plastering shall be started from top and worked down. All putlog holes shall be properly filled in advance of the plastering while the scaffolding is being taken down.
- c. Wooden screeds 75 mm wide and of the thickness of the plaster shall be fixed vertically 2.5 to 4 meters apart, to act as gauges and guides in applying the plaster.
- d. The mortar shall be laid on the wall between the screeds using the plaster's float and pressing the mortar so that the raked joints are properly filled. The plaster shall then be finished off with a wooden straight edge reaching across the screeds.
- e. The straight edge shall be worked on the screeds with a small upward and sideways motion 50 mm to 75 mm at a time. Finally, the surface shall be finished off with a plasterer's wooden float. Metal floats shall not be used.
- f. When recommencing the plastering beyond the work suspended earlier, the edges of the old plaster shall be scrapped, cleaned and wetted before plaster is applied to the adjacent areas.
- g. No portion of the surface shall be left unfinished for patching up at a later period.
- h. The plaster shall be finished true to plumb surface and to the proper degree of smoothness as directed by the Engineer.
- i. The average thickness of plaster shall not be less than the specified thickness. The minimum thickness over any portion of the surface shall not be less than the specified thickness by more than 3 mm.
- j. Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut in rectangular shape and re-done as directed by the Engineer.

Curing of Finishes

Curing shall be commenced as soon as the mortar used for finishing has hardened sufficiently not to be damaged during curing. It shall be kept wet for a period of at least 28 days. During this period, it shall be suitably protected from all damages.

Scaffolding for Finishes

Stage scaffolding shall be provided for the work. This shall be independent of the structure.

ACCEPTANCE OF WORK All work shall be true to the lines and levels as indicated on the drawing or as directed by the Engineer, subject to tolerances as indicated in these specifications.

Mortar cubes shall be tested in accordance with IS:2250 for compressive strength, consistency of mortar and its water retentivity. The frequency of testing shall be one sample for every 2 cubic meters of mortar, subject to a minimum 3 samples for a day's work.
In case of plaster finish, the minimum surface thickness shall not be less than the specified thickness by more than 3 mm.

MEASUREMENTS FOR PAYMENT

All brick work shall be measured in cubic meters. Any extra work done by the Contractor over the specified dimensions shall be ignored.

The work of plastering and pointing shall be measured in square meters of the surface treated

SECTION – VI A
GENERAL CONDITION OF CONTRACT

GOVERNMENT OF RAJASTHAN
OFFICE OF THE ADDITIONAL CHIEF ENGINEER WATER RESOURCES ZONE,
JAIPUR (RAJ.)

NOTICE INVITING TENDERS FOR WORKS

1. Tenders are hereby invited on behalf of the Governor of Rajasthan for the works of **Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk & Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonk** from enlisted contractors of the appropriate class. Contractors enlisted with the CPWD, Postal, Telecom, Railway, MES, other State Governments/Central Government Undertakings/Organizations equivalent to A and AA Class of Rajasthan are also eligible after giving prescribed Earnest Money to tender for works as under:-

i.	Contractors equivalent to AAClass of Rajasthan	Works of which cost exceeds Rs. 10 crores
ii.	Contractors equivalent to A Class of Rajasthan	Works of which cost exceeds Rs. 5 crores and less than 10 Crores

2. Contract document consisting of the detailed plan, complete specifications, the Schedule of the quantities of the various classes of work to be done and the set of Conditions of Contract to be complied with by the persons whose tender may be accepted, which will also be found printed in the form of tenders, can be seen at office of **the Additional Chief Engineer Water Resources Zone Jaipur** every day except on Sunday and public holiday, during office hours during the period of sale.
3. Tenders which should be placed online with the name of work written on the cover to **Additional Chief Engineer Water Resources Zone Jaipur up to 3.00 PM** on dated as per NIB and Post qualification bid will be opened at 3.00 PM on dated as mentioned in NIB & Financial bid will be opened according to the date decided after opening of technical bid and shall be informed to the successive bidders.
4. Tenders are to be submitted through e-tendering, which can be downloaded from website www.eproc.rajasthan.gov.in on payment of a sum of **Rs. 10,000.00 as tender cost & Rs.2,500/- as processing fees** through e-GRAS Challan in favour of Executive Engineer, Water Resources Division Tonk respectively which should also be furnished as mentioned in NIT along with Bid Security. Before submitting tenders, it should be ensured that all the tender papers including Conditions of contract are digitally signed by the tendered. Eligibility to get tender forms shall be with reference to the amount of NIT
5. The work is to be completely finished to the satisfaction of Engineer-in-charge within **24 months** including rainy and canal regulation period season from the 10th day after the date of written order to commence the work.
6. BC/BG/DD//Insurance Surety bonds/e-GRAS Challan of Earnest Money, amounting to Rs 0.5%

for Registered Contractors with WR, Rajasthan Department and 2% for registered in other departments must accompany each tender. The bid security may be given in the form of DD/BC/BG in specified format from nationalized bank or scheduled bank in India/Insurance surety bond or deposited through e-GRAS Challan in favour of Executive Engineer, Water Resources Division Tonk payable at Tonk. Earnest Money deposited through BC/BG/DD/Insurance surety bond, the original copies should also be submitted physically in the office of Additional Chief Engineer WR Zone Jaipur to cashier or authorized clerk in the office as mentioned in NIT. The scanned copy of BC/BG/DD/Insurance surety bond/e-GRAS Challan for earnest money, tender cost of work, and processing fee shall be enclosed with the tender document submitted through e-tendering.

7. Performance security. –

1. Performance security shall be solicited from all successful bidders except the departments of the State Government and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of the Central Government. However, a performance security declaration shall be taken from them. The State Government may relax the provision of performance security in particular procurement or any class of procurement.
2. The amount of performance security shall be 5 percent, or as may be specified in the bidding documents, of the amount of supply order in case of procurement of goods and services and **10 percent of the amount of work order in case of procurement of work.** In case of Small-Scale Industries of Rajasthan, it shall be one percent of the amount of quantity ordered for supply of goods and in case of sick industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR), it shall be Two percent of the amount of supply order. **(As per RTPP Rule 75 and its sub rules).**
3. Performance security shall be furnished in any one of the following forms-
 - a) deposit through eGRAS;
 - b) Bank Draft or Banker's Cheque of a scheduled bank
 - c) National Savings Certificates and any other script/instrument under National Savings Schemes for promotion of small savings issued by a Post Office in Rajasthan, if the same can be pledged under the relevant rules. They shall be accepted at their surrender value at the time of bid and formally transferred in the name of procuring entity with the approval of Head Post Master;
 - d) Bank guarantee or electronic Bank Guarantee (e-BG) of a scheduled bank for transacts the business of issuing Insurance Surety Bonds. It shall be got verified from the issuing bank. Other conditions regarding bank guarantee shall be same as mentioned in the rule 42 for bid security;
 - e) Fixed Deposit Receipt (FDR) of a scheduled bank. It shall be in the name of procuring entity on account of bidder and discharged by the bidder in advance. The procuring entity shall ensure before accepting the Fixed Deposit Receipt that the bidder furnishes an undertaking from the bank to make payment/premature payment of the Fixed Deposit Receipt on demand to the procuring entity without requirement of consent of the bidder concerned. In the event of forfeiture of the performance security, the Fixed Deposit shall be forfeited along with interest earned on such Fixed Deposit.

- f) (ee) Insurance Surety Bonds issued by Insurer registered with the Insurance Regulatory and Development Authority of India (IRDA) for transact the business of issuing Insurance Surety Bonds
- g) In case of procurement of works, the successful bidder at the time of signing of contract agreement may submit option for deduction of performance security from his each running bill and final bill @ 10% of the amount of the bill.

4. Performance security furnished in the form specified in clause (b) to (d) of sub-rule (3) shall remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the bidder, including warranty obligations and maintenance and defectliabilityperiod.(Asper RTPP Rule 75 and its sub rules).

8. **Additional performance security:** -As per notification of Finance (G&T) Department dated 22.10.2021, 75A an additional performance security shall also be taken from the successful bidder in case of unbalanced bid. The additional performance security shall be equal to fifty percent of unbalanced bid amount. The additional performance security shall be deposited in lump sum by the successful bidder before execution of agreement. The additional performance security shall be deposited through e-Grass, demand draft, banker's cheques, Government securities or bank guaranteeor electronic Bank Guarantee (e-BG).

Explanation: - For the purpose of this rule:-

- (i) Unbalanced bid means any bid below more than 15 % of estimated bid value.
- (ii) Estimated bid value means value of subject matter of procurement mentioned in bidding document by the procuring entity.
- (iii) Unbalanced bid amount means positive difference of 85% of estimated bid value minus bid amount quoted by the bidder.

The additional performance security shall be refunded to the contractor after satisfactory completion of the entire work. The performance security shall be forfeited by the procuring entity when work is not completed within stipulated period by the contractor. Provision for unbalanced bid and additional performance security shall be mentioned in the bidding documents by the procuring entity.

- 9. The acceptance of the tender will rest with the competent authority who does not bind itself to accept the lowest tender, and reserves to himself the authority to reject any or all of the tenders received without assigning any reason.
- 10. Tenders downloaded from website eproc.rajasthan.gov.in must be uploaded on the website with all enclosures upto the date and time of receipt of tenders.

Value of Tends	Name of office
(i) Tenders for which sanctioning authority is Executive Engineer/ Superintending Engineer	Divisional Office
(ii) Tenders for which the sanctioning authority is Additional Chief Engineer/Chief Engineer	Circle Office
(iii) Tenders for which sanctioning authority is Board/State Government.	Additional Chief Engineer/ Chief Engineer Office

11. No refund of tender fees is claimable for tenders not accepted or form returned or for tenders not submitted.

The tenders for work shall remain open for acceptance for the period as given below from the date of opening of technical bid.

1	For tenders to be accepted by Executive Engineer.	20 Days
2	For tenders to be accepted by Superintending Engineer.	30 Days
3	For tenders to be accepted by Addl. Chief Engineer/ Chief Engineer	40 Days
4	For tenders to be accepted by. Adm. Deptt./ empowered committee /board	50 Days

Note: Communicator of acceptance of tender shall also be within the above limits. **Bid offer shall be valid for period of 120 days.**

If any tendered withdraws his tender prior to expire of said validity period or mutually extended period or makes modification in the rates, terms and conditions of the tender within the said period. Which are not acceptable to the department or fails to commence the work in the specified period fails to execute the agreement, the department shall, without prejudice to any, other right or remedy, be at liberty to forfeit the amount of earnest money given in any form absolutely. If any contractor, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to re-tendering, he shall stand debarred from participating such re-tendering in addition to forfeitures of earnest money / security deposit and other action under agreement.

12. All tenders, in which any of the prescribed conditions are not fulfilled or which have been vitiated by errors in calculations, totaling or other discrepancies or which contain overwriting in figures or words or corrections not initialed and dated, will be liable to rejection.
13. Enlisted contractors in Water Resources will be required to pay Earnest Money @ 1/2% of estimated cost put to tender, in case of work for which they are authorized to tender. Rules for enlistment of contractors, but the amount to the extent of full earnest money shall be liable to be forfeited in the event of circumstances explained in clause 11 above.
14. The whole work may be split up between two or more contractors or accepted in part and not in entirety if considered expedient.
15. If the contractor does not submit performance guarantee within 10 days from the date of communication of acceptance of his tender, his earnest money shall be liable to be forfeited.

Sd

Signature of Engineer-in-charge

For and on behalf of the
Governor of Rajasthan

GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF BIDDERS

1. All works proposed for execution by contract will be notified in a form of invitation to tender pasted on public places and on a board hung up in the office of and signed by the Chief Engineer or other duly authorized Engineer.
The form of invitation to tender will state the work to be carried out as well as the date of submitting and opening of tenders and the time allowed for carrying out the work, also the amount of earnest money to be deposited with the tender, and the amount of the security deposit to be deposited by the successful tenderers and the percentage. Copies of the specifications, designs and drawings and estimated rates/ schedule rates and any other documents required in connection with the work signed for the purpose of identification by the Executive Engineer shall be open for inspection by the contractor at the office of the Chief Engineer or other duly authorized Engineer during office hours.
2. In the event of the tender being submitted by the firm, it must be signed separately by each partner, thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney, authorizing him to do so, such power of Attorney will be submitted with the tender and it must disclose that the firm is duly registered under the Indian Partnership Act, by submitting the copy of registration certificate.
3. Receipt for payment, made on account of a work when executed, by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm, in which case the receipt 'must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.
4. Any person, who submits percentage rate tender, shall fill up the usual printed form stating at how much percent above or below the rate specified in schedule G, he is willing to undertake the work. Only one rates of percentage more, or less, on all the estimate' rates/ scheduled rates shall be mentioned. Tender, which propose any alteration in the work, specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each work. Tenders shall have the name and number of works, to which they refer, written outside the envelope.
5. The Chief Engineer or other duly authorized engineer will open the tenders in the presence of any contractor(s) or their authorized representatives who may be present at the time, and will announce and enter the rates/ amounts of all tenders in the register of opening of tenders. (Form RPWA 20A). In the event of tender being accepted, a receipt for the earnest money deposited shall be given to the contractor, who shall sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected the earnest money forwarded with such unaccepted tenders shall, be returned to the contractor making the same.
6. The Chief Engineer or other duly authorized engineer shall have the right of rejecting all or any of the tender without assigning any reason.
7. The receipt of an Accountant, Cashier or any other official, not authorized to receive such amount, will not be considered as an acknowledgement of payment to the Chief Engineer or other duly Authorized Engineer.
8. The memorandum of work tendered for, memorandum of material and plan to be supplied by the departmental and their rates shall be completed in the office of the Chief Engineer or duly authorized engineer the tender from is issued.

9. If it is found that the tender is not submitted in proper manner, or contain too many corrections and or unreasonable rates or amounts, it would be open for the Engineer-in-charge not to consider the tender, forfeit the amount of earnest money and / or delist the contractor.
10. The tenderer shall sign a declaration under the "Official Secrets Act" for maintaining secrecy of the tender documents, drawings or other record connected with the work given to him in form given below. The unsuccessful tenderers shall return all the drawings given to them.

DECLARATION

" I/ We hereby declare that I/We shall treat the tender documents, drawings and other record, connected with the work as secret confidential documents, and shall not communicate information derived therefrom to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same."

11. Any percentage rate tender containing item-wise rates, and any item rate tender containing percentage rate below or above estimated / schedule' rates, will be summarily rejected. However, if a tenderer voluntarily offers a rebate for payment within a stipulated period, this may be considered.
12. On acceptance of the tender, the name of the accredited representative (s) of the Contractor (with a photograph and signature attested), who would be responsible for taking instructions from the Engineer in charge, shall be communicated to the Engineer-in-charge.
13. GST or any other tax on materials, or Income Tax in respect of the contract shall be governed by clause 36A, B and C and D of the conditions of contract, Deduction of Income tax at source will be made as per provision of the Income Tax Act, in force from time to time.
14. The tender to work shall not be witnessed by a contractor or contractors who himself / themselves has / have tendered or who may and has / have tendered for the same work. Failure to observe the secrecy of the tenders will render tenders of the contractors, tendering as well as witnessing the tender, liable to summary rejection.
15. If on check, there are discrepancies the following producer shall be followed: -
 - (i) Where there is a difference between the rates in figures and words lower of the two rates shall be taken as valid and correct rate.
 - (ii) When the rates quoted by the contractor in figures and in words tallies, but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount worked out.
 - (iii) While quoting rates, if rate/ rates against any item or items are found to be omitted, the rate given in the schedule 'G' by the department for such items will be taken into account while preparing comparative statement and contractor shall be bound to execute such item on 'G' schedule rates.
 - (iv) In case where percentage is given but the 'above' or 'below' not scored, the tender will be non-responsive.
16. The Contractor shall comply with the provision of the Apprenticeship Act, 1961, and the rules and orders issued, there under, from time to time. If he fails to do so, his failure will be a breach of the contract and the original sanctioning authority in his discretion may cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of violations by him of the provisions of the Act.
17. The contractor shall read the specifications and study the working drawing carefully before submitting the tender.
18. The site for execution of the work will be made available as soon as the work is awarded. In case, it is not possible for the department to make the entire site available on the award of the work, the contractor shall arrange his working programme accordingly. No claim, whatsoever, for not giving the site in full on award of the work or for giving the site gradually in parts will be tenable. The contractor may satisfy himself regarding site, acquisition of land, approach road etc.
19. The tender documents show already the specific terms and conditions on which tenders are required by the Government, hence all tenders should be in strict conformity with the tender

documents and should be fulfilled in, wherever necessary and initialed. Incomplete tenders are liable to be rejected. The terms and conditions of the tenders documents are firm, as such conditional tenders are liable to be rejected.

20. The bidder shall carefully examine all forms contained in the tender document and submit the same, duly filled, signed, and certified wherever required by a Notary Public, Chartered Accountant, or any other competent authority, strictly in accordance with the specified requirements. Any omission, deficiency, or discrepancy in the submitted documents shall be the sole responsibility of the bidder, and such bid shall be liable to be treated as **non-responsive** without any further correspondence.

21. The tenderer, while submitting tender, must provide adequate information regarding his financial, technical and organizational capacity and working experience to execute the work of the nature and magnitude.

22. The Chief Engineer or other duly authorized Engineer reserves the right to ask for submission of samples as in respect of materials for which the tenderer has quoted his rates before the tender can be considered for acceptance. If the tenderer, who is called upon to do so, does not submit within seven days of written order to do so, the Engineer-in -charge shall be at liberty to forfeit the said earnest money absolutely.

23. The contractor shall submit the list of the work, which are in hand (Progress) in the following form.: -

Name of work	Name and particulars of the sub division / division, where work is being executed.	Amount of work	Position of work in progress	Remarks

24. The Contractor should quote his rates only in one language i.e., either in Hindi or English. Rates should be quoted in figures as well as in words. In case a contractor has quoted rates in both the languages, and the rates so quoted differ, then the lower of the two shall be treated as the rate quoted by the contractor.

25. All addition, deletions, corrections and overwriting, must be serially numbered and attested by the contractor at every page, so also by the officer opening the tenders, so as to make further disputes impossible on this score.

26. After acceptance of the tender, the contractor or all partners (in the case of partnership firm) will append photographs and signatures duly attested, at the time of execution of agreement.

27. If any contractor, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to re-tendering, he shall stand depraved from participating in such re-tendering, in addition to forfeiture of earnest money/ security deposit and other action under agreement.

28. The tender documents shall be issued to those contractors only having valid enlistment as on the date of issue of documents.

29. (a) If a tenderer reduces the rates voluntarily after opening of the tenders/ negotiations, his offer shall stand cancelled automatically, his earnest money shall be forfeited and action for debarring him from business shall be taken as per enlistment rules.

(b) If a non-tender offers lower rates after opening of tenders, action for debarring him from business shall be taken as per enlistment rules.

30. Contractor shall submit only unconditional tenders. Conditional tenders are liable to be rejected summarily.

Note:-All contractors with Govt. shall required registration of workers under the building and other construction workers (Regulation of employment and condition of services) Act. 1996 and extension benefit to such workers under this Act.

DECLARATION FORM

1. I/We declare that I/We have visited the site and fully acquainted myself / ourselves with the local situation regarding material, labour land other factors pertaining to the work before submitting this tender.
2. I/We hereby declare that I/We have carefully studied the conditions of the contract, specification and other tender documents of this work and agree to execute the same accordingly.
3. I/We hereby declare that I/we shall treat the tender document drawings and other records, connected with the work, as secret confidential documents, and shall not communicate information derived there from to any person other than a person to whom I/We/am/are authorised to communicate the same or issue the information in any manner prejudicial to the safety of same.

(to be Submitted as an affidavit on non-judicial stamp paper, duly notarized)

Signature of the Contractor

Tender for works

I/We hereby tender for the execution for the Governor of the state of Rajasthan of the work specified in the underwritten memorandum with in the time specified in such memorandum at the rates (in figures)% (as well as in words) Percent below /above the amount, entered in the Schedule 'G' in all respects in accordance with the specification, designs, drawings and instructions in writing referred to in Rule I in all respects in accordance with such conditions so far as applicable. I/we have visited the site of work and am are fully aware of all the difficulties and conditions likely to affect carrying out the work. I/We have fully acquainted myself / ourselves about the conditions in regard to accessibility of site and quarries/ kilns. nature and the extent of ground, working conditions including stacking of materials, installation of tools and plant, conditions effecting accommodations and movement of labouretc required for the satisfactory execution of contract.

MEMORANDUM

- (a) General description of work: - **Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP Kanwarawas PS Todaraisingh District Tonk & Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil Todaraisingh District Tonk**

(b) Estimated cost - Rs. 3682.65 Lacs.

- (c) Bid Security - 0.5% must accompany to each tender to enlisted contractor in Irrigation/Water Resources Department, Rajasthan and 2% to the tenderer outside Water Resources Department Rajasthan, must accompany to each tender.

(c) **Performance security: -**

1. Performance security shall be solicited from all successful bidders except the departments of the State Government and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of the Central Government. However, a performance security declaration shall be taken from them. The State Government may relax the provision of performance security in particular procurement or any class of procurement.
2. The amount of performance security shall be 5 percent, or as may be specified in the bidding documents, of the amount of supply order in case of procurement of goods and services and 10 **percent of the amount of work order in case of procurement of works**. In case of Small-Scale Industries of Rajasthan it shall be one percent of the amount of quantity ordered for supply of goods and in case of sick industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR), it shall be two percent of the amount of supply order. **(As per RTPP Rule 75 and its sub rules).**
3. Performance security shall be furnished in any one of the following forms-
 - a) deposit through eGRAS;
 - b) Bank Draft or Banker's Cheque of a scheduled bank
 - c) National Savings Certificates and any other script/instrument under National Savings Schemes for promotion of small savings issued by a Post Office in Rajasthan, if the same can be pledged under the relevant rules. They shall be accepted at their surrender value at the time of bid and formally transferred in the name of procuring entity with the approval of Head Post Master;

- d) Bank guarantee or electronic Bank Guarantee (e-BG) of a scheduled bank for transacts the business of issuing Insurance Surety Bonds. It shall be got verified from the issuing bank. Other conditions regarding bank guarantee shall be same as mentioned in the rule 42 for bid security;
 - e) Fixed Deposit Receipt (FDR) of a scheduled bank. It shall be in the name of procuring entity on account of bidder and discharged by the bidder in advance. The procuring entity shall ensure before accepting the Fixed Deposit Receipt that the bidder furnishes an undertaking from the bank to make payment/premature payment of the Fixed Deposit Receipt on demand to the procuring entity without requirement of consent of the bidder concerned. In the event of forfeiture of the performance security, the Fixed Deposit shall be forfeited along with interest earned on such Fixed Deposit.
 - f) (ee) Insurance Surety Bonds issued by Insurer registered with the Insurance Regulatory and Development Authority of India (IRDA) for transact the business of issuing Insurance Surety Bonds
 - g) In case of procurement of works, the successful bidder at the time of signing of contract agreement may submit option for deduction of performance security from his each running bill and final bill @ 10% of the amount of the bill.
4. Performance security furnished in the form specified in clause (b) to (d) of sub-rule (3) shall remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the bidder, including warranty obligations and maintenance and defect liability period.
5. Time allowed for the completion of work (to be reckoned from the 10th day after the date of written order to commence the work) is 24 months including rainy season and canal regulation period. Should this tender be accepted in whole or in part. I/We hereby agree to abide by and fulfill all the terms and conditions of the contract annexed here to and the notice inviting tender, or in default thereof to forfeit and pay to the Governor of Rajasthan or his successors in office, the sum of money mentioned in the said conditions.

Bid Security shall absolutely be forfeited to the Governor of Rajasthan or his successor in office without prejudice to any other right or remedies of Governor of Rajasthan or his successor in his office, should I/We fail to commence the work specified in the above memorandum in accordance with clause 1 of the said conditions of contract.

Signature or Witness
Witness's Address & Occupation

Signature of Contractor
Address of contractor

Date:

The above tender is hereby accepted by me on behalf of the Governor of Rajasthan.

Dated

Engineer-in- charge
For and on behalf of the Governor of Rajasthan

("Copy of appendix XI of PW" F& AR, Govt. of Rajasthan effective from 01.07.99 and subsequent addendum up to date. In case of any typographical error or omission or alteration the original version of the same shall be valid.")

CONDITIONS OF CONTRACT

Clause 1–Security Deposit. –

The security deposit @ 10% of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposited shall however be adjusted while deducting security deposit from the first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or electronic bank guarantee (e-BG) or any acceptable form of security for an amount equal to the full amount of security deposit @ 10% of the work order before or at the time of executing the agreement. In that case, earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills.

All compensation of other sums of money payable by the contractor to Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his ²[XXXX] Security Deposit, or from interest arising there from, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security deposit being reduced by reason of any such deduction or sale as aforesaid, the Contractor shall within ten days thereafter, make good in cash or Bank Guarantee or electronic bank guarantee (e-BG) of Nationalized/Scheduled bank, as aforesaid, any sum or sums which may have been deducted from or raised by sale of his ²[XXXX] Security Deposit or any part thereof..

In case of Bank Guarantee or electronic bank guarantee (e-BG) of any Nationalized/Scheduled Bank is furnished by the Contractor to the Government, as part of the Security Deposit ³[XXXX] and the bank goes into liquidation or, for any reason, is unable to make payment against the said Bank guarantee or electronic bank guarantee (e-BG), the loss caused thereby shall fall on the Contractor and the Contractor shall forthwith, on demand, furnish additional security to the Government to make good the deficit.

The liability or obligation of the bank under the Guarantee Bond shall not be affected or suspended by any dispute between the Engineer-in-charge and the Contractor, and the payment, under the Guarantee Bond by the bank to the Government shall not wait till disputes are decided. The bank shall pay the amount under the Guarantee, without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the Contractor. The demand, so made, shall be conclusive as regards to amount due and payable by the bank, under the guarantee limited to the amount specified in the Guarantee Bond. The guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

The Bank Guarantee or electronic bank guarantee (e-BG) shall remain valid up to the specified date unless extended on demand by the Engineer-in-charge, which shall include the period of completion of the contract and the defect removal period as per terms of the Agreement. bank's liability shall stand automatically discharged unless a claim in writing is lodged with the bank within the period stated in the Bank Guarantee including the extended period. After satisfactory completion of the contract and clearance of all dues by the Contractor, the Chief Engineer or duly authority Engineer will discharge the bank Guarantee after expiry of the original or the extended period, as the case may be. In case the date of expiry of the Bank Guarantee is a holiday, it will be deemed to expire on the close of the next working day.

Government is not concerned with any interest accruing to the Contractor on any form of Security (primary or collateral) lodged by him with the bank or any sums payable to sureties obtained by the Bank as counter guarantee to secure its own position. These will be the matters between the Bank and the Contractor.

Clause 2 Compensation for delay

The time allowed for carrying out the work, as entered in the tender, shall be strictly observed by the contractor and shall be reckoned from the 10th day after date of written order to commence the work given to the contractor. If the contractor does not commence the work within the period specified in the work order, he shall stand liable for the forfeiture of the amount of earnest money and security deposit Besides appropriate action may be taken by the Engineer in charge /competent authority to debar him from taking part in future tenders for a specified period or black list him The work shall throughout the stipulated period of completion of the contract, be proceeded with all due diligence, time being essence of the contract on, the part of the contractor To ensure good progress during the execution of work the contractor shall be bound in all cases in which the time allowed for any work exceeds one month (save for special jobs) to complete 1/8 of the whole of the work before ¼ of the whole time allowed under the contract has elapsed 3/8 of the work before ½ of such time has elapsed and ¾ th of the work before ¾ of such time has elapsed. If the contractor fails to complete the work in accordance with this time schedule in terms of cost in money, and the delay in execution of work is attributable to the contractor, the contractor shall be liable to pay compensation to the Govt. at every time span as below:-

A- Time span of full stipulated period.	1/4th (days)	1/2th (days)	3/4th (days)	Full (days)
B- Work to be completed in terms of money.	1/8th (Rs.lacs)	3/8th (Rs. lacs)	3/4th (Rs.lacs)	Full (Rs.lacs)
C- Compensation payable by the contractor for delay attributable to contractor at the stage.	2.5% of scheduled work remained unexecuted on the last day of (1/4) time span.	5% of scheduled work remained unexecuted on the last day of (1/2) time span.	7.5% of scheduled work remained unexecuted on the last day of (3/4) time span.	10% of scheduled work remained unexecuted on the last day of contracted full period.

Note: - In case delayed period over a particular span is split up and is jointly attributable to government and contractor the competent authority may reduce the compensation in proportion of delay attributable to Government over entire delayed period over that span after clubbing up the split delays attributable to government and this reduced compensation would be applicable over the entire delayed period without paying any escalation. Following illustration is given.

1. First time span is of 6 months delay is of 30 days which is split over as under:

5 days (attributable to government) + 5days (attributable to contractor) +5days (attributable to government) +5days (attributable contractor) +5days (attributable to government) +5 days (attributable to contractor)

Total delays are thus clubbed to 15 days attributable to Govt. and 15 days attributable to contractor.

The normal compensation of 30 days as per clause 2 of agreement is 2.5% which can be reduced as $2.5 \times 15/30 = 1.25\%$ over 30 days without any escalation by competent authority.

The contractor shall, further, be bound to carryout the work in accordance with the date and quantity entered in progress statement attached to the tender.

In case the delay in execution of work is attributable to the contractor, the span wise compensation as laid down in this clause shall be mandatory. However in case the slow progress in one time span is covered up within original stipulated period then the amount of such compensation levied earlier shall be refunded. The price escalation if any, admissible under clause 45 of conditions of contract would be admissible only on such rates and cost of work as would be admissible if work would have been carried out in that particular time span. The Engineer in charge shall review the progress achieved in every time span and grant stage-wise extension in case of slow progress with compensation, if the delay is attributable to contractor, otherwise without compensation.

However, if for any special job, a time schedule has been submitted by the contractor before execution of agreement and it is entered in agreement as well as same has been accepted by the Engineer in-charge, the contractor shall complete the work within the said time schedule. In the event of the contractor failing to comply with this condition he shall be liable to pay compensation as prescribed in foregoing paragraph of this clause provided that the entire amount of compensation to be levied under the provisions of this clause shall not exceed 10% of the value of the contract. While granting extension in time attributable to the Government, reasons shall be recorded for each delay.

Clause 2A: Incentive for early completion:

In the event that the project (cost more than 50 crore) completion date occurs prior to the scheduled completion date (after taking into account any time extension approved by the competent authority for delay not attributable to the contractor), the contractor shall be entitled to receive a payment of incentive equivalent to 0.03% (zero point zero three percent) of the contract price for each day by which the project completion date precedes the scheduled completion date, but subject to a maximum of 3% (three percent of the contract price). Provided however, that the payment of incentive, if any, shall be made only after the issue of the completion certificate.

Note: Contract price for calculation of above incentive means original cost of work, plus cost of additional and extra items, if any, but excluding price variation/escalations granted, if any.

Clause 3 Risk & Cost Clause:

The Engineer-in-charge or the competent authority defined under rules may without prejudice to his right against the contractor, in respect of any delay or inferior workmanship or otherwise or to any claims for damages in respect of any breaches of the contract and without prejudice to any right or remedies under any of the provisions of this contract or otherwise and whether the date for completion has or has not elapsed by notice in writing absolutely determine the contract in any of the following cases:-

- (i) If the contractor have been given by the Engineer in charge a notice in writing to rectify reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un work man like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter, or if the contractor shall delay or suspend the execution of the work so that either in the judgment of the Engineer in charge (which shall be final and binding), he will be unable to secure completion of the work by the date for completion or he has already failed to complete the work by that date.
- (ii) If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor, shall be appointed or if circumstances shall arise, which entitle the court or creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.
- (iii) If the contractor commits breach of any of the terms and conditions of this contract

(iv) If the contractor commits any acts mentioned in Clause in 19 hereof.

When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer in charge on behalf of the Governor of Rajasthan shall have powers:

- (a) To determine or rescind the contract as aforesaid (of which determination or rescission notice in writing to the contractor under the hand of the Engineer in charge shall be conclusive evidence upon such determination or rescission the earnest money full security deposit of the contract shall be liable to be forfeited and shall be absolutely at the disposal of Government.
- (b) To employ labour paid by the department and to supply material to carry out the work or any part the work debiting the contractor with the cost of the labour and price of the materials (of the amount which cost and price certified by the Engineer in charge shall be final and conclusive against the contractor, and crediting him with the value of the work done in all respect in same manner and at the same rates, as if it had been carried out by the contractor under the terms of this contract The certificate of the divisional officer as to the value of the work done shall be final and conclusive evidence against the contractor provided always that action under the sub clause shall only be taken after giving notice in writing to the contractor Provided also that if the expensed incurred by the department are less than amount payable to the contractor at his agreement rates, the difference shall not be paid to the contractor.
- (c) After giving notice to the contractor to measure up the work of the contractor and to take such part thereof, as shall be unexecuted out of his hands and to give it to another contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him [of the amount of which excess the certificate in writing of the Engineer in charge shall be final and conclusive, shall be borne and paid by the original contractor and may be deducted from any money due to him by the government under this contract or any other account whatsoever or from his earnest money security deposit enlistment security or the proceeds of sales thereof or a sufficient part thereof as the case may be in the event of any one or more of the above courses being adopted by the Engineer in charge the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials of entered in to any engagement or made any advances on account or with a view to the execution of the work or the performance of the contract And, in case action is taken under any of provisions aforesaid the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer in charge has certified, in writing, the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

Clause:4 Contractor remains liable to pay compensation if action not taken under clause 3:

[I] In any case in which any of the powers conferred by clause 3 hereof shall have become exercisable and the same shall have not been exercised, the non-exercise thereof, shall not constitute waiver of any of the conditions hereof and such power shall notwithstanding be exercisable in the event of any future case of default by the contractor for which by any clause or clauses hereof, he is declared liable to pay compensation amounting to the whole of his security deposit / earnest money / enlistment security and the liability of the contractor for past and future compensation shall remain unaffected.

Powers to take possession of or require removal sale of contractor's Plant:

[ii] In the event of the Engineer in Charge putting in force powers vested in him under the preceding clause 3 he may if he so desires take possession of all or any tools plants materials and stores in or upon the works or the site, thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof, paying or

allowing for the same in account at the contract rates or in case of these not being applicable at current market rates to be certified by Chief Engineer or duly authorized Engineer [whose certificate thereof shall be final and conclusive] otherwise the Engineer in charge may by notice in writing to the contractor or his clerk of the works foreman or other authorized agent require him to remove such tools plants materials or stores from the premises [within a time to be specified in such notice]and in the event of the contractor failing to comply with any requisition the Chief Engineer or other duly authorized Engineer may remove them at the contractors expenses sell them by auction or private sale on account of the contractor and at his risk in all respects and the certificate of the Chief Engineer or other duly authorized Engineers as to the expenses of any such removal and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

Clause 5 Extension of time

If the contractor shall desired an extension of time for completion of the work on the ground of his having being unavoidably hindered in its execution or on any other grounds he shall apply in writing to the Engineer in charge within 30 days of the date of the hindrance on account of which he desired such extension as aforesaid and the Authority Competent to the grant extension under the rules /delegations of powers or other duly authorized Engineer shall if in his opinion [which shall be final] reasonable ground shown therefore authorized such extension of time if any as may in his opinion be necessary or proper if the period of completion of contract expires before the expiry of the period of one month provided in this clause the application for extension shall be made before the expiry of the period stipulated for completion of the contract The competent authority shall grant such extension at each such occasion within a period of 30 days of receipt of application from the contractor and shall not wait for finality of work. Such extension shall be granted in accordance with provision under clause [2] of this agreement.

Clauses. 5A: Monthly return for Extra Claim:

Contractor has to submit a return every month for any work claimed as extra The contractor shall deliver the return in the office of the Executive Engineer and obtain, Receipt Number of the Receipt Register of the day on or before 10 day of every month during the continuance of the work covered by this contract, a return showing details of any work claimed as extra by the contractor which value shall be based upon the rates and prices mentioned in the contract or in the Schedule of Rates in force in the district for the time being The contractor shall be deemed to have waived all claims not included in such return and will have no right to enforce any such claim not included, whatsoever be the circumstances.

Clause 6 Final certificate:

On completion of work the contractor shall send a registered notice to the Engineer in charge giving the date of completion and sending a copy of it to the officer excepting the contract on behalf of the Governor and shall request the Engineer in charge to give him a certificate of completion but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the site on which the work shall be executed all scaffolding surplus materials and rubbish and cleared off the dirt from all wood work doors walls floors or other parts of any building in upon or about which the work is to be executed or of which he may have possession for the execution thereof, he had filled up the pits. If the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding surplus materials and rubbish and cleaning off dirt and filling of pits on or before the date fixed for completion of the work the Engineer in charge may at the expenses of the contractor remove such scaffolding surplus materials and the rubbish dispose

of the same as he thinks fit and clean off such dirt and fill the pits as aforesaid and contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such scaffolding or surplus arterial as aforesaid except for any sum actually realized by the sale thereof. On completion the work shall be measured by the Engineer in charge himself or through his subordinates, whose measurements shall be binding and conclusive against the contractor. Provided that if subsequent to taking of measurements by the subordinate as aforesaid the Engineer in charge had reason to believe that the measurement taken by his subordinate are not correct the Engineer in charge shall have the power to cancel the measurement already taken by his subordinate and acknowledged by the contractor and to take measurement again after giving reasonable notice to the contractor as such re-measurements shall be binding on the contractor within thirty days of the receipt of the notice. Engineer in charge shall inspect the work and if there is no visible defect on the face of work shall give the contractor, a certificate of completion. If the Engineer in charge finds that the work has been fully completed it shall be mentioned in the certificate so granted if on the other hand it is found that there are certain visible defects to be removed the certificate to be granted by Engineer in charge shall specifically mention the details of visible defects along with the estimate of the cost for removing these defects. The final certificate of work shall be given after visible defects pointed out as above have been removed (delete whichever is not applicable). (Ten days will apply to works at the headquarters of Engineer-in-charge and thirty days for works at another place).

Clause 7 Payment of intermediate certificate to be re-granted as advance

No payment shall be made for works estimated to cost less than Rupees twenty five thousand till after the whole of the work shall have been completed and a certificate of completion given. But in the case of works estimated to cost more than Rupees twenty five thousand the contractor shall on submitting the bill therefore be entitled to receive a monthly payment proportionate to the part thereof then approved and passed by the Engineer in charge whose certificate of such approval and passing of sum so payable shall be final and conclusive. Running Account Bill shall be paid within 15 days from presentation. But all such intermediated payments shall be regarded as payment by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad unsound and imperfect or unskillful work to be removed and taken away and re-constructed or re-erected or considered as an admission of the due performance of the contract or any part thereof in any respect or the accruing of any claim nor shall it conclude determine or effect in any way the powers of the Engineer in charge under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be made / submitted by the contractor within a one month of the date fixed for completion of the work otherwise the Engineer in charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

Clause 7A: Time limit for payment of Final Bills:

The final bill shall be paid within 3 months on presentation by the contractor after issuance final completion certificate in accordance with clause 6 of the conditions of contract. If there shall be any dispute about any item[s] of the work, Then the undisputed item (s) only shall be paid within the said period of 3 months. If a final bill [which contains no disputed item or disputed amount of any item is not paid within the period of 3 months from presentation of final bill or 6 months from the date of receipt of registered notice regarding completion of work in accordance with clause 6 of the conditions of the contract the defects if any shall be

brought to the notice of the higher authority The period of 3months is shall commence from the date of rectification of the defects. The higher authority shall ensure that in no case final bill should be left unpaid after 9 months from the receipt of registered notice regarding completion of work the contractor shall submit a memorandum of the disputed items along with justification in support within 30 days from the disallowance thereof and if he fails to do so his claims shall be deemed to have been fully waived and absolutely extinguished.

Clause:8 - Bills to be submitted monthly

A bill shall be submitted by the contractor each month on or before the date fixed by the Engineer in charge for all work executed in the previous month and the Engineer in charge shall take or cause to be taken the requisite measurement for the purpose of having the same verified and the claim as far as admissible authorized or paid if possible before the expiry of ten days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid the Engineer in charged may depute a subordinate to measure up the said work in the presence of the contractor whose signature in the measurement book will be sufficient warrant and the Engineer in charge may prepare a bill from such measurement book, which shall be binding on the contractor in all respect.

Clause 8A Contractor to be given time to file objection to the Measurements, recorded by the Department:

Before taking any measurement of any work as have been referred to the preceding clause 6,7&8 the Engineer in charge or a subordinate deputed by him shall give reasonable notice to the contractor. If the contractor fails to be present at the time of taking measurements after such notice or fails to sign or to record the difference within a week from the date of measurement in the manner required by the Engineer in charge then in any such event, the measurement taken by the Engineer in charge or by the subordinate deputed by him, as the case may be shall be final and binding on the contractor and the contractor shall have no right to dispute the same.

Clause 8B - Recovery of cost of preparation the bill:

In case of contractor of Class “A” and “AA” do not submit the bill with in time fixed, the Engineer in charge may prepare the bill as per provision of clause 8 of the condition of contract but deduction @ 0.5% of amount of such a bill shall be made & credited to the general revenue on account of preparation of bill.

Clause 9 - Bills to be on printed from:

The contractor shall submit all bills on the printed forms to be had on application at the office of the Engineer in charge and the charges in the bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions and not mentioned or provided for in the tender at the rates hereinafter provided for such work.

Clause 9A Payments of Contractor's Bills to Banks:

Payments due to the contractor may if so desired by him be made to his Bank instead of direct to him provided that the contractor has furnished to the Engineer in charge [I] an authorization in the form of a legally valid document such as a power of attorney conferring authority on the Bank to receive payments and [ii] his own acceptance of the correctness of the account made out as being due to him by Government or his signature on the bill or other claim preferred against Government before settlement by the Engineer in charge of the account of claim, by payments to the bank while the receipt given by such bank shall constitute a full and sufficient discharge for the payment the contractor should whenever

possible present his bill duly receipted and discharged through his Banker Nothing herein contained shall operate to create in favor of the Bank any rights visa vis the Governor.

Clause 10 Stores supplied by Government

If the specification or estimate of the work provides for the use of any special description of material, to be supplied from Engineer in charge's stores, or if it is required that contractor shall use certain stores to be provided by the Engineer in charge specified in the schedule or memorandum hereto annexed, The contractor shall be bound to procure and shall be supplied such material and stores as are, from time to time, required to be used by him for the purpose of the contract only, and the value of the full quantity of the material & stores, so supplied, at the rates specified in the said schedule or memorandum, may be set off or which may be deducted from any sum, then due or there after become due, to the contractor under the contract or otherwise or against or from the performance guarantee and or security deposit or the proceeds of sale, if the same is held in government securities, the same or a sufficient portion thereof being in this case, sold for this purpose. All materials supplied to the contractor, either from departmental stores or with the assistance of Government, shall remain the absolute property of Government. The contractor shall be the trustee of the stores / materials, so supplied / procured, and these shall not, on any account, be removed from the site of work and shall be, all times, open to inspection by the Engineer in charge. Any such material, unused & in perfectly good condition at the time of completion or determination or rescinding of the contract, shall be returned to the divisional officers stores, if by a notice in writing under his hand, he shall so require, and if on service of such notice, the contractor fails to return the materials, so required, he shall be liable to pay the price of such material in accordance with the provision of clause 10 B in bid. But the contractor shall not be entitled to return any such materials, unless with such consent, and shall have no claim for compensation on account of any such materials. So supplied to him as aforesaid being unused by him, or for any wastage in or damage to any such materials. For the stores returned by the contractor, he shall be paid for, at the price originally charged excluding storage charges, in case of material supplied from departmental stores and actual cost including freight, cartage taxes etc. paid by the contractor, in case of supplies received with the assistance of Government, which, however, should in no case exceed market rate prevailing at the time the materials are taken back. The decision of the Engineer in charge, as to the price of the stores returned, keeping in view its conditions etc, shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall, in addition to the throwing himself open to account for contravention of the terms of the license or permit and /or for criminal breach of trust, pay to the Government, all advantage or profits resulting, or which in the usual course, would result to him by reason of such breach. Provided that the contractor shall, in no case be entitled to any compensation or damage on account of any delay in supply or non-supply thereof, all or any such materials and stores.

Clause 10A - Rejection of materials procured by the Contractor

The Engineer in charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default the Engineer in charge shall be at liberty to employ other person [s] to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials to be substituted thereof and in case of default Engineer in charge may cause the same to be supplied and all costs which may attend such removal and substitution are to be borne by the contractor.

Clause 10B- Penal rate in case of excess consumption:

The contractor shall also be charged for the materials consumed in excess of the requirements calculated on the basis of standard consumption approved by the department at double of the issue rate including storage and supervision charges or market rate whichever is higher. A Material Supply and Consumption Statement in prescribed Form RPWA 35A shall be submitted with every running Account Bill, distinguishing material supplied by the Government and material procured by the contractor himself. The recovery for such material shall be made from Running Account Bill next after the consumption and shall not be deferred. Certificate of such nature shall be given in each Running Account Bill.

Clause 10C - Hire of Plant and Machinery:

Special plant and Machinery required for execution of the work may be issued to the contractor, if available on the rates of hire charges and other terms and conditions as per departmental rules as per schedule annexed to these conditions. Rates of such plant & Machinery shall be got revised periodically so as to bring them at par with market rate.

Clause 11- Works to be executed in accordance with specifications drawing Order etc.

The contractor shall execute the whole and every part of the work in the most substantial and satisfactory manner and both as regards materials and otherwise in every respect in strict accordance with the Specification. The contractor shall also conform exactly fully and faithfully to the design drawings and instructions in writing relating to the work signed by the Engineer in charge and lodged in his office and to which the contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the contractor shall, if he so require, be entitled, at his own expense to make or cause to be made copies of specifications and of all such designs, drawings and instructions as aforesaid. A certificate of executing works as per approved design and specification etc. shall be given on each Running Account Bill.

The specification of work, material, methodology of execution, drawings and designs shall be signed by the Contractor and Executive Engineer while executing agreement and shall form part of agreement.

Clause 12:-

The Engineer in charge shall have power to make any alternations omissions or additions to or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary during the progress of the work and the contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer in charge and such alterations omission additions or substitutions shall not invalidate the contract and any altered additional or substituted shall not invalidate the contract and any altered additional or substituted 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. The time for the completion of the work shall be extended in the proportion that the altered additional or substituted work bears to the original contract work and the certificate of the Engineer in charge shall be conclusive as to such proportion. The rates for such additional altered or substituted work under this clause shall be worked out in accordance with the following provision in their respective order

- [I] If the rates for the additional altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work
- [ii] If the rates for the additional altered or substituted work are not specifically provided in the contract for the work the such rates will be derived from the rates for a similar class of work as are specified in the contract for the work
- [iii] If the rates for the altered, additional or substituted work cannot be determined in the manner specified in the sub clause [I] to [ii] above, then the rates for such composite work item shall be worked out on the basis of the concerned schedule of rates of the District/area specified above minus/plus the percentage which the total tendered amount bears to the estimated cost of the entire work put to tender provided always that if the rate for a particular part of parts of the item is not in the schedule of rates, the rate for such part or parts will be determined by the Engineer in charge on the basis of the prevailing market rates when the work was done .
- [iv] If the rates for the altered, additional or substituted work item cannot be determined in the manner specified in sub clause [i] to [iii] above then the contractor shall within 7 days of the date of receipt of 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 supported by analysis of the rate or rates claimed and the Engineer in charge shall determine the rate or rates on the basis of prevailing market rates, and pay the contractor accordingly. However, the Engineer in charge, by notice in writing, will 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 advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates on items falling under the clause.
- [v] Except in case of items relating to foundation, provisions contained in sub clauses (i) to (iv) above shall not apply to contract or substituted items as individually exceed the percentage set out in the tender documents under clause 12.A.

For the purpose of operation of clause 12 (v) the following works shall be treated as work relating to foundations:-

- [a] For buildings, compound wall, plinth level or 1.2 meters (4feet) above ground level whichever is lower excluding items above flooring and D.P.C. but including base concrete below the floors.
- [b] For abutments, piers, retaining wall of culverts and bridges, walls of the water reservoir and the bed of floor level.
- [c] For retaining walls, where floor levels is not determinate 1.2 meters above the average ground level or bed level.
- [d] For roads, all items of excavation and filling including treatment of sub base and soling work.
- [e] For water supply lines, sewer lines underground' storms drains and similar work, all items of work below ground level except items of pipe work for proper masonry work.
- [f] For open storm water drains, all items of work except lining of drains.
- [g] Any other items of similar nature which Engineer in charge may decide relating to foundation.

The rates of any such work, except the items relating to foundations, which is in excess of the deviation limit shall be determined in accordance with the provision contained in clause 12 A.

Clause 12A

The quantum of additional work for each item shall not exceed 50% of the original quantity given in the agreement and the total value of additional work shall not exceed 20% of the total contract value unless otherwise mutually agreed by the Engineer in charge and the contractor. This limit shall not be applicable on items relating to foundation work which shall be executed as per original rates or provision of clause 12[i] to [iv].

In case of contract substituted items or additional items, which results in exceeding the deviation limit laid down in this clause except items relating to foundation work which the contractor is required to do under clause 12 above the contractor shall within 7 days from the receipt of order claim revision of the rate supported by proper analysis in respect of such items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provision of sub clauses [ii] of clause 12 and the Engineer in charge may revise their rates having regard to the prevailing market rates and the contractor shall be paid in accordance with the rates so fixed. The Engineer in charge shall however be at liberty to cancel his order to carry out such increased quantities of work by giving notice in writing to the contractor and arrange to carry it out in manner as he may consider advisable. But under no circumstance, the contractor shall suspend the work on the plea of non-settlement of rates of items failing under this clause.

All the provisions of the preceding paragraph shall equally apply to decrease in rates of items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such item exist in the tender for the main work or can be derived in accordance with the provisions of sub clause [ii] of the preceding clause 12 and the Engineer in charge may revise such rates having regard to the prevailing market rates unless otherwise mutually agreed by the Engineer in charge and the contractor.

Clause 13: No compensation for alternations in or restriction of work to be Carried out:

- 5 If, at any time after the commencement of the work, the Government shall, for any reason whatsoever not require the whole work, thereof, as specified in the tender, to be carried out the Engineer in charge shall give notice in writing of the fact to the contractor who shall have no claim to any payments or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full which he did not derive in consequences of the full amount of the work not having been carried out. Neither shall he have any claim for compensation by reason of alterations having been made in the original specifications, drawing and design and instructions which shall involve any curtailment of the work as originally contemplated provided that the contractor shall be paid the changes for the cartage only of materials actually brought to the site of the work by him for benefited use and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof and taken them back by the contractor provided however that the Engineer in charge shall have in all such cases the option of taking over all or any such materials at their purchase price or at local market rates whichever may be less in the case of such stores, having been issued from Government stores charges recovered including storage charges shall be refunded after taking into consideration any deduction for claim on account of any deterioration or damage while in the custody of the contractor and in this respect the decision of the Engineer in charge shall be final.

Clause 14: Action and compensation payable in case of bad work:

If it shall appear to the Chief Engineer or any authorized authority or the Engineer in charge or his subordinates in charge of the work or to the committee of retired officer/officers appointed by the State Government for the purpose that any work has been executed with

unsound, imperfect or unskillful workmanship or with material of any inferior description or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted or otherwise not in accordance with contract the contractor shall on demand in writing from the Engineer-in-charge specifying the work/ materials or articles complained of, notwithstanding that the same may have been inadvertently passed certified and paid for will rectify or remove and reconstruct the work so specified in whole or in part as the case may be, remove the materials or articles, so specified and provide other proper and suitable materials or articles at his own cost and in the event of his failing to do so, within a period to be specified by the Engineer in charge in his demand as aforesaid than the contractor shall be liable to pay compensation at the rate of one percent on the tendered amount of work for every week not exceeding ten percent while his failure to do so shall continue and in the case of any such failure the Engineer in charge may rectify or remove and re execute the work or remove and replace with others the materials or articles complained of as the case may be at the risk and expense, in all respects of the contractor

Clause 15 Work to be open to inspection: Contractor or his responsible Agent to be present:

All work under or in course of execution or executed in pursuance of the contract shall at all times be open to inspection and supervision of the Engineer in charge and his superior officer e.g. Superintending Engineer Additional Chief Engineer Chief Technical Engineer, Chief Engineer and his subordinates and any other authorize agency of the Government and the contractor shall at all times during the usual working hours and at all other times at which reasonable notice of the intention of the Engineer in charge or his subordinate and any other authorized agency of Government or committee of retired officer/ officers appointed by the state Government for the purpose to visit the work shall have been given to the contractor either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for the purpose Orders given to the contractors agent shall be considered to have the same force as if they had been given to the contractor himself.

Clause 16: Notice to be given before any work is covered up:

The contractor shall give not less than 7days notice, in writing, to the Engineer-in- charge or his subordinate in charge of the work, before covering up or otherwise placing beyond the reach of measurement. any work in order that the same may be measured and correct dimensions thereof be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Engineer in charge of the work and if any work, shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained the same shall be uncovered at the contractor's expenses or in default, thereof, no payment or allowance shall be made for **such work, or for the materials, with which the same was executed.**

Clause 17 Contractor liable for done and for imperfections:

If the Contractor or his work people or servants shall break deface injure or destroy any part of a building in which they may be working or any building road fence enclosure or cultivated ground contiguous to the premises on which the work or any part of it is being executed or if any damage shall happen to the work while in progress from any cause whatsoever or any imperfections become apparent in it within a period specified in clause 37 after a Certificate final or otherwise of its completion shall have been given by the Engineer in charge may cause the same to be made good by other workmen and deduct the expensed [of which the certificate of the Engineer in charge shall be final] from any sums that may be

then or at any time thereafter may become due to the contractor or from his security deposit or the proceeds of sale thereof or a sufficient portion thereof .

Clause 18 Contractor to supply plant, Ladders, Scaffolding etc.

The contractor shall arrange and supply at his own cost all material (except such special materials, if any, as may in accordance with the contract, be supplied from the Engineer in charge s store] Plants tools appliances implements ladders cordage tackle scaffolding and temporary works requisite or proper for the proper execution of the work whether original altered or substituted and whether included in the specification or other documents forming part of the contract or referred to in these conditions or not or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer in charge as to any matter as to which under these conditions he is entitled to be satisfied or which he is entitled to require together with carriage thereof to and from the work The contractor shall also arrange and supply without charges the requisite number of persons with the means and materials necessary for the purpose of setting out work and counting weighing and assigning in the measurement or examination at any time and from time to time of the work or materials Failing his so doing the same may be provided by the Engineer in charge at the expense of the Contractor and the expenses may be deducted from any money due to the contractor under the contract or from his performance guarantee and/or security deposit or the proceeds of sale thereof or a sufficient portion thereof The contractor shall also provide all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defense of every suit action or other proceeding at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay to pay damages and costs which may be awarded in any such suit action proceeding to any such person or which may with the consent of the contractor, be paid to compromise any claim by any such person

Clause19: Work not to be sublet contract may be rescinded and Security Deposit and Performance forfeited for subletting bribing or if Contractor becomes insolvent

The contract shall not be assigned or sublet without the written approval of the Chief Engineer, and if the contractor shall assign or sublet his contract or attempt so to do or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt so to do or any bribe gratuity gift loan requisite reward or advantage, pecuniary or otherwise, shall either, directly or indirectly, be given promised or offered by the contractor or any of his servants or agents to any public officer or person in the employ of Government, in any way relating to his office or employment or if any such officer or person shall become, in any way, directly or indirectly, interested in the contract the Chief Engineer may, thereupon by notice, in writing, rescind the contract and the Performance Guarantee and Security Deposit of the contractor shall thereupon, stand forfeited and be absolutely at the disposal of Government and the same consequence shall ensue as if the contract has been rescinded under clause 3 here of and in addition the contractor shall not be entitled to recover or paid for any work therefor, actually performed under the contract.

Clause 20: Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss:

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

Clause 21: Changes in Constitution of firm:

Where the contractor is a partnership firm, the previous approval in writing, of the Engineer in charge shall be obtained before any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu Undivided family business concern such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the work there by undertaken by the contractor. If previous approval as aforesaid is not obtained the contract shall be deemed to have been assigned in contravention of clause 19 thereof, and the same action may be taken and the same consequence shall ensue as provided in the said clause 19.

Clause 22 Works to be under Direction of Engineer in charge.

All the works to be executed under the contract shall be executed under the direction and subject to the approval in all respect of the Engineer in charge of the government of Rajasthan for the time being who shall be entitled to direct, at what point or points, and in what manner, they are to be commenced and from time to time carried on.

Clause 23 Standing Committee for Settlement of dispute:

If any question difference or objection whatsoever shall arise in any way, in connection with or arising out of this instrument or the meaning of operation of any part thereof or the rights duties or liabilities of either party then, save in so far as the decision of any such matter as herein before provided for and been so decided such matter constructing a total claim of Rs 50,000/- or above, whether its decision has been otherwise provided for and whether it has been finally decided accordingly, or whether the contract should be terminated or has been rightly terminated and as regards the right or obligations of the parties as the result of such termination, shall be referred for decision to the empowered Standing Committee, which would consist of the following:

- [i] Administrative Secretary concerned,
- [ii] Finance Secretary or his nominee not below the rank of Deputy Secretary and/or Chief Accounts officer.
- [iii] Law Secretary or his nominee, not below the rank of Joint Legal Remembrancer.
- [iv] Chief Engineer cum Add. Secretary of the concerned department.
- [v] Chief Engineer /Addl. Chief Engineer concerned [Member Secretary]

The Engineer in charge on receipt of application along with nonrefundable prescribed fee [the fee would be two percent of the amount in dispute, not exceeding Rs One Lac] from the contractor shall refer the disputes to the committee within a period of **three month** from the date of receipt of application.

Procedure and application for referring cases for settlement by the Standing Committee shall be as given in Form RPWA 90.

(विवाद जिसको निस्तारण हेतु स्टेडिंग कमेटी के समक्ष रखा जाना है, New work process (online) के अन्तर्गत अधिशासी अभियंता के द्वारा कार्य की प्रगति एवं बिल के सत्यापन की दिनांक से 90 दिवस की समय सीमा में इंजिनियर इंचार्ज के समक्ष प्रस्तुत किया जा सकता है।)

Clause 23A- Contractor to indemnify for infringement of patent or Design

Contractor shall fully indemnify the Governor of Rajasthan against any action claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract, in the event of any claims made under or action brought

against Government in respect of any such matters as aforesaid the contractor shall be immediately noticed thereof, and the Contractor shall be at liberty at his own expense to settle any dispute or to conduct any litigation that may arise there from provided in that the contractor shall not be liable to indemnify the Governor of Rajasthan if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer in charge in this behalf

Clause 24 imported store articles to be obtained from Government:

The Contractor shall obtain from the stores of the Engineer in charge all imported store articles which may be required for the work or any part thereof or in making up articles required thereof or in connection therewith unless he has obtained permission in writing from the Engineer in charge to obtain such stores and articles from elsewhere The value of such stores and articles as may be supplied to the contractor by Engineer in charge will be debited to the contractor in his account at the rates shown in schedule attached to the contract and if they are not entered in the schedule, they will be debited at cost price which for the purposes of this contract shall include the cost of carriage and all other expenses whatsoever which shall have been incurred in obtaining delivery of the same at the stores aforesaid plus storage charges.

Clause 25 Lump Sums in estimate:

When the estimate, on which a tender is made, includes lump sums in respect of the parts of work, the contractor shall be entitled to payment in respect of the item of work involved or the part of the work in question at the same rates as are payable under the contract for such items or if the part of the work in question is not in the opinion of the Engineer in charge capable of measurement, the Engineer in charge may at his discretion pay the lump sum amount entered in the estimate and the certificate in writing of the Engineer in charge shall be final and conclusive with regard to any sum or sums payable to him under the provision of this clause.

Clause 26 Action where no specification:

In case of any class of work for which there is no such specification as is mentioned in Rule 1, such work shall be carried out in accordance with the detailed specification of the department and also in accordance with the instructions and requirement of the Engineer in charge.

Clause 27 Definition of work:

The expression "Works" or work" where used in these conditions, shall, unless there become thing either in subject or context repugnant to such construction be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary of permanent and whether original, altered, substituted or additional.

Clause 27A Definition of Engineer in charge

The term "Engineer in charge" means the Divisional officer who shall supervise and be in charge of the work and who shall sign the contract on behalf of the Governor.

Clause 28:

It cannot be guaranteed that the work will be started immediately after the tender have been received No claims for increase of rate will be entertained if the orders for starting work are delayed.

Clause 29: Payments at reduced rates on account of items of work not accepted and no completed to be the discretion of the Engineer in charge

The rates for several items of works, estimates to cost more than Rs 1000/- agreed within, will be valid only when the item concerned is accepted, as having been completed fully in accordance with the sanctioned specification. In cases, where the items of work are not accepted, as so completed, the Engineer in charge may make payment on account of such items, at such reduced rates as he considers reasonable in the preparation of final or on account bills and his decision in the matter shall be final and binding

Clause 29A Payments at part rates:

The rates for several items of work may be paid at part rates provisionally in running bills in proportion to the quantum of items executed at the discretion of Engineer in charge in case of item rates if the rate quoted for certain items are very high in comparison to the average/overall tendered premium then the payment at running stages shall not be made more than the average sanctioned premium, The deterred payment will however be released after successful completion of the work.

Clause 30 Contractor's percentage whether applied to net or gross amount of bills: -

The percentage referred to in the Tender for works will be deducted /added from/to the gross amount of the bill before deducting the value of any stock issued

Clause 31 Contractor to adhere to labour Laws/regulation:-

The contractor shall adhere to the requirements of the Workmen's Compensation Act and Labour Legislation in force from time to time and be responsible for and shall pay any compensation to his workmen which would be payable for injuries under the workmen compensation act, hereinafter called the said act, if such compensation paid by the state as principal employer under sub section [1] of section 12 of the said act, on behalf of the contractor; if shall be recoverable by the state from the contractor under such section (2) of the said section, such compensation shall be recovered in the manner laid down in clause 1 of the conditions of contract.

"Note – All contracts with Govt. shall require registration of workers under the building and other construction workers (Regulation of employment and condition of services) Act, 1996 and extension of benefit to such workers under the act. Definitions of cess at source will be made as per provisions of the said act, in force from time to time."

Clause 32: Withdrawal of work from the contractor.

If the Engineer-in - charge shall at any time and for any reasons ,whatever including in ability to maintain prorate progress, think any portion of the work should not be executed or should be withdrawn from the contractor he may by notice in writing to that effect require the contractor not to execute the portion of the work specified, in the notice or may withdraw from the contractor the portion of work, so specified and the contractor shall not be entitled to any compensation by reason of such portion of work having been withdraw from him. The engineer-in-charge may supplement the work by engaging another agency to execute such portion of the work at the cost of the original contractor without prejudice to his rights under clause 2. He shall also be competent to levy compensation for delay in progress. The recovery of excess cost shall be made from next available running bill or any other claim and shall not be deferred.

Clause 33:

The contractor includes clearance leveling and dressing of site within distance of 15 meters of the building on all sides except where the building adjoins another building.

Clause 34: Protect works:

The contractor shall arrange to protect at his own cost in adequate manner all cut stone work and other work requiring protection and to maintain such protection as long as work is in progress. He shall remove and replace this protection as required by the Engineer in charge from time to time. Any damage to the work so protected no matter how it may be caused shall be made good by the contractor free of cost.

All templates, forms, moulds, Centering, false work and models which in the opinion of the Engineer in charge are necessary for the proper and workman like execution of the work shall be provided by the contractor free of cost.

Clause 35: Contractor liable for settlement of claims caused by his delays

If the progress of the work has fallen so much in arrears as to prevent other contractors on the work, from carrying out their part of the work within the stipulated time, he will be liable for the settlement of any claim put in by any of these contractors for the expenses of keeping their labour unemployed to the extent considered reasonable by the Engineer in charge.

Clause 36A: The liability, if any, on account of quarry fees, royalties, octroi and any other taxes and duties in respect of materials actually consumed on public work, shall be borne by the contractor.

Clause 36B: The cost of all water connections necessary for the execution of work and the cost of water consumed, and hire charges of meters and the cost of electricity consumed in connection with the execution of work, shall be paid by the contractor, except where otherwise specifically indicated

Clause 36C: Payment of GST and any other Taxes.

Royalty or other tax on materials, issued in the process of fulfilling contract payable to the Government under rules in force will be paid by the contractor himself.

Clause 36D: In respect of goods and materials procured by the contractor for use in works under the contract GST will be paid by the contractor himself but in respect of all such goods manufactured and supplied by the contractor and works executed under the contract the responsibility of payment of GST would be that of the Engineer in charge

Clause 36E:

If any rates of Tax are increased or decreased, a new tax is introduced in India only, an existing Tax is abolished, or any change in interpretation or application of any Tax resulting from a change or introduction in India only due to any National or State Statute, Ordinance, Decree or other law or any regulation or bye-law of any local or other duly constituted authority in India only, in the course of performance of contract, which was or will be assessed on the Contractor, in connection with the performance of the Contract, an equitable adjustment of the Contract price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be. However, these adjustments would be restricted to direct transactions between the Owner and Contractor only those items which are included in bid. Further, no adjustment of the Contract Price shall be made on account of variation in deemed export benefits, if any. Any increase or decrease which is included in price variation formula incorporated in the contract shall not be accounted for this purpose. Such increase including GST shall not be made in the extended period of contract for which the contractor alone is responsible for delay as determined by authority for extension of time."

Clause 37: Refund of Performance Security Deposit

Performance Security deposit will be refunded after the expiry of the period as prescribed below

- [a] in case of contracts relating to hiring of trucks and other T&P transportation including the loading unloading of materials, the amount of security deposit is refundable along with the final bill.
- [b] Supplies of material:- As per provision of GF & AR
- [c] Ordinary repairs:- 3 months after completion of the work provided of final bill has been paid
- [d] Original works/ special repair / renewal works: Security deposit will be refunded six months after completion or expiry of one full rainy season, or after expiry of defect liability period, as defined in special conditions of the agreement, whichever is later provided the final bill has been paid.
- [e] In case of PWD original works/special repairs works costing more than Rs 10 lac partial amount of security deposit will be refunded during the defect liability period @10% of SD amount after lapse of one year of completion and thereafter 10% of original amount of SD at the end of each subsequent year. The remaining amount of SD be refunded after the expiry of defect liability period.

Note:- The amendments issued by the F.D. (Financial Rules) in this regard from time to time would be part of this clause and would prevail accordingly.

Clause 38: Fair Wages Clause:

- [a] The contractor shall pay not less than fair wages/minimum wages to laborious engaged by him on the work as revised from time to time by Government but the government shall not be liable to pay anything extra for it except as stipulated price escalation clause [Clause 45] of the agreement.

Explanation: - Fair Wages means minimum wages for time or piece work fixed or revised by the state Government under the Minimum Wages Act 1948.

- [b] The contractor shall notwithstanding the provision of any contract to the contrary cause to be paid fair wages to labour indirectly engaged on the work including any labour engaged by his subcontractors in connection with the said work as if the laborers have been immediately or directly employed by him
- [c] in respect of all laborers immediately or directly employed on the work for the purpose of the contractors part of this agreement the [contractor shall comply with or cause to be complied with the Public Works Department contractor's Labour Regulation made or that may be made by the Government, from time to time in regard to payment of wages, wages period, deductions from wages, recovery of wages not paid, and un authorized deductions maintenance of wages register wage card publication of scale of wages and other terms of employment inspection and submission of periodical returns and other matters of like nature .
- [d] The Engineer in charge shall have the right to deduct from the money due to the contractor any sum required or estimated to be required for making good the loss suffered by a workers or workers, by reasons of nonfulfillment of the conditions of the contract, for the benefit of the worker, or workers nonpayment of wages or of deductions made therefrom which are not justified by the terms of the contract, or as a result of non-observance of the aforesaid regulations.
- [e] Vis-a-vis the Government of Rajasthan the contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub-contractors.

- [f] The regulation aforesaid shall be deemed to be part of this contract and any breach thereof shall be deemed to be breach of the contract

Clause 39 Contractor to engage technical staff:

The contractor shall engage the technical staff as follows on the contract work

- [a] For works costing Rs100 lacs above One Graduate Engineer
- [b] For works costing between Rs 50 lacs to 100 lacs One qualified diploma holder having experience of not less than 3 years.
- [c] For work costing between Rs. 15 lacs and 50 lacs - One qualified diploma holder.

The technical staff should be available at site whenever required by Engineer in charge to take instructions

Clause 39 A:

The contractor shall comply with the provision of the Apprenticeship Act 1961 and the Rules and orders issued thereunder from time to time. If he fails to do so his failure will be a breach of contract The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provision of the said Act

Clause 40 safely code:

The contractor shall follow the safety code of the Department

Clause 41 Near Relative barred from tendering:

The contractor shall not be permitted to tender for works in Circle in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Superintending Engineer and Assistant Engineer [both inclusive] He shall also intimate the names of persons, who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazette officer in the Organization/Department Any breach of this condition by the contractor worked. If such facts are noticed [a] before sanction of tender his offer shall be declared invalid and earnest money shall be forfeited [b] after sanction of the tender then the tender sanctioning authority may at his discretion forfeit his earnest money, performance guarantee security deposit and enlistment deposit and the work/remaining work may allot to any registered contractor on the same rate as per rules

Note: by the term near relative is meant Wife, Husband, Parents and grandparents' children and grandchildren brothers and sisters uncles and cousin and their corresponding in laws

Clause 42 Retired Gazetted Officers barred for 2 years:

No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering Department of the Government of Rajasthan is allowed to work as a contractor for a period of 2 years of his retirement from Government service without the previous permission of Government of Rajasthan The contract is liable to be cancelled, if either the contractor or any of his employee is found at any time to be such a person who had not obtained the permission of Government as aforesaid before submission of the tender or engagement in the contractor's service as the case may be

Clause 43 Quality Control:

The Government shall have right to exercise proper Quality control measures the contractor shall provide all assistance to conduct such tests

Clause 43A

The work [whether fully constructed or not] and all materials, machines tools and plant scaffolding temporary building and other things connected therewith, shall be at the risk of the contractor until the work has been delivered to the Engineer in charge and a certificate from him, to the effect, obtained

Clause 44 Death of Contractor.

Without prejudice to any of the rights or remedies under the contract if the contractor dies the legal heirs of the contractor or the Chief Engineer or duly authorized Engineer shall have the option of terminating the contract without any compensation

Clause 45: Price variation clause:

If during the progress of the contract of value exceeding Rs. 50.00 lac (accepted tendered amount minus cost of material supplied by the department) and where stipulated completion period is more than 3 month (both the conditions should be fulfilled) the price, of any material / bitumen / diesel and petrol incorporated in the works (not being material to be supplied by the department) and / or wages of labour increases or decreases, as compared to the price and / or wages prevailing at **the last date of submission of bids**, the amounts payable to contractors for the work shall be adjusted for increase or decrease in the rates of materials (excepting those materials supplied by the department)/labour / bitumen diesel and petrol/cement/steel.

नोट: मूल्य विचलन की गणनाहेतु इस क्लॉज 45 मेंनीचेदियेगयेसूत्र (A) से (F) तकतथाक्लॉज 45A मेंजोसूत्र दियेगयेहैंउनमेंभीक्लॉज45 एवं 45A मेंकियेगयेउक्तसंशोधनअनुसार**"the last date of submission of bids"** कोआधारतिथिमानतेहुए तदनुरूपहीसंशोधन समझा जाकरमूल्य विचलन की गणना की जावें।

यहआदेशजारीहोने की दिनांक (अर्थात् 05.07.2018) से जोबोलीआमंत्रित करनेवालेनोटिस(NIB) प्रकाशितकिए जायेगे उन सभीउपापनोंपर यहसंशोधितप्रावधानलागूहोंगें।

इस आदेशदिनांक से पूर्वप्रारंभहोचुकीबोली/उपापनोंप्रक्रियाओं एवंअनुबंधोंमेंपूर्व के हीप्रावधानलागूहोंगें।

(उपर्युक्तदियागयानोटदिनांक 05.07.2018 कोजारीआदेशPWF&AR -71/2018 का हीभागहै।कृपयाउक्तआदेश का वित्त विभाग की वेबसाईटपरअवलोकन करे।)

Increase or decrease in the cost of labour / material / bitumen / diesel and petrol shall be calculated quarterly in accordance with the following formula

(A) Labour:

$$V_L = 0.75 \times (P_L/100) \times R \times (L_{L1}-L_{L0})/L_{L0}$$

V_L = Increase or decrease in the cost of work during the quarter under consideration due to change in rates for labour.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of materials supplied by the department and excluding other items as mentioned in this clause.

L_{L0} = The average consumer price index for industrial workers (whole –sale prices) for the quarter in which tenders were opened/ negotiated (as published in Reserve Bank of India Journal/ Labour Bureau Shimla, for the area)

L_{L1} = The average consumer price index for industrial workers (whole –sale prices) for the quarter of calendar year under consideration (as published in Reserve Bank of India Journal/ Labour Bureau Shimla, for the area.)

P_L = Percentage of labour components.'

Note:- in case of revision of minimum wages by the Government or other competent authority, nothing extra would be payable except the price & escalation permissible under this clause.

(B) Material (excluding material supplied by the department):

$$V_M = 0.75 \times (P_M/100) \times R \times (L_{M1}-L_{M0})/L_{M0}$$

V_M = Increase or decrease in the cost during the quarter under consideration due to change in the rates of material.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of materials supplied by the department and excluding other items as mentioned in this clause.

L_{M0} = The average wholesale price index (all commodities) for the quarter in which tenders were opened / negotiated (as published in Reserve Bank of India Journal / Economic Adviser to Government of India, Ministry of Industries, for the area.)

L_{M1} = The average wholesale price index (all commodities) for the quarter under consideration (as published in Reserve Bank of India Journal / Economic Adviser to Government of India, Ministry of Industries, for the area.)

P_M = Percentage of materials component (excluding materials supplied by the department.)

(C) Bitumen.

$$V_b = 0.85 \times (P_b/100) \times R \times \{(B_i - B_o)/B_o\}$$

V_b = Increase or decrease in the cost of the work during the quarter under consideration due to change in rates for Bitumen.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of materials supplied by the department and excluding other items as mentioned in this clause.

B_o = The wholesale price for bitumen on the day of opening of tenders/negotiation by Economic Adviser to Government of India, Ministry of Industry.

B_1 = The average wholesale price index for bitumen for the quarter under consideration as published weekly Economic Adviser to Government of India, Ministry of Industry.

P_b = Percentage of bitumen components excluding bitumen supplied by the department (specified in the sanctioned estimate of the work).

(D) Petroleum:

$$V_F = 0.75 \times (P_F/100) \times R \times (F_1 - F_0)/F_0$$

V_F Increase or decrease in the cost of the work during the quarter under consideration due to changes in the rate for fuel and lubricants.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of materials supplied by the department and excluding other items as mentioned in this clause.

F_0 = The average whole –sale price index of highspeed diesel (HSD) as published by the Economic adviser to Govt. of India, ministry of Industry on the day of opening of tender/ negotiation.

F_1 = The average wholesale price index of H.S.D. for the quarter under consideration as published weekly by the economic adviser to the Government of India, ministry of Industry for the quarter under consideration.

P_F = Percentage of fuel and lubricants component excluding fuel and lubricants supplied by the department (specified in the sanctioned estimate for the work)

R = Total work done during the quarter as prescribed under this clause.

Note: - for application of this clause price of HSD is chosen to indicate fuel and lubricant component.

(E) Cement:

$$V_c = 0.75 \times (P_c/100) \times R \times (L_{c1} - L_{c0})/L_{c0}$$

V_c Increase or decrease in the cost of the work during the quarter under consideration due to changes in the rate for CEMENT.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of materials supplied by the department and excluding other items as mentioned in this clause.

L_{c0} = The average whole –sale price index for the quarter under which tenders were opened / negotiated (as published by the Economic adviser to Govt. of India, ministry of Industries)

L_{c1} = The average wholesale price index for the quarter under consideration (as published by the Economic adviser to Govt. of India, ministry of Industries)

P_C = Percentage of cement components.

(F) STEEL:

$$V_S = 0.75 \times (P_S/100) \times R \times (L_{S1} - L_{S0})/L_{S0}$$

V_S Increase or decrease in the cost of the work during the quarter under consideration due to changes in the rate for STEEL.

R = The value of the work done in rupees during the quarter under consideration excluding the cost of steel supplied by the department and excluding other items as mentioned in this clause.

L_{S0} = The average whole –sale price index for the quarter under which tenders were opened / negotiated (as published by the Economic adviser to Govt. of India, ministry of Industries)

L_{S1} = The average wholesale price index for the quarter under consideration (as published by the Economic adviser to Govt. of India, ministry of Industries)

P_S = Percentage of steel components.

Clause 45A: Price Variation in- installation of elevators, supply/installation of centrally Air Conditioning and Central Evaporating cooling works:

In all cases of contracts for installation of elevators, supply/ installation of central Air Conditioning and Central Evaporating Cooling works, the price quoted shall be based on the Indian electrical and Electronics Manufacturers Association (IEEMA) price variation clause based on the cost of raw materials/ components and labour cost as **on the last date of submission of bids**, and the same is deemed to be related to wholesale price index number of metal products and all India Average consumer price Index number of industrial workers as specified below. In case of any variation in these index numbers, the prices shall be subject to adjustment up or down in accordance with following formula.

नोट: मूल्य विचलन की गणना हेतु इस क्लॉज 45 में नीचे दिये गये सूत्र (A) से (F) तक तथा क्लॉज 45A में जो सूत्र दिये गये हैं उनमें भी क्लॉज 45 एवं 45A में किये गये उक्त संशोधन अनुसार **"the last date of submission of bids"** को आधार तिथि मानते हुए तदनु रूप ही संशोधन समझा जाकर मूल्य विचलन की गणना की जावें।

यह आदेश जारी होने की दिनांक (अर्थात् 05.07.2018) से जो बोली आमंत्रित करने वाले नोटिस (NIB) प्रकाशित किए जायेंगे उन सभी उपापनों पर यह संशोधित प्रावधान लागू होंगे।

इस आदेश दिनांक से पूर्व प्रारंभ हो चुकी बोली / उपापनों प्रक्रियाओं एवं अनुबंधों में पूर्व के ही प्रावधान लागू होंगे।

(उपर्युक्त दिया गया नोट दिनांक 05.07.2018 को जारी आदेश PWF&AR -71/2018 का ही भाग है। कृपया उक्त आदेश का वित्त विभाग की वेबसाइट पर अवलोकन करें।)

$$P = P_0/100 [15+55 (MP/MP_0) + 15 \times W_0 + 15 \times W_0 (1)/ W_0]$$

Where

P = price payable as adjusted in accordance with the above price variation formula.

P_0 = price quoted/ confirmed.

MP = Wholesale price index Number for metal products as published by the office of the Economic Advice Ministry of Industry, Government of India, in their weekly bulletin, Revised Index number of wholesale prices (base: 1981-82=100) for the week ending first Saturday of the relevant calendar month. The relevant month shall be that in which price was offered or negotiated whichever is later.

W_0 = All India Average consumer price Index number for Industrial workers (Base: 1982=100) as published by labour bureaus Ministry of labour Government of India, for relevant calendar month. The relevant month shall be that in which price was offered or negotiated whichever is later.

The above index number MP & W_0 are those published by IEEMA as prevailing on the first working day of the calendar month FOUR months prior to the date tendering.

MP = Wholesale price Index Number of metal products as published by the office of Economic adviser, ministry of Industry, Government of India, in their weekly bulletin revised index number of wholesale price (Base: 1981-82= 100). The applicable wholesale price index number or metal

products as prevailing on 1st Saturday of the month covering the date FOUR months prior to the date of delivery and would be as published by IEEMA.

W.(D) = All India average consumer price index number for industrial workers prevailing for the month covering the date FOUR month prior to the date of delivery of manufactured material and would be as published by IEEMA.

W(I) = All India average consumer price index number for industrial workers (base:1982=100) as published by labour bureau ministry of labour, Government of India. The applicable all India consumer Price Index number of Industrial workers prevailing for the FOUR Months prior to the date of completion of installation/ progress parts of Installation and would be as published by IEEMA. The date of delivery shall be the date on which the manufactured materials are actually supplied at site. The date of completion of installation (or progress part of installation shall be the date on which the work is notified as being completed and is available for inspection/ duly tested. In the absence of such notification, the date of completion is not intimated such completion shall be considered by the Engineer-in-charge which shall be final.

Note- 1 The wholesale price index number for metal products is published weekly by the office of the economic adviser, but if there are any changes, the same are incorporated in the issue appearing in the following week. For the purpose of this price variation clause, the final index figures shall apply.

Note-2 the sole purpose of the above stipulation is to arrive at the entire contract under the various situations. The above stipulation does not indicate any intentions to sell materials under this contract as movables.

Note-3 the indices MP & wo are regularly published by IEEMA in monthly basis price circulars based on information bulletins from the authorities mentioned. These will be used for determining price variation and only IEEMA circulars will be shown as evidence, if required.

General Condition as for admissibility of Escalation

1. The exact percentage of labour/ material [excluding materials to be supplied by the department] / bitumen/diesel and petrol component and labour component for the work shall be approved by the authority while sanctioning the detailed estimates
2. The breakup of components of labour/materials [excluding materials to be supplied by the department] /bitumen/diesel and petrol as indicated in Clause 45 have been pre-determined as below

[a] Labour	27.50%
[b] Material	21.60%
[c] Bitumen	00.00%
[d] Diesel and petrol	10.00%
[e] Cement: -	32.40%
[f] Steel	08.50%
Total	100.00%

- 3 While allowing price escalation the following shall be deducted from the value(R):
 - (a) Cost of material supplied by the department
 - (b) Cost of services rendered as per clause 34
 - [c] Secured Advance/any advance added earlier but deducted now after work is Measured
 - [d] Cost of extra item the rates for which have been worked out based on market rates/mutually agreed rates
- 4 The first statement of escalation shall be prepared at the end of three months in which the work was awarded and the work done from the date of start to the end of this period shall be taken into account for subsequent statement, cost of work done during every quarter shall be taken into account At the completion of work the work done during the last quarter or fraction, thereof shall be taken into account

- 5 For the purpose of reckoning the work done during any period the bills prepared during the period shall be considered the dates of recording measurement in the measurement book by the Assistant Engineer shall be guiding factor to decide the bills relevant to any period. The date of completion as finally recorded by competent authority in the Measurement Book, shall be the criterion
- 6 The index relevant to any quarter, for which such compensation is paid, shall be the arithmetical average of the indices relevant of the calendar month.
- 7 Price adjustment clause shall be applicable only for the work that is carried out within the stipulated time or extension thereof as are not attributable to the contractor
- 8 If during the progress in respect of contract works stipulated to cost Rs 50.00 lacs or less the value of work actually done excluding cost of material supplied by the Department exceeds Rs 50.00 lac and completion period is more than 3 months then escalation would be payable only in respect of value of work in excess over Rs 50.00 lacs from the date of satisfying both the conditions.
- 9 Where originally stipulated period is 3 months or less but actual period of execution exceeds beyond 3 months on account of reasons not attributable to contractor escalation amount would be payable only in respect of extended period if amount of work is more than Rs 50.00 lacs.
- 10 In case the contractor does not make prorate progress in the first-or-another time span and the short fall in progress is covered up by him during subsequent time span within original stipulated period than the price escalation of such work expected to be done in the previous time span shall be notionally given based upon the price index of that quarter in which such work was required to be done.
- 11 No claims for price adjustment other than those provided herein shall be entertained
- 12 If the period of completion including extended period attributable to Government exceeds 3 months but cost does not exceed more than 50.00lacs no escalation is admissible.
- 13 Similarly, if cost of works increases more than Rs 50.00 but completion period including extended period attributable to Government is less than 3 months no escalation is admissible
- 14 No Provisional escalation is payable on the basis of indices of the previous quarter in absence of nonpublication of indices for concerned quarter by the RBI.
- 15 Escalation is always payable quarterly and no provisional escalation is payable monthly or fortnightly.
- 16 In case at the time of executing agreement both the conditions [completion period 12 months and amount of works Rs 50.00 lacs] for admissibility of prices escalation are not fulfilled and subsequently due to additional work and extension of time attributable to Government, both the conditions become fulfilled in that case the escalation shall be payable from the date of satisfying both the conditions and only for work done beyond Rs. 50.00 lacs and in period of work beyond 3 months
- 17 The contractor shall for the purpose of this conditions keep such books of account and other documents as are necessary to show the amount of any increase climbed or reduction available and shall allow inspection of the same by a duly authorized representative of Government and further shall at the request of the Engineer in charge furnishes verified in such a manner as the Engineer in charge may require any documents so kept and such other information as the Engineer in charge may require.
- 18 Price variation clause shall be applicable in case of lump sum contracts estimated to more than Rs. 100 crores with stipulated completion period of more than 15 months.\
- 19 The component of operation and maintenance (O&M) cost included in the contract price shall not be subject to price variations. The price may be adjusted by the use of prescribed formula (or formulae) which breaks down the total price into components.
- 20 The amount of price variation in case of lump sum contracts will be made by adding of deducting, as case may be, from the payment made at the stage of work specified in the contract document.

Clause 46: Force Majeure:

Neither party shall be liable to each other for any loss or damages occasioned by or arising out of acts of God such as unprecedented floods volcanic eruptions earthquake or other invasion of nature and other acts.

Clause 47: General Discrepancies and Errors:

In case of percentage rate tenders, if there is any typographical or clerical error in the rates shown by the Department in the G -Schedule the rates as given in the Basic Schedule of Rates of the department for the area shall be taken as correct

Clause 48: Post payment Audit & Technical Examination:

The Government shall have right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers abstract etc to be made within 2 year after payment of the final bills and if as a result of such audit and technical examination any sum is found to have been over paid in respect of any work done by the contractor under the contract or any work claimed by him to have been done by him under the contract and found not to have been executed or executed below specification the contractor shall be liable to refund the amount of over payment and it shall be lawful for department to recover the same from him in the manner prescribed in clause 50 or in any other manner legally permissible, and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it the amount of such under payment shall be duly paid by the Government to the contractor.

Clause 48A: Pre-Check or post check of bills.

The Government shall have right to provide a system of pre check of contractors bills by a specified Organization, and payment by an Engineer or an Account Officer/Sr Account Officer /Chief Account Officer/Financial Advisor, as the Government may in its absolute discretion prescribe Any overpayments / excess payment detected as a result of such pre check or post check of contractor's bills can be recovered from the contractors bills in the manner herein before provided and the contractor will refund such over/excess payments

Clause 48B: Check Measurements:

The department reserves to itself the right to prescribe a scale of check measurement of work in general or specific scale for specific works, or by other special orders (about which the decision of the department shall be final) checking of measurement by superior officer shall supersede measurements by the subordinate officer and the former will become the basis of the payment Any over/excess payment detected as a result of such check measurement of otherwise at any stage up to the date of completion and the defect removal period specified elsewhere in this contract shall be recoverable from the contractor as any other dues payable to the Government.

Clause 49: Dismantled Materials

The contractor, in course of the work, should understand that all materials e.g. stone bricks steel other materials obtainable in the work by dismantling etc will be considered as the property of the Government and will be disposed off to the best advantage of the Government as per directions of the Engineer-in-charge

Clause 50: Recovery from contractors

Whenever any claim against the contractor for the payment of a sum of money arises out of or under the contract the Department shall be entitled to recover such sum by appropriating, in part or whole of the performance Guarantee and /or Security Deposit security Deposit at the time of enlistment of the contractor in the event of the security being insufficient or if no security has been taken then the balance or the total sum recoverable as the case may be shall be deducted from any sum then due or which at any time thereafter may become due to the contractor under this or any other contract with the Governor of Rajasthan Should this sum

be not sufficient to cover the full amount recoverable, the contractor shall pay to the Department on demand the balance remaining dues

The department shall further have the right to affect such recoveries under public Demands Recovery Act.

Clause 51: Jurisdiction of Court:

In the event of any dispute arising between the parties here to, in respect of any of the matters comprised in this agreement the same shall be settled by a competent Court having jurisdiction over the place where agreement is executed and by no other court after completion of proceedings under clause 23 of this contract.

**Schedule of Materials to be supplied by the Department, if available
(Referred to in Clause 10)**

S.No.	Particulars	Quantity	Rates		Place of Delivery
			Unit	Rupees	

Schedule of Machinery/T & P to be supplied by the Department

The following Machinery/T & P shall be supplied by the Department, if available, to the Contractor, on hire as per "Rules of the Department for supply for machinery and T & P to the Contractors on hire" (Referred to in Clause 10 C)

S.No.	Item	Rate	Place of Delivery and Return

Progress statement referred to in clause 2 of conditions of contract.

Name of Work	Date from which the work should be commenced.	Date by which the work should be completed.	Monthly rate of progress.
1	2	3	4

The contractor has been informed that his tender has been accepted.

Signature of Engineer-in-charge

Dated:-

Signature of Contractor

Dated:-

NOTES:- FOR FILLING IN THE PROGRESS STATEMENT FROM

1. Columns 2,3 and 4 must be initialed and dated by the contractor.
2. Column 4 must be initialed and dated by the chief Engineer or other duly authorized Engineer also.
3. The date in column 2 should correspond to the date on which the order to commence work TS given to contractor read with Clause 2 of the conditions of Contract."
4. The date in column 3 must correspond to the period stated in sub clause [e] of the Memorandum below Tender for works
5. Column 4 This will ordinarily be worked out proportionately thus if Rs 24000/- is the cost of the whole or portion of work tendered for and six months period of completion then the monthly rate of progress should be Rs 4000/- if necessary, quantities may also be specified in this column at the discretion of the chief Engineer
6. The certificate as to intimation of acceptance of tender printed at the foot of the form, must be signed and dated both by the chief Engineer or other duly authorized Engineer and the Contractor

Progress Statement referred to in Clause 2 of Conditions of Contract

Name of Work	Date from which the work should be commenced	Date by which the work should be completed	Monthly rate of Progress

The Contractor has been informed that his tender has been accepted.

Date Signature of Engineer-in-charge Date Signature of Contractor

For Filling in the Progress Statement Form

1. Columns 2, 3 and 4 must be initiated and dated by the Contractor.
2. Column 4 must be initiated and dated by the Chief Engineer or other duly authorized Engineer also.
3. The date in column 2 should correspond to the date on which the order to commence work is given to the contractor read with Clause 2 of the conditions of contract.
4. The date in column 3 must correspond to the period state in Sub Clause (e) of the Memorandum below "Tender for works".
5. Column 4. This will ordinarily be worked out proportionately; thus if Rs. 25000/- is the cost of the whole or portion of work tendered for, and 6 months period of completion, then the monthly rate of progress should be Rs. 4,000/-. If necessary, quantities may also be specified in this column at the discretion of the Chief Engineer.
6. The Certificate as to intimation of acceptance of tender printed at the foot of the form, must be signed and dated both by the Chief Engineer or other duly authorized Engineer and the Contractor.

ANNEXURE TO APPENDIX XI
RAJASTHAN PUBLIC WORKS DEPARTMENT CONTRACTORS
LABOUR REGULATIONS

1. **Short title:** These regulations may be called "The Rajasthan Public Works Department Contractor's-Labour Regulations."
2. **Definition:** These regulations unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say :-
 - (i) **"Labour"** means a minimum worker employed by a Rajasthan P.W. Department contractor directly or indirectly through a sub-contractor or other person or by an agent on his behalf.
 - (ii) **"Fair Wage"** means minimum wages for time or piece work fixed or revised by the State Government under the Minimum Wages Act, 1948,
 - (iii) **"Contractor"** shall include every person whether sub-contractor or headman or Agent employing labour on the work taken on contract.
 - (iv) **"Wages"** shall have the same meaning as defined in the Payment of Wages Act and includes time and piece rate wages.
3. **Display of Notice regarding wages etc. :** The contractor shall
 - (a) before he commences his work on contract, display and correctly maintain and continue to display and in conspicuous places on the work notices in English and the correctly maintain in Hindi by the majority of the workers giving the rate of wages which have been certified by the Executive Engineer-, the Superintending Engineer, the Chief Engineer or Labour Commissioner, as fair wages and the hours of works for which such wages are earned, and
 - (b) send a copy of such notices to the Certifying Officers.
4. **Payment of Wages:**
 - (i) Wages due to every worker shall be paid to him direct.
 - (ii) All wages shall be paid in current coin or currency or in both.
5. **Fixation of wage periods:**
 - (i) The contractor shall fix the wage periods in respect of which the wages shall be payable.
 - (ii) No wage period shall exceed one month.
 - (iii) Wages of every workman employed on the contract shall be paid before the expiry of ten days after the last day of the wage period in respect of which the wages are payable.
 - (iv) When the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.
 - (v) All payments of the wages shall be made on a working day except when the work is completed before the expiry of the wage period, in which case, final payments shall be made within 48 hours of the last working day.

Note: The term "working day" means a day on which the labour is employed in progress.

6. Wage Book and Wage Slips etc.

- (i) The Contractor shall maintain a Wage Book of each worker in such form as may be convenient but the same shall include the following particulars :-
 - (a) Rate of daily or monthly wages.
 - (b) Nature of work on which employed.
 - (c) Total number of days worked during each wage period.
 - (d) Total amount payable for the work during each wage period.
 - (e) All deductions made' *from the* wages with an indication in each case of the ground for which the deduction is made.
 - (f) Wages actually paid for each wage period.
- (ii) The contractor shall also maintain a wage slip for each worker employed on the work.
- (iii) The Executive Engineer may grant an exemption from the maintenance of the wage books and wages slips to a contractor who, in his opinion, may not directly or indirectly employ more than 50 persons on the work.

7. Fines and deductions which may be made from wages :-

- (i) The wages of a worker shall be paid to him without any deductions of any kind except those authorized, namely the following:-
 - (a) Fines.
 - (b) Deductions for absence from duty i.e. from the place or places where, by the terms of his employment, he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
 - (c) Deductions for damages to or loss of goods expressly entrusted to the employed person for custody or for loss or any other deductions of money, which he is required to account where such damages or losses are directly attributable to his neglect or default.
 - (i-a) The Rajasthan Government may, from' time to time, allow deductions other than those specified in clause I above.
- (ii) No fines shall be imposed on a worker and no deductions for damage or loss shall be made until worker has been given an opportunity of showing cause against each fine or deductions.
- (iii) The total amount of fines which may be imposed in anyone wage period on a worker, shall not exceed an amount equal to three paisa in rupee of the wage payable to him in respect of that wage period.
- (iv) No fine imposed on any worker shall be recovered from him by installments or after the expiry of 60 days from the date on which it was imposed.

8. Register of fines etc. : The contractor shall maintain a register of fines and of all deductions for damage or loss. Such register shall mention the reasons for which fine was imposed or deduction for damage or loss was made.

The Contractor shall maintain both in English and local Indian Language, a list approved by the Labour Commissioner clearly stating the acts and omission for which penalty of fine may be imposed on a workman and display it in a good condition in a conspicuous place of the work.

9. Preservation of Register: The wage register, the wage card and the register fines deductions required to be maintained under these regulations, shall be preserved for 6 months after the date of the 1st entry made in them.

10. Powers of Labour Welfare Officer to make investigation of enquiry: The Labour Welfare Officer or any other person, authorized by the State Government on their

behalf, shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and provisions of the regulations. He shall investigate into any complaint regarding default made by the Contractor or Sub-Contractor in regard to such provisions.

11. **Report of Labour Welfare Officer:** The Labour Welfare Officer or other person, authorized as aforesaid, shall submit a report of the result of his investigation or enquiry to the Executive Engineer concerned indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractors bill be made and the wage and other dues be paid to the labour concerned. In case an appeal is made by contractor under clause 12 of these regulations, actual payment to Labors will be made by the Executive Engineer after the Labour Commissioner had given decision on Such appeal.
12. **Appeal against the decision of Labour Welfare Officers:** Any person aggrieved by the decision and recommendation of the Labour Welfare Officer or other persons, so authorized, may appeal against such decision to the Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to Executive Engineer concerned but subject to such appeal the decision of the Officer shall be final and binding upon the contractor.
- 12-A No party shall be allowed to be represented by a lawyer during any investigation, enquiry, appeal or any other proceedings.
13. **Inspection of Wage Books and Slips:** The Contractor shall allow inspection of the wage books and wage slips and register of fines and deductions to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Welfare Officer or any other person authorized by the State Government on his behalf.
14. **Submission of Returns:** The Contractor shall submit periodical returns, as may be specified from time to time.
15. **Amendments:** The State Government may, from time to time, add to or amend these regulations and on any questions as to the application, interpretational effect of these regulations, the decision of the Labour Commissioner to the Government of Rajasthan or any other person authorized by the State Government in that behalf, shall be final.

SAFETY CODE

SAFETY CODE:

- (i) Suitable scaffolds should be provided for workman for all works that cannot safely be done from the ground or from solid construction except such short period works as can be done safely from ladders. When a ladder is used an extra Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable foot holds and hand holds shall be provided on the ladder and the ladder shall be given inclination not steeper than 1/4.
- (ii) Scaffolding or staging more than (4M) above the ground or floor, swung or suspended from an overhead support or created with stationery support shall have guard rails properly attached, bolted braced and otherwise secured at least (1M) high above the floor of platform of such scaffolding or staging and extending along the entire length of the outside the ends thereof with only such opening as may be necessary for the delivery of the materials. Such scaffolding or staging shall be fastened as to prevent if swaying from the building or structure.
- (iii) Working platform, Gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform of Gangway or the stairway is more than 4 M above ground level of floor level, they should be closely boarded, should have adequate width and should be suitably fenced, as described in (ii) above.
- (iv) Every opening in the floor of building or in working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 Meter.
- (v) Safe means of accesses shall be provided to all working platform and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10 M in length, while the width between side rails in rung ladder shall be in no case be less than 30 cms, for ladder and including 3 m in length. For longer ladders this width should be increased at least 6 mm for each additional 30 cms of length, uniforms step spacing shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall also provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit action or other proceedings in law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay and damages and costs which may be awarded in any such suit, action or proceeding to any such person or which may with the consent of the contractor be paid to compromise any claims by any such reason.
- (vi) **EXCAVATION AND TRENCHING**
All trenches, 1.2 m or more in depth shall at all times be supplied with at least one ladder for each 30 m in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 1.0 meter above the surface of the ground. The sides of the trenches which are 1.5 m or more in depth shall stepped back to give suitable slopes or securely held by timber bracing so as to avoid the danger of sides to collapse. The excavated materials shall not be placed with 1.5 m of the edge of the trench or half of the depth of the trench whichever is more. Cutting shall be done, from top to bottom. Under no circumstance undermining or under cutting shall be done.
- (vii) **DEMOLITION**
Before any demolition work is commenced and also during the process of the work:
 - (a) All roads and open areas adjacent to the work site shall either be closed or suitable protected.
 - (b) No electric cable or apparatus, which is liable to be a source of danger over a cable or apparatus used by the operator, shall remain electrically charged.
 - (c) All practical steps shall be taken to prevent any danger to persons employed from risk of fire or explosion, flooding. No floor, roof or other part of the building shall be so over-loaded with debris materials as to render it unsafe.

- (viii) All necessary personal safety equipment as considered adequate by the Engineer-in-charge should be kept available for the use of persons employed on the site and maintained in condition suitable for immediate use; and the contractor should take adequate steps to ensure proper use of equipment by those concerned.
 - (a) Workers employed on mixing Asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
 - (b) Those engaged in white washing and mixing or stacking of cement bags or any material, which is injurious to the eye, shall be provided with protective goggles.
 - (c) Those engaged in welding works shall be provided with welder's protective eye shields.
 - (d) Stone beakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
 - (e) When workers are employed in sewers and Manholes, which are in use, the contractor shall ensure that the Manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the Manholes, and the Manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.
- (f) The contractor shall not employ any man below the age of 18 and women on the work of painting with products containing leads in any form. Whenever men above the age of 18 and employed on the work of lead painting the following precautions should be taken:
 - (i) No paint containing lead or lead products shall be used except in the form of paste or ready-made paint.
 - (ii) Suitable facemasks should be supplied for use by workers, when paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.
 - (iii) Overalls shall be supplied by the contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on cessation work.
- (ix) When the work is done near any place where there is risk of drowning all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions should be made for prompt First Aid treatment of all injuries likely to be sustained during the course of the work.
- (x) Use of hoisting machines and tackle including the attachments, anchorage and supports shall conform to the following standards or conditions.
 - 1 (a) These shall be of good mechanical construction sound material and adequate strength, and free from patent defect and shall be kept in good repair and in good working order.
 - (b) Every rope used in hoisting or lowering materials, or as means of suspension shall be of durable quality and adequate strength, and free from patent defects.
 - 2. Every crane driver or hoisting appliances operator shall be properly qualified and no person under an age of 21 years should be in charge of any hoisting machine including and scaffold which or give signals to be the operators.
 - 3. In case of every hoisting machine and of every chain ring, hook, shackle swivel and pull block used in hoisting or lowering as means of suspensions the safe working load shall be ascertained by adequate means.
 - 4. In case of departmental machines the safe working load shall be notified by the Electrical Engineer-in-charge. As regards contractor's machines, the contractor shall notify the safe working load of the machine to Engineer-in-charge, whenever he brings any machinery to site of works and get it verified by the electrical engineer concerned.
- (xi) Motors, Gearing Transmission, Electric Wiring or other dangerous parts of hoisting appliance should be provided with efficient safe guards, hoisting appliance should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum, the risk of fall of suspended load becoming accidentally displaced. When workers are employed in electrical installation, which are already energized insulating mats, wearing apparel such as gloves, sleeves and boots as

- may be necessary should be provided. The workers should not wear any rings, watches and carry keys or other material, which are good conductor of electricity.
- (xii) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near place of work.
 - (xiii) These safety provisions should be brought to notice of all concerned by display on a notice board at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named therein by the contractor.
 - (xiv) To ensure effective enforcement of the rule and regulations relating to safety precautions the arrangements made by the contractor shall be opened to inspection by the Labour Officer, Engineer-in-charge of the department or their representatives.
Notwithstanding the above clause(i) to (xiv), there is nothing in these to exempt the contractor to exercises exclude the operations of any other Act of rule in force in the Republic of India.
 - (xv) In respect of all the labours directly or indirectly employed in the work for the performance of the contractors part of this Agreement, the contractor shall at his own expenses arrange for the safety provision as per C.P.W.D. safety code framed from time to time and shall at his own expense provide for all facilities as aforesaid, he shall be liable to pay a penalty of Rs. 50/- for each default in addition, the Engineer-in-charge shall be at liberty to make and recover the costs incurred in that behalf from the contractor.

5 No. 1 LIABILITY FOR ACCIDENTS TO PERSON

- (A) The contractor shall be deemed to have indemnified and saved harmless the Government against all action, suits, claims, demands, costs etc. arising in connection with injuries suffered by any persons employed by the contractor or his subcontractor for the works whether under the General law or under workman's compensation Act, or any other statute in force at the time of dealing with the question of the liability of employees for the injuries suffered by employees and to have taken steps properly to ensure against any claim there under.
- (B) On the occurrence of an accident which results in the death of the workmen employed by the contractor or which is so serious as is likely to result in the death of any such workmen, the contractor shall within 24 hours of happening of such accident intimate in writing to the Engineer of the facts of such accidents. The contractor shall indemnify Government against all loss or damage sustained by the Government resulting directly from or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by Government as a consequence of Governments failure to give notice under the workmen's Compensation Act or otherwise to conform to the provisions of the said Act in regard to such accident.
- (C) In the event of any claim being made, or action brought against the Government involving the contractor and arising out of the matter referred to and in respect of which the contractor is liable under this clause the contractor shall be immediately notified thereof, and he shall with the assistance if he so required of the government but at the sole expense of the contractor conduct all negotiations for the settlement of the same or of any litigation that may arise there from. In such cases the Government shall at the expense of the contractor afford all available assistance for any such purposes. Furthermore, the Engineer shall have the right to pay or to defend or to compromise any claim which may be made against the Government or in case of threatened legal proceedings or in anticipation of legal proceedings being instituted is liable to take such steps as he may consider necessary or desirable to ward off or mitigate the effect of such proceedings and to recover the contractor all sums and expenses, the Engineer may incur and pay in this behalf, provided that the Engineer shall before taking any action as aforesaid give to the contractor a notice in writing of the action proposed to be taken by him and in case the Engineer proposed to pay or Compromise effected without the consent of the contractor except when the claim does not exceed a sum of Rs. 10,000/- and the payment or the compromise is sanctioned by the government.

- (D) In the event of an accident on the work under this contract in respect of which compensation become payable under workmen's Compensation Act whether by the contractor or by the government as principle, it shall be lawful for the Engineer to retain, out of the money's due and payable to contractor such sum or sums of money as may be sufficient to meet such liability.

No. 2 LIABILITY FOR DAMAGE TO WORKS OR PLANT:

- (a) The contractor shall during progress of the work properly cover up and protect the work, and plant and material places at his disposal or acquired for him by the government from injury by exposure to the weather and shall take every reasonable proper, timely and useful precaution against accident or injury to the same from any cause and shall be and remain answerable and liable for all accidents or injuries there to, which, until the same be or be deemed to be taken by the Government may arise or be occasioned by the acts or omissions of the contractor or his workman or sub-contractor and all losses and damages to the works or such plants of material arising from such accidents or injuries as aforesaid shall be made good in the most complete and substantial manner by and the sole cost of the contractor and to the reasonable satisfaction of the Engineer.
- (b) Further the contractor shall, at all times, protect and prevent and materials, plants and equipment that he may himself have procured for the execution of the work. All reasonable requests of the Engineer to enclose or specially protect any of the above shall be expeditiously complied with.
- (c) If the Engineer considers that the work or material or plant is not sufficiently protected by the contractor he shall be entitled to arrange for reasonable precautions and recover the cost thereof from the contractor.
- (d) Until the work shall be or deemed to be taken over as aforesaid, the contractor shall also be liable for and shall be deemed to have indemnified the government in respect of all damage or injury to any person or any property of the Government or of other occasioned by the negligence of the contractor or his workmen or his sub-contractor shall not be liable under the contract for any loss or damage or injury caused by or arising from the acts of the Government or of others due to the circumstances over which the contractor has no control nor shall his total liability for loss, damage or injury exceed the total value of the contract.

No. 3 THE CONTRACTOR TO SUPPLY AND BE RESPONSIBLE FOR THE SUFFICIENCY OF THE MEANS EMPLOYED

The contractor shall supply and take upon himself the entire responsibility of the sufficiency of the scaffolding, timbering, Machinery, tools implements and generally of all means used for the fulfillment of this contract whether such means may or may not approved of or recommended by the Engineer and the contractor must accept all risks of accidents or damages from whatever cause they may arise, except where otherwise provided in this contract, until the completion of this contract.

No. 4 COMPENSATION AND PENALTY

All sums recovered from the contractor by way of penalty under any of the conditions of this contract shall be considered as a reasonable compensation to be applied to the use of the Government without reference in the actual loss or damage sustained, and whether any damage has or has not been sustained.

FAIR - WAGE CLAUSE

1. SHORT TITLE

These regulations may be called the Rajasthan Public Works department contractor Labour Regulation.

2. DEFINITION

In these regulations unless otherwise expressed or indicated the following words and expressions shall have the meaning hereby assigned to them respectively that is to say:

- (a) Labour Means workers employed by a Rajasthan Irrigation Department contractor directly or indirectly through a sub contractor or other person or by an agent on his behalf.
- (b) Fair wages means minimum wages for time or piece works fixed or revised by the State Government under the Minimum Wages Act 1948.
- (c) Contractor shall include every person whether a subcontractor or head man or agent employing labour on the work taken on contract.
- (d) Wages shall have the same meaning as defined in the payment of wages Act and includes time and piece rate wages.

3. DISPLAY OF NOTICE REGARDING WAGES ETC.

- 6 The contractor shall (a) before he commences his work on contract display and correctly maintain and continue to display in conspicuous places on the work notices in English and correctly maintain in Hindi by the majority of the workers giving the rate of wages which have been certified by the Executive Engineer, the Superintending Engineer, the Chief Engineer or Labour Commissioner, as fair wages and the hours of works for which such wages are earned, and (b) send copy of such notices to the Certifying Officers.

4. PAYMENT OF WAGES

- i. Due wages of every worker shall be paid to him directly.
- ii. All wages shall be paid in current coin or currency or in both.

5. FIXATION OF WAGE PERIODS

- (i) The contractor shall fix the wages period in respect of which the wages shall be payable.
- (ii) No wage periods shall exceed one month.
- (iii) Wages of every workman employed on the contract shall be paid before the expiry of ten days after last day of the wage period in respect of which the wages are payable.
- (iv) When the employment of any worker is terminated by or on behalf of the contractor the wage earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.
- (v) All payment of the wages shall be made on a working day except when the work is completed before the expiry of the wage period in which case final payments shall be made within 48 hours of the last working day.

Note: The term working day mean a day on which the labour is employed in progress.

6. WAGE BOOK AND WAGE SLIPS ETC.

- 1. The contractor shall maintain a wage book of each worker in such form as may be convenient but the same shall include the following particulars:
 - (a) Rate of daily or monthly wage.
 - (b) Nature of work on which employed.
 - (c) Total number of days worked during each wage period.
 - (d) Total amount payment for the work during each wage period.
 - (e) All deductions made from the wages with an indication in each case of the ground for which the deduction is made.
 - (f) Wages actually paid for each wage period.

7. FINES AND DEDUCTIONS, WHICH MAY BE MADE FROM WAGES

The wages of a worker shall be paid to him without any deduction of any kind except those authorised namely the following:

Fines.

Deductions for absence from duty i.e. from the place or places where by the terms of his employment he is required to work. The amount to deductions shall be in proportion to the period for which he was absent.

Deductions for damages to or loss of goods expressly entrusted to the employed person for custody or for loss or any other deduction of money which he is required to account where such damages or losses are directly attributed to his neglect or default.

The Rajasthan Government may from time to time allow deductions other than these specified in clause 1 above.

No fines shall be imposed on a worker and no deductions for damages or loss shall be made until worker has been given an opportunity of showing cause against each fine or deduction.

The total amount of fines which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in rupees of the wage payable to him in respect of that wage period.

No fine imposed on any worker shall be recovered from him by installments or after the expiry of 60 days from the date on which it was imposed.

8. REGISTER OF FINES ETC.

The contractor shall maintain a register of fines and of all deductions for damage or loss. Such register shall mention the reason for which fine was imposed or deduction for damage or loss was made.

"The contractor shall maintain both in English and local Indian language, a list approved by the Labour commissioner clearly stating the acts and omission for which penalty of fine may be imposed on a workmen place and display it in a good condition in a conspicuous place on the work."

9. PRESERVATION OF REGISTER

The wage register, the wage card and the register of fines deductions required to be maintained under these regulations shall be preserved for 12 months after the date of the last entry made in them.

10. POWER OF LABOUR WELFARE OFFICERS TO MAKE INVESTIGATION OF ENQUIRY.

The Labour Welfare Officer or any other person authorised by the State Government on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and provisions of the regulations. He shall investigate into any complaint regarding default made by the contractor or subcontractor in regard to such provisions.

11. REPORT OF LABOUR WELFARE OFFICER

The Labour Welfare Officer or other person authorised as aforesaid shall submit a report of the result of his investigations or enquiries to the Executive Engineer concerned indicating the extent if any to which the default has been committed with a note that necessary deductions from the contractor's will be made and the wage and other dues to be paid to the labour concerned. In case an appeal is made by the contractor under clause 12 of these regulations, actual payment to labourers be made by the Executive Engineer after the Labour Commissioner has given decision on such appeal.

12. APPEAL AGAINST THE DECISION OF LABOUR WELFARE OFFICER

Any person aggrieved by the decision and recommendation of the Labour Welfare Officer or other persons so authorised may appeal against such decision to the Labour Commissioner with 30 days from the date of decision forwarding simultaneously a copy of his appeal to Executive Engineer concerned but subject to such appeal the decision of the officer shall be final and binding upon the contractor.

- 12 A.** No party shall be allowed to represent by a lawyer during any investigation, enquiry, appeal or any other proceedings.
- 13. INSPECTION OF WAGE BOOKS AND SLIPS**
The contractor shall allow inspection of the wage book and wage slips and register of fines and deductions to any of his workers or to his agent at a convenient time and place after due notice is received or to the labour Welfare Officer or any other person authorised by the State Government on his behalf.
- 14. SUBMISSION OF RETURNS**
The contractor shall submit periodical returns as may be specified from time to time.
- 15. AMENDMENTS**
The State Government may from time to time add to or amend these regulations and on any question as to the application, interpretation effect of these regulations the decision of the Labour Commissioner to the Government of Rajasthan or any other person authorised by the State Government in that behalf shall be final.

**SCHEDULE OF FAIR WAGE TO BE GIVEN BY EXECUTIVE
ENGINEER
LIST OF ACTS AND COMMISSION FOR WHICH FINE CAN BE
IMPOSED**

1. Willful insubordination or disobedience whether alone or in combination with another.
2. The fraud or dishonesty in connection with the contractor's business or property of the Rajasthan W.R.D.
3. Taking or giving bribes or any illegal gratification.
4. Habitual late attendance.
5. Drunkenness; fighting, riot or disorderly or indecent behavior.
6. Habitual negligence.
7. Smoking near or around the area where combustible or other materials are stocked.
8. Habitual indiscipline.
9. Causing damage work in progress or to property of the Rajasthan W.R.D. or the contractor.
10. Sleeping on duty.
11. Malingering or sowing down work.
12. Giving of false information regarding name, age, father's name.
13. Habitual loss of wage cards supplied by the employers.
14. Unauthorized use of employer's property or manufacturing or making of unauthorized articles at the work places.
15. Bad workmanship in construction and maintenance by skilled workers which is not approved by the department and for which contractors are compelled to undertake rectification.
16. Making false complaints and/or misleading statement.
17. Engaging, in trade within the premises of the establishment.
18. Any delinquency of business affairs of the employers.
19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the employer.
20. Holding meeting inside the premises without previous sanction of the employer.
21. Threatening or intimidating any workman or employee during the working hours within the premises.

TIME SCHEDULE

The time allowed to complete the work **24 months** including rainy season and canal regulation period from the date of commencement as defined in clause 2 of conditions of the contract and the time of schedule is also defined in clause-2 of the General conditions of the contract.

SECTION VIB

Special Conditions of Contract

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS:

PREAMBLE

These Special Conditions of Contract augment the Conditions of Contract as included in Schedule A-2, stipulating further details to certain clauses or adding additional clauses as considered useful or required to explicitly define certain Contract conditions under this Contract.

The Special Conditions are linked to the general Conditions of Contract by the corresponding numbering of sub-clauses to the clauses to which the Special Conditions refer. The Special Conditions also contain additional clauses which continue the numbering of clauses from the end of the Conditions of Contract.

The Contractor shall be deemed to have included in his tender for complying in full also with the terms and requirements of these Special Conditions of Contract as set out in this Schedule.

THE BIDDER IS ADVISED TO SEE THE SITE, LOCATIONS OF AVAILABILITY OF CONSTRUCTION MATERIALS, JOBS TO BE UNDERTAKEN AS PER SCOPE OF THE WORK, TIME LINE AND AS MENTIONED BELOW IN SPECIAL CONDITIONS. HE IS FURTHER ADVISED TO CONSIDER ALL ASPECTS RELATED TO EXECUTION OF WORK BEFORE SUBMITTING HIS OFFER.

1. For post construction quality assurance test, contractor has to take the core sample of the concrete/ masonry laid at his own cost as desired by the Engineer In Charge and final payment would be released after test results are found in conformity with specifications of concrete.
2. All the materials/equipment, key personnel required for construction of this work as specified in qualification criteria shall be arranged & make available at the work site at his own cost. Non availability of the above at work site, Department will be free to take action as per agreement.
3. The bidder has to furnish the detailed month wise detailed construction programme with the tender submission and before start of work with revised schedule.
4. Contractor has to submit the detailed construction programme and get it approved from Engineer-in-charge.
5. No work of any item shall be started without prior information to authorized site Engineer. The prior approval of all the construction operation have to be obtained in written from the Engineer-in-charge or authorized site Engineer.
6. Unauthorized or undesirable persons shall be excluded from the camp and work site.
7. Cement from mini cement plant will not be accepted.
8. The cement register regarding daily receipts, issues and balance have to be maintained by the contractor at site and same shall be shown to department authorities as and when required. The cement store of contractor shall be physically verified by department authorities as and when required.
9. An inspection register will be maintained by the contractor at the site of work for marking inspection remarks of the departmental authorities. In case of any defects mentioned in the remarks, shall be rectified by the contractor on priority and will get signature of site Engineer.
10. The contractor will maintain the O.K. register at site. O.K. card of each operation will be obtained from the departmental authorities as stated in departmental quality control manual.
11. The entire approach/haul road from material source to work site shall have to be constructed and maintained by the contractor. No extra payment shall be entertained on this account.
12. As per norms Site Engineers has to be deputed by the contractor for the execution of work as per specifications, conducting testing of construction material and other required test and to maintain the relevant registers daily. The registers will be shown to departmental authorities on their demand.

13. Arrangement of testing equipment of construction material and its checking will be done by contractor. In case of poor test result, Engineer-in-charge may disallow or reduce payment according to the gravity of result.
14. All the records to be maintained by the contractor at site, is to be get issued from Engineer-In-charge and he has to submit them whenever required by the departmental officers.
15. **Defect liability period will be 5 years from actual date of completion of work.** Contractor is required to remove defects as pointed out.
16. Special care should be taken for the curing of all pucca works, as per IS Code specifications.
17. Material required and supplied by the contractor shall be stored by him only at places approved by the Engineer-in-charge. Storage and safe custody of material shall be responsibility of the contractor.
18. **Provision of Vehicles for Inspection and Supervision-**The Contractor/Bidder/Agency shall, at its own cost, provide two (02) vehicles of make Bolero Neo N10 (latest model) complete with drivers and POL (Diesal, Oil & Lubricants) on a 24×7 basis for inspection, supervision, and official use of the Engineer-in-Charge or his authorized representative during the entire currency of the contract. The vehicles shall be mobilized and made available within ten (10) days from the stipulated date of start of work. The Contractor shall bear all costs whatsoever, including but not limited to Diesal, drivers' wages, overtime, maintenance, servicing, repairs, insurance, taxes, permits, toll tax, challans, penalties, and any other statutory or incidental charges, without any extra claim.
One vehicles shall be purchased and registered / transferred in the name of the Engineer-in-Charge within one (01) month of completion of the work, and no payment, reimbursement, or compensation of any kind shall be payable on this account. In the event of failure, delay, or discontinuation in providing the vehicles at any stage after commencement of work, the Engineer-in-Charge shall be fully empowered to arrange alternative vehicles through hiring or any other means deemed fit. The entire expenditure incurred shall be recovered from the Contractor's running account bills, security deposit, or final bill, and such recovery shall be final and binding. **No claim/extra payment** shall be admissible or entertained on this account under any circumstances.
19. **Project Monitoring Unit (PMU)-**The Bidder/Contractor shall, at its own cost, establish and maintain a Project Monitoring Unit (PMU) of minimum 220 square meters within departmental land approved by the Engineer-in-Charge for effective supervision and monitoring of the project during the contract period. The PMU shall be fully furnished, including office tables and chairs, a bed with mattress, dining table with chairs, sofa set, and other essential furnishings such as curtains and bedding, as directed by the Engineer-in-Charge. It shall be provided with potable water, electricity, internet, air-conditioning, one computer with colour printer, a functional washroom, and round-the-clock security with a security guard. All renovation, alteration, installation, furnishing, operation, and maintenance of the PMU shall be carried out by the Bidder/Contractor at its own cost. In the event of failure, delay, or discontinuation in establishing or maintaining the Project Monitoring Unit (PMU) at any stage after commencement of work, the Engineer-in-Charge shall be fully empowered to arrange the same through departmental means or any other means deemed fit. The entire expenditure incurred shall be recovered from the Contractor's running account bills, security deposit, or final bill, and such recovery shall be final and binding. **No claim/extra payment** shall be admissible or entertained on this account under any circumstances
20. The Bidder/Contractor shall, at its own cost, carry out **Operation and Maintenance (O&M)** works, including oiling, greasing, cleaning, and upkeep of gates, and clearing of bushes and obstructions before the onset of the rainy season to ensure proper water flow. The Bidder/Contractor shall also carry out desilting of anicuts, and transport and dispose of the desilted material at locations specified by the Engineer-in-Charge, up to the **Defect Liability Period (DLP)**. **No claim/additional payment** shall be admissible for the above works under any circumstances.

21. **Financial Implication;** Looking to the above special conditions, if there is any financial implication whatsoever it may be, then the bidder shall have to incorporate those expenses in the tender premium and for which no claim will be entertained by the department.
22. As per the order of Finance Department, Rajasthan vide order no प.3(1)/वित्त/सावित्री/2020 dated 29.01.2024 **“No Arbitrator will be appointed”**.
23. Rajasthan M sand policy 2024 and Mines and Petroleum (Group-2) letter noप.14(11) खान/गुप-2/2024 dated 04.12.2024, the use of minimum 50% M sand is compulsory for the said work as per provision of the circular
24. No extra payments: The contractor will have to convey out the work as per specification enclosed herewith. No extra payment shall be admissible for ancillary works specified in the specification.
25. **Execution of agreement-** The successful bidder shall sign the procurement contract within 10 days from the date on which the letter of acceptance or letter of intent is despatched to the successful bidder.
26. Other Conditions
 - (i). Conditional tender will not be accepted.
 - (ii). Extra item if any will be paid on BSR on which sanctioned estimate & G-Schedule of this work is based plus or minus the percentage above or below as the case may be.
 - (iii). All safety measure during blasting and execution of work has to be ensured by the contractor at his own cost. He will be responsible for any mis-happening/casualty if any. No extra payment will be made on this account.
 - (iv). If any typing error in rate, unit and nomenclature, the same will be applicable as per BSR on which G-Schedule is prepared.
 - (v). The rates entered in Schedule-G are inclusive of all ancillary operations required to execute these items and no extra claim whatsoever shall be paid.
 - (vi). The quantity of work increased/decreased as per site requirement; however, extra claim whatsoever may be shall be admissible as per SoP.
 - (vii). The contractor will have to establish field laboratory as per requirements at his own cost.

Sd-
Additional Chief Engineer
Water Resources Zone Jaipur

CONDITIONS

- 1 All payment for Extra items will be made as per Water Resources Department BSR 2023 for Zone Jaipur on which estimate and the G-Schedule prepare and such percentage rate (above / below) quoted by the contractor.
- 2 Design/Drawing should be vetted and approved from competent authority before execution of work. Work shall be carried out as per direction of the Engineer in charge.
- 3 Useable material from excavation is to be stacked properly as per direction of Engineer in charge. The Contractor shall have to use the material already collected at site and the recovery for the same shall be made as Water Resources Department BSR 2023 for Zone Jaipur.
- 4 The daily cement consumption register will be maintained by the contractor and shall be signed by the contractor or his authorized representative and Departmental representative.
- 5 Curing shall be done by the contractor to the satisfaction of Engineer in-charge.
- 6 The specification of all the items shall be applicable as per approved specification in Water Resources Department. The copy of the same is available in division office for reference.
- 7 If required the work shall be executed round the clock and expenditure on execution round the clock shall be borne by the contractor.
- 8 All dewatering and diversion work of flow/ sub surface water will be done by the contractor and for which no Extra payment will be given by the Department.
- 9 Any claim for Extra leads of material will not be accepted by the department.
- 10 Only ISI Mark 43/ 53 grade cement has to be used in execution of this work procured from major cement plants.
- 11 The contractor will provide labour for checking and measurement of work executed to the department representative.
- 12 If contractor fails to fulfil the condition mentioned at s.no. 5 the department reserves the right to deploy labour and material to carry out these activities and the amount shall be deducted from the Running bills of the contractor.
- 13 If contractor fails to full fil the condition mentioned at s.no.5 the department reserves the right to deploy labour and material to carry out these activities and the amount shall be deducted from the Running bills of the contractor.
- 14 Maintenance of work will be looked after by the contractor himself for **Five year** whichever is later. That will be the defective liability period.
- 15 Payment of S.D. will be released after passing of defective liability period.

Sd-
Additional Chief Engineer
Water Resources Zone Jaipur

Section VII: Contract Forms

Contents

1. Letter of Acceptance
2. Contract Agreement
3. Performance Security
4. Performance Security Declaration
5. Advance Payment Security

1. Letter of Acceptance

Letter of Acceptance

[on letterhead paper of the Procuring Entity]

No

Dated

To: *[name and address of the Contractor]*

Subject: *[Notification of Award for the Works]*

This is to notify you that your Bid dated *[date]* for execution of the .

..... *[name of the contract and identification number, as given in the Contract Data]* for the Accepted Contract Amount of the equivalent of *[.amount in numbers and words and name of currency]* , as corrected and modified in negotiations and in accordance with the Instructions to Bidders has been accepted by *[designation of the Procuring Entity]* The date of commencement and completion of the Works shall be:

You are requested to furnish the Performance Security/ Performance Security Declaration within Days in the form given in the Contract Forms for the same for an amount equivalent to Rupees within days of notification of the award valid up to 120 days after the date of expiry of Defects Liability Period and maintenance period, if applicable, and sign the Contract, failing which action as stated in sub-section 2 of section 42 of the Rajasthan Transparency in Public Procurement Act, 2012 and Instructions to Bidders shall be taken.

Authorized Signature:

Name and Title of Signatory:

Designation:

2. Contract Agreement

Contract Agreement

THIS AGREEMENT made the day of, between the Governor of Rajasthan/[*name of the Procuring Entity if other than a department of the State Government*] hereinafter “the Procuring Entity”) which expression shall, where the context so admits, be deemed to include his successors in office and assigns, of the one part, and [*name of the Contractor*] (hereinafter “the Contractor”), which expression shall, where the context so admits, be deemed to include his heirs, successors, executors and administrators, of the other part:

WHEREAS the *Procuring Entity* desires that the Works known as[*name of the Contract*]should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein, and for which the Contractor has submitted Performance Security for Rupees in the form of

The Procuring Entity and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - a) the Letter of Acceptance;
 - b) the BoQ of the Contractor as accepted along with the correspondence done on it, if any;
 - c) the Special Conditions of Contract/ Contract Data;
 - d) General Provisions of Contract;
 - e) the General Conditions of Contract;
 - f) the Specifications;
 - g) the Drawings;
 - h) the Instructions to Bidders;
 - i) Notice Inviting Bids.
3. In consideration of the payments to be made by the Procuring Entity to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Procuring Entity to execute the Works, performing operation & Maintenance and to remedy defects therein (and, if applicable, maintain the Works for a period of) in conformity in all respects with the provisions of the Contract.
4. The Procuring Entity hereby covenants to pay the Contractor in consideration of the execution and completion of the Work and the remedying of defects therein (and, maintain the Works for a period of), the Contract Price or such other sum

Section VII: Contract Forms

as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS where of the parties hereto have caused this Agreement to be executed in accordance with the laws of the Central and the State Government the day, month and year first mentioned herein before.

Signed by

Name, Designation, Date
for and on behalf of the Governor/
Procuring Entity

Signed by

Name, Designation, Date
for and on behalf the Contractor

in the presence of

Witness 1

Witness 2

Signature, Date, Name, Address

in the presence of

Witness 1

Witness 2

Signature, Date, Name, Address

3. Performance Security

Performance Security

[Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: *[Name and Address of Procuring Entity]*

Date:

Performance Guarantee No.:

We have been informed that *[name of the Contractor]*
(hereinafter called "the Contractor") has entered into Contract No
[reference number of the Contract] dated with you, for the
execution of *[name of contract and brief description of Works]*
(hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance security is required.

At the request of the Contractor, we *[name of the Bank]* hereby
irrevocably and unconditionally undertake to pay you any sum or sums not exceeding in total
an amount of Rupees* *[amount in figures]* (.Rupees.....
. . . . *[amount in words]*) such sum being payable upon receipt by us of your
first demand in writing accompanied by a written statement stating that the Contractor is in
breach of its obligation(s) under the Contract, without your needing to prove or to show
grounds for your demand or the sum specified therein. in this regard, Engineer in charge will
be sole judge to take decision for revoking.

The Guarantor agrees to extend this guarantee for a specified period in response to the
Procuring Entity's written request for such extension for that specified period, provided that
such request is presented to the Guarantor before the expiry of the guarantee.

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This guarantee shall expire, no later than the Day of , **,
and any demand for payment under it must be received by us at this office on or before that
date.

Seal of Bank and Authorized Signature(s)

Section VII: Contract Forms

The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract

Insert the date sixty days after the expected completion date, including defect liability period and maintenance period, if any.

- Notes:*
- 1. All italicized text is for guidance on how to prepare this advance payment guarantee and shall be deleted from the final document.*
 - 2. The Procuring Entity should note that in the event of an extension of the time for completion of the Contract, the Procuring Entity would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

4. Performance Security Declaration

Form of Performance Security Declaration

Date: _____ *[insert date (as day, month and year)]*

Contract Name and No.: _____ *[insert name and number of Contract]*

To: _____ *[insert Designation and complete address of Procuring Entity]*

We, the undersigned, declare that:

We understand that, according to your conditions, the Contract must be supported by a Performance Security Declaration as a guarantee to ensure fulfillment of our all-performance obligations under the Contract for----- *[insert name of subject matter of procurement.*

We accept that we will automatically be suspended from being eligible for bidding in any contract with you for the period of time of *[Procuring Entity to indicate here the period of time for which the Procuring Entity will declare a Bidder ineligible to be awarded a Contract if the performance Security Declaration is to be executed]* starting on the date that we receive a notification from you, the *[Designation of the Procuring Entity]* that our Performance Security Declaration is executed, if we are in breach of any of our performance obligation under the conditions of the Contract,

We understand this Performance Security Declaration shall expire after 90 days of completion of our all obligations under the Contract including Defect Liability, warranty/ Guarantee, operation, maintenance, etc. in accordance with the conditions of the Contract.

Signed: _____

[insert signature of person whose name and capacity are shown]

In the capacity of: _____

[insert legal capacity of person signing the Performance Security Declaration]

Name: _____

[insert complete name of person signing the Declaration]

Duly authorized to sign the Contract for and on behalf of: _____

[insert complete name and address of the Bidder]

Dated on _____ day of _____, _____ *[insert date of signing]*

Corporate Seal _____

5. Advance Payment Security

Advance Payment Security

Bank's Name, and Address of Issuing Branch or Office

Beneficiary: *[Name and Address of Procuring Entity]*

Date:

Advance Payment Guarantee No.:

We have been informed that *[name of the Contractor]* (hereinafter called "the Contractor") has entered into Contract No *[reference number of the Contract]* dated with you, for the execution of *[name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum *[name of the currency and amount in figures]*(*[amount in words]*) is to be made against an advance payment guarantee.

At the request of the Contractor, we *[name of the Bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[name of the currency and amount in figures]* (..... *[amount in words]*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor units account number *[Contractor's account number]* at *[name and address of the Bank]*

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that entire amount of the advance payment has been repaid or on *[the Intended Completion Date of the Works]*, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

The Guarantor agrees to extend this guarantee for a specified period in response to the Procuring Entity's written request for such extension for that specified period, provided that such request is presented to the Guarantor before the expiry of the guarantee.

Seal of Bank and Authorized Signature(s)

- Notes:**
- 1. All italicized text is for guidance on how to prepare this advance payment guarantee and shall be deleted from the final document.*
 - 2. The Procuring Entity should note that in the event of an extension of the time for completion of the Contract, the Procuring Entity would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee.*

Section VIII :G Schedule

G-Schedule**Executive Engineer Water Resources Division Tonk**

Name of work -

Construction of Anicut cum causeway at Banas river near Village Kanwarawas GP
Kanwarawas PS Todaraisingh District Tonk(A)

&

Construction of Anicut cum Causeway near Village Sentiawas at Banas river Tehsil
Todaraisingh District Tonk(B).**Part A**

boqSrl No	itemName	unit Name	totalQty	itemRate	Amount
Section: Construction of Anicut cum Causeway at Banas River near Village Kanwarawas PS Toda Raisingh Tehsil Toda Raisingh District Tonk(139576)					
G-1	Excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5m including dressing of excavated area and dewatering wherever required complete in all respect Hard soil mixed with Kankar / boulders, Morrum Add extra over item 10 (a) for lead beyond 250m & upto 750m (for average 1/2Km).	Cum	3354.36	136.25	457031.55
G-2	Refilling the excavated earth (excluding rock) in trenches, plinth side of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering including cost of water, loading and un-loading wherever required with cost of dewatering wherever required.	Cum	1693.38	91	154097.58
G-3	Supplying, Laying & consolidation of quarry rubbish / Murrum / Murda to required grade & camber in layers not exceeding 15 cm. thickness (loose) by road roller as per specifications including dressing etc. complete.	Cum	120	584	70080
G-4	Supplying stone, spall and laying R. R. stone pitching, hammer dressed with packing of voids from small stones including all lead & lifts, in required profile of 23 cm thickness (5 % thickness tolerance)	Cum	184	1820	334880
G-5	Providing and Laying in position of Cement concrete Nominal mix (1:3:6) including leads of all construction materials, curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto 20 mm	Cum	3517.08	5093	17912488.44

SECTION- VIII G Schedule

G-6	Providing and Laying in position of Cement concrete Design mix M-15 including leads of all construction materials, plasticizers (if required), curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto; (For mix design Cement content considered 320 kg/ cum of concrete) 20 mm	Cum	1409.52	5723	8066682.96
G-7	Side shuttering including propping etc. complete (to achieve finish F 2 for :Block joints of foundation stilling basins buckets, aprons etc. (non -suspended horizontally laid mass concrete)	Sqm	1229.99	160	196798.4
G-8	Side shuttering including propping etc. complete (to achieve finish F 2 for :Retaining wall, counterfort, abutment, wing walls up stream or down- stream slope facings of dams and open faces of construction joints etc.	Sqm	11289.92	220	2483782.4
G-9	Supply & fixing 6 mm thick rubber water seal of approved quality in construction/contraction joints as per drawing complete in all respect. 305 mm wide	R.M	388.44	675	262197
G-10	Supplying of M.S. reinforcement including labour charges for bending binding and placing in position all reinforcement as per drawing including cost of binding wire and all leads and lifts using. Tor or ribbed bars (IS :1786-1985)	Kg.	216799.08	89	19295118.12
G-11	Drilling holes of 35 mm diameter for anchor rods.Upto 1.50 m. depth	met er	2240	129	288960
G-12	Labour charges for Fixing of anchor bars in neat cement grout including cost of cement and curing etc. complete	Eac h	2240	245	548800
G-13	Supply of Tor steel anchor bars of required diameter, length and shape at site of work complete.	Kg	12936	72	931392
G-14	Supply of wire crates in required sizes made of hot dipped G.I. Wire conforming to IS 4826 -1979 having mesh of 10 cm x 10 cm (surface area of crate will be measured) made of wire of 5 mm diameter.	Sqm	4200	389	1633800
G-15	Filling crates with stone, in position at site including hinging with hot dipped G.I. Wire 5 mm dia, excluding cost of wire crates, including cost of stones in position complete in all respects.	Cum	2402.4	1090	2618616

SECTION- VIII G Schedule

G-16	Design, Drawing, fabrication, supply, erection, testing and commissioning of Vertical lift sliding type gate with frame consisting of skin plate, sealing frame, stiffeners, horizontal and vertical girders, guide, stainless steel flat/Brass flat, rivets, wedges, lifting rods etc., with all accessories as per relevant IS code including frame & gate complete set for Canal Cross, Escape, Head regulator /Tank head regulator including cost of all materials, machinery, labour, cutting, aligning, welding, finishing, cleaning, seal fixing, tools and tackles etc., applying two coat of zinc rich epoxy primer to give dry film thickness of 70 5 microns and finish coat (two coats) of solvent less coal tar epoxy paint using airless spray to provide dry film thickness of 150 5 microns per coat thus total dry film thickness of all coats, including primer coating, should not be less than 350 microns., complete as per specifications and approved drawings with all lead and lifts, including packing & forwarding, transportation charges for structural steel components and other materials.	ton ne	1.8	174880	314784
G-17	Providing and Laying in position of Cement concrete Design mix M-20 including leads of all construction materials, plasticizers (if required), curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto; (For mix design Cement content considered 400 kg/ cum of concrete) 20 mm Add extra over labour rates for item No. 2 to 5 for II stage concrete for obstruction of II stage embedded parts and restricted working space.In horizontal block-outs	Cum	7876.54	6795	53521089.3
G-18	Add extra over item No. 1 to 8 for disposal of excavated material above initial lift of 1.5m and for every additional lift of 1.5m or part there of including loading and unloading wherever required	Cum	8590.14	8.5	73016.19
G-19	Excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5m including dressing of excavated area and dewatering wherever required complete in all respect Hard soil mixed with Kankar / boulders, Morrum Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered. Beyond initial lead of 50 m & upto 250 m Add extra over item 10 (a) for lead beyond 250m & upto 750m (for average 1/2Km).	Cum	5726.76	165.75	949210.47

SECTION- VIII G Schedule

G-20	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Hard rock not requiring blasting Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered.	Cum	1779.3	301.25	536014.13
G-21	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Phylite& other hard rock requiring nominal blasting Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered.	Cum	1779.3	432.5	769547.25
G-22	Pumping sets Above 16 HP to 30 HP	Day	180	525	94500
G-23	Cost of Diesel	Lit	2880	94	270720
G-24	Nominal mix of Plain Cement Concrete well mixed and laid in position using 20% max permissible limit of plums above 160 mm and up to 450mm, including curing and finishing etc including all leads of all construction materials complete in all respect with well graded crusher broken stone aggregate. The plums shall be distributed evenly and shall be not closer than 150 mm from the surface.PCC Nominal Mix 1:2:4 with plum, Max size of Aggregate 20 mm	Cum	16592.42	5224	86678802.08
G-25	Excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5m including dressing of excavated area and dewatering wherever required complete in all respect Hard soil mixed with Kankar / boulders, Morrum	Cum	2372.4	118	279943.2

SECTION- VIII G Schedule

G-26	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Hard rock not requiring blasting Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered. Beyond initial lead of 50 m &upto 250 m Add extra over item 10 (a) for lead beyond 250m &upto 750m (for average 1/2Km).	Cum	6810.84	319.5	2176063.38
G-27	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Phylite& other hard rock requiring nominal blasting Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered. Beyond initial lead of 50 m &upto 250 m Add extra over item 10 (a) for lead beyond 250m &upto 750m (for average 1/2Km).	Cum	6810.84	450.75	3069986.13
Total (Part A)					203,988,401

Part B

boqSrl No	itemName	unitName	totalQty	itemRate	Amount
Section: Construction of Anicut cum causeway near village Sentiawas at Banas River Tehsil Toda Raising District Tonk(153088)					
G-1	Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered. (Hard soil mixes with kankar/boulders, Morrum)	Cum	5262.67	29.5	155248.77
G-2	Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continous pump running should only be considered.(Hard rock not required blasting)	cum	5262.67	60.25	317075.87

SECTION- VIII G Schedule

G-3	Add extra over item No. 1 to 5 for excavation under water for all type of strata including dewatering charges. (Quantity under water during actual work is only to be considered) Quantity of excavation below water level in foundation area during continuous pump running should only be considered.(Phyllite and other rock requiring nominal blasting)	cum	4210.14	86.5	364177.11
G-4	Extra lead over item no. 1 to 8 of excavated material. Add extra over item 10(a) for lead beyond 250 m and upto 750 m (for average 0.5 km)	cum	14735.48	18.25	268922.51
G-5	Cutting & clearance of jungle, bushes, shrubs Ankra/Ipomoea, Julifloratypna etc. on canal and bunds in dry/moist/slushy conditions including disposal as per instructions of the Engineer-in-charge. Cost of wood has been deducted from rates and thus will be property of contractor after cutting. Thick	Sqm	37757.37	2.5	94393.43
G-6	Supplying stone, spall and laying Rip rap in required profile properly hand packed using stone of specified size including all lead & lifts 23 cm thickness (5 % thickness tolerance)	Cum	263.16	1712	450529.92
G-7	Lip cutting and final dressing as per designed section including re-handling and disposal of excavated earth in layers 20 cm on embankments etc. with cost of dewatering wherever required, and complete in all respect	Sqm	835.2	34	28396.8
G-8	Design, Drawing, fabrication, supply, erection, testing and commissioning of Vertical lift sliding type Dam Shutter gates interchangeable consisting of sealing frame (embedded parts), skin plate of shutters, stiffeners, horizontal and vertical girders, guide, stainless steel flat, lifting hooks, clits fasteners etc., with all accessories including frame & gate complete set for Barrage/ Stop dam/ waste weir / spillway including cost of all materials, machinery, labour, cutting, aligning, welding, finishing, cleaning, tools and tackles, seal fixing, applying one coat of zinc rich epoxy primer and three coats of cold applied coal tar epoxy paint, including primer coating, should not be less than 350 microns., etc. complete as per specifications and approved drawings, including packing & forwarding, transportation charges for structural steel components and other materials.	tonne	6	174810	1048860
G-9	Filling crates with stone, in position at site including hinging with hot dipped G.I. Wire 5 mm dia, excluding cost of wire crates, including cost of stones in position complete in all respects.	Cum	3600	1090	3924000

SECTION- VIII G Schedule

G-10	Supply of wire crates in required sizes made of hot dipped G.I. Wire conforming to IS 4826 -1979 having mesh of 10 cm x 10 cm (surface area of crate will be measured) made of wire of 5 mm diameter.	Sqm	2400	389	933600
G-11	Supply of Tor steel anchor bars of required diameter, length and shape at site of work complete.	Kg	7276.5	72	523908
G-12	Labour charges for Fixing of anchor bars in neat cement grout including cost of cement and curing etc. complete	Each	1400	245	343000
G-13	Drilling holes of 35 mm diameter for anchor rods.Upto 1.50 m. depth	meter	1190	129	153510
G-14	R.R. stone Masonry Kharanja with proper packing of chipping stones using hammer as per IS specification (using R. R. stones where 75 % stones to be not less than 15 cm in size in any direction and weighing not less than 23 kg.) for foundation including all leads of all construction materials, curing etc. complete in 1: 6 Cement Mortar	Cum	493.5	4315	2129452.5
G-15	Supplying of M.S. reionforcement including labour charges for bending binding and placing in position all reinforcement as per drawing including cost of binding wire and all leads and lifts using. Tor or ribbed bars (IS :1786-1985)	Kg.	171268.25	89	15242874.25
G-16	Side shuttering including propping etc. complete (to achieve finish F 2 for :Retaining wall, counterfort, abutment, wing walls up stream or down- stream slope facings of dams and open faces of construction joints etc.	Sqm	14710.53	220	3236316.6
G-17	Extra labour charges for RCC due to obstruction in laying and placing the reinforced cement concrete due to reinforcement. Columns, slabs, cantilevers projections staircases, lintels, beams, chajjas, Retaining walls, piers, abutments, galleries, arch covers, bed plates, sluice capstan bases etc.	Cum	14498.05	200	2899610
G-18	Providing and Laying in position of Cement concrete Design mix M-25 including leads of all construction materials, plasticizers (if required), curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto; (For mix design Cement content considered 420 kg/ cum of concrete) 20 mm	Cum	1790.63	6548	11725045.24

SECTION- VIII G Schedule

G-19	Providing and Laying in position of Cement concrete Design mix M-20 including leads of all construction materials, plasticizers (if required), curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto; (For mix design Cement content considered 400 kg/ cum of concrete) 20 mm	Cum	12707.43	6288	79904319.84
G-20	Providing and Laying in position of Cement concrete Nominal mix (1:2:4) including leads of all construction materials, curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto 20 mm	Cum	1360.8	5648	7685798.4
G-21	Providing and Laying in position of Cement concrete Nominal mix (1:3:6) including leads of all construction materials, curing, compaction and finishing with rendering in cement sand mortar 1:3 (1 cement : 3 coarse sand) and making good the joints excluding the cost of centering, shuttering and reinforcement. Well graded crusher broken stone aggregate of maximum size upto 40 mm	Cum	2598.8	5058	13144730.4
G-22	Add extra for each subsequent lead of 500m or part there of beyond 0.500 Km and up to 5 km	Cum	4832.63	26.25	126856.54
G-23	Earth work in rough (borrow area) excavation for embankments in hard soil, morrum or highly weathered strata dry or moist, including laying in 20 cm layers (before compaction) and breaking of clods, sorting of grass, pebbles etc. and dressing when compacted by vibro compactor, vibro sheep foot roller, sheep foot roller/pneumatic tyred roller to obtain dry density of at least 98% of Standard Proctor s density with initial lift of 1.5m (Excluding charges for compaction and watering) including loading and un-loading wherever required complete in all respect.With lead beyond 250 m and up to 750 m (Km)	Cum	4832.63	137.5	664486.63
G-24	(ii)Compaction of earth or highly weathered strataBy mechanical equipment such as sheep foot roller/ pneumatic tyred roller/vibro compactor / vibro sheep foot compactor required as per site condition to obtain dry density of. at least 98% of Standard Proctor s density	Cum	4832.63	42	202970.46

SECTION- VIII G Schedule

G-25	Watering of earth including cost of carriage of water when source of water is up to 1 Km	Cum	4832.63	12.6	60891.14
G-26	Add extra over item No. 1 to 8 for disposal of excavated material above initial lift of 1.5m and for every additional lift of 1.5m or part there of including loading and un- loading wherever required	Cum	14735.48	8.5	125251.58
G-27	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Phylite& other hard rock requiring nominal blasting	Cum	4210.14	346	1456708.44
G-28	Excavation including loading unloading disposal and dressing of excavated rock within initial lead of 50m and lift upto 1.5m in dry or moist including dressing of excavated area, de-watering wherever required complete in all respect.Hard rock not requiring blasting	Cum	5262.67	241	1268303.47
G-29	Excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5m including dressing of excavated area and dewatering wherever required complete in all respect Hard soil mixed with Kankar / boulders, Morrum	Cum	5262.67	118	620995.06
G-30	Excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5m including dressing of excavated area and dewatering wherever required complete in all respect Hard / dense soil	Cum	6315.21	95	599944.95
G-31	Providing, fixing and erecting 50 mm dia painted tubular steel pipe as per IS 1239 railing in 3 rows on precast M-20 grade RCC vertical posts 1.8 meter high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 meter centre to centre, complete as per approved drawing as per MoRTH specification clause 808.	P.Rmt	1200	760	912000
G-32	Providing and laying Precast reinforced cement concrete Box culvert section of M-40 grade designed for 'AA' class loading as per IRC specifications including to effect of impact, EQ etc. complete on form base of 200mm thick lean concrete of M-10 grade with aggregate of size 40mm nominal of following internal size the work includes required safety measures construction of drain for diversion of flowing water cost of design of RCC Precast Box and its proof checking from IIT/MNIT Jaipur complete in all respect as per specifications Size 1.00 M x 1.00 M	Rmt	65.3	12072	788301.6

SECTION- VIII G Schedule

G-33	Pumping sets Above 16 HP to 30 HP	Day	180	525	94500
G-34	Cost of Diesel	Lit	2880	94	270720
G-35	Nominal mix of Plain Cement Concrete well mixed and laid in position using 20% max permissible limit of plums above 160 mm and up to 450mm, including curing and finishing etc including all leads of all construction materials complete in all respect with well graded crusher broken stone aggregate. The plums shall be distributed evenly and shall be not closer than 150 mm from the surface.PCC Nominal Mix 1:2:4 with plum, Max size of Aggregate 20 mm	Cum	2394.86	5224	12510748.64
	Total (B)				164,276,448
	Grand Total (A+B)				36,82,64,849

Sd-
Signature of Engineer-in-charge