

जयपुर विकास प्राधिकरण, जयपुर

कमरा नं. 133 प्रथम-तल, मुख्य भवन,
इन्दिरा सर्किल जवाहर लाल नेहरू मार्ग, जयपुर-302004

क्रमांक जविप्रा/अधि.अभि. (पीएचई- I)/2026/D-

दिनांक : 19.02.2026

निविदा सूचना

निविदा सूचना सं० अधि. अभि. (पीएचई- I)/18/2025-26

जयपुर विकास प्राधिकरण द्वारा "Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur" जिसकी अनुमानित लागत राशि रू. 41.46 लाख के लिए ऑनलाईन बिड्स दिनांक 05.03.2026 को सायं 6:00 बजे तक आमन्त्रित की जाती है। निविदा बोली का ऑनलाईन आवेदन व भुगतान जविप्रा पोर्टल पर करने की अन्तिम तिथि 05.03.2026 को सायं 6.00 बजे तक है। निविदा बोली के दस्तावेजों का विस्तृत विवरण www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in पर देखा जा सकता है।
(UBN No.....)

निविदा में भाग लेने वालो को निम्न शर्तों की पूर्ति करनी होगी।

1. निविदादाता जयपुर विकास प्राधिकरण की वेबसाईट www.jda.urban.rajasthan.gov.in पर पंजीकृत हो एवं निविदा में भाग लेने के लिए बोलीदाता को आवेदन करने के लिए दस्तावेज शुल्क, अमानत राशि, आर.आई.एस.एल. प्रोसेसिंग शुल्क ऑनलाईन जमा करनी होगी।
2. ऑनलाईन निविदा प्रस्तुत करने के लिए निविदादाताओं का राजस्थान सरकार के ई-प्रोक्यूरमेंट पोर्टल www.eproc.rajasthan.gov.in पर पंजिकृत हो।

अधिशायी अभियंता (पीएचई- I)
जविप्रा, जयपुर।

प्रतिलिपि:-

1. जन सम्पर्क अधिकारी, जविप्रा को तकनीकी सहायक (निदेशक अभियान्त्रिकी-प्रथम) के मार्फत समाचार पत्र में नियमानुसार प्रकाशन हेतु।
Job No. JDA/EE PHE I/A & F/2025-2026/Feb/335 dt. 04.02.2026

अधिशायी अभियन्ता (पीएचई- I)
जविप्रा, जयपुर

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved



JAIPUR DEVELOPMENT AUTHORITY

Room No. 133, First Floor, Main Building, Ram Kishore Vyas Bhavan, Indira Circle, JawaharLal Nehru Marg, Jaipur – 302 004 Telephone: +91-141-2569696

No: - JDA/EE/PHE-I/2026/D-

Dated : 19.02.2026

NOTICE INVITING BID

NIB No. : JDA/EE (PHE-I)/18/2025-26

UBN No.:

Online Bids are invited up-to 6.00PM of 05.03.2026 for “**Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master’s Creation Under Jurisdiction of PHE-I JDA, Jaipur**” The last date for Applying Bid and making online 41.46 Lacs. Details may be seen in the Bidding Document at our office or the State Public Procurement Portal website www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in/jda

To participate in the bid, bidder must:

- Participate in Tender & Deposit Payment on ‘Online Tender Participation’ Portal of JDA at <https://jda.urban.rajasthan.gov.in/jda> or by Single-Sign-On at <http://service.jaipurjda.org>.
- Submit e-Bid on ‘e-Procurement Portal’ of GOR at www.eproc.rajasthan.gov.in

Executive Engineer (PHE-I)
JDA, Jaipur

Copy to :-

- PRO Cell, JDA, Jaipur through TA to DE (I) for publication in News paper as per rules.

Job No. JDA/EE PHE I/A & F/2025-2026/Feb/335 dt. 04.02.2026

Executive Engineer (PHE-I)
JDA, Jaipur

OFFICE OF THE JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Signature valid

NIB No.- JDA/EE (PHE-I)/18/2025-26	
Name & Address of the Procuring Entity	<ul style="list-style-type: none"> ➤ Name: Executive Engineer (PHE-I), Jaipur Development Authority Address: Room No. 133, First Floor, Main Building, Ram Kishore Vyas Bhavan, Indira Circle, JawaharLal Nehru Marg, Jaipur – 302 004 ➤ Telephone: +91-141-2569696 E.mail: zepheljda@yahoo.in
Name of work	<ul style="list-style-type: none"> ➤ Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur.
Bid Procedure	<ul style="list-style-type: none"> ➤ Single Stage ➤ eBid procedure at http://eproc.rajasthan.gov.in]
Bid Evaluation Criteria (Selection Method)	<ul style="list-style-type: none"> ➤ L1 (eg. Least Cost based Selection (LCBS)-L1)
Websites for downloading Bidding Document, Corrigendum's, Addendums, etc.	<ul style="list-style-type: none"> ➤ Websites: www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in, www.jda.urban.rajasthan.gov.in
Estimated Procurement Cost	<ul style="list-style-type: none"> ➤ INR 41,45,852.00 Lacs (Forty One Lacs Forty Five Thousand Eight Hundred Fifty Two Only)
Website for online Bid application and payment *	<ul style="list-style-type: none"> ➤ Website: www.jda.urban.rajasthan.gov.in ➤ For participating in the Bid, the Bidder has to apply for this Bid and pay the Bidding Document Fee, RISL Processing Fee and Bid Security Deposit, online only. ➤ Bidding document fee: Rs. Rs 500/-(Rupees Five Hundred only) ➤ RISL Processing Fee: Rs. Rs 500/- (Rupees Five Hundred only) ➤ Requisite Bid Security Deposit. ➤ The Bidders are required to submit Bid security, cost of Bidding documents, and Bid processing fees through online payment after registering with JDA on www.jaipurjda.org/e-services/e-tender portal. There should be a gap of 3 working days between the End date for Bid Applying, Online Payment & Bid Submission and Bid Opening date. In the absence of the requisite fee, the bid of the concerned bidder will be considered as non-responsive and shall be liable for rejection
Bid Security Deposit (in favor of Secretary, JDA, Jaipur)	<ul style="list-style-type: none"> ➤ Amount (INR: 2% (Rs 82,917/-) For A & AA Above class contractors registered in the appropriate class with CPWD, Postal, Telegram, Railway, MES, Other State Government/Central Government undertakings/ organizations of Estimated Procurement Cost. (The bidder must capable to bid in the bid as per their enlistment) ➤ 0.5 % (Rs 20,729/-) for Bidder registered as a contractor in the appropriate (C & Above) class in JDA. ➤ In case of Departments of the State Government and undertakings, Corporations, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the State Government and Government undertakings of the Central Government shall submit a bid securing declaration in lieu of bid security. ➤ If a joint Venture is allowed in the Bid then 2% (Rs 82,917/-) shall be deposited by bidders (Joint Venture firm)
Start/ End Date for Bid Applying Bid and making Online Payment on JDA portal*	<ul style="list-style-type: none"> ➤ Start Date : 23-02-2026 from 9.30 AM onwards ➤ End date : 05-03-2026 up to 6.00 PM ➤ In case EMD in form BG Original Bank Guarantee is to be submitted in Room No 215 N Extension Building, JDA, P.L.N Marg, Jaipur Jaipur Development Authority, P.L.N Marg, Jaipur

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	06.03.2026, 9.30 AM to 10.03.2026 up to 6.00 PM (within three working days from the last date of submission of bid.)
Bid Submission on e-Procurement Portal of GOR**	<ul style="list-style-type: none"> ➤ Start date : 23.02.2026 from 9.30 AM ➤ End date : 05.03.2026 upto 6.00 PM
Date/Time/Place of pre-Bid	➤ NA
Date/ Time/ Place of Technical Bid Opening	<ul style="list-style-type: none"> ➤ 11.03.2026 at 12.00 PM ➤ Room No. 133, First Floor, Main Building, Ram Kishore Vyas Bhavan, Indira Circle, JawaharLal Nehru Marg, Jaipur
Date/ Time/ Place of Financial Bid Opening	➤ NA
Bid Validity	➤ 120 days from the bid submission deadline
Time Period	➤ 12 Months
A&F/Job No.	➤ Job No.: 335/2025-26

Procedure for bidding:

1. Single part bid system:

Single part (Two-envelope) (2 docket) system would be adopted, Docket-1 being for Documents and Docket-2 being for Financial Bid.

Docket-1:- is for proof of deposition of Bid Security, cost of bidding document and bid processing fee along with copy of GST registration, signed Annexure “B” and copy of enlistment as contractor/ bidder in required category.

Docket-2:- is for financial bid. The financial bid will be opened only for bidders whose proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in the required category and signed Annexure “B” are found to be in order. Bid Security will be accepted only in the form of online deposition or in the form of Bank Guarantee.

2. Two part bid system:

Two part (Two-envelope) (2 docket) system would be adopted, Docket-1 being for Technical Bid and Docket-2 being for Financial Bid.

Docket-1:- There will be three separate folders- Folder-1 is for proof of deposition of Bid Security, cost of bidding document and bid processing fee along with copy of GST registration, signed Annexure “B” and copy of enlistment as contractor/ bidder in required category. Folder-II is for bid document and folder-III is for technical bid.

Docket-2:- There will two separate folders-1 is for financial bid and 2 is for bill of quantities. The technical bid will be opened only for bidders whose proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in the required category and signed Annexure “B” are found to be in order. Bid Security will be accepted only in the form of online deposition or in the form of Bank Guarantee.

SCHEDULE AND SPECIFICATIONS

SCHEDULE – A: INFORMATION USEFUL FOR THE CONTRACTORS:

The bidder should see the site and fully understand the conditions of the site before bidding and include all leads, lift etc for the material in his item rate/percentage to be quoted on the rates given in Schedule ‘G’. The work shall be carried out in accordance with the Rajasthan PWD detailed specification and to the entire satisfaction of the Engineer – In – Charge of the work.

SCHEDULE – B: LIST OF THE DRAWING TO BE SUPPLIED BY THE DEPARTMENT

The drawing may be seen in the office of the undersigned.

Signature valid

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SCHEDULE – C: LIST OF THE DRAWING TO BE SUPPLIED BY THE CONTRACTOR: List of the drawing to be supplied by the contractor NIL. But the contractor shall have to arrange at his own cost drawings required for the work after deposition necessary cost with JDA.

SCHEDULE - D: TEST OF THE MATERIALS:

The test of the materials and workmanship shall be conducted by the JDA staff as necessary. The result of such tests should confirm to the standards laid down in the Indian standard & or the standards laid down in the detailed specifications of the work by the contractor. Qualified personnel required as per the contractor enlistment rules shall have to be engaged at site by the Contractor. The authority reserves the right to engage such staff and recover the expenses from the contractor on such account in case of his failure to do so.

SCHEDULE – E: SAMPLES OF THE MATERIALS:

The sample of the materials to be used by the contractor shall be deposited 15 days in advance with the Engineer In charge and be got approved by him before use.

SCHEDULE - F: TIME OF COMPLETION:

The work should start within 10 days of the issue of the work order and complete within time limits.

SCHEDULE – G: ATTACHED SEPARATELY BASED ON APPLICABLE BSRS IN JDA.

SCHEDULE – H: SPECIAL CONDITION: Attached Separately.

SCHEDULE – I: COST OF TENDER DOCUMENTS, PROCESSING FEES & BID SECURITY.

The Bid Processing fee is payable in favor of M.D. RISL & Cost of bid document & Bid Security is payable in Favour of the Secretary, JDA, Jaipur. Bidders have to pay bid processing fees, cost of bidding documents, and Bid Security through Online. If a bidder opts to deposit the bid security through bank guarantee, the bank guarantee should be valid for the next seven months after the bid opening date. A copy of the such bank guarantee will be required to be attached with the bid submission documents uploaded on the E-procurement portal of GOR. The bank guarantee will be physically handed over upto prescribed time to Nodal officer of the on-line tendering system of JDA i.e. D.D(E&B) in room No. 215 N Extension building, JDA, JLN marg, Jaipur, as per specified in bidding documents,

Annexure-1. Special Conditions of Contract regarding defect liability period.

Annexure-2A. Bank guarantee will be in specified Performa enclosed with this bidding document for Bid Security.

Annexure-2B. Bank guarantee will be in specified Performa enclosed with this bidding document for Performance Security.

Annexure-A. Compliance with the code of integrity and no conflict of interest (RTPP Act/Rules).

Annexure-B. Declaration by the bidder regarding qualifications (RTPP Act/Rules).

Annexure-C. Grievance Redressal during the procurement process (RTPP Act/Rules).

Annexure-D. Additional Conditions of Contract (RTPP Act/Rules).

Annexure-E. Process for Tender Participation & Depositing Payment on 'Online Tender Participation' Portal of JDA & Bid Submission on 'e-Procurement Portal' of Government of Rajasthan.

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JDA, Jaipur

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SPECIAL CONDITIONS

SCHEDULE 'H'

01. If there is any typographical error or otherwise in the 'G' Schedule, the rates given in the relevant BSR on which Schedule 'G' has been prepared, shall prevail.
02. The bidder shall follow the provisions of the builder labour regulation and abolition Act, 1970 & Rule, 1971.
03. The JDA shall have the right to cause an audit for technical examination of the work and the final bills of the bidder including all supporting vouchers, abstracts etc. to be made within two years after payment of the final bills and if as a result of such audit, any amount is found to have been overpaid / excess in respect of any work done by the bidder under the contract or any work claimed by him to have been done under this contract and found not to have been executed, the bidder shall be liable to refund such amount and it shall be lawful for the JDA to recover the such sum from him in the manner prescribed in special condition no. 8 or any other manner legally permissible and if it is found that the bidder was paid less than that was due to him under the contract in respect of work executed by him under it, the amount of such underpayment shall be paid by the JDA to the bidder.
4. Wherever any claim against the bidder for the payment of a sum of money arises out of under the contracts, the JDA shall be entitled to recover the sum by appropriating in part or whole of the performance security of the bidder, In the event of the security being insufficient or if no security has been taken from the bidder then the balance of the total sum recoverable as the case may be deducted from any sum then due or which at any time their contract with the JDA should this sum be sufficient to recover the full amount recoverable. The bidder shall pay to JDA on demand the balance remaining due. The JDA shall further have the right to affect such recoveries under P.D.R. Act.
5. The rate quoted by the bidder shall remain valid for a period of 120 days from the date of opening of the bids.
6. By submission of the Bid the bidder agrees to abide by all printed conditions provided in the PWD manual from 64 (Chapter 3-para 36) and subsequent modification.
7. No conditions are to be added by the bidder and the conditional Bid is liable to be rejected.
8. If any bidder withdraws his Bid prior to the expiry of said validity period given at S. No. 5 or mutually extended prior or makes modifications in the rate, terms and conditions of the Bid within the said period which are not acceptable to the authority or fails to commence the work in the specified period, fails to execute the agreement the authority shall without prejudice to any, other right or remedy, be at liberty to forfeit the amount of bid security given in any form absolutely. If any bidder, who has submitted a Bid does not execute the agreement or start the work or does not complete the work and the work has to be put to rebidding he will stand debarred for six months from participating of Bidding in JDA in addition to forfeiture of bid security/ Performance Security and other action under agreement
9. Any material not conforming to the specifications collected at the site have to be removed by the bidder within a period of 3 days of the instruction, issued by the Engineer -In charge in writing failing which, such material shall be removed by the Engineer-In charge at risk and cost of the bidder after the expiry of 3 days period.
10. The material collected at the site and paid provisionally shall remain under the watch and ward of the bidder till it is consumed fully on the work.
11. The rates provided in the Bidding documents are inclusive of all Taxes and royalties otherwise specified.

12. No extra lead of earth/material shall be paid over and above as specified in 'G' Schedule, Source/ borrow pit area for the earth shall have to be arranged by the Bidder at his own cost.
13. Undersigned has full right to reject any or all Bids without giving any reasons.

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RajKaj Ref No.:
20641074

eSign 1.0

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14. As per the Supreme Court decision “All contracts with Governments shall require registration of workers under the building and other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 and extension of benefits to such workers under the etc.”
15. Special Conditions of the Contract regarding the Defect Liability Period (DLP) for works costing Rs. 25.00 lacs and more shall be applicable (Annexure-I).
16. The Bidder is required to submit a copy of their enlistment as a contractor.
17. Conditions of RPWA-100 will be mandatory & acceptable to the bidder.
18. The bidder will have to install display boards at the site of work as directed by Engineer in charge.
19. All the provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules, 2013 and amendments issued from time to time by the Finance Department, GOR shall be applicable. If there are any contradictions in existing special conditions and provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules 2013 provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules 2013 shall prevail.
20. In case the rate received in the bid is below than BSR rate, additional Performance security shall be deposited by the bidder as per Rule 75 (A) of RTPPP Rules.
21. The Annexure “B” (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal by the bidder failing which the bid shall summarily be rejected without asking for any clarification.
22. Contractors enlisted in JDA, should be get reviewed periodically. The registered bidder who has not been reviewed within a period of 5 years 3 months, shall not be allowed to participate in the bid. Contractors enlisted in other departments shall be as per the provision of PWF&AR
23. The river sand shall be part replaced with crushed stone sand of crushed gravel sand (M-sand) up to a minimum extent of 25% of total mass of fine aggregate subjected to the codal provisions (clause 2) of is 383.2016 and article 11 of Rajasthan M-sand policy 2020.
24. In case the rate received in the bid is below than BSR rate, additional Performance security shall be deposited by the bidder as per Rule 75 (A) of RTPPP Rules.
25. The Annexure “B” (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal by the bidder failing which the bid shall summarily be rejected without asking for any clarification.
26. Contractors enlisted in JDA, should be get reviewed periodically. The registered bidder who has not been reviewed within a period of 5 years 3 months, shall not be allowed to participate in the bid. Contractors enlisted in other departments shall be as per the provision of PWF&AR

**Executive Engineer (PHE-I)
JDA, Jaipur**

ANNEXURE '1'

**SPECIAL CONDITIONS OF CONTRACT REGARDING DEFECT LIABILITY PERIOD (DLP) FOR
WORKS COSTING RS. 25.00 LACS AND MORE**

Table-1

S.No.	Type of work	DLP Period
1.	Bridge Work	5 Years
2.	CD Work	5 Years
3.	CC Road. PQC Work	5 Years
4.	CC tiles/Krebs/medians	5 Years
5.	Drains	5 Years
6.	Roads	5 Years

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	(i) Two-layer WBM/GSB	6 months or one full rainy season whichever is later
	(ii) For Renewal/Strengthening	
	(a) BT up to 30 mm thickness	1 Years
	(b) BT above 30 mm to up to 40 mm	2 Years
	(c) BT above 40 mm to up to 90 mm	3 Years
	(d) BT above 90 mm thickness	5 Years
	(iii) New Roads	
	(a) BT up to 90 mm	3 Years
	(b) BT more than 90 mm	5 Years
7.	Compound wall	3 Years
8.	Building Work	
	(i) Work pertaining to Sanitary work electrical works, Joinery works and painting work.	2 Years
	(ii) Work pertaining to the Building structure and other civil works	5 Years
9.	Electric work except for maintenance	3 years
10.	Sewer/Water supply including STP and water supply-related work except for maintenance works.	3 Years

1. ROAD-WORKS

- 1.1 The Defect Liability Period (DLP) for all Road works excluding patch repair work shall be as per the above table. Road works executed by the Contracting agency shall be maintained by them at their own cost for completion (DLP) from the actual date of completion of work as per the clause in the Contract Agreement and Special Condition of the Contract.
- 1.2 No extra payment shall be made to the contracting agency on account of maintenance of Road works and removal of defect during the Defect Liability Period.
- 1.3 The word "Road Works" means all new Road Works construction, widening, strengthening, up-gradation and renewal works
- 1.4 The word "Maintenance of Road Works during Defect Liability Period" means
 - (i) Routine maintenance of Road Works,
 - (ii) To remove the defect as & when appear in part and the entire structure of Road Works, in the specified time and keeping the Road Surface with good riding quality and
 - (iii) Damages due to improper drainage/drains, local flooding, depressions on roads etc.
- 1.5 The contracting agency shall do the routine maintenance of Road works, including pavement, road side and cross drains including surface drains to the required standards and keep the entire road surface and structure in Defect free conditions during the entire period of routine maintenance, which begins at the completion of the construction work and ends after complete (DLP).
- 1.6 The routine maintenance shall consist of the routine maintenance operation defined in the manual for the maintenance of roads of MoRTH and shall be carried out accordingly.
- 1.7 The routine maintenance activities and their periodicity.

S.No.	Name of Item/Activity	Frequency of operations in one year
1	Restoration of rain cuts and dressing of berms.	Once in a year, generally after rains.
2	Making up of shoulders.	As and when required.
3	Maintenance of Bituminous surface road and/or gravel road/WBM road including filling pot holes and patch repairs etc.	As and when required.
4	Insurance of proper functioning of drains including civil maintenance and desalting of drains. (If constructed by the same Road agency or not)	As and when required.
5	Maintenance of road signs. (If installed by the same Road agency)	Maintenance as and when required. Repainting once in every one and a half years.
6	Road Marking, Kerb Stone / Dand. (If done by the same Road agency)	Thermoplastic Paint Maintenance as and when required. Repainting once in every one & a half years.

		Ordinary Paint Maintenance as and when required. Repainting thrice in every year.
7	Damages beyond the control of the agency.	Road cuts made by various agencies for utility, duly permitted by JDA / JNN will have to be repaired by the agency on the same rates of the contract agreement till DLP.

2. General

2.1 Inspection of works during the Defect Liability Period

2.1.1 The contracting agency shall undertake a joint detailed inspection along with Engineer-in-charge/A.En., at least once in three months in case of all Road works. The Engineer-in-charge can reduce this frequency in case of an emergency. The Contracting agency shall forward to the engineer in-charge the record of inspection and rectification immediately after the joint inspection. The Contracting agency shall pay particular attention to those road sections, which are likely to be damaged during rainy season.

2.1.2 One register has to be maintained by every AEN for recording the inspection details of works in his jurisdiction under defect liability period.

2.2 Conditions regarding Performance Security

2.2.1 Security for DLP-

The contracting agency shall have to furnish Performance Security in the form of Bank Guarantee valid from the actual date of completion, which shall be assigned by the Engineer-in-charge.

2.2.2 The release of PS amount shall be as per following table 2 :-

S.No.	Released PS	DLP Period	1 Year	2 Years	3 Years	5 Years
1.	After 1 year		100%	40%	20%	10%
2.	After 2 year			60%	20%	10%
3.	After 3 year				60%	10%
4.	After 4 year					20%
5.	After 5 year					50%

The Performance Security will be released as per the above table after a satisfactory performance certificate issued by Engineer-In-Charge:-

2.2.3 Forfeiture of Performance Security

In case the contracting agency fails to rectify the defects within the stipulated period notified to him by the Engineer-in-charge concerned under the contract agreement, the Engineer-in-charge shall serve a final notice for 5 days time reckoned from the date of issue of notice to rectify the defects. In case the contracting agency not responding to the notice and fails in the rectification of defects the Engineer-in-charge will get the defect removed at the risk and cost of the contracting agency. Action such as encashment of Bank Guarantee and action under enlistment rules etc. shall also be taken against the contracting agency by the competent authority.

2.2.4 Force Majeure

The defect that arises due to earthquakes, cyclones, and natural calamities shall not be the responsibility of contracting agency.

2.2.5 Various conditions for managing DLP are as under :-

- (i) At the time of completion of work, final component shall be worked out for each individual item like BT/CC/tiles/ drains etc. (as per different categories in Table II, DLP)

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shall be operative based upon type of individual item ex:- CC-5 years, BT-1/2/3/5 years, Drain-3 years etc.

- (ii) If any work, amount is less than Rs. 25 lacs but later on due to extra/excess work, if amount of final work crosses more than Rs. 25 lacs, DLP shall be operative as per rule for each individual item.
- (iii) Similarly, if any work is more than Rs. 25 lacs but after finalization amount of work is less than Rs. 25 lacs, DLP should be operative for six months or rainy season whichever is later.
- (iii) During DLP period if contractor fails to repair any work even after the issue of 7 days written notice, the same work shall be got executed by the respective Executive Engineer at the contractor's risk and cost. This process shall be applicable throughout the DLP period. After completion of DLP period in such works contractor should be debarred and blacklisted, from JDA for three years as per RTPPP rule 2012 and 2013 where his defaults twice in a single agreement or in two different works.
- (iv) Quarterly Inspection as per rules shall be carried out and DLP registers shall be maintained by respective Executive Engineers to monitor the DLP repairs.
- (v) Special and regular inspection shall also be carried out as per order no. JDA/XEN & TA to DE-I/2014-15/D-223 dated 12.03.2015 and order no. SE (PMGSY) CIRCULAR 2006/D-115 dated 04.05.2006 Point no. 3.
- (vi) In case JDA feels to take up work on any existing DLP road due to any reason, the following procedure should be adopted:
 - (a) At the time of withdrawal total liability of repairs as per DLP conditions to be carried out and the contractor shall be asked to complete the same. After completion of assessed repairs, DLP period shall be released after deduction amt. as per following table-III.

Table-3

% Recovery on withdrawal of DLP of work order DLP period	1 Year	2 Year	3 Year	4 Year	5 Year
1 Year	1.12	-	-	-	-
2 Year	2.55	1.43	-	-	-
3 Year	4.38	3.26	1.83	-	-
5 Year	9	7.88	6.45	4.62	2.47

Note:- Calculation is to be done on a quarterly basis.

- (b) In case the Contractor fails to carry out these repairs, same shall be carried out at his risk and cost. If the total amt. of such repairs works out to be more than the total retained amount of PS same shall be recovered from other works and as per PDR rules. The amount as per Table 3 is also to be deducted in addition to this amount.
- (vii) Based upon the type of work, DLP conditions for works to be carried out during the DLP period with their frequency of the respective type of work shall be prepared by respective SE"s after approval of these periods.

Signature valid

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Designation: Executive Engineer
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3. In case patch repairs/civil maintenance works costing more than Rs. 25.00 Lakhs, defect liability period will as per clause 37(C) of Contract Agreement.

**Executive Engineer (PHE-I)
JDA, Jaipur**

Annexure-2A

Specified Bank Guarantee Performa for Bid Security

Section - 6

Form of (Bank Guarantee) -En cashable at the branch of the bank in Jaipur City.

To
Secretary,
Jaipur Development Authority,
Jaipur

Sub:

Bank Guarantee No. _____ dated _____ for [amount of Security in figures] [in words] on behalf of _____ [Name of the Bidder] against Bid Security Deposit for the work of **“Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master’s Creation Under Jurisdiction of PHE-I JDA, Jaipur”** WHEREAS, _____ [name of Bidder with address] (hereinafter called **“the Bidder”**) has submitted his Bid dated for the work of **“Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master’s Creation Under Jurisdiction of PHE-I JDA, Jaipur”** (here in after called **“ the Bid ”**).

KNOW ALL PEOPLE by these presents that we _____
_____ (Name of Bank) of having our registered office at _____ [name of country] having our registered office at _____ (hereinafter called **“the Bank”**) are bound unto Secretary, Jaipur Development Authority. (Hereinafter called **“the Employer”**) in the sum of Rupees _____ [**Amount of Security in figures**] _____ (in words) only for which payment will and truly to be made to the said Employer, the Bank binds itself, its successors, and assigns by these presents.

That on demand of JDA , this Bank Guarantee is cashable at the following branch in Jaipur City.

1. Name of Bank:

12

RajKaj Ref No.:
20641074
eSign 1.0

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

2. Name of the branch with branch code:
3. Address:
4. E-Mail Id:
5. Telephone No.
6. Fax No.:

SEALED with the Common Seal of the said Bank this _____ day of _____ of 20 _____.

THE CONDITIONS of this obligation are:

- (1) if the Bidder withdraws his Bid during the period of Bid validity specified in the Form of Bid;
- (2) if the Bidder refuses to accept the correction of errors in his bid;

- (3) If the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

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

This Guarantee will remain in force up to and including the date 30 days after the date of expiration of the Bid Validity, as stated in the Instructions to Bidders, or any such extension thereto as may be agreed by the Bidder, a notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank no later than the above date.

The amount covered under the above Bank Guarantee shall be automatically credited in the accounts of JDA in ICICI Bank, JDA Campus, Jaipur through **IFSC code No ICIC0006754. Bank Account No. 675401700518** on the date of expiry or its validity, unless the agencies get it re-validated well before its expiry date or produce NOC from JDA in writing for its release.

Date _____ Signature of the Bank _____

Witness _____ Seal _____

[Signature, Name, and Address]

[Note: To be furnished on appropriate non-judicial stamps & should be valid for the next 7 months from the bid opening date]

Annexure-2B

Specified Bank Guarantee Performa for Performance Security

Section - 6

Form of (Bank Guarantee) -En cashable at the branch of the bank in Jaipur City.

To
Secretary,
Jaipur Development Authority,
Jaipur
Sub:

Bank Guarantee No. _____ dated _____ for [amount of Security in figures] [in words] on behalf of _____ [Name of the Bidder] against Performance Security Deposit for the work "**Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatadari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur**" WHEREAS, _____ [name of Bidder with address] (hereinafter called "**the Bidder**") has submitted his Bid dated for the work of "**Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatadari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur**" (herein after called "the Bid").

KNOW ALL PEOPLE by these presents that we _____
_____ (Name of Bank) of having our registered office at _____ [name of country] having our registered office at _____ (hereinafter called "the Bank") are bound unto Secretary, Jaipur Development Authority. (Hereinafter called "the Employer") in the sum of Rupees _____ [**Amount of Security in figures**] _____ (in words) only for which payment will and truly to be made to the said Employer, the Bank binds itself, its successors, and assigns by these presents.

That on demand of JDA, this Bank Guarantee is cashable at the following branch in Jaipur City.

1. Name of Bank:
2. Name of the branch with branch code:
3. Address:
4. E-Mail Id:
5. Telephone No.
6. Fax No.:

SEALED with the Common Seal of the said Bank this _____ day of _____ 2026

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
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We undertake to pay to the Employer up to the above amount upon receipt of his first written demand within valid period of this guarantee.

This Guarantee will remain in force up to and including the date 30 days after the date of expiration of the Bid Validity, as stated in the Instructions to Bidders, or any such extension thereto as may be agreed by the Bidder, a notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank no later than the above date.

The amount covered under the above Bank Guarantee shall be automatically credited to the accounts of JDA in ICICI Bank, JDA Campus, Jaipur through **IFSC code No ICIC0006754. Bank Account No. 675401700518** on the date of expiry or its validity, unless the agencies get it re-validated well before its expiry date or produce NOC from JDA in writing for its release.

Date _____ Signature of the Bank _____

Witness _____ Seal _____

[Signature, Name and Address]

[Note: To be furnished on appropriate non-judicial stamps.]

Name of work:- Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur.

Scope of work:-

The scope of work under this Contract includes Construction of Clear Water Reservoirs with P/L/J of Pipe line and construction of tube wells & installation of pumps for Niji Khatedari Scheme Master's Creation under the Jurisdiction of EE, PHE-I, JDA, Jaipur.

SPECIAL CONDITIONS OF THE CONTRACT (Part-A)

CONTRACT

1.1 Type of Contract

THE WORK DESCRIBED IN THIS TENDER DOCUMENTS CONSIST OF TWO PARTS;

- PART "A"** Construction of 200 mm dia Tube wells.
- PART "B"** Construction of 150 KL CWR & Pump Sets.
- PART "C"** Rising & distribution system.

1.2 Priority of contract

The documents forming part of the agreement are to be taken as mutually explanatory documents of one another. In case of discrepancies, they shall be explained and adjusted by the Engineer In Charge. The priority of the Contract documents shall be as follows:

1. Letter of award
2. Special Conditions of Contract Part A & Part B

Instructions to Bidders

3. General Conditions of Contract
4. Work description/ Scope of works
5. Technical specifications
6. Drawings
7. Bill of quantities

Design And Drawings

2.1 General Design Obligations

The Contractor shall be deemed to have scrutinized, prior to submission of bid, the JDA Requirements (including design criteria and calculations, if any). The Contractor shall be responsible for the design of the following works and for the accuracy of such designs-

1. Survey & Soil Investigation Work (Not to be paid separately)

The works included are as defined below but shall not be limited to

Survey work shall be carried out for confirmation of department design & drawings by contractor and submit acceptance to department. SBC shall be carried out at CWR location.

2. Construction of RCC CWR of 150 KL Capacity:

Signature valid

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Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

Following are the works covered in the Job of CWR,s:

- (i) SBC test of the soil for determination of SBC of the site. The structural design of the reservoir shall be based on the actual SBC or 10 MT/sqm, whichever is less.
- (ii) The contractor is required to submit the detailed design and execution drawings such as site plan, general arrangement drawings, plans, structural drawings and all working drawing of all civil works stated in the above clause 2.1. He will also submit the detailed system and working drawings as well as performance curves and data for all hydraulic, mechanical, Electro-mechanical and electrical equipment. Submission of structural design and drawing & Mix design as per specification and general arrangement drawing for the CWR and get checked from MNIT Jaipur or any other NIT as per approval of EIC
- (iii) Construction of RCC CWR,s as per design approved.
- (iv) Providing and fixing of all puddle collars, valves, ventilator, dismantling piece and level indicator as per specifications.
- (v) The Contractor shall be fully responsible for the soundness of the construction, structural safety & water tightness of the structure based on the specifications, sound engineering practices, and latest I.S. provisions.
- (vi) Valve chamber for valve of out let pipe SV shall have to be constructed.
- (vii) Testing of tank for water tightness and structural stability by filling it with water and in accordance to the procedure laid down in tender document/IS code.
- (viii) Painting the metallic surface & putting slogan on tank as per specifications.
- (ix) Final clearance of site before handing over the work, including leveling of earth and disposal of surplus earth as per directions of the Engineer in Charge.
- (x) Submission of 'As Built' drawings.
- (xi) Topographic survey, preparation of site contour plan, conducting SBC test and its approval from department before construction. Submission and approval of concrete mix design and water quality test report for water to be used in construction.
- (xii) Excavation in all types of soil, PCC below foundation & all RCC Work including all labour and material charges including providing and fixing of accessories such as SS ladder, SS manhole frame and covers, water level indicator (float type), SS ventilator with SS screen, float valve, puddle collars, G.I. pipe railing around walk way, Top Dome/Slab, Staircase.
- (xiii) CWR shall be provided with adequate plinth protection all around the structure in a width starting from edge of structure at GL and extending at least up to 1.0m beyond the vertical wall of CWR. The plinth protection shall consist of 150mm thick PCC in M-15 concrete over 150mm thick compacted soil fill.
- (xiv) Providing and applying two coats of food grade epoxy paint on the inside surface of the roof slab, and 600 mm height of the vertical wall.
- (xv) Successful hydro test and water tightness test as per I.S. code.
- (xvi) Providing and applying three coats of anti-carbonation paint on the roof Slab.
- (xvii) Providing and applying three coats of cement-based paint on the remaining external surface area of the structure.

Signature valid

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Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

- (xviii) Providing and fixing SS-304 ventilator, SS 304 manhole frame and cover and SS 304 ladder from roof slab to bottom Slab, inside container. Providing and fixing water level indicator (Float type).
- (xix) Providing and fixing MS ladder from ground to top slab.
- (xx)j) All MS parts to be painted with two coats of the enameled paint over the primer coat of red oxide.
- (xxi) Providing and fixing of 150mm wide water bar for the construction joints in the container.
- (xxii) Providing and fixing CI/DI puddle collars the vertical wall for connecting inlet, outlet, overflow and washout pipes of the reservoir.
- (xxiii) Inlet, outlet, overflow, washout pipes and valves are not included in this work, provision for the same shall be taken separately.

A. Submissions

The following submissions are required for approval:-

- Submission of acceptance of structural designs and working drawings to Engineer-in-charge. The foundation shall only be laid on firm ground or hard soil bed after removing all loose material, if any.
- Submission of test reports of construction material to be used in the structure
- Submission of samples of material equipment(s) for approval.
- Submission of data sheet for equipment's for approval.
- No separate payments shall be made for the reconnaissance, preliminary investigations, surveys, inspections, plinth protection, site clearance etc. They shall be included in the lump sum rates.
- The Contractor shall be fully responsible for Technical suitability of design, soundness of the construction, structural safety & water tightness of the structure based on the specifications, sound engineering practices, and latest IS Provisions.

3. COMPLETION OF THE WORK

3.1 Time for completion

The whole of the work, including mobilization, reconnaissance, construction, installation, testing, commissioning and trial runs, and demobilization has to be completed within a period of **12 months** calculated from the commencement date, which is 10 days after the written order to commence the Work.

3.2 Completion of work and fully commissioning

Once the entire system has been successfully tested and commissioned, and removal of all visible defects to the satisfaction of Engineer In Charge-in-Charge, the work shall be treated as **“Completed”**.

Unless otherwise provided in the contract, after the successful completion Engineer In Charge shall issue a certificate of “Completion of Work”. The date of Certificate notifying “Completion of Work” will be used for the final payment as per clause 6 and 7 of General Conditions of Contract.

3.3 Defects liability period :-

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RajKaj Ref No.:
20641074

eSign 1.0

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

The defect liability period shall be as per JDA office order no. JDA/Ex.En. (TA to Dir. Eng.-1)/2016/D-29 dated 11.03.16 (Annexure 'E').

3.4 Cost of water and electricity for testing

Water and electricity for construction and testing of scheme purpose shall be arranged by the contractor at his own cost. Electricity for trial and run period shall be provided by JDA. Electric connection and regular electric bill of Pumps/TW shall be paid by JDA but liaison work shall be carried by contractor with JVVNL, Jaipur.

4 As-Built Drawings

The submission of the as-built drawings for the equipment is the precondition for the final payment. The final drawings shall be submitted in one reproducible set and 3 copies on linen bound in an album of an approved size. The contractor shall submit all the completion drawings and approved design calculations on CD ROM / DVD in two copies with proper directory structure. The scale of drawing and the size of drawing shall be as per the direction of the Engineer In Charge.

The contractor shall prepare, and keep up to date, a complete set of "as built" records of the execution of the works, showing the exact as built locations, sizes and details of the works as executive. The records shall be kept on the site and shall be used exclusively for the purpose of this sub clause. Two copies shall be supplied to JDA before the commencement of the tests on completion. The Contractor shall obtained the consent of JDA as to their size, the references system, and other relevant details.

5 Progress of Work

All components of works shall ensure a logical sequence of supply, installation, testing, and commissioning. If any supply of a material is made, not in conformity to the logical sequencing of the work component, no payments will be entitled against such supplies and installations.

It will be the responsibility of contractor to maintain simultaneous pro-rata progress of civil work, pumping stations, RCC SR.

6 Documents Required For Payment:

The contractor shall submit the following documents in duplicate along with the invoice/bill.

- (i) Invoice indicating details of equipment's, material manufactured, supplied and installed or work carried out, supply value of such material or equipment or value of such work carried out and amount claimed.
- (ii) Inspection reports/ test reports/ reports certifying completion of activity with acceptable results.
- (iii) Report/certificate of inspections /tests carried out by the supplier of the contractor or by the contractor himself.
- (iv) Any other such details/documents as may be reasonably specified by the Engineer In Charge-in-Charge from time to time during execution of the contract.
- (v) Certificates, as prescribed, GST Registration, duties etc. legible on supplies made.
- (vi) Other documents required by the Engineer In Charge-in-charge.

7 Payment Terms

7.1 Breakup of Payment for construction of RCC CWR:-

1	After excavation, laying PCC and casting of foundation slab	15%
2	After completion of outer vertical wall, RCC stair case inside and outside	30%
3	After completion of top dome/roof, Head room, railing	55%

Signature valid

4	After fixing of CI fittings, painting and miscellaneous works, and satisfactory testing as per standards	25%

7.2 Breakup of payment for Supply laying jointing, installation and testing of DI pipe line and specials, installation of sluice valve, Air Valves and dismantling joints.

1	After Supply laying jointing, installation and testing of DI/HDPE pipe line and specials, installation of sluice valve, Air Valves and dismantling joints.	100 % payment shall be paid on providing lowering in trenches, laying installation and jointing and after Satisfactory testing.
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8. Refund of Performance Guarantee & Security Deposit

The Security Deposit (SD) and Performance Guarantee (PG) shall be refunded after successfully completion for defect liability period as per JDA DLP norms.

- 8.1 The contractor/firm or company while executing the above work will adopt all safety measures on his cost to safeguard from any loss of life & damage of public & private property. if any loss & damage occurred then they will pay the full compensation from their own pocket. all the consequence will be born by them & JDA will not be responsible in any way.
- 8.2 The contractor/firm or company will display necessary signboards & lights from safety point of view during nights at site of work on his own cost as directed by the authorized Engineer In Charge.
- 8.3 The contractor shall not work after the sunset & before sunrise without specific permission of the Engineer In Charge in-charge.
- 8.4 Contractor shall provide sufficient number of boards at site of work indicating 'JDA AT WORK" at his own cost as required by Engineer In Charge-In Charge.
- 8.5 The contractor will pay compensation to the house owner or to the owner of any adjoining property or any other works for the damaged sustained on account of this work while in progress or complete from his own pocket.

9. Price Variation Clause:

No Price Escalation shall be payable in work.

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

SPECIAL CONDITIONS OF THE CONTRACT

1. Contractor shall get the D.I. pipe inspected from the third party (CEIL, SGS, RITES) before bringing the material at site. The inspection charges shall be born by the contractor. No payment of these items shall be made before the third party inspection.
2. In case of pipe line testing shall be done as per the relevant Code and the leakage level shall not be more than as per IS 8329. Only 80% of the payment shall be released after providing, laying and jointing of pipes and special in trenches, 20% of the payment shall be released after testing as above.
3. The quantity of work can be increased or decreased. However, no guarantee is given about the actual quantity of work.
4. No extra payment shall be made to the contractor on account of excavation in collapsible strata or in hard or rocky strata. The tenderers shall have to make their own arrangement for completing the work and no claim in this respect will entertained.
5. On collection of complete material for each section the same shall be got checked by Engineer-in-Charge or his authorized representative. Such approval shall in no way release the contractor of his responsibility regarding completion of work, as per required specification until the contract is complete.
6. The electric connection, if required, for construction and testing purpose shall be arranged by the contractor at his own cost.
7. The contractor shall make his own arrangement regarding water required for the execution and testing of the work and shall also arrange for the supply of drinking water to his own employees. He shall defray all charges in this connection and should include in his rates a sufficient amount to cover such charges. All such facilities as are required now to be provided for the labour, made under labour welfare rules enforce, shall also be provided by the contractor at his own cost.
8. The contractor will be required to see that the usual hours of work are adhered too. No work shall be done after the sun set without the permission of the engineer-in-charge.
9. The contractor/firm or company while executing the work will adopt all safety measures at his cost to safeguard from any loss of life and damage of public and private property. If any loss and damage is occurred, they will pay the full compensation from their own pocket to the concern. All the consequence (legal and or financial) will be born by the contractor only and JDA will not be responsible in any way.
10. Water for construction / testing purpose shall have to arrange by contractor at his own cost. If water is supplied by the department, the same shall be recovered from the contractor from each running bill at the rate of 1% of total value of pipe line laying work, In case of metered connection the charges shall be recovered on the actual consumption basis on the commercial rates.
11. The contractor shall be fully responsible for structural safety and water tightness of pipeline when tested.
12. No secured advance against material procured at site will be allowed.
13. Pipeline laying should be done in the presence an Engineer not below the rank of Junior Engineer of the JDA, and trench shall be refilled after checking of Assistant engineer. After taking layout, the contractor shall submit day to day schedule of work to the Engineer-in-charge in advance.
14. The contractor/firm or company will take utmost care to safeguard the water mains, Electric and Telephone cable existing surface drains water connections etc., while executing the work. Any damages/rectification shall be born by the contractor only
15. The contractor shall, at his own cost, arrange to provide, erect and maintain necessary display boards/ flags/banners etc. at selection points of project site giving such information as considered necessary for public awareness/ information/ safety as directed by the Engineer-in-charge.
16. Contractor shall provide sufficient number of boards at site of work indicating "JDA AT WORK" at his own cost as required by Engineer-in-charge.
17. The surplus earth and damaged materials will be immediately removed from the site of work and dumped as per instruction of Engineer-in-charge.
18. The material collected at site and paid provisionally shall remain under the watch and ward of the contractor till it is consumed fully on the work.
19. Any material not conforming to the specifications collected at site shall have to be removed by the contractor within a period of 3 days of the instructions, issued by the Engineer-in-charge, failing which, such material shall be removed by the Engineer-in-charge at risk and the contractor after expiry of 3 days period.
20. The contractor/firm/company is bound to get the workmen insured against accident from the Insurance Company at his own cost.
21. Contractor shall be the sole custodian of the men and material at work and will be fully responsible for any loss of life or otherwise occurred during the execution of the works.
22. **The Engineer – in – Charge or his authorized representative will carry out as and when considered necessary for the quantity and quality of work done and for the materials used in the work. The contractor, unless otherwise specified shall provide all facilities and arrangements to undertake these tests and all testing charges shall be borne by the contractor.**

23. The contractor shall supply required quantity of samples desired by executive engineer, the samples so obtained shall be sent to authorized laboratory for testing, if the material is not found according to the specifications the entire lot of supply will also be rejected. The entire cost of samples and testing shall be borne by the contractor.
24. Defects Liability period
The defect liability period shall be as per JDA office order no. JDA/Ex.En. (TA to Dir. Eng.-1)/2016/D-29 dated 11.03.16 (Annexure 'E').
25. **As Built Drawings.**
The submission of the As-built drawings of the water line work is the precondition for the final payment. The final drawings shall be submitted in one reproducible set and 3 copies on linen bound in an album of an approved size. The contractor shall submit all the completion drawings. The scale of drawing and the size of drawing shall be as per the direction of the Engineer in Charge.
26. The contractor shall be solely responsible for all kind of liaison before starting the work with PHED/Other JDA zone/JVVNL & BSNL etc. which is required to avoid any damage of already laid pipe lines, Electric, BSNL cables. The contractor shall also liaison for the inter connection work with existing PHED system.
27. Before start of work contractor has to inform concerned JDA zone officers to avoid/minimize road damage
28. If there is any typographical error or otherwise in the 'G' Schedule. The nomenclature and the rates as given in the relevant BSR and JDA approved items/rates on which schedule 'G' is based, shall prevail.

The above conditions may be read very carefully and adhered strictly.

I/we confirm above

Signature of contractor

Executive Engineer (PHE-I)

JDA, Jaipur

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

Special conditions for Tube well work

1. The tenderers are advised to study geographical, geological, hydrological and geo-physical condition prevailing in the jurisdiction of JDA for which they are tendering for the work of drilling of 200 mm/150 mm dia tube well for power pump with development etc. complete. The rates shall be quoted based on their own assessment of the above features including the nature of the strata to be encountered and approachability of the site etc.
2. The JDA shall be free to carry out the work from any participating agency on the rate of lowest bidder during the current rate contract.
3. Quantity of work can be increased or decreased. However, no guarantee is given about the actual quantity of work.
4. The envelope shall contain the following information/ documents :-
 - a I. Certified copy of Registration Certificate of Contractor
 1. Each page of Tender Document be filled up wherever required and be signed and submitted.
5. No extra charges for higher size drilling in collapsible strata will be paid by the JDA. The tenderers shall have to make their own arrangement for completing the work and no claim in this respect will entertained.
6. Payment will be made on completion of individual tube well in all respect including development.
7. The boring shall be accepted only when it's Yield is 4000 LPH or more for 200 mm diameter TUBE WELL at a draw down not exceeding 7 meters. Only payment of Drilling shall be made for the tube wells having discharge less than above. It is responsibility of contractor to fill up bore holes of such unsuccessful tube wells upto the ground level immediately.
8. Inspection and Checking of work

As material are collected and the construction of each section of work is completed it will be checked by Engineer– in–Charge or his authorized representative and the representative of the contractor will assertion from the engineer form time to time that what part and portion he wishes to check over and pass out. Such approval shall in no way release the contractor of his responsibility regarding completion of work, as per required specification until the contract being completed.
9. Water Supply for Work and Drilling Purposes

The contractor shall make his own arrangement regarding water required for the execution and testing of the work and shall also arrange for the supply of drinking water to his own employees. He shall defray all charges in this connection and should include in his rates a sufficient amount to cover such charges. All such facilities as are required now to be provided for the labour, made under labour welfare rules enforce, shall also be provided by the contractor at his own cost.
10. Time of Working

The contractor will be required to see that the usual hours of work are adhered too. No work shall be done in the night without prior permission of Engineer – in – Charge except when it is absolutely necessary in the public interest. In this case contractor shall immediately inform the Engineer– in–Charge and get it approved.

Signature valid

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

11. The security deposit of for the work shall be refundable after six months from the date of completion of the work and successful testing.

12. The defect liability period for the tube well and pump set and panel etc. shall be one year after commissioning of the tube well. 10% of amount shall be withheld for each tube well and shall be released after one year of defect liability period. The contractor shall be liable for successful running of tube well during defect liability period.

13. Completion Period

Date of completion of work shall be minimum 7 days for each tube well from date of issue of work order. If nos. of tube wells are increased additional three days will be given for construction of each extra tube wells.

14. Release of Electric connection from JVVNL

The contractor shall be responsible for getting electric connection released from JVVNL in feasible areas on behalf of JDA. For this JDA shall provide duly signed application form which shall be produced by contractor in JVVNL office. In normal case the final payment shall not be passed till electric connection is released and testing as per norms is done, however in case of non-feasibility of electric connection area the decision of EIC shall be final. The amount required for release of electric connection shall be deposited by contractor to JVVNL office at first stage which shall be reimbursed to him on producing of original receipt of JVVNL.

15. Electric and water connections for construction and testing purpose if needed, shall be arranged by the contractor himself at his own cost.

16. Contractor shall provide sufficient number of boards at site of work indicating "JDA AT WORK, TOWARDS MAKING JAIPUR A WORLD CLASS CITY" at his own cost as required by Engineer – in – Charge

17. The following information's shall be furnished on completion by the contractor in accordance with clause No. of 12.2 of IS 2800 (Part I) : 1991, while handling over the tube well

- a) Total depth of tube well drilled.
- b) Strata chart of tube well indicating different type of soil formation met with at different depths and indicating the depths of each type of soil formation from hydrologist.
- c) Samples of strata collected, neatly packed and correctly marked in sample bags.
- d) Position of every joint in well assembly.
- e) Method used for development.
- f) Total hours of development done.
- g) Developed discharge in L.P.S.
- h) Discharge is totally sand free or presence of sand particles is there.
- i) PPM and turbidity after development.
- j) Pumping water level at developed discharge, and
- k) Static water level

18. Payment shall be made to contractor ensuring that the lowest tenderer shall remain lowest on the completion of work.

19. If contractor failed to do work with in specified time period, the work shall be awarded to second lowest after deposition of earnest money as per rule.

20. The format as per IS: 2800 (Part I): 1991 for furnishing the details is given as below:

- a) Agency drilling the tubewell.....
- b) Location of tube well.....
- c) Method of drilling adopted.....
- d) Date of starting
- e) Date of completion
- f) Pilot hole and test hole Bit Size.....
Bit typeHours.....fromto
- g) Coring doneBit size..... Bit type
Hoursrecovery.....from.....to.....
- h) ReamingBit Size.....Bit Type
- Hours.....from.....to.....
- i) Lithological data
From To Formation
.....

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Section A-4

Specifications of Work

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General

Standards

Except as otherwise specified in this technical specification, the Indian/International Standards and Codes of Practice in their latest version shall be adhered to for the design, manufacturing, inspection, factory testing, packing, handling and transportation of product. Should any product be offered conforming to other standards, the equipment or products shall be equal to or superior to those specified and the documentary confirmation shall be submitted for the prior approval of the Engineer in Charge.

This specification requires a reference to the following standard specifications

IS: 4985	Unplasticized PVC pipes for potable water supplies
IS: 10151	PVC and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals, and drinking water
IS: 10500	Drinking water specification
IS: 12235	Methods of test for unplasticized PVC pipes for potable water supplies
IS: 4669	Methods of test for PVC resin
IS: 12818	Unplasticized PVC screen and casing pipes for bore/tube well
IS: 3400	Methods of test for vulcanized rubber (part-1 to 22)
IS: 1387	General requirements for the supply of metallurgical material
IS: 210	Grey iron casting
IS: 1536	Centrifugally cast (spun) iron pressure pipe for water, gas and sewage
IS: 1537	Vertically cast iron pressure pipe for water, gas and sewage
IS: 1538	Cast iron fittings for pressure pipes for water, gas and sewage
IS: 5531	CI specials for Asbestos cement pressure pipes for water gas & sewage
IS: 1363	Hexagon head bolts, screws and nuts of product grade A and B (part:1-5)
IS: 1367	Technical supply conditions for threaded steel fasteners
IS: 780	Sluice valve for water works purposes
IS: 2906	Specifications for sluice valves for water works purposes
IS: 318	Leaded tin bronze ingots and casting
IS: 8543	Methods of testing plastics: Determination of density of solid plastics
IS: 7181	Horizontally cast iron double flanged pipes for water, gas and sewage.
IS: 8794	CI detachable joints for use with Asbestos cement pressure pipes
IS: 5382	Rubber sealing rings for gas mains, water mains and sewers
IS: 5531	Cast iron specials for asbestos cement pressure pipes for water, gas and sewage
IS: 779	Water meters
IS: 3624	Pressure and vacuum gauges
IS: 341	Black japan, types A, B and C

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IS: 9862	Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and chlorine resisting
IS: 1239	Mild steel tubes, tubular and other wrought steel fittings
IS: 7328	High density polyethylene materials for moulding and extrusion
IS: 4984	Specification for high density polyethylene pipes for potable water supplies; sewage and industrial effluents
IS: 554	Dimensions for pipe threads where pressure tight joints are required on the threads
IS: 1592	Asbestos cement pressure pipes – Specifications
IS: 778	Specifications for copper alloy gate, globe and check valves for water works purposes
IS: 12820	Dimensional requirements for rubber gaskets for mechanical joints and push on joint for use with cast iron pipes and fittings for carrying water, gas and sewage.
IS: 9523	Specification for DI fittings for pressure pipes for water, gas, and sewage.
ISO: 2045	Single socket for uPVC and uPVC pressure pipes with elastic sealing ring type joints - Minimum depth of engagement
ISO: 2507	PVC pipes and fittings- Vicat softening temperature - Test method and specification
ISO: 3603	Fittings for PVC pipe with elastic sealing ring joints pressure test for leak profanes
ISO: 1167	Thermoplastics pipes for the transport of fluids - Resistance to internal pressure - Test method and basic specification
ISO 3451-5	Determination of Ash: Part-5 - Poly vinyl chloride
ASTM: D 2152	Standard test method for degree of fusion of extruded PVC pipe and moulded fittings by Acetone immersion
MTNL	Mahanagar Telephone Nigam Limited; Technical specifications for cable ducts.
BS: 4772	Specification for DI fittings
IS: 7634- Parts 1-3	Code of practice for plastic pipe works for potable water supplies
IS: 8329	Centrifugally cast (spun) ductile iron pressure pipes for water, gas and sewage.
IS: 12288	Code of practice for use and laying of ductile iron pipes
CPHEEO Manual on Water Supply and Treatment, III edition, Ministry of Urban Development, New Delhi- May 1999.	

Ductile Iron Pipe:-

The pipes will be centrifugally cast (spun) Ductile Iron pipes for Water confirming to the IS 8329: 2000. The pipes used will be either with push on joints (Rubber Gasket Joints) or Flanged joints. The class of pipe to be used shall be of the class K-7 / Double Flange K-9.

The pipes shall be coated with bitumen as per appendix C and have factory provided cement mortar lining in

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inside as per the provisions of Appendix B of the IS 8329: 2000.

The pipes will be supplied in standard length of 5.50 and 6.00 meters length with suitably rounded or chamfered ends. Each pipe of the push on joint variety will also be supplied with a rubber EPDM gasket. Any change in the stipulated lengths will be approved by the Engineer – in charge. The gaskets will conform to the IS 5382:1985.

The gaskets should also be supplied by the manufacturer of the pipes. They should preferably be manufactured by the manufacturer of the pipes. In case they are not, it will be the responsibility of the manufacturer of the pipes to have them manufactured from a suitable manufacturer under its own supervision and have it tested at his/sub-contractors premises as per the contract. The pipe manufacturer will however be responsible for the compatibility and quality of the products.

The flanged joints will conform to the Clause 6.2 of IS 8329. The pipe supply will also include one rubber gaskets for each flange.

Inspection and Testing:

The pipes will be subjected to following tests for acceptance:

Visual and dimensional check as per Clause 13 and 15 of IS 8329

Mechanical Test as per Clause 10 of IS 8329

Hydrostatic Test as per Clause 11 of IS 8329

The test reports for the rubber gaskets shall be as per acceptance tests of the IS 5832 and will be in accordance to Clause 3.8

The sampling shall be as per the provisions of the IS 8329

Marking

All pipes will be marked as per Clause 18 of IS 8329 and show as below:

Manufacturer name/ stamp

Nominal diameter

Class reference

A white ring line showing length of insertion at spigot end

Packing and Transport:

The pipes should be preferably transported by road from the factory and stored as per the manufacturer specifications to protect damage.

Specials for Ductile Iron Pipes

General

This section covers the general requirements for Ductile Iron (DI) fittings suitable for Tyton joints to be used with Ductile Iron pipes with flanged and Tyton jointing system.

Types of specials

The following types of DI fittings shall be manufactured and tested in accordance with IS: 9523 or BS: 4772.

flanged socket

flanged spigot

Double socket bends (90, 45, 22 1/2 0, 11 1/4 0)

Double socket branch flanged tee

All socket tee.

Double socket taper.

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All Flanged Tee.

All Flanged taper.

Supply

All the DI fittings shall be supplied with one rubber ring for each socket. The rubber ring shall conform to IS: 12820 and IS: 5382 as described in the preceding chapter. Flanged fittings shall be supplied with one rubber gasket per flange and the required number of nuts and bolts.

General

This section covers the requirements for lubricant for the assembly of Ductile Iron pipes and specials suitable for Tyton push-in rubber ring joints

Specification

The lubricant has to have the following characteristics:

must have a paste like consistency and be ready for use

has to adhere to wet and dry surfaces of DI pipes and rubber rings

to be applied in hot and cold weather; ambient temperature 0 - 50 °C, temperature of exposed pipes up to 70 °C

must be non toxic

must be water-soluble

must not affect the properties of the drinking water carried in the pipes

must not have an objectionable odour

has to inhibit bacterial growth

must not be harmful to the skin

must have a shelf live not less than 2 years

Acceptance tests

They shall be conducted in line with the provisions of the IS 9523

Packing

All the DI fittings shall be properly packed with jute cloth. Rubber rings shall be packed in polyethylene bags. Rubber rings in PE bags and nuts, bolts etc. shall be supplied in separate jute bags.

The fittings should also be supplied by the manufacturer of the pipes. They should preferably be manufactured by the manufacturer of the pipes. In case they are not, it will be the responsibility of the manufacturer of the pipes to have them manufactured from a suitable manufacturer under it's own supervision and have it tested at his/sub contractors premises as per the contract. The pipe manufacturer will however be responsible for the compatibility and quality of the products.

Laying and jointing of DI pipes

Pipes should be lowered into the trench with tackle suitable for the weight of pipes. For smaller sizes, up to 200 mm nominal bore, the pipe may be lowered by the use of ropes but for heavier pipes suitable mechanical equipment have to be used.

All construction debris should be cleared from the inside of the pipe either before or just after a joint is made. This is done by passing a pull-through in the pipe, or by hand, depending on the size of the pipe. All persons should vacate any section of trench into which the pipe is being lowered

On gradients of 1:15 or steeper, precautions should be taken to ensure that the spigot of the pipe being laid does not move into or out of the socket of the laid pipe during the jointing operations. As soon as the joint assembly is

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been completed, the pipe should be held firmly in position while the trench is back filled over the barrel of the pipe.

The designed anchorage shall be provided to resist the thrusts developed by internal pressure at bends, tees, etc.

Where a pipeline crosses a watercourse, the design and method of construction should take into account the characteristics of the watercourse to ascertain the nature of bed, scour levels, maximum velocities, high flood levels, seasonal variation, etc. which affect the design and laying of pipeline.

The assembly of the pipes shall be made as recommended by the pipe manufacturer and using the suitable tools.

The socket and spigot ends of the pipes shall be brushed and cleaned. The chamfered surface and the end of the spigot end have to be coated with a suitable lubricant recommended by the manufacturer of the pipes. Oil, petroleum bound oils, grease or other material which may damage the rubber gasket shall not be used as lubricant. The rubber gasket shall be inserted into the cleaned groove of the socket. It has to be checked for correct positioning.

The two pipes shall be aligned properly in the pipe trench and the spigot end shall be pushed axially into the socket either manually or with a suitable tool specially designed for the assembly of pipes and as recommended by the manufacturer. The spigot has to be inserted up to the insertion mark on the pipe spigot. After insertion, the correct position of the socket has to be tested with a feeler blade

Deflection of the pipes -if any- shall be made only after they have fully been assembled. The deflection shall not exceed 75 % of the values indicated by the pipe manufacturer.

Anchoring of the pipeline

Thrust blocks shall be provided at each bend, tee, taper, end piece to prevent undue movements of the pipeline under pressure. They shall be constructed as per design of ENGINEER- IN- CHARGE according to the highest pressure during operation or testing of the pipes, the safe bearing pressure of the surrounding soil and the friction coefficient of the soil.

Leakage Test

After laying and jointing the pipeline shall be tested for tightness of barrels and joints, and stability of thrust blocks in sections approved by the Engineer in Charge. The length of the sections depends on the topographical conditions. Preferably the pipeline stretches to be tested shall be between two chambers (air valve, scour valve, bifurcation, other chamber). At the beginning, the Contractor shall test stretches not exceeding 2 km. After successful organization and execution of tests the length may be extended to more than 2 km after approval of the Engineer in Charge.

The water required for testing shall be arranged by the contractor himself. The Contractor shall fill the pipe and compensate the leakage during testing. The Contractor shall provide and maintain all requisite facilities, instruments, etc. for the field testing of the pipelines. The testing of the pipelines generally consists in three phases: preparation, pre-test/saturation and test immediately following the pre-test. Generally, the following steps are required which shall be monitored and recorded in a test protocol if required

The testing conditions for the pipelines are summarized as follows:

Maximum hydrostatic test pressure for DI K-7 / Double Flange K-9 pipes shall be 2.0 times of maximum design pressure in the pipeline.

Pre test and saturation period with addition of make-up water

Pressure:	Test pressure
Duration:	3 hrs for DI pipes without cement mortar lining / 24 hrs for DI pipes with cement mortar lining

Pressure test with addition of make-up water

Pressure:	Test pressure
Duration:	3 hrs

Test criteria for DI pipes: Q = 1 liter per km per 10mm of pipe per 30 m test pressure per 24 hrs.

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All pressure testing at site should be carried out hydrostatically. The pipes shall be accepted to have passed the pressure test satisfactorily, if the quantity of water required to restore the test pressure as per the latest codal provisions does not exceed the amount 'Q', calculated by the above formula.

If it is required to test a section of a pipeline with a free end, it is necessary to provide temporary support against the considerable end thrust developed by the application of the test pressure. The end support can be provided by inserting a wooden beam or similar strong material in a short trench excavated at right angle to the main trench and inserting suitable packing between the support and pipe end.

The pipeline stretch will pass the test if the water added during the test period is not exceeding the admissible limits. No section of the pipe work shall be accepted by the Engineer in charge until all requirements of the test have been obtained.

On completion of a satisfactory test any temporary anchor blocks shall be broken out and stop ends removed. Backfilling of the pipeline shall be completed.

Failure to pass the test

All pipes or joints which are proved to be in any way defective shall be replaced or remade and re-tested as often as may be necessary until a satisfactory test shall have been obtained. Any work, which fails or is proved by test to be unsatisfactory in any way, shall be redone by the Contractor.

Flushing and disinfecting of pipelines

After testing and commissioning the contractor shall flush the pipes with a velocity not less than 1 m/s or as approved by the Engineer in Charge. Disinfection of drinking water pipelines shall be made by engineer- in charge.

Supply of Ductile Iron Pipes:-

The Contractor will have to supply DI pipes manufactured by manufacturer who has been in business of supply of DI pipes rubber ring jointed and have proven record of successful supply and testing of pipeline for minimum one year.

Specifications for Laying and Jointing of Pipe Line System for Water Supply

Preparatory work

The contractor will inspect the route along which the pipe line is proposed to be laid. He should observe/ find out the existing underground utilities/ construction and propose an alignment along which the pipeline is to be laid. He should make all efforts to keep the pipe as straight as possible with the help of ranging rods. Wherever there is need for deviation, it should be done with the use of necessary specials or by deflection in pipe joints (limited to 75% of permissible deflection as per manufacturer). The alignment as proposed should be marked on ground with a line of white chalk and got approved from Engineer In-Charge. The Contractor will than prepare an L-Section along this alignment showing the location of proposed pipeline. The L-section should be got approved from the site Engineer. The position of fittings, valves, should be shown on the plan.

Alignment and the L-Sections

The alignments, L-section (depth of laying) and location of specials, valves and chambers may be changed at site in co-operation with and after approval of the Engineer in Charge. The minimum cover to the top of the pipe shall be 1 m.

Standards

Except as otherwise specified in this technical specification, the Indian Standards and Codes of Practice in their latest version, National Building code, PWD specification of the state of Rajasthan and Manual of water supply of GOI shall be adhered to for the supply, handling, laying, installation, and site testing of all material and works.

Tools and equipment

The contractor has to provide all the tools and equipment required for the timely, efficient and professional implementation of the work as specified in the various sections of the contract and as specified by the instructions of

manufacturers of the pipes and other material to be handled under this contract. On demand he shall provide to the Engineer in Charge a detailed list of tools and equipment available. If in the opinion of the Engineer in Charge the progress or the quality of the work cannot be guaranteed by the available quantity and type of tools and equipment the contractor has to provide additional ones to the satisfaction of the Engineer in Charge. The Contractor will always have a leveling instrument on site.

Handling and laying of pipes

Transportation of pipes and specials & Storage:-

The Contractor has to transport the pipes and other materials from manufacturer to the site of laying as indicated by the Engineer in Charge. Pipes should be handled with care to avoid damage to the surface and the socket and spigot ends, deformation or bending. Pipes shall not be dragged along the ground or the loading bed of a vehicle. Pipes shall be transported on flat bed vehicles/trailers. The bed shall be smooth and free from any sharp objects. The pipes shall rest uniformly on the vehicle bed in their entire length during transportation. Pipes shall be loaded and un-loaded manually or by suitable mechanical means without causing any damage to the stacked pipes.

The transportation and handling of pipes shall be made as per IS 12288. Handling instructions of the manufacturers of the pipes shall be followed. All precautions set out shall be taken to prevent damage to the protective coating, damage of the jointing surfaces or the ends of the pipes.

Whatever method and means of transportation is used, it is essential that the pipes are carefully placed and firmly secured against uncontrolled movement during transportation to the satisfaction of engineer in charge.

Cranes or chain pulley block or other suitable handling and lifting equipment shall be used for loading and un-loading of heavy pipes. However, for pipes up to 400 mm nominal bore, skid timbers and ropes may be used. Where using crane hooks at sockets and spigot ends hooks shall be broad and protected by rubber or similar material, in order to avoid damage to pipe ends and lining. Damage to lining must be repaired before pipe laying according to the instructions of the pipe manufacturer. Pipes shall not be thrown directly on the ground or inside the trench.

When using mechanical handling equipment, it is necessary to employ sufficient personnel to carry out the operation efficiently with safety. The pipes should be lifted smoothly without any jerking motion and pipe movement should be controlled by the use of guide ropes in order to prevent damage caused by pipes bumping together or against surrounding objects.

Rolling or dragging pipes along the ground or over other pipes already stacked shall be avoided.

The pipe should be given adequate support at all times. Pipe should be stored on a reasonably flat surface free from stones and sharp projections so that the pipe is supported throughout its length. In storage, pipe racks should provide continuous support and sharp corners of metal racks should be avoided. Socket and Spigot pipes should be stacked in layer with sockets placed in alternate ends of the stack to avoid lop sided stacks.

Pipes should not be stored inside another pipe. On no account the pipes should be stored in stressed or bent condition or near the sources of heat. Pipes should not be stacked more than 1.5 m high and pipes of different sizes and classes should be stacked separately. The ends of the pipes should be protected from abrasion. The pipes should be protected from U.V. rays and excessive heat at all times. Their storage facility should be well ventilated.

The Contractor shall provide proper and adequate storage facilities to protect all the materials and equipment's against damage from any cause whatsoever and in case of any such damage/theft, the Contractor shall be held responsible.

The contractor will lay the pipelines along the alignments as per the layout given by the Engineer in Charge. The layout shall be given keeping in view the information available regarding existing services like water lines, sewers, telephone and electric lines/ cables. In the event some services fall in the alignment of lines to be laid, the contractor shall have to shift such services for which a provision has been made in the BOQ. The contractor shall take all due care to avoid damage to any such services and, in case of any damage occurring to them in progressing the work, the Contractor shall make good the same at his own cost. No additional time shall, however, be allowed on this account.

Stringing of pipes along the alignment

The pipes shall be laid out properly along the proposed alignment in a manner that they do not create any significant hindrance to the public and that they are not damaged.

Stringing of the pipe end to end along the working width should be done in such a manner that the least interference is caused in the land crossed. Gaps should be left at intervals to permit the passing of equipment across the working area. Pipes shall be laid out that they remain safe where placed and that no damage can occur to the pipes and the coating until incorporated in the pipeline. If necessary, pipes shall be wedged to prevent accidental movement. Precautions shall be made to prevent excessive soil, mud etc. entering the pipe.

Generally, the pipes shall be laid within two weeks from the date of their dispatch from the manufacturer /store .

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Pipe trench

Trench excavation

The trench excavation of pipeline shall be in accordance with IS 12288. Pipe trenches shall be excavated to the lines and levels shown on the drawings or as directed by the Engineer in Charge. The depth of the excavated trench shall be as given in the drawings or as directed by the Engineer in Charge. The width of the trench at bottom between the faces of sheeting shall be such as to provide 200 mm clearance on either side of the Diameter. No pipe shall be laid in a trench until the section of trench in which the pipe is to be laid has been approved by the Engineer in Charge.

The depth should be sufficient to provide a cover not less than 1000 mm. It may be necessary to increase the depth of pipeline to avoid land drains or in the vicinity of roads, railways or other crossings. Care should be taken to avoid the spoil bank causing an accumulation of rainwater.

The bottom of the trench shall be trimmed and leveled to permit even bedding of the pipes. It should be free from all extraneous matter, which may damage the pipe or the pipe coating. Additional excavation shall be made at the joints of the pipes, so that the pipe is supported along its entire length.

All excavated material shall be stacked in such a distance from the trench edge that it will not endanger the work or workmen and it will avoid obstructing footpaths, roads and driveways. Hydrants under pressure, surface boxes, fire or other utility controls shall be left unobstructed and accessible during the construction work. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural watercourses shall not be obstructed.

To protect persons from injury and to avoid damage to property, adequate barricades, construction signs, torches, red lanterns and guards, as required, shall be placed and maintained during the progress of the work and until it is safe for traffic to use the roadways. All materials, piles equipment and pipes which may serve as obstruction to traffic shall be enclosed by fences or barricades and shall be protected by illuminating proper lights when the visibility is poor.

As far as possible, the pipe line shall be laid below existing services, like water and gas pipes, cables, cable ducts and drains but not below sewers, which are usually laid at greater depth. Where it is unavoidable, pipeline should be suitably protected. A minimum clearance of 150 mm shall be provided between the pipeline and such other services.

Trees, shrubbery fences, poles, and all other property and surface structures shall be protected. Tree roots shall be cut within a distance of 50 cm from pipe joints in order to prevent roots from entering them. Temporary support, adequate protection and maintenance of all underground and surface structures, drains, sewers and other obstructions encountered in the progress of the work shall be provided. The structures, which will be disturbed, shall be restored after completion of the work.

Where water forms or accumulates in any trench the Contractor shall maintain the trench free of water during pipe laying.

Wherever necessary to prevent caving, trench excavations in soils such as sand, gravel and sandy soil shall be adequately sheeted and braced. Where sheeting and bracing are used, the net trench width after sheeting shall not be less than that specified above. The sides of the excavation shall be adequately supported at all times and, except where described as permitted under the Contract, shall be not battered.

The Engineer in Charge in co-operation with the Contractor shall decide about the sheeting/ bracing of the trench according to the soil conditions in a particular stretch and taking into account the safety requirements of the Contractor's and Engineer- In- Charge's staff. Generally, safety measures against caving have to be provided for trenches with vertical walls if they are deeper than 2.0 m.

Trench excavation to commensurate with the laying progress

The work of trench excavation should be commensurate with laying and jointing of the pipeline. It should not be dug in advance for a length greater than 500 m ahead of work of laying and jointing of pipeline unless otherwise permitted by the Engineer in Charge. The Contractor has to ensure the following:

- safety protections as mentioned above have to be incorporated in the work process
- hindrances to the public have to be minimized
- the trench must not be eroded before the pipes are laid
- the trench must not be filled with water when the pipes are laid
- the trench must not be refilled before laying of the pipes

The bed for the laying of the pipes has to be prepared according to the L-Section immediately before laying of the pipes.

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Bedding of the pipes

The trench bottom shall be even compact and smooth so as to provide a proper support for the pipe over its entire length, and shall be free from stones, lumps, roots and other hard objects that may injure the pipe or coating. Holes shall be dug in the trench bottom to accommodate sockets so as to ensure continuous contact between the trench and the entire pipe barrel between socket holes.

Laying and jointing of pipes

General

The pipes will be cleaned in the whole length with special care of the spigot and sockets on the inside/ outside to ensure that they are free from dirt and unwarranted projections. The whole of the pipes shall be placed in position singly and shall be laid true to profile and direction of slope indicated on longitudinal sections. The pipes shall be laid without deflection in a straight alignment between bends and between high and low points. Vertical and horizontal deflections between individual pipes need the approval of the Engineer in Charge. In no case the deflection shall be more than 75 % of those recommended by the manufacturer.

Before pipes are jointed they shall be thoroughly cleaned of all earth lumps, stones, or any other objects that may have entered the interior of the pipes, particularly the spigot end and the socket including the groove for the rubber ring.

Pipes and the related specials shall be laid according to the instructions of the manufacturers and using the tools recommended by them.

Cutting of pipes shall be reduced to a minimum required to conform to the drawings. Cutting has to be made with suitable tools and according to the recommendations of the manufacturer. The spigot end has to be chamfered again at the same angle as the original chamfered end. Cutting shall be perpendicular to the Centre line of the pipe. In case of ductile iron pipes the cut and chamfered end shall be painted with two coats of epoxy paint. If there is no mark for the insertion depth on the spigot end of the (cut) pipe it shall be marked again according to the instructions of the manufacturer.

Before pipes are jointed they shall be thoroughly cleaned of all earth lumps, stones, or any other objects that may have entered the interior of the pipes, particularly the spigot end and the socket including the groove for the rubber ring. End caps are removed only just before laying and jointing

All specials like bends, tees etc. and appurtenances like sluice or butterfly valves etc. shall be laid in synchronization with the pipes. The Contractor has to ensure that the specials and accessories are ready in time to be installed together with the pipes.

At the end of each working day and whenever work is interrupted for any period of time, the free ends of laid pipes shall be protected against the entry of dirt or other foreign matter by means of approved plugs or end caps.

When pipe laying is not in progress, the open ends of installed pipe shall be closed by approved means to prevent entrance of trench water and dirt into the line.

No pipe shall be laid in wet trench conditions that preclude proper bedding, or when, in the opinion of the Engineer in Charge, the trench conditions or the weather are unsuitable for proper installation.

The pipeline laid should be absolutely straight unless planned otherwise. The accuracy of alignment should be tested before starting refilling with the help of stretching a string between two ends of the straight stretch of pipes to rectify possible small kinks in laying.

Special Cast Iron fittings and Accessories

Normally when pipeline is laid, a certain number of cast iron fittings such as tees, bends, reducers, etc, and special fittings such as air or sluice valves are required.

Laying of Fittings – All cast iron fittings shall be plain ended to suit the outside diameter of Asbestos cement pressure pipes and to the class and diameter of pipe manufactured. When using such cast iron fittings, they are jointed by cast iron detachable joints only. For cast iron specials having flanges, they are jointed in the pipeline with cast iron flange adaptors having one end flanged and the other plain ended.

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Anchorage - It should particularly be noted that the cast iron joints do not hold pipe ends within it firmly. During working or test pressure, there will be tendency for the pipe ends or special ends to slip out of the joint, more so with the case of blank end cap used for closure of pipeline and all degree bends and tees. In order to keep them firmly in the pipeline, anchoring of these specials are necessary against the direction of thrust.

The anchorage shall consist of either concrete cast-in-situ or masonry built in cement mortar. The anchors shall be extended to the firm soil of the trench side. The shape of the anchors will depend on the kind of specials used. They shall be spread full width of trench and carried vertically by the side and over the special to about 15 cm. The bearing area on sides of the trench will be proportional to the thrust and to bearing capacity of the sides of the trench.

Back filling and tamping

The soil under the pipe and coupling shall be tamped in order to provide a firm and continuous support to the pipeline. Tamping shall be done either by tamping bars or by using water to consolidate the back fill material.

The initial back fill material used shall be free of large stones and dry lumps. In stony areas the material for initial back fill can be shovelled from the sides of the trenches. In bogs and marshes, the excavated material is usually little more than vegetable matter and this should not be used for bedding purposes. In such cases, gravel or crushed stone shall be hauled in.

The initial back fill shall be placed evenly in a layer of about 100 mm thick. This shall be properly

consolidated and this shall be continued till there is a cushion of at least 300 mm of cover over the pipe.

If it is desired to observe the joint or coupling during the testing of mains they shall be left exposed.

Sufficient back fill shall be placed on the pipe to resist the movement due to pressure while testing.

Balance of the back fill need not be so carefully selected as the initial material. However, care shall be taken to avoid back filling with large stones, which might damage the pipe when spaded into the trench.

Pipes in trenches on a slope shall have extra attention to make certain that the newly placed back fill will not become a blind drain in effect because until back fill becomes completely consolidated, there is a tendency for ground or surface water to move along this looser soil resulting in a loss of support to the pipe. In such cases, the back fill should be tamped with extra care and the tamping continued in 100 mm layers right up to the ground level.

Anchoring of the pipeline

Thrust blocks shall be provided at each bend, tee, taper, end piece to prevent undue movements of the pipeline under pressure. They shall be constructed as per actual design and approval of Engineer in Charge according to the highest pressure during operation or testing of the pipes, the safe bearing pressure of the surrounding soil and the friction coefficient of the soil.

Testing of the upvc pipelines

Sectional tests:- After laying and jointing the pipeline shall be tested for tightness of barrels and joints, and stability of thrust blocks in sections approved by the Engineer in Charge as per IS Code.

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Specification of Works

1. Sluice Valves

Sluice valve on the delivery line of the pumps shall be electrically operated with a provision of manual operation through suitable gear box arrangement and handle, so as to ensure required effort at hand wheel periphery as 80N maximum. It shall conform to provisions of IS 14846. All tests shall be carried out as per these standards.

Valve Gate Position Indicator

Valves shall have two position marked at the shut end of the scale, first one corresponding to the position of the gate tangential to the bore of the seating and the second position below the first, corresponding to the position of the gate as it sits on the seating after moving a further distance equal to the depth of the seating.

Materials of Construction

- | | | |
|------------------------------|---|---|
| (1) Body, Door, Dome, Wedge | : | For PN 1.0 - CI IS 210 Gr. FG 200 (all sizes)
<i>For PN 1.6 - CI IS 210 Gr. FG 260 (up to 800mm) and SG IS 1865 Gr 500/7 (900 to 1200mm)</i> |
| (2) Hand Wheel | : | Cast Iron IS 210 Gr FG 200 |
| (3) Stem | : | Stainless Steel AISI 410/431 |
| (4) Seat, Door Ring | : | SS 410/CA 15 |
| (5) Shoe Channel & Wedge Nut | : | Stainless Steel AISI 410 |
| (6) Back seat Bush | : | Halprene on SS 410 |
| (7) Drain and air plug | : | Stainless Steel AISI 410 |
| (8) Gland Packing | : | Hemp (greased) |
| (9) Gasket | : | Neoprene |
| (10) Rivets | : | Soft annealed SS |
- The material of construction, in general, shall conform to relevant IS standard.

NOTE:

1. All CI & SG Iron must have 2% Nickel and 0.5% Chromium.

2. No Gunmetal or Bronze parts are to be used inside the valve.

List of accessories/optional features to be furnished and accessories as approved by the Engineer-in-Charge to be supplied. The approved QAP for sluice valve in other project is enclosed in the tender document..

2. Double Ball Air Valve

General

- The valve shall be capable of exhausting air from pipe work automatically when been filled. Air being released at a sufficiently higher rate to prevent the restriction of the Inflow rate. Similarly the valve shall be capable of ventilating pipe work automatically when being emptied. The air inflow rate being sufficiently high to prevent the development of a vacuum in pipeline. The valve shall automatically release air accumulating in pipe line work during normal working condition.**
- For double ball air valve, Air valve shall be of double orifice type with a large orifice for ventilation for exhaust of the pipeline and small orifice for release of air under**

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working pressure. The valve shall be suitable for maximum working pressure in the system. All double ball air valves shall be provided with isolating sluice valve and flanged end connection.

- 3) Air valve shall be design to prevent premature closure prior to all air having been discharge from the line. The orifice shall be positively sealed in the close position but float (Ball) shall only be raised by the liquid and not by mixer of air and liquid. The sealing shall be design to prevent the floats striking after long period in the close position.
- 4) All branched outlets including outlets for Air valves will be with compensation pads (Dia of Main / For branch Dia ratio greater than 3). Diameter of compensation pad will not be less than 1.75 times the O.D. of the branched outlet. Plate thickness for pads will be same as that of the main.
- 5) For outlets with above ratio less than three, then the joints will be of plate reinforcement type.
- 6) The aperture of valves must be properly designed for which the contractor shall submit design calculations for necessary approvals before the procurement of valves.
- 7) The air valve should be as per IS: 14845
- 8) All branched outlets including air valve tee's will be provided with one ½" BSP coupling duly plugged for measurement of pressure in due course. The closing plug will be in Stainless Steel (AISI 304 or equivalent) with Hex. Head. and will be provided with copper washer for sealing.
- 9) All flanges will be drilled as per I.S. 1538.
- 10) The gaskets shall be of nitrile rubber.

Material of Construction

- | | | |
|--|---|---|
| (1) Body | : | CI IS 210 Gr FG 260 |
| (2) High Pressure Orifice & Plug | : | St. Steel AISI 410 |
| (3) Low Pressure Ball | : | Stainless steel float |
| (4) High Pressure Ball | : | Stainless steel float. |
| (5) Low Pressure Seat Ring | : | Dexine (Nitrile Rubber) |
| (6) Sluice Valve | : | Isolating Sluice Valve conforming to IS 14846 |
| (7) Spindle | : | Stainless steel |
| (8) Bolts & Nuts | : | MS |
| (9) The Isolating Sluice valve shall be as relevant IS/as per manufacturer's recommendations | | |

Fixing

The work of fixing appurtenances, i.e. sluice valves, air valves, scour valves, etc. shall be carried out carefully so as not to damage them during handling, erection and fixing. The work shall be executed in a workmanlike manner under the direction Engineer-in-Charge.

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3. Spring Loaded Dual Plate Check Valve

General

- 1) The valve shall be of flanged type suitable for mounting on a horizontal pipeline.
- 2) Valves shall possess high speed closing characteristics and be designed for minimum slam condition when closing.
- 3) Dual plate check valves conform to API 594 and API 598. They shall have resilient sealing. The spring action shall optimize the equal closing rates of each plate especially when the friction coefficients are uneven due to one plate resting upon one another. The plates shall not drag on the seat while opening. The plates shall not vibrate under full or partial flow condition.
- 4) The minimum body-wall thickness shall conform to those given in Table 1B of API Standard 594.
- 5) The face-to-face dimensions of valves (including valves with ring-joint facings) shall conform to those mentioned in Table 2B of API Standard 594.
- 6) The valve body shall be furnished with a clearly visible cast, forged, machined-in, or die-stamped arrow to indicate the direction of flow through the valve.

Constructional Features

Double Flanged quick closing non slam spring loaded dual plate generally conforming to API 594 for pressure rating as per requirement at particular section of size equivalent to the delivery pipe shall be provided with following material of construction:

Materials of Construction

(a)	Rating	As per requirement at particular section
(b)	Body	CI to IS 210 Gr FG 260
(c)	Plate	ASTM, A 216 Gr WCB
(d)	Hinge Pin /Stop Pin	SS. AISI 431
(e)	Springs	SS. AISI 316
(f)	Body & Plate Seat	13% Chromium overlay.
(g)	Seal	EPDM
(h)	Retainer	Carbon Steel
(i)	Body Bearing	SS AISC 316
(j)	Plate Bearing	SS AISC 316

Nut, Bolts, Washers

The jointing material such as nuts, bolts, washers, pig lead, rubber packing, etc. shall be provided by the Contractor.

Nuts and bolts shall be of the best quality bright steel, machined on the shank and under the head and nut. Studs, bolts and nuts shall be galvanized. Bolts shall be of accurate length so that only one thread shall show through the nut in the fully tightened conditions. Nuts and bolts shall conform to IS 1363 and IS 1367.

Washers, locking devices and anti-vibration arrangements shall be provided where necessary.

Where there is a risk of corrosion, bolts, nuts and studs shall be designed so that the maximum stress does not exceed half the yield stress of the material under any conditions. All bolts, nuts and studs shall be subject to

frequent adjustment or removal in the course of maintenance and repair shall be made of nickel bearing stainless steel.

The Contractor shall supply all holding down, alignment leveling bolts complete with anchorages, nuts washers and packing required to fix the plant to its foundations, bed plates, frames and other structural parts.

The Contractor shall procure and keep at site, reasonable excess quantities to cover wastage of those materials, which will be normally subject to waste during erection, commissioning and setting to work.

Throughout erection, the valves shall be supported properly on wooden sleepers, etc and shall be concreted immediately thereafter, as directed. Before the valves are actually fixed, they shall be cleaned and greased and it should be seen that all parts are in perfect working condition. In the case of air valves, the Contractor shall take special care of the dextine joints and the ebonite and /or vulcanite balls until they are fixed in position. They shall be kept immersed in water in suitable containers.

4. SPECIFICATIONS FOR CIVIL WORKS

CIVIL AND BUILDING WORKS

GENERAL

This part of the specification covers the design loads to be considered specifications of material and workmanship for the civil works. Material used and workmanship for the civil works of pump house, filter plant, campus development, repair/new works of Intake pumping station, renovation of buildings, civil works associated with pipeline laying etc. to be done under the contract will adhere to the provisions laid down in this chapter.

For materials used other than those specified, the material must conform to the requirement of respective Indian Standards. The contractor shall get prior approval of the materials proposed to be used under the contract as per the provisions of Special Conditions of Contract, from the Engineer-in-Charge.

DESIGN CONSIDERATIONS:

DESIGN SUBMISSIONS

The contractor shall be responsible for the safety of structures, correctness of design and drawings, even after the approval of the same by Engineer-in-Charge. Complete detailed design calculations of foundations and superstructure together with general arrangement drawings and explanatory sketches shall be submitted to the Engineer-in-charge. Separate calculations for foundations or superstructures submitted independent of each other shall be deemed to be incomplete and will not be accepted by the Engineer-in-charge.

The design considerations described hereunder establish the minimum basic requirements of plain and reinforced concrete structures, masonry structures and structural steel works. However, any particular structure shall be designed for the satisfactory performance of the functions for which the same is being constructed.

DESIGN STANDARDS

All designs shall be based on the latest Indian Standard (I.S.) Specifications or Codes of Practice unless otherwise specified. The design standards adopted shall follow the best modern engineering practice in the field based on any other international standard or specialist literature subject to such standard reference or extract of such literature in the English language being supplied to and approved by the Engineer-in-charge. In case of any variation or contradiction between the provisions of the I.S. Standards or Codes and the specifications given along with the submitted tender document, the provision given in this specification shall be followed.

DESIGN LIFE

The design life of all structures and buildings shall be 60 years.

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DESIGN LOADING

All buildings and structures shall be designed to resist the worst combination of the following loads/ stresses under test and working conditions; these include dead load, live load, wind load, seismic load, stresses due to temperature changes, shrinkage and creep in materials, dynamic loads:

DEAD LOAD

This shall comprise all permanent construction including walls, floors, roofs, partitions, stairways, fixed service equipments and other items of machinery. In estimating the loads of process equipment all fixtures and attached piping shall be included.

LIVE LOAD

Live loads shall be in general as per I.S. 875. However, the following minimum loads shall be considered in the design of structures:

i)	Live load on roofs	2.00 kN/m ²
ii)	Live load on floors supporting equipment such as pumps, blowers, compressors, valves etc.	10.00 kN/m ²
iii)	Live load on all other floors walkways, stairways and platforms	4.00 kN/m ²

In the absence of any suitable provisions for live loads in I.S. Codes or as given above for any particular type of floor or structure, assumptions made must receive the approval of the Engineer-in-charge prior to starting the design work. Apart from the specified live loads or any other load due to material stored, any other equipment load or possible overloading during maintenance or erection/ construction shall be considered and shall be partial or full whichever causes the most critical condition.

WIND LOAD

Wind loads shall be as per I.S. 875. Part 3

EARTHQUAKE LOAD

This shall be computed as per I.S. 1893 taking into consideration soil foundation system, importance factor appropriate to the type of structure basic horizontal seismic coefficient/ seismic zone factor & average acceleration coefficient.

DYNAMIC LOAD

Dynamic loads due to working of plant items such as pumps, blowers, compressors, switch gears, traveling cranes, etc. shall be considered in the design of structures

JOINTS

Movement joints such as expansion joints, complete contraction joints, partial contraction joints and sliding joints shall be designed to suit the structure. However contraction joints shall be provided at specified locations spaced not more than 7.5 m in both right angle directions for walls and rafts.

Expansion joints of suitable gap at suitable intervals not more than 40 m shall be provided in walls, floors and roof slabs. No expansion joint in water retaining structure shall be allowed.

The positions of construction joints should be specified by the designer & indicated on the drawings. If there is a need on site to revise any specified position or to have additional joints, the proposed positions should be agreed with the designer.

The concrete at the joint should be bounded with that subsequently placed against it, without provision for relative movement between the two concrete should not be allowed to run to a feather edge & vertical joints should be formed against stop edges.

Expansion joints for non liquid retaining structures shall be provided as per IS 3414.

FOUNDATIONS

- 1 The minimum depth of foundations for all structures, equipments, buildings and frame foundations and load bearing walls shall be as per IS 1904.
- 2 Bearing capacity of soil shall be determined as per IS : 6403.
- 3 Care shall be taken to avoid the foundations of adjacent buildings or structure foundations, either existing or not within the scope of this contract. Suitable adjustments in depth, location and sizes may have to be made depending on site conditions. No extra claims for such adjustments shall be accepted by the Employer.

- 4 A structure subjected to groundwater pressure shall be designed to resist floatation. The dead weight of empty structure shall provide a factor of safety of 1.2 against uplift during construction and service.
- 5 Where there is level difference between the natural ground level and the foundations of structure or floor slabs, this difference shall be filled up in the following ways.
- 6 In case of non-liquid retaining structures the natural top soil shall be removed till a firm strata is reached (minimum depth of soil removed shall be 500 mm) and the level difference shall be made up by compacted backfill as per specifications. However the thickness of each layer shall not exceed 150 mm. The area of backfilling for floor slabs shall be confined to prevent soil from slipping out during compaction.
- 7 In case of liquid retaining structures, the natural top soil shall be removed as described above and the level difference shall be made up with Plain Cement Concrete not weaker than M 10.
- 8 If pile foundations are used, the contractor shall conduct the initial routine test as per IS 2911 at his own cost, to determine the safe load bearing capacity of piles.

DESIGN REQUIREMENTS

The following are the design requirements for all reinforced or plain concrete structures.

1. All blinding and leveling concrete shall be a minimum 100 mm thick in concrete grade M10 unless otherwise specified.

Liquid Retaining Structures: All structural reinforced concrete shall be of a minimum M25 grade with a maximum 20 mm aggregate size for footings and base slabs and with a maximum 20 mm aggregate size for all other structural members.

2. The reinforced concrete for water retaining structures shall have a minimum cement content of 300 kg/m³ with a maximum 20 mm size aggregate.
3. The minimum reinforcement in walls, floors and roofs in each of two directions of right angles within each surface zone shall be as per 7.1 of IS: 3370 part 2.
4. The nominal cover of concrete for all steel, including stirrups, links, sheathing and spacers shall be as per 7.2 of IS: 3370 Part 2.
5. All buildings shall be provided with damp proofing for basement and floors and water proofing for roofs.
6. Any structure or pipeline crossing below roads shall be designed for Class A of IRC loading.
7. The bridges and bridge supporting structures (for clarifiers etc.) shall be designed to safely withstand the loadings such as loads and torque transmitted through scrapper blades, motor etc. depending on the arrangement offered.
8. All pipes and conduits laid below the structural plinth and road works shall be embedded in reinforced concrete of grade M20 of minimum thickness 150 mm.
9. Suitable admixtures may be used with the approval of engineer in charge.
10. Construction of floors and walls of Liquid Retaining structures shall be as per 9.4 & 9.5 of IS : 3370 Part 1.

Design requirement of RCC liquid retaining structures / grade of concrete / minimum cement content and for other provisions, these shall be governed by the provisions of IS 456 and IS 3370, whichever is more stringent.

MATERIALS & STANDARDS

The term "materials" shall mean all materials, goods and articles of every kind whether raw, processed or manufactured and equipment and plant of every kind to be supplied by the Contractor for incorporation in the Works.

Except as may be otherwise specified for particular parts of the works the provision of clauses in "Materials and Workmanship" shall apply to materials and workmanship for any part of the works.

All materials shall be new and of the kinds and qualities described in the Contract and shall be at least equal to approved samples.

Materials and workmanship shall comply with the relevant Indian Standards (with amendments) current on the date of submission of the tender.

Where the relevant standard provides for the furnishing of a certificate to the Engineer-in-charge, at his request, stating that the materials supplied comply in all respects with the standard, the Contractor shall obtain the certificates and forward it to the Engineer-in-charge.

The specifications, standards and codes listed below are considered to be part of this Bid specification. All standards, specifications, codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions.

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In case of discrepancy between two standards the provisions more stringent shall be followed. In case of discrepancy between the Bid Specification and the Standards referred to herein, the Bid Specification shall govern.

IS No.	Title
	Construction Planning and Storage of Materials
4082 :	Recommendation on stacking and storage of construction materials at site (first revision)
7969 :	Safety code for handling and storage of building materials
EARTHWORK	
883 :	Design of structural timber in building - Code of practice (third revision)
1498	Classification and identification of soils for general engineering purposes (first revision) (Amendments 2) (Reaffirmed)
2682 : 1984	Chlordane emulsifiable concentrates (second revision) (Amendment 1) (Reaffirmed 1994)
3764: 1992	Excavation work - Code of safety (first revision)
4081	Safety code for blasting and related drilling operations
6313 (Part 2)	Code of practice for anti-termite measures in buildings: Part 2 Preconstructional chemical treatment measures (Reaffirmed)
FOUNDATIONS	
269 :	33 grade ordinary Portland cement.
432 (Part 1)	Mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars (third revision)
455	Portland slag cement
456	Code of practice for plain and reinforced concrete (Reaffirmed 2000)
1080 : 1986	Code of practice for design and construction of shallow foundations on soils (other than raft, ring and shell)
1489 (Part 1)	Portland pozzolana cement: Part 1 Fly ash based
1489 (Part 2)	Portland pozzolana cement: Part 2 Calcined clay based
1786	High strength deformed steel bars and wires for concrete reinforcement
1904	Code of practice for design and construction of foundations in soils: General requirements
2062	Steel for general structural purposes
2950 (Part 1)	Code of practice for design and construction of raft foundations: Part 1 Design
2974 (Part 1)	Code of practice for design and construction of machine foundations: Part 1 Foundations for reciprocating type machines
2974 (Part 2)	Code of practice for design and construction of machine foundations: Part 2 Foundations for impact type machines (hammer foundations)

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2974 (Part 3)	Design and construction of machine foundations - Code of practice: Part 3 Foundations for rotary type machines (medium and high frequency)
2974 (Part 4)	Code of practice for design and construction of machine foundations: Part 4 Foundations for rotary type machines of low frequency
2974 (Part 5)	Code of practice for design and construction of machine foundations: Part 5 Foundation for impact machines other than hammers (forging and stamping press, pig breakers, drop crusher and jolter)
3629	Specification for structural timber in building (first revision) (Reaffirmed 1991)
4091 : 1979	Code of practice for design and construction of foundations for transmission line towers and poles (first revision) (Reaffirmed 1987)
6403	Code of practice for determination of bearing capacity of shallow foundations.
6909	Specification for supersulphated cement
8009 (Part 1)	Code of practice for calculation of settlement of foundations: Part 1 Shallow foundations subject to symmetrical static vertical loads
8009 (Part 2)	Code of practice for calculation of settlement of foundations: Part 2 Deep foundations subjected to symmetrical static vertical loading.
4138	Safety code for working in compressed air.
8041	Rapid hardening Portland cement
9456: 1980	Code of practice for design and construction of conical and hyperbolic paraboloidal types of shell foundations.
19556	Code of practice for design and construction of diaphragm walls.
11089	Code of practice for design and construction of ring foundation
12269	53 grade ordinary Portland cement.
13094	Guidelines for selection of ground improvement techniques for foundation in weak soils.
13301	Guidelines for vibration isolation for machine foundations
SP 36 (Part 2) :1988	Compendium of Indian Standards on soil engineering : Part 2 Field testing
MASONRY	
	Part 1 Mortars
269	33 grade ordinary Portland cement
383	Coarse and fine aggregates from natural sources for concrete
455	Portland slag cement
456	Code of practice for plain and reinforced concrete
1344	Calcined clay pozzolana
1489 (Part 1)	Portland pozzolana cement: Part 1 Fly ash based
1489 (Part 2)	Portland pozzolana cement: Part 2 Calcined clay based
2116	Stand for masonry mortars

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2250	Code of practice for preparation and use of masonry mortars
2720 (Parts 1 to 41)	Methods of test for soils
3812	Fly ash for use as pozzolana and admixture
6452	Specification for high alumina cement for structural use
6909	Specification for supersulphated cement
8041	Rapid hardening Portland cement
8043	Hydrophobic Portland cement
8112	43 grade ordinary Portland cement
12269	53 grade ordinary Portland cement
12600	Low heat Portland cement
SP 20 (S & T) :	Handbook on masonry design and construction
SP 21 (S & T)	Summaries of Indian Standards for building materials
	Stonework
1123	Method of identification of natural building stones
1127	Recommendations for dimensions and workmanship of natural building stones for masonry work
1128	Limestone (slab and tiles)
1129	Recommendation for dressing of natural building stones
1130	Marble (blocks, slabs and tiles)
1597 (Part 1)	Code of practice for construction of stone masonry: Part 1 Rubble stone masonry
1597 (Part 2)	Code of practice for construction of stone masonry: Part 2 Ashlar masonry
1905	Code of practice for structural use of un-reinforced masonry
2250	Code of practice for preparation and use of masonry mortars
3316	Specification for structural granite
3622	Specification for sandstone (slab and tiles)
3696 (Part 1)	Safety code of scaffolds and ladders: Part 1 Scaffolds
4101 (Part 1)	Code of practice for external facing and veneers: Part 1 Stone facing
12440	Pre-cast concrete stone masonry blocks
SP 20 (S & T)	Handbook on masonry design and construction
SP 21 (S & T)	Summary of Indian Standards for building materials
	Plain And Reinforced Concrete
269	33 grade ordinary Portland cement

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383	Coarse and fine aggregates from natural resources for concrete
432 (Part 1 & 2)	Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars. Part 2 Hard drawn steel wire
455	Portland slag cement
456	Code of practice for plain and reinforced concrete
516	Method of test for strength of concrete
712	Building limes
875 (Part 1)	Code of practice for design loads (other than earthquake) for buildings and structures: Part 1 Dead loads -Unit weights of building material and stored materials
875 (Part 2)	Code of practice for design loads (other than earthquake) for buildings and structures: Part 2 Imposed loads
875 (Part 3)	Code of practice for design loads (other than earthquake) for buildings and structures: Part 3 Wind loads
875 (Part 4)	Code of practice for design loads (other than earthquake) for buildings and structures: Part 4 Snow loads
875 (Part 5)	Code of practice for design loads (other than earthquake) for buildings and structures: Part 5 Special loads and load combinations
650	Standard sand for testing of cement
3085	Method of test for permeability of cement mortar & concrete
9284	Method of test for abrasion resistance of concrete
5816	Method of test for splitting tensile strength of concrete cylinders
8142	Method of test for determining setting time of concrete by penetration resistance
12600	Low heat Portland cement masonry cement
3466	Masonry cement
3558	Code of practice immersion Vibrator for consolidating concrete
8042	White Portland cement
13620	Fusion bonded epoxy coated reinforcing bars
1343	Code of practice for Prestressed concrete
883	Design of structural timber in building - Code of practice
1199	Methods of sampling and analysis of concrete
1344	Calcined clay pozzolana
1489 (Part 1)	Portland pozzolana cement: Part 1 Fly ash based
1489 (Part 2)	Portland pozzolana cement: Part 2 Calcined clay based
1566	Hard-drawn steel wire fabric for concrete reinforcement
1786	High strength deformed steel bars and wires for concrete reinforcement

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1791	Batch type concrete mixers
1946	Code of practice for use of fixing devices in walls, ceilings and floors of solid construction
2062	Steel and general structural purposes
2386 (Part 1)	Methods of test for aggregates for concrete: Part 1 Particle size and shape
2386 (Part 2)	Methods of test for aggregates for concrete: Part 2 Estimation of deleterious materials and organic impurities
2386 (Part 3)	Methods of test for aggregates for concrete: Part 3 Specific gravity, density, voids, absorption and bulking
2386 (Part 4)	Methods of test for aggregates for concrete: Part 4 Mechanical properties
2386 (Part 5)	Methods of test for aggregates for concrete: Part 5 Soundness
2386 (Part 6)	Methods of test for aggregates for concrete: Part 6 Measuring mortar making properties of fine aggregates
2386 (Part 7)	Methods of test for aggregates for concrete: Part 7 Alkali aggregate reactivity
2386 (Part 8)	Methods of test for aggregates for concrete: Part 8 Petrographic examination
2502	Code of practice for bending and fixing of bars for concrete reinforcement
2505	Concrete vibrators - Immersion type - General requirements
2506	General requirements for screed board concrete vibrators
2514	Concrete vibrating tables
2751	Recommended practice for welding of mild steel plain and deformed bars for reinforced construction
3025	Methods of sampling and test (physical and chemical) for water used in industry
3036	Laying lime concrete for a waterproofed roof finish - Code of practice
3812	Fly ash for use as pozzolana and admixture
4031 (Part 1)	Methods of physical tests for hydraulic cement: Part 1 Determination of fineness by dry sieving
4098	Lime-pozzolana mixture (first revision)
4656	Form vibrators for concrete
4925	Concrete batching and mixing plant
4926	Ready mixed concrete
4990	Plywood for concrete shuttering work
6452	Specification for high alumina cement for structural use
6909	Specification for supersulphated cement
7861 (Part 1)	Code of practice for extreme weather concreting: Part 1 Recommended practice for hot weather concreting
7861 (Part 2)	Code of practice for extreme weather concreting: Part 2 Recommended practice for cold weather concreting

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8041	Rapid hardening Portland cement
8043	Hydrophobic Portland cement
8112	43 grade ordinary Portland cement
9012	Recommended practice for Concreting
9013	Method of making, curing and determining compressive strength of accelerated cured concrete test specimens
9103	Admixtures for concrete
10262	Recommended guidelines for concrete mix design
12269	53 Grade ordinary Portland Cement
13330	Sulphate resisting Portland Cement
12600	Low heat Portland cement
13311 (Part 1)	Non-destructive testing of concrete - Methods of test: Part 1 Ultrasonic pulse velocity
13311 (Part 2)	Non-destructive testing of concrete - Methods of test: Part 2 Rebound hammer
SP 23 (S & T)	Handbook on concrete mixes (based on Indian Standards)
SP 24 (S & T)	Explanatory handbook on Indian Standard Code for plain and reinforced concrete
SP 33 (S & T)	Handbook on timber engineering
SP 34 (S & T)	Handbook on concrete reinforcement and detailing
	Steel Construction
104	Ready mixed paint, brushing, zinc chrome, priming
123	Ready mixed paint, brushing, finishing, semi-gloss, for general purposes to Indian Standard Colours No.445, 446, 448, 449, 451, 473 and red oxide
800	Code of practice for general construction in steel
801	Code of practice for use of cold formed light gauge steel structural members in general building construction.
806	Code of practice use of steel tubes in general building construction
811	Cold formed light gauge structural steel sections
814	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel
816	Code of practice for use of metal arc welding for general construction in mild steel
817 (Part 1)	Code of practice for training and testing of metal arc welders: Part 1 Manual metal arc welding
819	Code of practice for resistance spot welding for light assemblies in mild steel
919 (Part 1)	ISO system of limits and fits: Part 1 Bases of tolerances, deviations and fits
1024	Code of practice for use of welding in bridges and structures subject to dynamic loading
1030	Carbon steel castings for general engineering purposes

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1148	Hot-rolled rivet bars (up to 40 mm dia) for structural purposes
1149	High tensile steel rivet bars for structural purposes
1161	Steel tubes for structural purposes
1182	Recommended practice for radiographic examination of fusion welded butt joints in steel plates
1261	Code of practice for seam welding in mild steel
4000	Code of practice for high strength bolts in steel construction
1852	Rolling and cutting laterals for list rolled steel structures
1278	Filler rods and wires for gas welding
1323	Code of practice for oxy-acetylene welding for structural work in mild steels
1363 (Part 1)	Hexagon head bolts, screws and nuts of product grade C: Part 1 Hexagon head bolts (size range M 5 to M 64)
1363 (Part 2)	Hexagon head bolts, screws and nuts of product grade C: Part 2 Hexagon head screws (size range M 5 to M 64)
1363 (Part 3)	Hexagon head bolts, screws and nuts of product grade C: Part 3 Hexagon nuts (size range M 5 to M 64)
1364 (Part 1)	Hexagon head bolts, screws and nuts of product grades A and B: Part 1 Hexagon head bolts (size range M 1.6 to M 64)
1364 (Part 2)	Hexagon head bolts, screws and nuts of product grades A and B: Part 2 Hexagon head screws (size range M 1.6 to M 64)
1364 (Part 3)	Hexagon head bolts, screws and nuts of product grades A and B: Part 3 Hexagon nuts (size range M 1.6 to M 64)
1367 (Part 3)	Fasteners - Threaded steel - Technical supply conditions: Part 3 Mechanical properties and test methods for bolts, screws and studs with full loadability
1393	Code of practice for training and testing of oxy acetylene welders
1477 (Part 1)	Code of practice for painting of ferrous metals in buildings: Part 1 Pretreatment
1477 (Part 2)	Code of practice for painting of ferrous metals in buildings: Part 2 Painting
1929	Hot forged steel rivets for hot closing (12 to 36 mm diameter)
808	Dimensions for hot rolled steel beams, column channels and angle sections
1398	Placing paper, water proof, bitumen laminated
4353	Recommendations for submerged arc welding of mild steel and low alloy steel
2595	Code of practice for radiographic testing
3935	Code of practice for composite constructions
3658	Code of practice for liquid penetration flow detention
1977	Structural steel (ordinary quality)
2062	Steel for general structural purposes

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2074	Ready mixed paint, air drying, red oxide-zinc chrome, priming
2155	Cold forged solid steel rivets for hot closing (6 to 16 mm diameter)
3502	Steel chequered plates
3613	Acceptance tests for wire flux combination for submerged arc welding
3640	Hexagon fit bolts
3757	High strength structural bolts
5369	General requirements for plain washers and lock washers
5370	Plain washers with outside diameter ≈ 3 x inside diameter
5374	Taper washers for I-beams (ISMB)
6419	Welding rods and bare electrodes for gas shielded arc welding of structural steel
6560	Molybdenum and chromium-molybdenum low alloy steel welding rods and bare electrodes for gas shielded arc welding
6610	Heavy washers for steel structures
6623	High strength structural nuts
6649	Hardened and tempered washers for high strength structural bolts and nuts
7205	Safety code for erection of structural steel work
7215	Tolerances for fabrication of steel structures
7280	Bare wire electrodes for submerged arc welding of structural steels
7307 (Part 1)	Approval tests for welding procedures: Part 1 Fusion welding of steel
7310 (Part 1)	Approval tests for welders working to approved welding procedures: Part 1 Fusion welding of steel
7318 (Part 1)	Approval tests for welders when welding procedure approval is not required: Part 1 Fusion welding of steel
8500	Structural steel - Microalloyed (medium and high strength qualities)
9595	Recommendations for metal arc welding of carbon and carbon manganese steel
12843	Tolerances for erection of steel structures
5334	Code of practice for magnetic practice flow detention of welds
SP 6(5)	Cold- formed, light-gauge steel structures
	Roofs and Roofing
158	Ready mixed paint, brushing, bituminous, black lead-free, acid alkali and heat resisting
217	Cutback bitumen
269	33 grade ordinary Portland cement
277	Galvanized steel sheet (plain and corrugated)
280	Mild Steel wire for general engineering

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383	Coarse and fine aggregates from natural sources for concrete
432 (Part 1)	Mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars
451	Technical supply conditions for wood screws
455	Portland stag cement
456	Code of practice for plain and reinforced concrete
459	Corrugated and semi-corrugated asbestos cement sheets
723	Steel countersunk head wire nails
725	Copper wire nails
730	Hook bolts for corrugated sheet roofing
805	Code of practice for use of steel in gravity water tanks
808	Dimensions for hot-rolled steel beam, column channel and angle sections
883	Design of structural timber in building - Code of Practice
1077	Common burnt clay building bricks
1120	Coach screws
1199	Methods of sampling and analysis of concrete
1254	Corrugated aluminium sheet
1322	Bitumen felts for waterproofing and damp-proofing
1343	Code of practice for Prestressed concrete
1344	Calcined clay pozzolana
1489 (Part 1)	Portland pozzolana cement: Part 1 Fly ash based
1489 (Part 2)	Portland pozzolana cement: Part 2 Calcined clay based
2098	Asbestos cement building boards
2119	Code of practice for construction of brick-cum-concrete composite (Madras terrace) floor or roof
2204	Code of practice for construction of reinforced concrete shell roof
2527	Code of practice for fixing rainwater gutters and down pipes for roof drainage
2690 (Part 1)	Burnt clay flat terracing tiles: Part 1 Machine made
2690 (Part 2)	Burnt clay flat terracing tiles: Part 2 Hand made
3007 (Part 1)	Code of practice for laying of asbestos cement sheets: Part 1 Corrugated sheets
3007 (Part 2)	Code of practice for laying of asbestos cement sheets: Part 2 Semi-corrugated sheets
3629	Specification for structural timber in building
6061 (Part 1)	Code of practice for construction of floor and roof with joints and filler blocks : Part 1 with hollow concrete filler blocks

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6061 (Part 2)	Code of practice for construction of floor and roof with joints and filler blocks : Part 2 with hollow clay filler blocks
6061 (Part 3)	Code of practice for construction of floor and roof with joints and filler blocks : Part 3 Precast hollow clay blocks joints and hollow clay filler blocks
6061 (Part 4)	Code of practice for construction of floor and roof with joints and filler blocks : Part 4 With precast hollow clay blocks slab panels
6332	Code of practice for construction of floor and roofs using precast doubly curved shell units
8869	Washers for corrugated sheet roofing
12093	Code of practice for laying and fixing of sloped roof coverings using plain and corrugated galvanized steel sheet (ISO 6589-1983)
12506	Code of practice for improved thatching of roof with rot and fire retardant treatment
	Damp - Proofing and Waterproofing
73	Paving bitumen
269	33 grade ordinary Portland cement
383	Coarse and fine aggregates from natural sources for concrete
702	Industrial bitumen
1195	Bitumen mastic for flooring
1203	Determination of penetration
1322	Bitumen felts for waterproofing and damp-proofing
1346	Code of practice for waterproofing of roofs with bitumen felts
1580	Bituminous compounds for water proofing and caulking purposes
1609	Code of practice for laying damp-proofing treatment using bitumen felts
1635	Code of practice for field slaking of building lime and preparation of putty
1834	Hot applied sealing compound for joint in concrete
2116	Sand for masonry mortars
2508	Low density polyethylene films
2527	Code of practice for fixing rainwater gutters and down pipes for roof drainage
2541	Code of practice for preparation and use of lime concrete
2645	Integral cement water proofing compounds
2690 (Part 1)	Burnt clay flat terracing tiles: Part 1 Machine made
2690 (Part 2)	Burnt clay flat terracing tiles: Part 2 Hand made
3036:1992	Laying lime concrete for a waterproofed roof finish
3037	Bitumen mastic for use in waterproofing of roofs

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3067	Code of practice for general design details and preparatory work for damp-proofing and waterproofing of buildings
3370 (Part 1)	Code of practice for concrete structures for the storage of liquids: Part 1 General Requirements
3384	Specification for bitumen primer for use in waterproofing and damp proofing
4098	Lime-pozzolana mixture
4365	Code of practice for application of bitumen mastic for water proofing of roofs
5871	Bitumen mastic for tanking and damp-proofing
6494	Code of practice for waterproofing of underground water reservoirs and swimming pools
7193	Glass fibre base coaltar pitch and bitumen felts
7198	Code of practice for damp-proofing using bitumen mastic
7290	Recommendations for use of polyethylene film for waterproofing of roofs
9759	Guidelines for dewatering during construction
9918	Code of practice for application of silicone based water repellent
12027	Silicone-based water repellents
12054	Code of practice for application of silicone based water repellent
13182	Waterproofing and damp-proofing of wet areas in building Recommendations
Part 1	Water Supply
1172	Code of basic requirements of water supply, drainage and sanitation
1239 (Part 1)	Mild steel tubes, tubular and other wrought steel fittings: Part 1 Mild steel tubes
1536	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage
1537	Vertically cast iron pressure pipes for water, gas and sewage
1592	Asbestos cement pressure pipes
3114	Code of practice for laying of cast iron pipes
5822	Code of practice for welded steel pipes for water supply
1626 (Part 1)	Asbestos cement building pipes and pipe fittings, gutters and gutter fittings and roofing fittings: Part 1 (Pipe and pipe fittings)
2064	Selection, installation an maintenance of sanitary appliances - Code of practice
2065	Code of practice for water supply in buildings
2692	Ferrules for water services
3076	Low density polyethylene pipes of potable water supplies; sewage and industrial effluents
4984	Specification for high density polyethylene pipes for potable water supplies; sewage and industrial effluents
4985	Specification for unplasticised PVC pipes for potable water supplied

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7558	Code of practice for domestic hot water installations
7634 (Part 2)	Code of practice for plastics pipe work for potable water supplies : Part 2 Laying and jointing polyethylene (PE) pipes
7634 (Part 3)	Code of practice for plastics pipe work for potable water supplies : Part 3 Laying and jointing of UPVC pipes
12183 (Part 1)	Code of practice for plumbing in multi-storeyed buildings: Part 1 Water supply
1916	Steel cylinder pipes with lining and coating
4127	Code of practice for laying of salt glazed stoneware pipes
12709	Glass fibre reinforced plastic pipes, joints and rings for potable water supply
3597	Concrete pipes-methods of test
7319	Perforated concrete pipes
NBC	National Building Code of India
SP 35 (S & T)	Handbook of water supply and drainage with special emphasis on plumbing
	Special Construction Procedures Earthquake Effects, Etc.
1893	Criteria for earthquake resistant design of structures
4326	Earthquake resistant design and construction of buildings- Code of practice
13920	Ductile detailing of reinforced concrete structures subjected to seismic forces - Code of practice
13935	Repair and seismic strengthening of buildings - Guidelines
4991	Criteria for blast resistant design of structures for explosions above ground
6922	Criteria for safety and design of structures subject to underground blasts
2190	Selection, installation and maintenance of first-aid fire extinguishers - Code of practice
3696 (Part 2)	Safety code of scaffolds and ladders: Part 2 Ladders
4912	Safety requirements for floor and wall openings, railings and toe boards
	General
10005	S.I. units and recommendations for use of their multiples and of certain other units
6060	Code of practice for day lighting of factory buildings
3103	Code of practice for industrial ventilation
3483	Code of practice for noise reduction in industrial buildings
2440	Guide for day lighting of buildings
1200 (1 to 28)	Method of measurement of Building and Civil Engg. Works
7973	Code of practice for architectural and building working drawings
962	Code of practice for architectural and building drawings
13415	Code of safety for protective barrier in and around buildings

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4801	Safety code for blasting and related drilling operations
8969	Safety code for erection of concrete framed structures

5. Specifications of Mono block pumps/ Centrifugal Coupled Pump Sets

The mono block pumps shall conform to the requirements of the required head and flow as given above. The construction features of the pump shall conform to IS 9079.

Accessories and services required to be supplied by the Bidder with pump.
The bidder is supposed to provide at least the following accessories

- Base Plate
- Foundation Bolts
- Coupling, if required
- Coupling guard, if required

Drawings and information to be provided

During detailed engineering the Bidder shall submit the following:

- General arrangement, cross-sectional and dimensional drawings/data pertaining to selected model.
- Complete detailed drawing of the base plate
- Complete performance curve with (for pumps of BHP more than 50 HP)
- H - Q curves.
- Test reports, performance curves and other particulars, as required by the applicable clauses of this specification.
- Instruction Manuals:
- Instruction manual for Erection
- Instruction for pre-commissioning check up, operation, abnormal conditions, maintenance and repair

Delivery & Suction Pipes – Design considerations

- The sizes of manifold pipes shall be as mentioned in the scope of work.
- All in house pipes shall be of MS as per IS 3589-2000. However the minimum thickness shall be as per IS 3589-1991 or as per design or 6.35 mm whichever is more.
- All the in house piping shall be provided with internal food grade epoxy painting and external enamel painting as approved by EIC.
- Pipes shall be welded with companion flanges of respective valves and dismantling joints etc.
- The suction and delivery pipes shown in the conceptual drawings clear water pumping stations are tentative. However the contractor shall check the same so as to limit the velocity of flow in respective pipes, below 2 m/sec. The velocity in the delivery pipes shall not exceed 1.8 m/s. The velocity in the suction pipe shall not exceed 1.0 m/s. The velocity in suction manifold shall not exceed 0.6 m/s. These velocities shall correspond to the ultimate demand of 2031.

6. Specifications of Submersible Mono block pumps Sets for Lifting water from CWR :-

- Submersible Mono block pump set conforming to IS 8034 and 02 pole motor operating at synchronized speed of speed 3000 RPM, with water proof winding.
- Pump shall be suitable for various delivery head and discharge with stainless steel shaft.
- Motor suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz AC and with water lubricated bearing to accept entire hydraulic thrust.
- Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust.
- The pump set shall be suitable for direct coupling, with suitable suction strainer.
- Pump should have suitable discharge out let as per manufacturer's design.
- Anti-thrust stream lined non return valve shall be provided with the pump and minimum 6 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall be provided with each pump etc. complete in all respect as per specification, scope of work and direction of Engineer in Charge of following power rating, suitable for prescribed duty conditions.

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7. SPECIFICATIONS FOR PUMPING STATIONS (ELECTRICAL)

General

It is not the intent to specify herein all the details pertaining to the design, drawing, selection of equipment/materials, procurement, manufacture, installation, testing & commissioning, however, the same shall be of high standard of engineering and shall comply with all currently applicable standards, regulations & safety codes. These specifications cover the equipment to be installed in switchgear, cables etc. along with the specifications for workmanship, laying cables, earthing systems, lightning protection etc.

It shall be the responsibility of the Bidder to design the electrical system based on the selection of the mechanical equipment. The work will be executed as per the detailed designs and drawings approved during execution.

Wherever the electrical equipment and system has to be connected with the Instrumentation system, the details of the connectivity of the electrical system/equipment with the Instrumentation system has to be worked out by the bidder to be commensurate with the requirement of the Instrumentation system to be provided, Irrespective of the provisions given in these specifications for electrical equipment/works, in this chapter. The bidder shall provide all necessary accessories with the equipment dealt herein or additional equipment required for effective functioning of the electrical and Instrumentation systems.

The pre-dispatch inspection and pre-commissioning testing and commissioning details are provided in Chapters of Specifications for Pre-dispatch inspection and Specifications for Testing, Commissioning and Trial run respectively. The specifications of material and workmanship of all civil works and lighting fixtures shall be in compliance with the specifications given in the chapter for "Specifications for Civil Works".

The brief technical specifications of the various electrical equipments are given in subsequent clauses comprising the following:

- Applicable Indian Standards
- Other considerations (if any)
- Technical parameters supplied by the department
- Drawings and documents for review/approval

The various systems covering the installation practices are described separately.

The scope of the Bidder shall cover design and drawing of electrical systems, selection of the equipment/materials, procurement, expediting, inspection, packing and forwarding, delivery at site, erection, testing, commissioning, obtaining the statutory approvals, handing over the complete plant etc.

Power Supply Information

The proposed power supplies are as follows:

(i)	415V AC System	Voltage variation +10 to -15% Freq. Variation +3 to -5%	Three Phase and neutral, 50 Hz, effectively earthed system, SC. rating of 50 kA
(ii)	240V AC System	Voltage variation + 10% to -15 % Freq. Variation + 3% to - 5%	Single phase and neutral, 50 Hz, effectively earthed system

The ambient temperature for design of the electrical equipment shall be 50° C.

Fault Levels

The fault levels of the proposed units in the substation / pump house shall be as per IS: 2026 as follows:
415 system : 20 MVA

Design Considerations

General

The electrical installations proposed under the contract are for the project requirement. Wherever found necessary, the installations shall be done considering the likely extension of the system/system component for integration with the future extensions.

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Motor Control center

Main panel as per requirement on head work as per the requirement enclosed in vol III of tender document..

incoming Air Circuit Breaker / MCCB of required capacity as per SLD diagram of pump house.

Ammeter with ASS, Voltmeter with VSS, Multifunction meter with Port for interfacing with PLC, indicating lights

Out going Starter, Soft Starter with MCCB & Moter duty MCB ,KWH meter having port for PLC- interface, Motor protection relay with Over load, phase loss, Locked roter, stalling protections, local & remote start stop buttons, on off-trip indications, Auto / manual selector

APFC Panel with 12 stage microprocessor based relay, SFU, Contactor, Auto manual selector, indicating lamps

Fixed capacitor for Transformer at all pumping stations

Auxiliary panel

Reversible starter for actuators as per requirement.

Lighting Risings for internal & out door lights through MCB

Starter for dewatering pump

DP MCB for control supply of Flow, pressure, level sensors

Spare Rising 63A TPN -4 nos.

Rising for chlorinator

DRAWING AND DOCUMENTS REQUIRED

- GA drawing for operating mechanism.
- Schematic and wiring diagram.
- GA drawing of supporting structures with foundation details.
- Instruction manual for installation, operation and maintenance

METAL ENCLOSED LT SWITCHGEAR

STANDARDS

Standard	Description
1. IS 4237	Switchgear general requirements.
2. IS 5578	Guide for making of insulated conductors
3. IS 8623	Factory built assemblies of Sw Gr & Cont. Gr (for voltages < 650 V).
4. IS 2147	Degree of protection of enclosure for LV switchgear and control gear.
5. IS 1248	Electrical Indicating Instruments.
6. IS 722	Integrating AC electric meters.
7. IS 2705	Current transformers.
8. IS 3156	Voltage transformers.
9. IS 10118	Installation and maintenance of switchgear.
10. IS 11353	Guide for uniform system of marking and identification of conductor and equipment terminals.
11. IS 13947	Specification for low voltage switchgear and control gear

OTHER CONSIDERATIONS

This section is applicable for all 415V switchboard panels

- Motor Control center/Auxiliary panel

The switchboard panel shall be made out of sheet steel in compartmentalized design and shall be suitable for bottom cable entry. The horizontal bus bar chamber shall be on the top whereas vertical busbars shall be provided in bus alley at the front.

The minimum clearance on the back and sides of each switchboard panel shall be >1000 mm <200mm and on the front side the same shall be 2500 mm.

At least 2 spare bays of adequate rating will be kept in the panel for additional circuits in future.

1	Sheet Steel Thickness	
	Enclosure and Doors	2.0 mm CRCA
	Partitions and covers	1.6 mm CRCA
	Gland Plate	3 mm HR Sheet

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	Base Frame	min 3 mm HR Sheet
2	Degree of Protection	IP 52
3	Surface Finish	Powder coating
4	Shade (Interior & Exterior)	Light Grey, Shade : 631 (IS : 5)
5	PVC Heat shrink Sleeve	Black sleeve with coloured tape for R/Y/B
6	Control Connections for PT and other connections For CT circuits	1.5 mm ² stranded Copper wire 2.5 mm ² stranded Copper wire
7	Gasket for Doors	Neoprene Gasket shall be provided to make Panel dust & vermin proof, conforming to degree of protection IP 52.
8	Earth bus	Earth bus suitable for fault level of panel shall be provided throughout the length of panels. The horizontal earth bus shall project out of the panel at bottom and shall have at-least two holes for earth connections.
9	Door closing arrangement Cable lugs	All power switches shall be door interlocked Cu cable lugs for copper cables shall be fitted.
10	Cable glands	Double compression brass cable glands shall be provided.
11	Operating Height	Operating switches, push buttons and handles shall not be placed below 300 mm and above 2000 mm
12	Cubicle illumination	Shall be provided
13	Live connections	Live connections from Bus Bar up to switches shall be shrouded in order to avoid accidental touch.

TECHNICAL PARAMETERS FOR MOTOR CONTROL PANELS

a)	TPN busbar details	High Conductivity Al grade E91E for TPN bare busbar, size shall be suitable for continuous current rating as per the detailed design.
b)	Min. clearance	Phase to phase - 25 mm & Phase to earth - 20 mm
c)	Power freq. Withstand	2.5 kV RMS, 50 Hz for one minute
d)	Short Circuit Current	25 kA (RMS) for 1 second
e)	Max. temp. of bus bar	70 ° C
f)	CT details	Cast resin / bar primary type, 5 A CT CT ratio, burden and class shall be as per the maximum current expected at the point of installation in the circuit, indicative CT ratio and burden are shown in respective SLD
g)	MCB details	Rating shall be as per the maximum current expected on that circuit. MCB will be current limiting feature
h)	Contactors details	Rating shall be as per the requirement of the motors Duty shall be as per application
i)	Relays	Motor protection relay shall have over load , phase loss, Locked roter, stalling protections.
j)	Motor control supply	415/230 V, AC
k)	Selector switch details	AS for Ammeter with R, Y, B, OFF positions. VS for Voltmeter with RY, YB, BR, OFF positions
l)	Indicating Meter details	Moving iron type, 90 ° scale, for AM & VM, Suppressed scale in case of VM to indicate CT primary current. AM dial range to suit CT primary current.

		VM dial range 0-600 volt. Size 96 mm ² Accuracy Class 1.0
m)	Multi-function meter	Shall have built in ammeter, voltmeter, kW meter, kVA meter, PF meter, kWh meter, kVAH meter
n)	Integrating Meter details	Electronic/Train gear type, calibrated for required CT-PT ratio Accuracy Class 1.0, for other details refer drawings
o)	Push button details	Momentary type, 2 NO & 2 NC contacts of 10 A at 240 V AC spare No, NC to be provide
p)	Indicating lamp details	LED type with series resistance,
q)	Control fuse details	HRC cartridge type with base & carrier. Contactor to select rating.
r)	Changeover switch	2 position, on load type
s)	Miscellaneous details	1. Control terminals shall be of 10 A, 1100 V grade, clip on type with din rail mounting. 2. CT terminals shall be provided with shorting link and earthing facility 3. Control wiring - marked with ferrule Nos. at both ends.

SOFT STARTERS

Specifications:

The Soft Starter shall be suitable to operate on AC 415 V (+ 10 % / - 15 %) 50 C / S +3% 3 Phase, 6 wire system and at an ambient temperature of 50 deg C.

Soft Start, Soft Stop adjustable current limit features.

Integrated micro Processor based overload relay with adjustable trip class 10/15/20. Overload relay shall remain active when soft starter is in by pass mode. Proper indications shall be there for on-off trip position optional free contracts shall be there for logic requirement for on-off trip.

Current rating of Soft Starter shall be considered on 50 deg temperature and it shall be 30 % higher than full load current of motor.

Panel Cooling fans shall be provided for soft starters Rising.

The Soft Starter shall have 1-120 second adjustment range for soft start and stop at site adjustment compatibility, kick start to over ride soft start for high torque and kick start and stop time selectable options. Soft stop control through selectable step down and end voltage level during stop ramp to prevent water hammering.

Power connection by Six wire connection with motor.

Protections: The Soft Starter should have following protections

Over Load Protection with trip class 10/20/30 A site selectable. Dual over load relay to select different trip class during start and normal run, Motor over temperature, Starter over temperature, Phase imbalance, Phase sequence, instantaneous high current, Under load, Motor connection, Phase loss, frequency fault, Shorted or open SCR, Soft Starter PCB fault, Communication failure and Reverse rotation.

Warnings: The Soft Starter should have provision for following warnings before tripping, Motor Over load warning, Thyristor over load warning and high current warning.

Operator

Interface: Digital key pad with LCD screen for at least 20 segment display, Local push button for start, Stop and reset, RYB Phase Start, Stop, Trip LED indications, Start Stop two programmable inputs, motor thermistor PTC input for monitoring motor temperature and protection, three programmable relay inputs, Motor current settings as – 30 % to 115%, flexible communication option as Modbus / Profibus / Devicenet / ASI.

PROTECTION RELAY (EMPR) SPECIFICATION

Motor Protection Relay should be Micro-processor based having following protection with 240 Volt AC supply through auxiliary supply 240 Volt AC supply

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RajKaj Ref No.:
20641074

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1. Thermal overload should have class 10, 10A, 20, 30 to match the Characteristic of Motor.
2. Earth Fault protection 10% to 50% with difin ate time less then 300 mili sec.
3. Negative sequence 40% for 3 sec. mainly for singlar phasing protection.
4. Locked Rotor 3 Im for 1 sec.
5. Under current 0.5 Im for 3 sec.
6. Current unbalance.

The relay should have the facility to bye pass lock rotot and under current protection.

The relay should have the Power On LED and having the separate LED for faults indication means for under current ,lock rotor,earth fault,negative sequence & overload.

The relay should have inbuilt CBCT.

The rely should have following current settings.

1 A to 2.75 A, 2 A to 5.5 A, 4 A to 11 A, 8 A to 22 A, 16 A to 44 A, 32 A to 88 A

MAKE- L&T/SIEMENS/AREVA

Capacitors

LT CAPACITORS

Standards

Standard	Description
IS 2834	Power factor improvement capacitors

Other considerations

The Contractor shall check with manufacturer regarding providing of inductor coil.

The Contractor shall work out the automatic power factor control (APFC) scheme to achieve a power factor of 0.92. The power factor improving capacitor requirement shall be as per the power factor of the equipment selected by the Contractor.

Technical parameters

a)	Quantity and output	The quantity and output must be designed as per the requirement of load to achieve the objective.
b)	Power factor control	Through APFC / CAPACITORS
c)	Capacitor type	MPP
d)	Rated voltage and frequency	415 Volts 3 phase (line to line), 50 Hz
e)	Maximum over voltage the unit capacitor is capable of withstanding continuously	105 %

Drawing and documents required

- GA drawing of the capacitor unit, bank
- Instruction manual for installation, operation and maintenance for capacitor

Cables

HT/LT CABLES

Standards

No.	Standard	Description
1.	IS 1554	PVC insulated electric Cables.
2.	IS 8130	Conductors for insulated electric cables.
3.	IS 5831	PVC insulation and sheath of electric cables.
4.	IS 3975	Mild steel wires, strips and tapes for armouring of cables.
5.	IS 1753	Aluminium conductors for insulated cables.
6.	IS 7098	LT/HT XLPE cables

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Other Considerations

Power cable shall be of Al conductor, whereas control and lighting cables shall be of Cu conductor. The minimum size of Al conductor cable shall be 4 mm² and Cu conductor cable of 2.5 mm².

Power cable sizing shall be based on the various de-rating factors recommended by cable manufacturer, rated current, temperature rise of conductor and voltage drop.

Control cables of CTs shall be based on the VA burden of CT and relays, meters.

Technical parameters

LT Cables	PVC insulated, taped PVC inner sheath and outer sheath 650/1100 V grade, with multi-stranded aluminium/copper conductor, armoured
Cable selection	Cable shall be selected considering following points Current rating of the load De-rating due to grouping of cables Voltage drop up to 3% in cable due to cable resistance De-rating factor due to ambient temperature. DE-RATING DUE TO DEPTH IN CASE OF BURIED CABLES
Spare cores for control cables	Up to 4 cores - nil 5 cores to 9 cores - 1 core 10 cores to 20 cores - 2 core 21 cores to 30 cores - 3 core More than 30 cores - 4 core

Drawing and documents required

- Cable catalogue

Lighting Fixtures

STANDARDS

No.	Standard	Description
1.	IS 1913	General & Safety requirements for electric lighting fittings.
2.	IS 1777	Industrial lighting fittings with metal reflector
3	IS 5077	Decorative lighting outfits
4.	IS 2149	Luminaries for street lighting
5.	IS 6665	Code of practice for Industrial Lighting

OTHER CONSIDERATIONS

In order to have higher illumination for maintenance and repairs in the pump room area outlets of 16 A SPN shall be provided for the connection of portable lamps. 16 A SPN switch with socket shall be provided in every bay of the pump house on the suction and delivery sidewalls. The flexible lighting fixture shall be suitable for GLS lamps.

The bidder shall design the lighting system and get approval of the design along with related drawings and specifications for the fixtures proposed for lighting.

Cabling System

INSTALLATION

The cables shall be laid in trenches, trays or conduits or buried in ground. Cable routings shall be checked at site to avoid interference with structures, piping and ducting. All cables shall be carefully measured and cut to the required length, leaving sufficient length for final connections to the equipment on both ends.

The Bidder shall ascertain the exact requirement of cable, for a particular Rising, by measuring at site along the actual finalised route.

Cables shall be laid in complete uncut lengths from one item of equipment to another.

Cables shall be neatly arranged in the trenches, trays in such a manner that criss-crossing is avoided and final take off to the motor, switchgear is facilitated. LT Cables shall be laid a maximum two layers in each tray for cables up to 3-½ C x 95 mm². Arrangement of cables within the trench, tray shall be the responsibility of the Bidder.

Power and control cables shall be laid on different trays in one trench. 1.1 kV grade cable may be laid on one tray.

All cables shall be identified close to their termination point by cable numbers. Cable numbers will be punched on aluminium straps, (2 mm thick), securely fastened to the cable and wrapped around it.

Underground cables shall be provided with cable markers. These cable marker posts shall be located at every 50 metres and every corner or change of direction.

All temporary ends of cables shall be protected against dust and moisture to prevent damage to the insulation. While laying cables, the ends shall be taped with PVC tape.

Cables shall be handled carefully during installation to prevent mechanical injury to the cables. Ends of cables leaving trenches shall be coiled and provided with protective cover until the final termination to the equipment is completed.

Directly buried cable shall be laid underground in excavated cable trenches wherever required. The trenches shall be suitably designed for accommodating all the cables. Before cables are placed, the trench bottom shall be filled with a layer of sand. This sand shall be levelled and cables laid over it. The cable shall be covered with 150 mm of sand over the top of the largest dia. cable and sand shall be lightly pressed. A protective covering of RCC tiles shall then be laid on top in case of HT cable and ordinary brick in case of LT cables. The balance trench area shall then be back filled with soil, rammed and levelled.

As each cable is laid in the trench, it shall be subjected to an insulation test in the presence of the Engineer in Charge before covering. Any cable, which proves defective, shall be replaced at no additional cost.

All wall openings shall be effectively sealed after installation of cables.

Where cables rise from trenches to motors, control stations, lighting panels etc., they shall be taken up in GI pipes (rigid, flexible) for mechanical protection up to a minimum of 600 mm above grade level. The diameter of the GI pipe shall be at least 3 times the diameter of the cable.

Cable shall be carefully pulled through conduits to prevent damage.

Wherever cables are taken in conduits, pipe, the Bidder shall ensure that the area of conduit, pipe is at least 100 % more than the cable area.

If pipe sleeves installed are inadequate due to a greater number of cables being laid, then additional pipe sleeves shall be laid. After the cables are installed and all testing is complete, conduit ends above grade level shall be plugged with suitable weatherproof plastic compound.

Where cables pass through foundation walls or other underground structures, the necessary ducts or openings will be provided in advance for the same.

At road crossings and other places where cables enter pipe sleeves an adequate bed of sand shall be given.

Cables installed above grade level shall be run in trays, exposed on walls, ceilings or structures and shall be run parallel to, or at right angles to, beams, walls or columns. The cables shall be so routed that they will not be subjected to heat.

Cables running along with structures will be clamped by means of GI saddles and saddle bars at a spacing of 300 mm.

Cable carrier systems i.e. site fabricated ladder type cable trays and supporting steel shall be painted before laying of cables. Painting shall have two coats of red oxide and one coat of Aluminium paint.

For all outdoor buried cables a 3-metre diameter loop shall be provided at both ends before termination.

TERMINATION

All XLPE insulated cables shall be terminated using HT termination kit only

All PVC cables shall be terminated at the equipment/panel by means of double compression type brass glands and tinned copper lugs.

Power cable cores shall be identified with red, yellow and blue PVC tapes.

In case of control cables, all cores shall be identified at both ends by their terminal numbers by means of PVC ferrules. Wire numbers shall be as per inter-connection diagrams, to be furnished to the Bidder.

The cable shall be taken through an adequate size gland inside the panel or any other electrical equipment.

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Cable leads shall be terminated at the equipment terminals by means of crimped type solderless connectors.

Crimping shall be done by hand crimping/hydraulically-operated tool and conducting jelly shall be applied on the conductor. Insulation of the leads should be removed immediately before the crimping.

TESTING OF CABLES

Before energizing, the insulation resistance shall be measured from phase to phase and phase to ground.

Earthing System

GENERAL

All the material required for the earthing system shall be supplied and installed by the Bidder. The hot dip GI strip shall be used.

All the material required for making earthing stations shall be supplied by the Bidder. Excavation and refilling for laying of earth strip and for earth pit shall also be in Bidders scope.

- The entire earthing system shall fully comply with Indian electricity act and rules. The Bidder shall carry out all changes desired by the electrical inspector, in order to make the installation conform to I.E. Rules.
- In trenches, earth strip shall be laid along the trench. It shall be protected against mechanical damage. Joints and tapping in the main earth grid shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints except the equipment end shall be welded. All joints buried in ground shall be suitably protected by applying two coats of bitumen and covering with hessian tape.
- Conduits in which cables have been installed shall be bonded and earthed. Cable armours shall be earthed at both ends.
- Earth pipe electrodes shall be installed as per IS 3043. Their location shall be marked on earth pit chamber covers.
- The electrodes shall be tested for earth resistance by means of standard earth tester.
- A disconnecting facility shall be provided for individual earth pit to check earth resistance.
- All electrical equipment above 230 V shall be earthed at two points and equipment 230 V and below shall be earthed at one point.
- Conductor size for connections to various equipment shall be as per the table as follows:

Equipment		Conductor Size
Motors /Transformers/ Panel	Up to 11 kW	8 SWG GI wire
	11 kW to 22 kW	4 SWG GI wire
	22 kW to 90 kW	25 x 5 mm GI strip 40 x 5 mm
	90 kW to 200 kW	GI strip
200kW to 200 kW	50 x 6 mm GI strip	
Local control station, street light pole & its junction box		8 SWG GI wire
Lighting Panel, Auxiliary panel Indoor Light fixtures		25 x 3 mm GI strip Green insulated wire 1 mm sq copper

- All paint, scale etc. shall be removed before earthing connections are made.
- Anchor bolts or fixing bolts shall not be used for earthing connections.

Lighting System

The cabling/wiring, installation and commissioning of complete illumination system shall comply with all currently applicable statutes, regulations, fire insurance and safety codes.

Outdoor lighting shall be carried out by using 1.1 kV grade four-core cable. The cabling for the outdoor lighting fixtures will be done in loop-in/loop-out at respective outdoor fixture mounted junction boxes. The indoor lighting shall also be carried out by using 2 Core, 2.5 mm² copper cables. The indoor office area wiring shall be carried in conduits.

Outdoor cabling shall be buried in ground whereas indoor lighting wiring (cable/conduit) shall be of exposed type.

GENERAL REQUIREMENTS

Except as specifically approved by the Engineer in Charge in charge, installation of conduits and lighting fixtures shall be commenced only after all major services in that particular area have been completed.

Location of lighting fixtures, switches and receptacles shall be shown on the drawings or indicated by the Engineer in Charge and shall be relocated if required to suit the site conditions. 5A, 3 pin, 15A, 6 pin receptacles with switches shall be provided on the light control switchboards.

LP's shall be provided with labels indicating LP number and outgoing circuit Rising numbers.

LPs shall be provided with cable gland for incoming cable and knockouts for outgoing conduit termination.

Cable and Conduit supports shall be provided at an interval of 300-400 mm for horizontal runs and 400-500 mm for vertical runs.

Cables and Conduits shall be kept, wherever possible at least 300 mm away from pipes, heating devices and other equipment.

For the purpose of calculating connected loads of various circuits, a multiplying factor of 1.25 will be made to the rated lamp voltage for lamp fixtures to take into account the losses in the control gear.

Bidder shall supply junction boxes, pull boxes, terminal blocks, glands, conduits and accessories (elbows, tees, bends etc.) and supporting/anchoring materials, to make the installation complete.

In all types of cabling, due consideration shall be given to neatness and good appearance. The decision of the Engineer in Charge, regarding acceptance of appearance, shall be final.

The rate for installation, testing and commissioning of the indoor lighting shall include the mounting of fixtures with necessary materials, laying of cable/conduit, pulling of wires through conduit and external earth wire, providing all accessories for cable/conduit installation, including conduit fittings. Providing of light control switchboard with switches, switchboard mounted 5A, 3 pin receptacles with switches etc. The rate shall also be applicable for the lighting fixtures installed outside the building as perimeter lighting, entrance lighting below canopy etc.

TESTING

Lighting installation shall be tested as per the instructions of the Engineer in Charge and shall include but not be limited to the following:

- Measure the insulation resistance of each circuit without the lamps being in place. It should be not less than 1 M ohms to earth.
- Current and voltage of all the phases shall be measured at the lighting panel busbars with all the circuits switched on with lamps. If required, load shall be re-balanced on the three phases.
- Check the earth continuity for all socket outlets. A fixed relative position of the phase and neutral connections inside the socket shall be established for all sockets.
- After inserting all the lamps and switching on all circuits, minimum and maximum illumination level shall be measured in the area with an approved industrial lightmeter. Bidder shall supply an approved luxmeter for testing at no extra cost.

Miscellaneous

Cable glands and lugs

All HT cables shall be terminated with HT cable termination kit of indoor or outdoor type depending on the application.

All LT cable glands shall be made out of brass and shall be of double compression type.

All LT cable lugs shall be of tinned copper, crimping type.

CABLE TRAYS

Cable carrier system shall comprise of site fabricated ladder type cable trays made out of structural steel and painted with two coats of red oxide primer and a final coat of enamel paint. The construction of the cable trays shall be as per the site requirement and generally in line with the tender drawings.

LIGHTING PANELS (LP)/ FAN DB

The panels shall be of 14 gauge sheet metal construction. Panels shall be equipped with phase and neutral busbars of adequate capacity and miniature circuit breakers (MCB). The incomer shall be of ELMCB (earth leakage miniature circuit breaker) and outgoing circuits shall have only MCBs. MCB shall be of 9 kA. Miniature circuit breakers shall be mounted in such a way that operating levers project outside the front cover plates. A hinged door to cover the operating knobs shall be provided. Synthetic rubber gasketing shall be provided between box and cover. The board shall be provided with detachable top and bottom plates with 25 mm knockouts. All metal surfaces shall be cleaned free of rust, given powder coating of shade 631 as per IS 5. A 415V danger board and engraved nameplate shall be fixed on the panel. The lighting panels shall be marked with the voltage and No. of phases of the supply.

RUBBER MATS

Electrical grade rubber mats shall be provided in the switchgear room in front of all panels.

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CIVIL WORKS

The civil works required for electrical installation will also be part of this package. The Bidder shall also coordinate all inter-discipline interfaces between civil and electrical work.

Local Push-button (PB) Stations

Construction	Outdoor type weatherproof
Main pump motor	On-off with ammeter
Other motors	On-off
Valve motors	Forward-stop –reverse spring return starter with indication for full open/close position of valve.

Spare parts for Electrical Equipment

The compulsory spare parts shall be provided as per the list enclosed under scope of work. All spare parts shall be packed for long storage under the climatic conditions prevailing at the site. Each spare part shall be labelled on the outside of its packing with its description, number and purpose and, if more than one spare is packed in a single case, a general description of the case contents shall be shown on the outside and a packing list enclosed.

Fire extinguishers

Dry powder type fire extinguishers shall be provide, near transformer & near main panel & Pump.

7. SPECIFICATION FOR CWR

GENERAL:

The construction of Elevated Service reservoir and Clear water reservoir shall be carried out in accordance with the drawings specification mentioned herein and relevant IS amended up to date. The Drawings and arrangement of the piping system shall be as per drawings enclosed with the tender documents. In cases where the specifications given below are silent about any aspects in respect of any item, the work shall be carried out as per the relevant IS code of practice in the latest version and as per sound engineering practice as decided by the Engineer in Charge.

Some of the important IS codes to be referred during execution of the work are as follows:

Earth work

IS 3764 – Safety code for excavation works

IS 3720 – Methods of tests for soils

Soil Investigation

IS – 1988 – SBC

Concrete Works

IS.280 – Mild steel wire for general engineering purposes

IS.269 – Portland cement

IS.383 – Coarse and fine aggregate

IS.432 – Medium tension steel bars and hard drawn steel wire

IS.456 – Code of practice for plain and reinforced concrete

IS.516 – Methods of testing for strength of concrete

IS.1199 – Method of sampling and analysis of concrete

IS.1566 – Fabric reinforcement

IS.1786 – Cold twisted steel bars for concrete reinforcement

Reinforcement

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IS. 3370 – Code of practice for concrete structures for the storage of liquids

IS. 7861 – Recommended practice for hot weather concreting (Part-I)

IS. 4082– Recommendation on stacking and storage of construction material on site.

General

IS.875 - Code of practice for structural safety of buildings, loading standards

IS.1911 – Dead loads

IS.1893 – Criteria for earthquake resistant design and structures

IS.2950 – Design of raft

IS.1200 – Method of measurements

The scope of work for construction of reservoir includes survey, acceptance of department design, construction testing and commissioning of partly underground clear water RCC reservoir having effective storage capacity for locations as specified in Scope of Work along with all associated works viz: supply, installation, of DI/C.I pipes, specials, valves etc. for Inlet/Outlet/Overflow/Interconnection with existing system as described.

THE FOLLOWING ACTIVITIES SHALL BE CARRIED OUT BUT SHALL NOT BE LIMITED TO.

- (i) The contractor shall be carried out (if desired) confirmative topographical survey of site and submit to Engineer-in-charge.
- (ii) Approval of all designs and drawings, material to be used, equipment specifications and the samples, prior to commencing of work at site.
- (iii) Preparation and submission of the layout plan, cross-section and conceptual drawings etc. and all other drawings and details for planning of all components of the project. The drawings must be to the scale as appropriate subject to the prior approval of the Engineer-in-charge.
- (iv) Preparation and submission of all detail working drawings on the basis of conceptual designs and plans approved by the Engineer-in-charge.
- (v) Providing adequately planned plinth protection works for Reservoirs.
- (vi) Manufacturing, shop testing, pre-dispatch inspection, transportation to site, storage, handling at site, fixing for all relevant components of the system.
- (vii) Submission of "As Built" drawings.

No separate payment will be made for the reconnaissance survey, laboratory test, factory and performance tests, testing and commissioning, etc. This shall be included in the rate quoted by the contractor.

GENERAL RCC

The aggregates and cement shall be proportioned by weight only. The mixing shall invariably be carried out in mechanical mixer and in such a way so as to avoid any loss of water or cement. No hand mixed concrete will be allowed. It should be conveyed, placed in position and compacted by suitable type of mechanical vibrator as rapidly as practicable but in no case the time of compaction after mixing shall increase 30 minutes. Standby Concrete Mixer and Vibrator shall be available at Site.

The concrete shall be cured properly by keeping it moist constantly until end of three weeks from the date of casting.

Ordinary Portland Cement (OPC)/ PPC conforming latest to IS: 269-1976/ IS : 1489-1991 mark shall be used. Cement manufactured in mini-cement plants shall not be used.

All **reinforcement** used shall be of Tor steel (Fe 415) ISI marked shall be clean and free from loose mill scales, rust and coating of oil or other coatings which may destroy or reduce bond. Minimum size of reinforcement bars shall be of 8mm. Only **steel shuttering** shall be used. Shuttering shall be new or in good condition without holes or dents. It has to be approved by the Engineer in Charge. The individual elements should be in the good shape to ensure a gap free shuttering according to the drawings. The paint used shall have good bonding and shall not stick to the concrete surface. Suitable system have to be provided for keeping the surface in place and keeping the correct distance in case of walls. The construction joints should be minimum and they have to be executed with most care. Before continuing concreting the loose material has to be removed and they have to be cleaned properly. Honey combing has to be avoided by suitable shuttering and proper use of vibrators.

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The **water** used for concreting shall be free from all undesirable salts and other impurities and shall be fit for concreting as per IS: 456.

It is specifically being mentioned that the ground water available in this area may not be potable and not fit for concreting; therefore **transportation from nearby safe water source has to be made**. For the purpose of concreting and curing only potable water is to be used. For this purpose contractor shall make a temporary masonry/RCC **underground water reservoir** of 3 days average water consumption storage capacity. He shall provide a diesel **pump set** and necessary **pipng arrangement** to ensure proper curing.

The exposed surface of concrete shall be kept continuously in a wet condition by ponding or covering with a layer of sackings, canvas, hessian or similar materials and kept continuously wet for at least 28days from the date of placing of concrete.

To obtain a dense concrete and to reduce chances of honeycombing adequate **admixture** approved by Engineer In Charge shall be used as integral water proofing compound in concrete work. The quantity of the admixture shall be as prescribed by the manufacturer and as approved by the Engineer in Charge.

TESTING

Materials and workmanship shall comply with the relevant specifications as described in subsequent clauses and in the Rajasthan PWD(B&R) Specification and Explanatory Notes for Building and House Drainage. Any material or workmanship not covered by the above specifications shall comply with the relevant Indian Standard (with upto date amendments).

MATERIAL

The Contractor shall submit to the Engineer In Charge or his representative, samples of the materials which will form part of the permanent works, sufficiently in advance of the start of the work, so that necessary tests can be carried out for the approval of the Engineer In Charge or his representative, before using any such material on site. Samples for the basic materials shall be submitted from every supplier and from each consignment; if materials differ from one consignment to another, the consignment differing from the accepted sample shall be replaced by the Contractor free of cost. The format will be provided by Engineer In Charge.

The testing of materials to be used in the Works, or of the quality of finished items shall generally be done in a laboratory approved by the Engineer In Charge or his representative. All testing charges shall be borne by the Contractor. The following tests shall be carried on a routine basis:

- (a) Gradation and specific gravity of coarse and fine aggregate to be used for concrete work.
- (b) Moisture content in fine and coarse aggregates, bulking of sand of fine aggregate.
- (c) Determination of fines and deleterious materials, organic impurities and light weight places in coarse and fine aggregate.
- (d) Workability tests on concrete by means of slump cone.
- (e) Determination of the crushing strength, absorption and efflorescence of bricks.
- (f) Concrete cube crushing strength at 7 days and 28 days.
- (g) Determination of flakiness index and crushing value for coarse aggregates.

The above tests (a) to (g) inclusive, shall be done on a routine basis as per the provisions of the relevant Indian Standards, or as specified by PMC and explanatory notes shall be kept during the construction period. The following additional tests of materials and workmanship shall also be carried out at contractor's cost, if the Engineer In Charge or his representative require:-

- (h) Chemical tests of fine and coarse aggregates, to determine the sulphate, chlorides and other deleterious material present in the aggregate.
- (i) Testing of cement (Physical and Chemical), as per IS 269 or IS 485, as the case may be.
- (j) Tests on steel (Mild and High Tensile (Tor) as per IS 1786 to establish the Ultimate tensile strength, yield stress, percentage elongation and chemical composition.
- (k) Tests for suitability of water for concrete work.

In addition to the above tests, the Engineer In Charge or his representative, may request any other test to be carried out from time to time as per the Indian Standards or the Rajasthan PWD specification, at contractor's cost.

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CONCRETE

During the progress of construction sampling, preparation of test specimens, curing and testing of concrete shall be conducted in accordance with IS 1199 and IS 516, to determine whether the concrete being produced complies with the strength requirements as specified.

At least one slump test shall be carried out for every compressive strength test carried out, or as directed by the Engineer in Charge. Six No.15 cm cubes shall be made for each cubic meter. or portion thereof or for each pour per grade of concrete. This number may be increased at the discretion of the Engineer In Charge. Six specimens shall preferably be prepared from different batches, three being tested after 7 days and the remaining three being tested at 28 days. The Contractor shall provide, at his own expense, all apparatus, labour and arrange for testing at a laboratory, approved by the Engineer in Charge.

The concrete tested in accordance with "Testing of Concrete" clause above, shall be the criteria for acceptance of concrete as per IS 456. The strength of concrete shall be the average strength of three specimens tested at 28 days and conform to strength requirements for different grades of concrete. If the advance 7 days tests show crushing strengths that are too low, corrective measures shall be taken at once, at the Engineer's direction, without waiting for the results of the 28 days tests.

FAILURE TO MEET STRENGTH REQUIREMENTS

In cases where concrete tested fails to meet the test requirements, the Engineer In Charge shall have the right to require any one or all the following additional tests. These shall be carried out by contractor at his own expense. The Engineer In Charge shall be the finally authority for interpreting the results and shall decide upon the acceptance or otherwise.

- ✓ Curing and load testing of the concrete member concerned represented by the test which failed.
- ✓ Replacement of any such portions of the structure. No payment shall be made for the dismantling of the concrete, relevant form work, or reinforcement. Embedded fixtures and reinforcement of adjoining structures damaged during dismantling shall be made good by the contractor at his own expense.
- ✓ Extended curing of the structure of the concrete represented by the specimen.
- ✓ Collecting and testing of a core specimen from the hardened concrete. The location number and size of such specimen shall be taken as directed by the Engineer In Charge.
- ✓ Any Other tests i.e. ultrasonic/ or rebound hammer tests to be decided by the Engineer in Charge, at the contractors own cost.

CHECK OF REINFORCEMENT AND CONCRETING

All reinforcement shall be got checked recorded prior to pouring of concrete, by a representative of the Engineer In Charge. Similarly, the entire concrete pouring work shall be done in the presence of an officer not below the rank of Site Engineer. The contractor shall therefore, give a notice of a minimum three days to the Engineer In Charge or his representatives, such that the work can be checked by him or his representative . No work shall be covered before inspection and approval of Engineer in Charge.

MINIMUM REQUIREMENT FOR ALL REINFORCED OR PLAIN CONCRETE STRUCTURES

- a) The minimum grade of concrete for water retaining structures shall be M25 having minimum cement content of 360 kg/m³ with maximum 20mm size downgraded coarse aggregates.
- b) Approved quality water proofing compound (chloride free) shall be added during concreting of all water retaining structure, in the proportion specified by the manufacturer/as per design mix or up to 2% (percent) by weight of cement.

PRECAUTIONS TO KEEP SERVICE RESERVOIR FREE FROM CONTAMINATION

As soon as possible after completion of reservoir and after all pipes have been laid the Contractor shall remove all dirt, debris, materials, tools etc. from the reservoir and shall wash and brush down with water the whole of the interior.. The greatest care shall be taken to keep the entire reservoir free from any contamination. Strict supervision shall be maintained over the workmen entering after first washing down. Provision shall be made to enable workmen to wash their feet or footwear clean and sterilize them before entering.

CONSTRUCTION JOINTS

As construction joints are weak in shear, Normally, construction joints, if required, shall be provided in location where shear stress is minimum. However, construction joints should be avoided in the bottom slab of any water retaining structure. In the event the Contractor solely for his convenience proposes construction joints in the bottom slab and or vertical construction joints in the wall of the water retaining structures, then the Contractor shall provide approved Rubber/PVC water-stop of 230mm width in all such joints. For the convenience of construction and to avoid segregation of concrete horizontal construction joints shall be provided in a planned way at a height not more than 2.0M in case of approved admixture, at his cost, is used by the contractor in the concrete to increasing the workability of the concrete without affecting the designed water cement ratio. In case such admixture is not used the height of such cast shall be restricted maximum up to 1.5M.

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All such construction joints should be prepared properly like removing of all loose materials by wire brush and soaking with rich cement slurry mixed with approved water-proofing compound in prescribed ratio, before pouring next concrete. Next pour of concrete in any construction joints in water retaining structures should be within 24 hours of last pour.

FINAL FINISHING

The contractor shall ensure that the entire structure along with all its installations is in a finished and in new and fully operative condition when handed over. He shall have repaired and remove all signs of damage that might have been done during the course of installation and fixing of equipment. He shall also see that all the exterior finished properly and the entire site is cleared all extra construction material, debris and excavated soil. This shall have to be done to the satisfaction of Engineer in Charge.

ALL FLANGED SPECIALS

The DI / iron flanged specials (all flanged tee, flanged tapers, bends, blank flanges. Puddle collar) shall conform to IS 1538.

The specials shall be internally and externally coated with hot applied (dip) bituminous paint.

All flanged specials shall be used for nominal pressure of 25 kg/cm² (2.5 Mps).

Flanged specials shall be supplied with the galvanised bolts, nuts and rubber gaskets. The galvanised nut & bolts shall be supplied in jute bag; rubber gasket shall be supplied in polyethylene bags. The rubber gaskets shall conform to IS 5382.

The length and size of the puddle collars to be fixed at different places of the structures shall be decided by the Engineer in Charge.

PUDDLE COLLAR

All puddle collars shall be of C.I. The length and size of the puddle collars shall be as per specification of tender.

LADDER

M. S. ladder 450 mm wide, made up of 50mm x 50mm x 6 mm M.S. angle iron and 25mm M.S. bars welded at 300mm c/c shall be provided outside from the balcony to top dome.. The ladder from top dome to inside platform and from platform to button dome in the container shall be of aluminium. Its drawing shall be got approved from EIC before dispatch.

RAILING

Hand railing around the platforms, Balcony, stairs and landings shall be consisting of 25mm diameter medium B class GI pipes in two rows (one at the top and other at middle level) and 1000mm high vertical post 65x65x6 mm angle iron @ 1500mm center to center (At least two vertical angles are to be provided wherever distance is less) with all accessories like elbows, tees etc. including welding, threading and embedding in cement concrete floor. Railing shall be protected against corrosion after welding. The pipe shall pass through hole in the vertical angle.

WATER LEVEL INDICATOR

Water level indicator consists of an approved copper float and iron counter weight and connected by 4 mm thick steel flexible stranded wire passing over aluminum pulleys 7 cm diameter fixed on GI medium class pipe which is installed as indicated in the drawing shall have to be provided. The scale shall be calibrated in centimeters and should consist of MS sheet 20 gauge fixed over wooden plank with an MS angle iron frame of 35 mm X 35 mm X 5 mm and painted with white enamel bases, letters in black and red. The scale shall be located and fixed with RCC column at 2.3 m above the ground for Service Reservoir.

For Ground Level Clear Water Reservoir the water level indicator will be fixed on outer portion of vertical wall as directed by Engineer.

VENTILATOR

A ventilator, as shown in the drawings shall be provided

LIGHTNING ARRESTER

Lighting arrester shall be of copper bar of 25mm dia and 2m. long to be provided at the top of OHSR. This is to be connected by a GI strip of 25 mm wide & 3mm thick. This conductor strip shall be connected to a 450mm x 450mm x 3mm thick copper plate to be embedded below the average ground level by digging a pit as shown in drawing. The earthing system shall comply with Indian Electricity Rules and shall confirm to IS 3043. The pit shall be refilled by alternate layers of salt and coke as shown in the drawing and balance shall be filled with loose soil. The 40 mm dia GI watering pipe shall be provided in the pit. Care shall be taken that earth pit does not sink.

PAINTING

If not otherwise stated metallic surfaces shall receive one initial coat at the manufacturer's workshop. After arrival of the equipment on site, the same shall be inspected and damaged portions shall be cleaned and given the primer and under coat of similar paint. After erection all metal work shall be painted as follows:

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PAINTING OF METALLIC SURFACES

All mild steel railing, gate, frame, MS ladders, ventilator, manholes, cover, float valves shall receive a coat of primer of red oxide, two under coats and one finishing coat of an approved enamel paint and of approved shades.

PLINTH PROTECTION

Plinth protection works are to be constructed below the Elevated Service Reservoir, it shall be extended up to 1m from fall of balcony or edge of raft slab, whichever is more all around service reservoir. It shall consist of laying lean concrete 150 mm thick in M10, over compacted soil. Sectional details shall be as indicated in the drawing included with the document.

The minimum free space between plinth protection and the first bracing of the OHSR shall be 1.60 mtr.

SLOGAN AND LOGO

The contractor shall paint a area of 6m x 3m on the vertical wall of the tank portion by using 3 coats of plastic emulsion paint of shade as approved by Engineer In Charge to form a base for writing the slogan with 75 mm thick boarder around the area and logo of "JAL BHI SEEMIT PARIWAR BHI SEEMIT" in Hindi. For writing the slogan the letters shall be of 30 cm size. The size of logo shall be 75 cm. The shade for painting the slogan will be approved and directed by Engineer in Charge.

PIPE CLAMP

The clamp shall be 6mm thick 50mm wide MS flat fixed on pipe & column as shown in drawing.

MAN HOLE COVER

Square man hole cover 800x800 mm shall be provided. The cover shall be made of 3 mm thick MS flat. The frame shall be made of MS angle 80'80'4. The cover shall be connected to this frame by using two nos. strung hinges. Arrangement shall be provided as shown in drawings.

TESTING FOR WATER TIGHTNESS

The contractor shall carry out a water tightness test for the maximum water head condition i.e. with the water standing at full supply level. All cost of testing shall be born by the contractor. This test shall be carried out in accordance with the procedure given below:

For water tightness test, before the filling operations are started, the reservoirs shall be jointly inspected by the Engineer In Charge and the representative of the Contractor and condition of surfaces of wall, construction joints etc. shall be inspected and noted and it shall be ensured that jointing material filled in the joints is in position and all openings are closed. The contractor shall make necessary arrangement for ventilation and lighting of reservoir by way of floodlights, circulators etc. for carrying out proper inspection of surface and internal conditions if so desired by the Engineer in Charge.

The water retaining structures shall be filled with water gradually at the rate not exceeding 30 cm rise in water level per hour and shall extend for a period of 72 hours. Records of leakages starting at different level of water in the reservoirs, if any, shall be kept.

The reservoirs once filled shall be allowed to remain filled for a period of 7 days before any readings or drop in water level is recorded again at 7 days. The total drop in surface level over a period of 7 days shall be taken as indication of the water tightness of the reservoir, which for all practical purposes shall not exceed 40mm. There shall be no indication of leakages around the puddle collars or on the wall and bottom of the reservoir.

If the structure does not satisfy the test requirements, and the daily drop in water level is decreasing, the period of test may be extended for a further seven days and if the specified limit is not exceeded, the structure may be considered as satisfactory.

In case the drop in water level exceed the permissible limit with the stipulated period of test, the Contractor shall carry out such additional works and adopt such measures as may be directed by the Engineer In Charge to reduce the leakage in the permissible limit. The entire rectification work that shall be carried out in this connection shall be at Contractor's cost.

If the test results are unsatisfactory, the Contractor shall ascertain the cause and make all necessary repairs and repeat the water retaining structure test procedures, at his own cost. Should the re-test results still be

unsatisfactory after the repairs, the structure will be condemned and the Contractor will dismantle and reconstruct the structure, to the original specification, at his own cost.

DESIGN CONSIDERATIONS:

DESIGN SUBMISSIONS

The contractor shall be responsible for the safety of structures, correctness of design and drawings.

The design considerations described hereunder establish the minimum basic requirements of plain and reinforced concrete structures, masonry structures and structural steel works. However, any particular structure shall be designed for the satisfactory performance of the functions for which the same is being constructed.

DESIGN STANDARDS

All designs shall be based on the latest Indian Standard (I.S.) Specifications or Codes of Practice unless otherwise specified. The design standards adopted shall follow the best modern engineering practice in the field based on any other international standard or specialist literature subject to such standard reference or extract of such literature in the English language being supplied to and approved by the Engineer-in-charge. In case of any variation or contradiction between the provisions of the I.S. Standards or Codes and the specifications given along with the submitted tender document, the provision given in this specification shall be followed.

DESIGN LIFE

The design life of all structures and buildings shall be 60 years.

DESIGN LOADING

The structure shall be designed to resist the worst combination of the following loads/ stresses under test and working conditions; these include dead load, live load, wind load, seismic load, stresses due to temperature changes, shrinkage and creep in materials, dynamic loads:

Dead Load

This shall comprise all permanent construction including walls, floors, roofs, partitions, stairways, fixed service equipments and other items of machinery. In estimating the loads of process equipment all fixtures and attached piping shall be included.

Live Load

Live loads shall be in general as per I.S. 875. However, the following minimum loads shall be considered in the design of structures:

- | | | | |
|-----|--|---|------------------------|
| i) | Live load on roofs | : | 1.50 KN/m ² |
| ii) | Live load on all other floors walkways, stairways and platforms | : | 4.00 KN/m ² |

In the absence of any suitable provisions for live loads in I.S. Codes or as given above for any particular type of floor or structure, assumptions made must receive the approval of the Engineer-in-charge prior to starting the design work. Apart from the specified live loads or any other load due to material stored, any other equipment load or possible overloading during maintenance or erection/ construction shall be considered and shall be partial or full whichever causes the most critical condition.

Wind Load

Wind loads shall be as per I.S. 875. Part 3

Earthquake Load

This shall be computed as per I.S. 1893 taking into consideration soil foundation system, importance factor appropriate to the type of structure basic horizontal seismic coefficient/ seismic zone factor & average acceleration coefficient.

JOINTS

Movement joints such as expansion joints, complete contraction joints, partial contraction joints and sliding joints shall be designed to suit the structure.

No expansion joints in wall, floor & roof of water retaining structure shall be allowed.

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The positions of construction joints should be specified by the designer & indicated on the drawings. If there is a need on site to revise any specified position or to have additional joints, the proposed positions should be agreed with the designer.

The concrete at the joint should be bounded with that subsequently placed against it, without provision for relative movement between the two concrete should not be allowed to run to a feather edge & vertical joints should be formed against stop edges.

DESIGN CONDITIONS FOR UNDERGROUND OR PARTLY UNDERGROUND LIQUID RETAINING STRUCTURES

Ground or partly underground liquid containing structures shall be designed for the following conditions:

Liquid depth up to full height of wall : no relief due to soil pressure from outside to be considered;

Structure empty (i.e. empty of liquid, any material, etc.): full earth pressure and surcharge pressure wherever applicable, to be considered;

Structures shall be designed for uplift in empty conditions with the water table as indicated in geo-technical report & due care should be taken for seasonal variation on higher side.

Walls shall be designed under operating conditions to resist earthquake forces from earth pressure mobilization and dynamic water loads;

Ground or partially underground structures shall also be checked against stresses developed due to any combination of full and empty compartments with appropriate ground/uplift pressures from below to base slab. The design shall be such that the minimum gravity weight exceeds the uplift pressure at least by 20%.

An increase cover of 15 mm is recommended for walls and roof bottom to account for contact with chlorinated water in side the reservoir. The increase cover is not proposed for the base slab as cement concrete screed topping is proposed to provide protection to the RCC Structure.

FOUNDATIONS

The minimum depth of foundations for the structures, frame foundations and load bearing walls shall be as per IS 1904.

Bearing capacity of soil shall be determined as per IS: 6403.

Care shall be taken to avoid the foundations of adjacent buildings or structure foundations, either existing or not within the scope of this contract. Suitable adjustments in depth, location and sizes may have to be made depending on site conditions. No extra claims for such adjustments shall be accepted.

A structure subjected to groundwater pressure shall be designed to resist floatation. The dead weight of empty structure shall provide a factor of safety of 1.2 against uplift during construction and service.

Where there is level difference between the natural ground level and the foundations of structure or floor slabs, this difference shall be filled up in the following ways

In case of liquid retaining structures, the natural topsoil shall be removed as described above and the level difference shall be made up with Plain Cement Concrete not weaker than M 10.

DESIGN REQUIREMENTS

The following are the design requirements for all reinforced or plain concrete structures.

- a) All blinding and leveling concrete shall be a minimum 75 mm thick in concrete grade M10 unless otherwise specified.

Liquid Retaining Structures:

All structural reinforced concrete shall be of a minimum M25 grade with a maximum 40 mm aggregate size for footings and base slabs and with a maximum 20 mm aggregate size for all other structural members.

The reinforced concrete for water retaining structures shall have minimum cement content of 360 kg/m³ with a maximum 20 mm size aggregate and 330 kg/m³ with a maximum 40 mm size aggregate.

The minimum reinforcement in walls, floors and roofs in each of two directions of right angles within each surface zone shall be as per 7.1 of IS: 3370 part 2.

- a) The nominal cover of concrete for all steel, including stirrups, links, sheathing and spacers shall be as per 7.2 of IS: 3370 Part 2.
- b) Structure shall be provided with damp proofing for basement and floors and water proofing for roofs.

Any structure or pipeline crossing below roads shall be designed for Class A of IRC loading.

All pipes and conduits laid below the structural plinth and road works shall be embedded in reinforced concrete of grade M20 of minimum thickness 150 mm.

Suitable admixtures may be used with the approval of Engineer in charge.

Construction of floors and walls of Liquid Retaining structures shall be as per 9.4 & 9.5 of IS: 3370 Part 1.

The following minimum thickness shall be used for different reinforced concrete members, irrespective of design thickness.

- (i) Walls for liquid retaining structures : 150 mm
- (ii) Roof slabs for liquid retaining structures (other than flat slabs) : 125 mm
- (iii) Bottom slabs resting on Ground for liquid retaining structures : 150mm
- (iv) Floor slabs including roof slabs, walkways, canopy slabs : 100 mm
- (v) Wall of cables/ pipe trenches, underground pits etc. : 150 mm
- (vi) Column footings : 300 mm
- (vii) Parapets, Chhajja : 100 mm

CONCRETE MIXES

Cement concrete (plain or reinforced) shall comply with the requirement of specifications of Rajasthan PWD (B&R) Specification and Explanatory Notes for Buildings and House Drainage except in so far as these are not altered or modified by specific stipulations as given in the specifications herein. The concrete grades to be used shall not be leaner than following:

Water bearing structure i.e. container, beam platform in the reservoir and roof.	M25
Other structural concrete	M25
Lean concrete in foundation	M10

Signature of Contractor

Executive Engineer (PHE-I)

JDA, Jaipur

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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 the 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 an 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.

A bidder may be considered to be in conflict of interest with one or more parties in the bidding process if, including but not limited to:

- (a) Have controlling partners/shareholders in common; or
- (b) Receive or have received any direct or indirect subsidy from any of them; or
- (c) Have the same legal representative for purposes of the bid; or
- (d) 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 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 proposed to be hired) by the procuring entity as engineer-in-charge/consultant for the contract.

Declaration by the Bidder regarding Qualifications

Declaration by the Bidder

In relation to my/our Bid submitted to for procurement of
“.....” in response to their
Notice inviting Bids No. Dated.....
I/wehereby 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 offense 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 the bidder

Place: Name:

Designation:

Address:

Note:- Annexure “B” is mandatory to be fulfilled & signed with seal by the bidder failing which the bid shall summarily be rejected without asking any clarification.

Grievance Redressal during Procurement Process

The designation and address of the First Appellate Authority :

Signature valid

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Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

Jaipur Development Commissioner, JDA, Jaipur

The designation and address of the Second Appellate Authority: **Executive Committee,
JDA, 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 there under, 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 Endeavour 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 the 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) **Appeals 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 the need of procurement
(b) Provisions limiting the 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 Appeals: -**
(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 the first appellate authority or second

The appellate authority, as the case may be, in person or through registered post or authorized representative.
- (6) **Fee for filing Appeal: -**
(a) Fee for the first appeal shall be rupees two thousand five hundred and for the second appeal shall be rupees ten thousand, which shall be non-refundable.
(b) The fee shall be paid in the form of a bank demand draft or banker's cheque of a scheduled bank in India payable in the name of the appellate authority concerned.

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(7) Procedure for disposal of Appeal: -

- (a) The first appellate authority or second appellate authority as the case may be, upon the filing of the appeal, shall issue notice accompanied by a copy of the appeal, affidavit and documents, if any, to the respondents and fix a date of hearing
- (b) On the date fixed for hearing, the first appellate authority of the second appellate authority, as the case may be shall-
 - (i) Hear all the parties appeal presenting 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 a copy of the 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.

Annexure D
(RTPP Act/Rules)

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 the 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

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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 disqualified 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 the contract, the quantity of goods, works or services originally specified in the bidding documents may be increased or decreased, by a specified percentage, but such increase or decrease shall not exceed fifty percent, of the quantity specified in the bidding documents. It shall be without any change in the unit prices or other terms and conditions of the bid and the conditions of the 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 circumstances, the bidder shall not be entitled to any claim or compensation except otherwise provided in the conditions of the 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 25% of the value of goods of the original contract and shall be within one month from the date of expiry of the 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, then in such cases, the quantity may be divided between the Bidder, whose Bid is accepted and the second lowest Bidder or even more Bidder in that order, in a fair, transparent and equitable manner at the rates of the Bidder, whose Bid is accepted.

4. As per office order No. JDA/DD (E&B)/2018/D-352 dated 29.08.2018, Clause of agreement no. 45 for Price Escalation variation is not applicable.

ANEXTURE-"E"

Process for Tender Participation & Depositing Payment on 'Online Tender Participation' Portal of JDA & Bid Submission on 'e-Procurement Portal' of Government of Rajasthan:-

<p>A*Process for Tender Participation & Depositing Payment on 'Online Tender Participation' Portal of JDA</p> <p>1-Participate in tender</p> <ul style="list-style-type: none">a) Bidder can access 'Online Tender Participation' Portal of JDA at https://jda.urban.rajasthan.gov.in/jda or by Single-Sign-On at http://service.jaipurjda.org.b) Create user Login with a valid mobile number to register yourself for various Online Services of JDA.c) Select 'Proceed as Citizen' and then 'Proceed for Subscription' for 'Tender Online Payment'. The prevailing plan for getting registered for tendering process of JDA is Rs. 500.00 with the validity period of 3 Years (renewable).d) After successful payment, re-login and upload required documents for KYC (Know Your Client) compliance as per the type of entity viz. Individuals/ Company/ Partnership Firms/ Trusts & foundations. Besides, Bank Passbook / Cancelled Cheque consisting of Bank Account, IFSC Code, mandatory to be uploaded, to refund the bid security of unsuccessful bidder.

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- e) After receiving the payment successfully and approving KYC documents the bidder will be authenticated by JDA for taking part in Tender.

2-Deposit Tender Fee, RISL processing fee and Bid Security (EMD)

- **Option-1:** Payment Gateway (Aggregator)
The facility to make payment through Debit Card, Credit Card, Net banking etc., will be available. User can use this facility from anywhere any time till the closing date & time of bid participation.
- **Option-2:** Electronic Fund Transfer (EFT: NEFT/RTGS)
If the bidder selects payment mode as EFT (NEFT/RTGS), "Paying Slip for EFT (NEFT/RTGS)" will be generated by the system for the complete amount. The payment can be made from any Bank any Branch using this Paying Slip through NEFT/RTGS (Claim against payment made through EFT in any other JDA bank account will not be acceptable and bidder stands disqualified from participation in the bid applied for). After successful transaction through NEFT/RTGS, as per the standard procedures it may take 4 to 24 hours in process of confirmation of EFT through Auto-Process depending on the time of EFT done. Therefore, option to make payment through EFT (NEFT/RTGS) will be available till 48 hours prior to closing date of bid participation.

3- Deposit Bid Security (EMD)

The Bid Security (EMD) can be submitted through Bank Guarantee (BG). Bidder may opt Bank Guarantee (BG) against Bid Security (EMD), for which bidder requires to prepare BG before applying in the tender. The detail of BG requires to be fed on 'Online Tender Participation' Portal of JDA before paying balance amount (Tender Fee + RISL Processing Fee). This balance amount will be paid through Payment Gateway only, option to make balance payment through EFT (RTGS/NEFT) will not be available.

4-Obtain Bid Participation Receipt

After confirming payment, the bidder will get Bid Participation Receipt based on which user will get the payment details along with other details for bidding on e-Procurement portal of GOR.

- In case of BG as the remaining payment will be done through Payment Gateway, on successful transaction the 'Bid Participation Receipt' will be generated on real time basis.
- In case complete payment is done through Payment Gateway, on successful transaction the 'Bid Participation Receipt' will be generated on real time basis.
- In case complete payment is done through EFT (NEFT/RTGS), on confirmation of payment from ICICI Bank (Auto Process) 'Bid Participation Receipt' will be available on Login of Bidder on JDA portal.

B-Bid Submission on 'e-Procurement Portal' of Government of Rajasthan**

- 1- Online e-Bid can be submitted after registration at e-Procurement Portal of Government of Rajasthan www.eproc.rajasthan.gov.in
- 2- It is mandatory to upload Bid Participation Receipt with the bid submission.
- 3- Details of online payment available on Tender Participation Portal of JDA have to be filled in 'offline payment' section of e-Procurement portal.

Note

- 1- Bidder (authorised signatory) shall submit their offer on-line in electronic formats both for technical and financial proposal.
- 2- In case, any of the bidders fails to pay the Tender Fee, BSD, and RISL Processing Fee, online (subject to confirmation), its Bid shall not be accepted.
- 3- To participate in online bidding process, Bidders must procure a Digital Signature Certificate (Type III) as per Information Technology Act-2000 using which they can digitally sign their electronic bids. Bidders can procure the same from any CCA approved certifying agency, i.e., TCS, Safecrypt, nCode etc. Bidders who already have a valid Digital Signature Certificate (DSC) need not procure a new DSC. Also, bidders must register on <http://eproc.rajasthan.gov.in> (bidders already registered on <http://eproc.rajasthan.gov.in> before 30-09-2011 must register again).
- 4- JDA will not be responsible for delay in online submission due to any reason. For this, bidders are requested to upload the complete bid well advance in time so as to avoid 11th hour issues like slow speed; choking of web site due to heavy load or any other unforeseen problems.
- 5- Bidders are also advised to refer "Bidders Manual Kit" available at eProc website for further details about the e-Tendering process.
- 6- Training for the bidders on the usage of e-Tendering System (eProcurement) is also being arranged by DoIT&C, GoR on a regular basis. Bidders interested in training may contact e-Procurement Cell, DoIT&C for booking the training slot.

Contact No: 0141-4022688 (Help desk 10 am to 6 pm on all working days) e-m

eproc@rajasthan.gov.in

Address: e-Procurement Cell, JDA, Yojana Bhawan, Tilak Marg, C-Scheme, Jaipur

- 7- The procuring entity reserves the complete right to cancel the bid process and reject any or all of the Bids.
- 8- No contractual obligation whatsoever shall arise from the bidding document/ bidding process unless and until a formal contract is signed and executed between the procuring entity and the successful bidder.
- 9- Procurement entity disclaims any factual/ or other errors in the bidding document (the onus is purely on the individual bidders to verify such information) and the information provided therein are intended only to help the bidders to prepare a logical bid-proposal.
- 10- The provisions of RTPPA Act 2012 and Rules thereto shall be applicable for this procurement. Furthermore, in case of any inconsistency in any of the provisions of this bidding document with the RTPPA Act 2012 and Rules thereto, the later shall prevail.

Jaipur Development Authority, Jaipur.	
Bid Participation Receipt	
	Date & Time:-
Bid Detail	
Bid ID:	Procurement Entity:-
Bid Title:	
Bid Value:	Bid Opening Place:
Bidder Detail	
Name of Entity:	Mobile No.:
Registration Type:	Instrument Amount:
Payment Mode:	Payment Channel:
Instrument No.:	Instrument Date:

Signature valid

Dates Detail

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RajKaj Ref No.:
20641074

eSign 1.0

Digitally signed by Dileep Lamba
Designation: Executive Engineer
Date: 2026.02.19 15:44:08 IST
Reason: Approved

Sr. No.	Event Name	Event Date
1	Publishing Date	
2	Bid Opening Date	

Specific Instrument for eProc Rajasthan			
Instrument Type			
Instrument Number	Head Name	Amount	Date
	Tender Fee		
	RISL Processing Fee		
	Bid Security Deposit		
Issuer Detail: Jaipur Development Authority		Challan Number:	

More details about Registration Process, Terms and Conditions and FAQ along with contact detail is available on JDA website www.jda.urban.rajasthan.gov.in.

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Name of work : Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur".

Estimate

Part 'A' (Construction of 200 mm dia Tube wells)

REVISED PHED BSR 2023

S. No.	Particulars	Unit	Qty	Rate	Amount
Drilling of tubewell					
1	Construction of tube well from ground level & up to 100 mtr depth to accommodate housing and assembly pipe of following sizes in all type of alluvium strata unconsolidated formation such as pebbles, boulders etc. by percussion/rotary drilling method as per IS:2800 Part 1: 1991 and IS:2800 Part II: 1979 (both amended up to date) and technical specifications, with gravel as per IS:4097-1967 and it's packing as per IS: 2800 (Part I & II) 1979 as amended up to date (the work includes the cost of gravel & it's primary packing and packing during development, lowering of				

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	housing & strainer assembly pipes with supply and wrapping of coir-rope, wherever necessary for arresting fine sand particles and development work, but excluding the cost of housing and strainer pipe assembly). The work would be completed after obtaining sand free water.				
1.1	Nominal bore 200 mm dia.	Rmt.	200.00	1523.00	304600.00
2	Construction of tube well after completion of drilling by rotary /percussion method & up to 100 mtr. depth in all type of rocks by DTH system as per IS:2800 Part 1: 1991 and IS:2800 Part II: 1979 (both amended up to date) and technical specifications. The work shall be deemed completed only after obtaining sand free water. The bore well should have a throughout nominal size bore beyond casing pipe.				
2.1	Nominal bore 200 mm dia.	Rmt.	280.00	1263.00	353640.00
5	Supply of ERW M.S. black casing pipe ISI marked (IS: 4270/2001) or amended up to date of following sizes				
5.1	200 mm dia NB (Thickness of pipe 5.4mm & mass of tube 28.46 Kg/m)	Rmt.	280.00	2734.00	765520.00
6	Labour charges for making slots on blank pipes made of ERW MS black pipe ISI marked of following sizes, the slotting should be as per IS:8110-1985.				
6.1	200 mm dia nominal bore of 5.4mm thickness	RM	36.00	317.00	11412.00
	Supply & Installation of 3 phase ISI marked submersible motor pump set of three star or better rating of BEE and as per IS: 8034-2018 (pump) and IS 9283-2013 (motor) or as amended up to date of approved make of following duty condition with required accessories including making connection suitable for tube well/DCB. The job includes lowering of motor pump, installation of complete fitting & accessories, jointing of electrical cables up to switch board, testing of submersible pump set and interconnection up to water mains, complete in all respect				
	Up to 5.5 KW (7.5 HP) & head above 120 Mtr	Kw	11.00	9628.00	105908.00
7	Supply & Fixing M S clamp set of 50x6 mm flat from iron with nuts and bolts etc. for holding the riser pipe assembly of submersible pump set.	Each	2.00	696.00	1392.00
8	Supply & Fixing tube well cover of MS sheet 8mm thick at top & 5mm thick 100mm wide shroud around the edge so as to form a cap on the top end of casing pipe with GI Nipple 45cm long & two GI flanges at both ends in 80mm sizes passing through a hole in the centre of MS sheet. A 25 mm socket with end plug shall also be welded over top plate. A GI nipple having outside thread of size 1/2" (for installation pressure gauge) shall be provided & welded with 80mm GI nipple near top plate nipple shall be provided with end plug.				
8.1	200 mm dia	Nos.	2.00	986.00	1972.00

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10	Providing & Fixing of double flanged, CI body, ISI marked NRV of approved make of following sizes				
10.1	80 mm dia	Nos.	2.00	2830.00	5660.00
12	Supply and Fixing of electric control feeder panel comprising of suitable rating MCCB , fully automatic star-delta starter, over load relay, ampere meter with CTs, volt meter, phase preventer, suitable starting capacitors, phase indicators, lighting arrangement etc. complete suitable for three phase pump set. The panel should have space for energy meter (supplied by DISCOM). All these equipments shall be housed by panel box made out from 18 gauge M.S. Sheet with powder coating. Panel should be of minimum size 900 x 600 x 450 mm with Stand (made of angle iron of size 35x35x5mm) duly bolted/screwed with enclosure box having 4 legs, each leg's length 18" and double door including in built locking system. The legs should be embedded in M-15 cement concrete plat form. The size of CC platform should be equal or bigger than the base size of panel having height of at least 200 mm from ground level. The panel should have opening of suitable size in front of space for energy meter with glass for meter reading. The operation of panel should be suitable for on 440 Volt AC Supply.				
12.1	Above 10 HP and up to 15 HP	Nos.	2.00	27829.00	55658.00
19	Supply & Fixing of ISI marked three core PVC flat submersible cable as per IS 694:1990 or amended up to date and conductor as per class 5 of IS 8130:1980 including making connection etc.				
19.1	3 core 4.0 Sq.mm	RM	760.00	189.00	143640.00
13	Supply & Fixing XLPE insulated / P.V.C. sheathed cable of 1.1 KV grade with aluminium conductor Armoured of IS:7098-I/1554-1 approved make in ground as per IS:1255 including excavation of 30cmx75cm size trench, 25 cm thick under layer of sand, second Class bricks covering, refilling earth, compaction of earth, making necessary connection, testing etc. as required of size.				
13.1	16 sq mm size, 4 core	RM	60.00	234.00	14040.00
	Plate Earthing as per IS:3043 with G.I. Earth plate of size 600mm x 600mm x 6.0mm by embodying 3 to 4 Mtr below the ground level with 20 mm dia. G.I. 'B' class watering Pipe including all accessories like nut, bolts, reducer ,nipple, wire meshed funnel, and C.C. finished chamber covered with hinged type with locking arrangement C.I. Cover, C.I. Frame of size 300mm x 300mm complete with alternate layers of salt and coke/charcoal, testing of earth resistance as required.	Each	2.00	3651.00	7302.00
16	Providing & Lowering in tube well ISI marked GI Pipe medium duty ("B" class), Steel tube as per IS:1239 or amended up to date and zinc coating as per IS 4736, threaded and double flanged (welded)				

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	on both ends and two number 25x3mm MS flat welded on both ends between pipe & flange, rubber washer & nut bolts etc. complete in all respect.				
16.1	50 mm dia	RM	360.00	678.00	244080.00
	Providing, installing, testing and commissioning of double flanged bulk flow meter with removable mechanism, of class B conforming to ISO 4064/1 or amended up to date of approved make including cost of all material and labour as per specifications with GI Box (sheet 16 SWG) suitable with locking arrangement of following dia.				
	80 mm dia	Each	2.00	15752.00	31504.00
18	Providing & Fixing pump safety cage as per specifications or as directed by Engineer in charge.	Nos.	2.00	1106.00	2212.00
15	Supplying & Installing 100 mm diameter sealed diaphragm bourdon type pressure gauge of range 0 to 10 kg. including all jointing material as per specification with safety cover.	Nos.	2.00	1243.00	2486.00
11	Providing, lowering, aligning, fixing in position in pipe line, CI D/F Sluice valves straight and pocket less body passage of approved make of following Pressure rating & dia complete, confirming to IS:14846 (amended up to date) and of following specifications: Body, Bonnet, Wedge, Gland, Thrust Plate, Cap & Hand wheel of Grey cast iron of IS:210/ FG200 Stem - SS 304 ,Body Seat ring, Wedge facing ring & Bushes - LTB2/ SS , Face to face dimensions as per IS 14846/2000 (amended up to date) ,Epoxy (Non-Toxic- suitable for drinking water) applied inside and outside, Flanges Drilled as per IS 1538. Nut-Bolt confirming to IS:1363 and IS: 1367/ CS/ galvanised steel Insertion rubber of black EPDM 6mm thick . Sluice valves including all jointing & jointing material, labour, testing and commissioning along with pipe line as per Technical Specifications and as per direction of Engineer-in-charge. Note: Rates are exclusive of tail piece/ dismantling joints and earth work.				
11.1	a) 80 mm	Nos.	2.00	6301.00	12602.00
Total for One Tube well. Amount					2,063,628.00

Executive Engineer (PHE-I)
JDA, Jaipur

I/We Quote as % Above/ Below the schedule " G "

(In Words.....)

'Signature of Contractor

With full Address & Mobile No.

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JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Name of work : Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur".

Estimate

Part 'B' (Construction of 150 KL CWR & Pump Sets)

S.No	Particulars	Qty	Unit	Rate	Amount
1	Construction of RCC (Flat slab type) Clear Water Reservoir of following capacity as per the Scope of work and Technical specification, consisting of the following main activities: -				
1.1	<p>a) Topographic survey, preparation of site contour plan, conducting SBC test and its approval from department before construction. Submission and approval of concrete mix design and water quality test report for water to be used in construction.</p> <p>b) Excavation in all types of soil, PCC below foundation & all RCC Work including all labour and material charges including providing and fixing of accessories such as SS ladder, SS manhole frame and covers, water level indicator (float type), SS ventilator with SS screen, float valve, puddle collars, G.I. pipe railing around walk way, Top Dome/Slab, Staircase.</p> <p>c) CWR shall be provided with adequate plinth protection all around the structure in a width starting from edge of structure at GL and extending at least up to 1.0m beyond the vertical wall of CWR. The plinth protection shall consist of 150mm thick PCC in M-15 concrete over 150mm thick compacted soil fill.</p> <p>d) Providing and applying two coats of food grade epoxy paint on the inside surface of the roof slab, and 600 mm height of the vertical wall.</p> <p>e) Successful hydro test and water tightness test as per I.S. code.</p> <p>f) Providing and applying three coats of anti-carbonation paint on the roof Slab.</p> <p>g) Providing and applying three coats of</p>				

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	cement-based paint on the remaining external surface area of the structure.				
1.2	<p>h) Providing and fixing SS-304 ventilator, SS 304 manhole frame and cover and SS 304 ladder from roof slab to bottom Slab, inside container. Providing and fixing water level indicator (Float type).</p> <p>i) Providing and fixing MS ladder from ground to top slab.</p> <p>j) All MS parts to be painted with two coats of the enamelled paint over the primer coat of red oxide.</p> <p>k) Providing and fixing of 150mm wide water bar for the construction joints in the container.</p> <p>l) Providing and fixing CI/DI puddle collars the vertical wall for connecting inlet, outlet, overflow and washout pipes of the reservoir.</p> <p>m) <i>Inlet, outlet, overflow, washout pipes and valves are not included in this work, provision for the same shall be taken separately.</i></p>				
1.3	Rates for RCC Partially Underground type clear water reservoir SBC 7 T/sqm, SEISMIC ZONE-2,3 & 4				
1.4	150KL capacity	150000.00	Litre	7.14	1071000.00
2	Mechanical Work				
2	<p>Providing, installation, testing and commissioning of submersible Monoblock pump set conforming to IS 8034 and 2 pole motor operating at synchronised speed of speed 3000 RPM, with water proof winding. Pump shall be suitable for various delivery head and discharge with stainless steel shaft. Motor suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz AC and with water lubricated bearing to accept entire hydraulic thrust. Supply, with cable guard, thrust carbon/fibre bearing to withstand entire hydraulic thrust. The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design. Antithrust stream lined non return valve shall be provided with the pump and minimum 6 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall be provided with each pump etc. complete in all respect as per specification, scope of work and direction of Engineer in Charge</p>				

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	of following power rating, suitable for prescribed duty conditions mentioned in TD.				
2.1	7.5 KW (10 HP)	2.00	Each	60640.00	121280.00
3	SITC STAR DELTA Starter type LT Panel of following rating: all switchgears are of PHED approved makes, CRCA sheet of Panel enclosure is of TATA/ Essar 1.6mm/ 2.0mm thick duly Electrostatic Powder Coated with angle frame including other ancillaries (Insulators, Acrylic Sheet , Backlight Sheet, Hardware, Wire, Name Plates, Lugs, Pvc Channel , Mcb Chanel , Lock, Hing , Bidding , Connectors, Neutral Links , Spiral , Saddle & Packing Material) etc. and 100A/ 125A ,TPN, Aluminium Bus Bar with Colour coated heat shrinkage sleeves complete as per Technical Specifications and as per direction of Engineer-In-Charge.				
4	STAR DELTA STARTER 7.5 KW (10.0 HP) - : For 2 motors (1 W+ 1S) I/C - MCB 63A ,FP, 10 KA, C Curve (1) , Analog Voltmeter 96*96mm (0-500V) (1), Volt Selector Switch (1) , Analog Ammeter 96*96mm (0-60A) (1), Amp. Selector Switch (1), C. T. 60/5A CL 1.0 5VA (3) , Indicating Lights (Red-1, Yellow -1) (2), Indicating Lights (Blue - 1) (1), Control MCB 6A SP 10 KA C Curve (3) and O/G- MCB 32A ,TP, 10 KA, C Curve (2), Power Cont 18A TP AC3 Duty(2), 2 NO+2 NC Aux. Block(2), Thermal Overload Relay (7-10A)(2), Control MCB 6A SP 10 KA C Curve (2), Single Phase Preventer (2), Indicating Lights (Red- 1, Green - 1, Amber-1)(6), Push Button 22.5 (Red - 1, Green - 1)(4), Selector Switch 1 Pole, 2 Way (2), Capacitor 440VAC Heavy Duty MPP Type 5Kvar (2), S/D Timer(2)	1.000	each	65077.00	65077.00
5	Providing and fixing double flanged ISI marked DI Class K-9 pipes as per IS:8329-2000 (amended up to date), as vertical pipes for RCC Reservoirs including specials required such as duck foot bend, bend, tee etc. providing and fixing clamps at every 3 mtr, jointing materials such as nuts, bolt, rubber packing, hydraulic testing etc. complete in all respect up to and from valve chamber as per direction of EIC, Technical Specification and Scope of work.				
5.1	100 mm	10.000	mtr	2259.00	22590.00
6	Providing, lowering, aligning, fixing in position in pipe line, CI D/F Sluice valves				

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	straight and pocket less body passage of approved make of following Pressure rating & dia complete, confirming to IS:14846 (amended up to date) and of following specifications: Body, Bonnet, Wedge, Gland, Thrust Plate, Cap & Hand wheel of Grey cast iron of IS:210/ FG200 Stem - AISI410 ,Body Seat ring, Wedge facing ring & Bushes - LTB2/ SS, Face to face dimensions as per IS 14846/2000 (amended up to date) ,Epoxy (Non-Toxic-suitable for drinking water) applied inside and outside, Flanges Drilled as per IS 1538. Nut-Bolt confirming to IS:1363 and IS: 1367/ CS/ galvanised steel Insertion rubber of black EPDM 6mm thick . Sluice valves including all jointing & jointing material, labour, testing and commissioning along with pipe line as per Technical Specifications and as per direction of Engineer-in-charge. Note: Rates are exclusive of tail piece/ dismantling joints and earth work. Manually Operated CI Sluice valve of Class PN-1.0				
6.1	100 mm HW	2.000	each	8649.00	17298.00
	Total				1,297,245.00

Executive Engineer (PHE-I)
JDA, Jaipur

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'Signature of Contractor

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JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Name of work : Construction of 150 KL CWR & 200 mm dia Tubewells and P/L/J of HDPE pipeline for Water Supply in Niji Khatedari Scheme Master's Creation Under Jurisdiction of PHE-I JDA, Jaipur".

Estimate

Part 'C' (Rising & distribution system)

S.No	Particulars	Qty	Unit	Rate	Amount
1	Providing, lowering, laying and jointing in trenches, standard lengths HDPE ISI marked Pipes as per IS-4984: 1995 (amended up to date) with necessary jointing material like mechanical connectors, i.e. thread/ insert joint/ quick release coupler joint/ compression fitting joint or flanged joint and specials jointing pipe by electro fusion welding method, including all taxes , transportation and freight charges, inspection charges, loading/ unloading charges, stacking of pipes, including cost of labour and material, specials (Tee, bend etc.), satisfactory hydraulic testing, disinfection, commissioning etc. complete as per technical specifications and direction of Engineer-in-charge of following class and diameter. (excluding earth work) . Note : Providing and fixing of all requisite specials as per drawing, design and layout are inclusive in RM measurement of the item and shall not be paid separately. Supply may be in coil or straight length in 6 M/12 M.				
1.1	HDPE PE-80 PN-6				
1.1.2	90 mm dia	1000.00	metre	306.00	306,000.00
1.1.3	110 mm dia	600.00	metre	463.00	277,800.00
3	Earth work in excavation by mechanical means (Hydraulic Excavator)/ manual means in trenches of required width and gradient for laying and jointing of pipe line including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 Mtr. including taking out the excavated soil, and then returning the soil as required in layers not exceeding 20cm in depth including consolidating each deposited layer by ramming, watering etc. and disposal of surplus excavated soil as directed within a lead of 50 Mtr. including required all safety provisions etc.: All kinds of soil	800.00	Cum	200.00	160,000.00

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4	Providing, lowering, aligning, fixing in position in pipe line, CI D/F Sluice valves straight and pocket less body passage of approved make of following Pressure rating & dia complete, confirming to IS:14846 (amended up to date) and of following specifications: Body, Bonnet, Wedge, Gland, Thrust Plate, Cap & Hand wheel of Grey cast iron of IS:210/FG200 Stem - SS 304 ,Body Seat ring, Wedge facing ring & Bushes - LTB2/ SS , Face to face dimensions as per IS 14846/2000 (amended up to date) ,Epoxy (Non-Toxic- suitable for drinking water) applied inside and outside, Flanges Drilled as per IS 1538. Nut-Bolt confirming to IS:1363 and IS: 1367/CS/ galvanised steel Insertion rubber of black EPDM 6mm thick . Sluice valves including all jointing & jointing material, labour, testing and commissioning along with pipe line as per Technical Specifications and as per direction of Engineer-in-charge. Note: Rates are exclusive of tail piece/ dismantling joints and earth work.				
4.1	Manually Operated CI Sluice valve of Class PN-1.0				
4.1.2	80 mm HW	2.00	Each	6301.00	12,602.00
4.1.3	100 mm HW	1.00	Each	8649.00	8,649.00
8	Providing, lowering, laying, aligning, fixing in position and jointing CI dismantling joint (Suitable for Sluice valves etc.) as per IS specifications complete of the following sizes including all jointing material, cost of all labour, testing and commissioning Technical Specifications and as per direction of Engineer. Class PN 1.0				
8.1	80 mm dia	4.00	each	3149.00	12,596.00
8.2	100 mm dia.	2.00	each	3666.00	7,332.00
TOTAL					784,979.00

Executive Engineer (PHE-I)
JDA, Jaipur

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