

**Government of Rajasthan
Public Health Engineering Department**

**Tender Document
(NIT No 91 /2021-22)**

**Work of P/L/J testing and
commissioning of DI Pipe Line,
Providing and Installation of Pump Set
with EMI, Construction of Pump House
and SITC of Grid Ties Solar Power Plant
including defect liability period of 12
months and O&M period of 120 months
at Railway Colony Phulera Block
Sambhar Distt Jaipur**

Volume-I

(Technical Bid)

**Instructions to Bidders, General conditions,
Special Conditions**



ESTIMATED COST

Rs 390.24 Lacs

**OFFICE OF THE ADDITIONAL CHIEF ENGINEER,
PHED Region II, Gandhi Nagar Jaipur**

Telephone No.: 0141-2702700

E-mail: ace2.jpr.phed@rajasthan.gov.in and

OFFICE OF THE ADDITAIONAL CHIEF ENGINEER,
PHED Region II, Gandhi Nagar Jaipur
Telephone No.: 0141-2702700 E-mail: ace2.jpr.phed@rajasthan.gov.in

Tender Issuing Form

S.No.	ITEM	Particulars
1.	Name of Work	Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur
2.	NIT No	91/2021-22
3.	Tender Fee (Non Refundable) Budget Head 0075-0-800-52-01	Rs. 5000 in favour of Executive Engineer, PHED, Division III Dudu Jaipur to be deposited DDO Code of Executive Engineer, PHED, Division III Dudu Jaipur is 8638 It is to be deposited under head is 0075-00-800-52-01 through e-GRASS (Website http://egras.raj.nic.in) and Scanned copy of e-Grass challan to be uploaded with documents of technical bid
4.	E Proc Fees (Non Refundable) Budget Head 8658-00-102-16-02	Rs. 1000.00 in favour of Managing Director RISL, payable at Jaipur. It is to be deposited under head is 8658-00-102-16-02 through e-GRASS (Website http://egras.raj.nic.in) and Scanned copy of e-grass challan to be uploaded with documents of technical bid
5.	Earnest Money Budget Head is 8443-00-108-00-00	Rs. 780480 in favor of Executive Engineer, PHED, Division III Dudu Jaipur . DDO Code of Executive Engineer, PHED, Division III Dudu Jaipur is 8638 It is to be deposited under head is 8443-00-108-00-00 through e-GRASS (Website http://egras.raj.nic.in) and Scanned copy of e-grass challan to be uploaded with documents of technical bid The enlisted contractor in appropriate class with PHED Rajasthan (as per rule) shall be required to deposit Rs. 195120 (0.5% of Estimated cost of NIT) in the aforesaid form.

OFFICE OF THE ADDITIONAL CHIEF ENGINEER,
PHED Region II, Gandhi Nagar Jaipur
Telephone No.: 0141-2702700 E-mail: ace2.jpr.phed@rajasthan.gov.in
NOTICE INVITING TENDERS FOR WORKS

Online Tenders are hereby invited on behalf of the Governor of Rajasthan for the following works from enlisted contractors as per PWF&AR Part II Appendix 16 dated 1.07.1999 and amendment issued by concerned department up to date and meeting eligibility criteria. Contractors enlisted with other departments of Govt. of Rajasthan and enlisted with CPWD, Postal Telecom, Railway, MES, other state Govts./ Central Govt. undertaking/organization equivalent to **AA class** of Rajasthan meeting eligibility criteria may also apply after giving prescribed Earnest Money. Tender documents can be downloaded from website <http://eproc.rajasthan.gov.in>.

1. PARTICULAR DETAIL OF TENDER:

SN	ITEM	DETAILS
a)	Name of Work	Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambhar Distt Jaipur
b)	Estimated Cost	Rs 390.24 Lacs
c)	Completion Period	9 Months
d)	Defect liability period including operation of the scheme	12 months after successful completion of scheme.
e)	O&M Period	120 months after successful completion of Defect Liability Period
f)	Type of contract	Schedule contract on SPR Basis
g)	Validity of tender	The tender for the works shall remain open for acceptance for the period of 90 days from date of opening of the PQ tender or mutually extended period.
h)	Price of Tender Document (Non Refundable)	Rs. 5000 in favour of Executive Engineer, PHED, Division III Dudu Jaipur It is to be deposited under head is 0075-00-800-52-01 DDO Code Executive Engineer, PHED, Division III Dudu Jaipuris 8638
i)	E Procurement Processing Fees (NonRefundable)	Rs. 1000.00 in favour of Managing Director RISL, payable at Jaipur. 8658-00-102-16-02 DDO Code Executive Engineer, PHED, Division III Dudu Jaipuris 8638
j)	Earnest Money	Rs. 780480 in favor of Executive Engineer, PHED, Division III Dudu Jaipur. DDO Code Executive Engineer, PHED, Division III Dudu Jaipur is 8638 It is to be deposited under head is 8443-00-108-00-00 through e-GRASS (Website http://e gras.raj.nic.in) and Scanned copy of e- grass challan to be uploaded with documents of technical bid The enlisted contractor in appropriate class with PHED Rajasthan (as per rule) shall be required to submit bid declaration to deposit EMD Rs. 195120 (0.5% of Estimated

		cost of NIT) in the aforesaid form.
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2. ELIGIBILITY CRITERIA:

Registration	The tenderer should be registered / enlisted in appropriate class per PWF&AR Part II Appendix 16 dated 1.07.1999 and amendment issued by concerned department up to date. Unregistered contractor shall not be allowed. The contractor is required to submit review letter of registration from competent authority. The scanned original/ duly notarized copy of registration certificate and review letter (if required) is to be submitted.
Fee	Required Tender Fee, E-proc Fee & Earnest money in prescribed format
Tender document	All required notarized and filled copy (where ever specified) and Digitally Signed documents.
Joint Vanture	No joint venture is permissible
GST registration	Copy of GST Registration certificate with latest GST return filled

TECHNICAL CRITERIA:

The The bidder should have experience of the following works related to water supply schemes/ projects during last 10 years up to the date of submission of tenders.

PROJECT EXECUTION: (Contract of similar nature): Execution and successful commissioning of one similar work costing not less than the amount equal to 58.54 Lacs (One Similar Work: - P/L and P/M)

Construction Experience of Key Components:-

Pipeline: - Should have experience of laying, jointing, testing and commissioning of:

- (i) Pipeline of minimum nominal dia 100 mm for length 204 mtr

General notes:

- Criteria of experience of 'Project Execution' as per 2.1 similar works for the experience of project execution means, an executed water supply scheme/ project having at least 1 (one) key component, if the no. of key components in the proposed work are up to 2 and at least 2 components; where no. of key components in proposed works are more than 2. Names of such components shall be mentioned in the criteria.
- Criteria of 'Construction Experience of Key Components' as per 2.2, shall be applicable for only those components of the project I scheme which are included in the list mentioned in explanatory note as per applicable criteria.
- For experience of pipeline work as per 2.2.1 and 3.2.1 the experience of specific size pipeline criterion no. 2.2.1 (i) & 3.2.1 (i) shall be in a single contract, but the experience of total length of pipeline criterion no. 2.2.1 (ii) & 3.2.1 (ii) can be in two contracts. The requirement of the components specific size/ length and total length can be met from the same contract or different contracts.
- For considering experience of a bidder for any work executed under JV; Bidder shall submit relevant documents/ certificates for evidence.
- Experience certificate shall be considered only if it is issued by an officer not below the rank of Executive engineer or equivalent for the work awarded by State Governments/ Central Government or their undertakings and autonomous bodies.
- The works which have been completed and commissioned during the last 10 years up to the date of submission of bid, though may have commenced earlier, shall be considered for experience purposes. If single NIT for a work has been invited and work order has been given in two splitted orders then both the splitted orders shall be considered jointly for experience purposes. Bidder shall submit relevant documents/ certificate for evidence.
- Experience of O&M of 2 years in an ongoing contract with scope of more than 2 years shall also be considered, even though not fully completed.
- Additional weightage @10% per year shall be given to the cost (capital and O&M) of executed projects/ schemes/ works during previous years to bring the same to current price level to account for price escalation over the years as illustrated below:

Year	Cost of Project	Effective Cost of executed project at present price level
2011-12	A	2.35 X A
2012-13	B	2.14 X B
2013-14	C	1.95 X C
2014-15	D	1.77 X D
2015-16	E	1.61 X E
2016-17	F	1.46 X F
2017-18	G	1.33 X G
2018-19	H	1.21 X H
2019-20	I	1.10 X I
2020-21	J	1.00 X J

Note: The Ten preceding Financial Years shall be considered as the years Immediately preceding the year during which bids are received; for instance, for bids received in FY 2021-22, the 10 preceding years shall be 2011-12 to 2020-21.

A- HISTORICAL CONTRACT NON PERFORMANCE:

HISTORY OF NON-PERFORMING CONTRACTS.	The prospective bidder should not have non been blacklisted /debarred for non performance or due to other breach of contracts contract /PWF&AR rules during last 6 months as per provision of applicable rules and should not have been under category of blacklisted/ debarred on the date of submission of bid on 500 rupees stamp with notarised NOTE i. Non-performance shall include all contracts except where Employers decision was over ruled by the competent authority. ii. Parameter of History of Non-Performing Contract also applies to Contracts executed by the Bidder as a JV member.
Relationship Certificate	Relationship Certificate for Near Relative as per format attached on 100 rupee stamp with notarised

3. IMPORTANT DATES

SN	ITEM	DETAILS
1	Date of Downloading of Tender Document	Tender documents can be downloaded from website http://eproc.rajasthan.gov.in from 6.00 PM on 25.01.2022 to 6.00 PM on 14.02.2022
2	Date of submission of pre bid Queries	Tender queries can be submitted online on official mail ID ace2.jpr.phed@rajasthan.gov.in up to 6.00 PM on 08.02.2021
3	Tender Fee	Rs. 5000 In favor of Executive Engineer, PHED, Division III Dudu Jaipur DDO Code 8638 is required to be submitted up to 6.00 PM on 14.02.2022
4	RISL Fee	Rs. 1000 In favor of Executive Engineer, PHED, Division III Dudu Jaipur DDO Code 8638 is required to be submitted up to 6.00 PM on 14.02.2022
5	Earnest Money deposition date	Rs. 780480 in favor of Executive Engineer, PHED, Division III Dudu Jaipur DDO Code 8638 is required to be submitted up to 6.00 PM on 14.02.2022 The enlisted contractor in appropriate class with PHED Rajasthan (as per rule) shall be required to deposit EMD Rs. 195120 (0.5% of Estimated cost of NIT) in the aforesaid form. The Name of bidder and NIT No 91 should be clearly

SN	ITEM	DETAILS
		mentioned.
6	Last Date and time of Submission of Tender	The tenders can be submitted electronically on http://eproc.rajasthan.gov.in . from 6.00 PM on 25.01.2022 to 6.00 PM on 14.02.2022
7	Date & time of opening of P.Q. bid	11.00 AM on 15.02.2022 in office of Additional Chief Engineer PHED Region II Jaipur.
8	Place and date of opening of financial bid.	Office of Additional Chief Engineer PHED Region II Jaipur. The date shall be intimated to successful tenderer separately.

Notes:

- 1 Before electronically submitting the tenders, it should be ensured that all the tender papers are including conditions of contract are properly uploaded and digitally signed by the bidder
- 2 The whole of the Work, including mobilization, reconnaissance, design, manufacturing, transportation, construction, installation, testing, commissioning and trial runs, and demobilization has to be completed within a period of 9 Months calculated from the commencement date, which is 10 days after the written order to commence the Work.
- 3 "The security deposit @ 10 %(or as per latest FD circular) of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. However, the amount of security deposit deducted from running bills shall not be converted into any mode of securities like bank guarantee. FDR etc. The earnest money deposited shall however be adjusted while deducting security deposit from first running bills of the contractor. There will be no maximum limit of security deposit.
 - A contractor may however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @10%(or as per latest FD circular) of the work order before or at the time of executing the agreement. In that case, earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution for the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills.
 - All compensation or other sums of money payable by the contractor to the Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising there from, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the contractor shall within ten days thereafter, make good in cash or bank guarantee or Nationalised/Scheduled bank as aforesaid, any sum of sums which may have been deducted from or raised by sale or his Security deposit or any part thereof.
- 4 The tender should be accompanied with **GST Registration with latest GST return filed from** the concerned departmental authorities, without which the tenders may not be entertained. GST Registration shall be submitted along with the Pre-qualification tenders.
- 5 The tenders for the works shall remain open for acceptance for the period of **90 days** from the date of opening of the Pre-Qualification tender or mutually extended period. A tender valid for a shorter period shall be rejected by the Department as being non-responsive.
- 6 If any tenderer withdraws his tender prior to expiry of said validity period or mutually extended period or makes modification in the rates, terms and conditions of the tender within the said period, which are not acceptable to the department, or fails to commence the work in the specified period/fails to execute the agreement, the department shall, without prejudice to any other right or remedy, be at liberty to forfeit the amount of earnest money given in any form absolutely. If any Tenderer, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to re-tendering, he shall stand debarred from participating in such re-tendering in addition to forfeiture of Earnest Money/Security Deposit and other action under agreement.
- 7 All tenders, in which any of the prescribed conditions are not fulfilled or which have been vitiated by errors in calculations, totaling or other discrepancies or which contain over-writing in figures or words or corrections not initialed and dated, may be liable to rejection
- 8 Tenderers enlisted in appropriate class who shall required paying Earnest Money @ ½ % of estimated cost of work (Rs. 195120), in case of work for which they are authorised to tender under Rules for enlistment of Tenderers, but the amount to the extent of full Earnest money shall be liable to be forfeited.

- 9 No conditional tender shall be accepted. It will be rejected summarily forthwith.
- 10 The acceptance of the tender will rest with the Department who does not bind itself to accept the lowest tender and reserves to itself the authority to reject any or all of tenders received without assigning any reason.
- 11 No refund of tender fee is claimable for tenders not accepted or forms not submitted.
- 12 All other conditions shall be prevailing as detailed out in the departmental tender document (in respective saections / volumes)
- 13 The bidder who wishes to participate in this tender will have to register on <http://eproc.rajasthan.gov.in>. The bidder shall have to procure digital signature certificate (Type II or III) as per IT act 2000 using which they can sign their bids. Bidders can procure the same from any CCA approved Certifying agency or they may contact E-procurement Cell of Dept. of IT & C, GoR for further assistance. Help Line contact Number is 0141-4022688 and can be contacted between 10 AM to 6.00 PM on all working days., email eproc@rajasthan.gov.in, Address: E Procurement Cell, RISL, Yojna Bhawan, Tilak Marg, C Scheme, Jaipur
- 14 The tenderer is requested to study tender detail published on e procurement system, Govt of Rajasthan, Tender Document and NIT published in news paper correctly. In case of any desripency regarding date and time of opening / closing and period of work, tender details published on e procurement system Government of Rajasthan shall prevail.
- 15 **Bidder Shall submit their offer online in Electronic formats both for technical & financial proposals, however Egrass Challan for tender fees, processing fees and EMD should be submitted in the name of Executive Engineer, PHED, Division III Dudu Jaipur**
- 16 Before electronically submitting the tenders, it should be ensured that all the tender papers including conditions of contract are digitally signed by the bidder.
- 17 Bidder shall ensure that scanned copy of all the filled copy of certificates required and mentioned in Vol I of the tender are attached with the tender.
- 18 The department will not be responsible for for any delay on account of late electronic submission of the tender.
- 19 All pages and schedules of online submitted tender document shall be essentially filled in (where ever required) and should be digitally signed by the bidder.
- 20 The Provisions of RTPP Act 2012 and RTPP Rules 2013 amended upto date shall prevail.
- 21 The procuring entity reserves the right to cancel the bid process and reject any or all the Bids received without assigning any reason.

SAVE WATER – SAVE LIFE

Additional Chief Engineer
PHED Region II Jaipur
On behalf of Governor of Rajasthan

Instructions to Tenderers (ITT)

A. INTRODUCTION	
General Information	1.1. EXECUTING AGENCY The Executing Agency of this project is the Public Health Engineering Department (PHED) of Rajasthan through the Additional Chief Engineer PHED Region II Jaipur, and Executive Engineer, PHED, Division-II, Dudu Jaipur.
	1.2. TYPE OF CONTRACT The works described in this tender document is considered to be a Schedule contract on SPR Basis. The Contractor is responsible for the entire site reconnaissance, field investigations, design, drawing, implementation, testing & commissioning, defect liability of the work as described in the tender documents. The name of the work under this contract is "Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur"
	1.3. All works, proposed for execution under the Contract, are notified in Volume II of the tender document under the headline "Scope of work and Technical Specifications".
	1.4. The Tenderer shall read the specification and study the conceptual drawings carefully before submitting the tender.
	1.5. The Tenderer is required to study all instructions, forms, terms, conditions and other details in the tender documents. Failure to furnish all information required by the tender documents or submission of a tender not substantially responsive to the tender documents in every respect will be at the Tenderer's risk and may result in rejection of his tender.
	1.6. The tenderer shall sign a declaration under the official Secrets Act for maintaining secrecy of the tender documents, drawings or other records connected with the work given to him in form given below. The unsuccessful tenderer shall return all the drawings given to them. <u>Declaration</u> "I/We hereby declare that I/We shall treat the tender documents, drawings and other records, connected with the work, as secret confidential documents and shall not communicate information derived therefrom to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same". Failure to observe the secrecy of the tenders will render tenders of the Tenderers, liable to summary rejection.
	1.7. The site for execution of the work will be made available as soon as the work is awarded. In case, it is not possible for the Department to make the entire site available on the award of the work, the Tenderer shall arrange his working program accordingly. No claim, whatsoever, for not giving the site in full on award of the work or for giving the site gradually in parts will be tenable. The Tenderer may satisfy himself regarding site, acquisition of land approach roads etc.
	1.8. Tenderers shall submit only unconditional tenders. Conditional tenders are liable to be rejected summarily. The tender documents show already the specific terms and conditions on which tenders are required by the Department, Hence all tenders should be in strict conformity with the tender documents and should be fulfilled in, wherever necessary, and initialed. Incomplete tender is liable to be rejected. The terms and conditions of the tender documents are firm, as such conditional tenders are liable to be rejected.
	The contractor shall comply with the provisions of the Apprenticeship Act, 1961, and the rules and orders issued, there under, from time to time. If he fails to do so, his failure will be a breach of the contract and the original sanctioning authority at its discretion may cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of violations made by him of the provisions of

	any Act/Rule/Order.
	1.9. The tender should be accompanied with GST Registration from the concerned departmental authorities, without which the tenders may not be entertained. GST Registration shall be submitted along with the Pre-qualification tenders in Cover 2
	1.10. If it is found that the tender is not submitted in proper manner, or contains too many corrections and or unreasonable rates or amounts, it would be open for the competent authority not to consider the tender, forfeit the amount of earnest money and/or delist the contractor.
Address for Communication	2.1. All communications in reference to this tender must be made to The Additional Chief Engineer PHED Region II Jaipur
Period for Completion	3.1. The work is to be completely finished to the satisfaction of Engineer-in-charge within 9 Months from the 10 th day after the date of written order to commence the work. The defect liability (including operation) period after the successful completion of the work shall be 12 months. The commencement of Defect liability period shall start from the date of issue of completion certificate from Engineer in Charge. Operation and maintenance period shall start after completion of Defect liability period.
	3.2 Definitions 3.2.1 Facilities Shall mean all works and its equipment(s), components which have been supplied and /or installed or designed, and/or constructed in the contract for works i.e. the reservoirs, the pump houses, clear water mains, head works electrification, all protection equipment, devices, alarms, meters, materials, plants, equipment or components thereof and all structures from the intake works to the town level reservoirs, and shall include any additions, modifications, alterations, replacement and/or repairs as may be made thereto from time to time during defect liability period. 3.2.2 Clause Unless otherwise mentioned, the reference to "clause" made in any section of the document, it shall mean referenced clause of that section. 3.2.3 Bid & Tender or Bidder & Tenderer The word 'Bid' & 'Tender' or word 'Bidder' & 'Tenderer' used in the tender document be treated as synonymous.

Pre-Qualification Criteria	B. Pre-Qualification Criteria	
	CRITERIA	QUALIFICATION PARAMETERS
4.	Registration	The tenderer should be registered / enlisted in appropriate class per PWF&AR Part II Appendix 16 dated 1.07.1999 and amendment issued by concerned department up to date. Unregistered contractor shall not be allowed. The contractor is required to submit review letter of registration from competent authority. The scanned original/ duly notarized copy of registration certificate and review letter (if required) is to be submitted.
	FEE	Required Tender Fee, E-proc Fee & Earnest money in prescribed manner
	Jv	No joint venture is permissible
	GST Registration	Copy of GST Registration certificate with latest GST Return filed
	TECHNICAL CRITERIA	
	WORK EXPERIENCE	The bidder should have experience of the following works related to water supply schemes/ projects during last 10 years up to the date of submission of tenders.

		PROJECT EXECUTION: (Contract of similar nature): Execution and successful commissioning of one similar work costing not less than the amount equal to 58.54 Lacs (One Similar Work: - P/L and P/M)																																	
	Pipe Line	Should have experience of laying, jointing, testing and commissioning of: (i) Pipeline of minimum nominal dia 100 mm for length 204 mtr																																	
General notes:	- Criteria of experience of 'Project Execution' as per 2.1 similar works for the experience of project execution means, an executed water supply scheme/ project having at least 1 (one) key component, if the no. of key components in the proposed work are up to 2 and at least 2 components; where no. of key components in proposed works are more than 2. Names of such components shall be mentioned in the criteria. - Criteria of 'Construction Experience of Key Components' as per 2.2, shall be applicable for only those components of the project I scheme which are included in the list mentioned in explanatory note as per applicable criteria. - For experience of pipeline work as per 2.2.1 and 3.2.1 the experience of specific size pipeline criterion no. 2.2.1 (i) & 3.2.1 (i) shall be in a single contract, but the experience of total length of pipeline criterion no. 2.2.1 (ii) & 3.2.1 (ii) can be in two contracts. The requirement of the components specific size/ length and total length can be met from the same contract or different contracts. - Criteria of 'Experience of O&M of scheme I project as per (3.1) shall be applicable for schemes/projects execution with O&M of 5 years or more and estimated cost of work more than Rs. 75.00 Crore. Similar work for the experience of O&M of scheme / project means, O&M of a scheme /project having at least 2 components similar to those included in the scope of the tender (intake, WTP, Pumping Station, Pipeline, Bore well). Names of such components shall be mentioned in the criteria. - For considering experience of a bidder for any work executed under JV; Bidder shall submit relevant documents/ certificates for evidence. - Experience certificate shall be considered only if it is issued by an officer not below the rank of Executive engineer or equivalent for the work awarded by State Governments/ Central Government or their undertakings and autonomous bodies. - The works which have been completed and commissioned during the last 10 years up to the date of submission of bid, though may have commenced earlier, shall be considered for experience purposes. If single NIT for a work has been invited and work order has been given in two splitted orders then both the splitted orders shall be considered jointly for experience purposes. Bidder shall submit relevant documents/ certificate for evidence. - Experience of O&M of 2 years in an ongoing contract with scope of more than 2 years shall also be considered, even though not fully completed. - Additional weightage @10% per year shall be given to the cost (capital and O&M) of executed projects/ schemes/ works during previous years to bring the same to current price level to account for price escalation over the years as illustrated below: <table border="1"> <thead> <tr> <th>Year</th><th>Cost of Project</th><th>Effective Cost of executed project at present price level</th></tr> </thead> <tbody> <tr><td>2011-12</td><td>A</td><td>2.35 X A</td></tr> <tr><td>2012-13</td><td>B</td><td>2.14 X B</td></tr> <tr><td>2013-14</td><td>C</td><td>1.95 X C</td></tr> <tr><td>2014-15</td><td>D</td><td>1.77 X D</td></tr> <tr><td>2015-16</td><td>E</td><td>1.61 X E</td></tr> <tr><td>2016-17</td><td>F</td><td>1.46 X F</td></tr> <tr><td>2017-18</td><td>G</td><td>1.33 X G</td></tr> <tr><td>2018-19</td><td>H</td><td>1.21 X H</td></tr> <tr><td>2019-20</td><td>I</td><td>1.10 X I</td></tr> <tr><td>2020-21</td><td>J</td><td>1.00 X J</td></tr> </tbody> </table> Note: The Ten preceding Financial Years shall be considered as the years Immediately preceding the year during which bids are received; for instance, for bids received in FY		Year	Cost of Project	Effective Cost of executed project at present price level	2011-12	A	2.35 X A	2012-13	B	2.14 X B	2013-14	C	1.95 X C	2014-15	D	1.77 X D	2015-16	E	1.61 X E	2016-17	F	1.46 X F	2017-18	G	1.33 X G	2018-19	H	1.21 X H	2019-20	I	1.10 X I	2020-21	J	1.00 X J
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	2021-22, the 10 preceding years shall be 2011-12 to 2020-21.	
	HISTORICAL CONTRACT NON PERFORMANCE :	
	HISTORY OF NON PERFORMAING CONTRACTS	The prospective bidder should not have non been blacklisted /debarred for non performance or due to other breach of contracts contract /PWF&AR rules during last 6 months as per provision of applicable rules and should not have been under category of blacklisted/ debarred on the date of submission of bid. Affidavit from client is required to be submitted on 500 Rupee stamp with notarised
		NOTE i. Non-performance shall include all contracts except where Employers decision was over ruled by the competent authority. ii. Parameter of History of Non-Performing Contract also applies to Contracts executed by the Bidder as a JV member.
Relationship Certificate		Relationship Certificate for Near Relative as per format attached on 100 rupee stamp with notarized on 100 rupee stamp with notarised

C. Tender Document	
Content of Tender Document	5.1. The facilities required, tendering procedures, contract terms and technical requirements are prescribed in the tender documents. The tender documents include the following sections, and addendum's issued till the date of submission of the tender: Volume I Notice inviting Tender Instruction to Tenderers Pre-Qualification Schedules Conditions of Contract General Conditions of Contract Special Conditions of Contract Volume II Scope of Work & Technical Specifications Annexure Tender Drawing Volume III Bill of Quantities 5.2. The Tenderer shall bear all costs associated with the preparation and submission of its tender, and the Department will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the tendering process.
Cost of Tendering	6.1. It shall be obligatory on the successful tenderer to pay stamp charges on the contract for preparation of contract agreement, as ruling on date of execution of the contract.
Site Visit before Tendering	7.1. The Tenderer and any of its personnel or agents will be granted permission by the Department to enter upon its premises and lands for purpose of such site visits, but the tenderer and its personnel will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the site visits 7.2. TENDERER TO INFORM HIMSELF FULLY The Tenderer shall be deemed to have satisfied himself as to all the conditions and circumstances affecting the Contract price, as to the general circumstances at the site of the work, as to the general labour position at the site, as to the availability of construction material, water, electricity, as to the transport conditions, as to the climatic and meteorological conditions and to have fixed his prices according to his own view of these. Tenderers are invited to visit the site with prior appointment with the Public Health Engineering. The Deptt. will not be responsible for the personnel of the Tenderer and for all acts in relation with the site inspection. No claims except as otherwise expressly provided will afterwards be accepted due to non-inspection of the site. The Tenderer shall be responsible for any

	misunderstanding or incorrect information however obtained except the information given in writing by the Deptt.
Amendment of Tendering Documents	8.1. At any time prior to the deadline for submission of tenders, the Department may, for any reason, whether at its own initiative, or in response to a clarification requested by a prospective Tenderer, amend the tender documents. These addendum/ amendment shall be uploaded on the website.
	8.2. The Amendment/ Addendum/ Corrigendum will be notified on the website and it shall be binding on them. The information of any such amendment/ Addendum/ Corrigendum shall be intimated to all firms prospective tenderers on their E-Mail account which they have submitted during registration on website. Tenderers are required to immediately download the same from website. In case he/she fails to do so the department shall not be responsible for the same. It will be assumed that the information contained therein has been taken into account by the Tenderer in its tender. In case there is any modification/ addendum/ corrigendum in price bid, it is mandatory for the contractors to download the latest version of same and revise their financial offer on latest price bid. IF the tenderer fails to do so, its tender shall be rejected and offer shall not be considered.
	8.3. In order to provide prospective Tenderers reasonable time to take the amendment into account, in preparing their tender, the Department may, at its discretion, extend the deadline for the submission of tenders, in which case, the Department will notify all tenderers in writing of the extended deadline, for submission of tenders.
D. Preparation of Tenders	
Language of Tender	9.1. The tender prepared by the Tenderer and all correspondence and documents related to the tender exchanged by the Tenderer and the Department shall be written either in Hindi or English provided that any printed literature furnished by the Tenderer may be written in another language, as long as such literature is accompanied by a translation of its pertinent passages in the language mentioned herein, in which case, for purposes of interpretation of the tender, the translation shall govern.
Alteration of Designed Components not acceptable	10.1. No principal deviations and exceptions are allowed, in the specifications and in the basic requirements of the total scheme, (including effect due to addendums), such as: • Pipe material, diameter of pipe, capacity of reservoirs, type of pumps etc. • Design flow and design capacity of various components. • Alignment of pipe line, • All other basic requirement and capacities of systems. However, apart from such deviations other minor deviations such as those for the material of construction of valves, etc., made in the provisions of the technical and financial tenders submitted to provide better specifications of material than those asked in the specifications, a statement of deviations and exceptions to the provisions in Volume II shall be given in Volume I. The Tenderers shall enclose no price information with respect to these deviations in Cover 2 (Pre Qualification Bid) The tenderer may substitute other authoritative standards, brand names or catalogue numbers in its Tender, provided that it demonstrates to the Department's satisfaction that the substitutions are equivalent or superior to those designated in the Specifications, except if the Specifications specially provide otherwise (as in case of water meter, valve etc.)
	10.2. Tenderers, which propose any alteration in the basic requirement, as specified in Volume II and its addendum if any, or which contain any other conditions of any sort will be liable to rejection.
	10.3. Inclusion of additional equipment, civil work or other plant and material which in the Tenderer's opinion is required to satisfy the scope of work will not constitute a deviation.
	10.4. MAKES AND ORIGIN OF THE EQUIPMENT It is expected that the Tenderer will quote with a view to supply equipment of
Makes and origin of the	

equipment	best makes and conforming to highest standard. Tenderer has to consider for his financial offer, only makes of reputed manufacturers of equipments corresponding to the state of art technology and to the latest Indian standards. Tenderer shall offer rates as per the makes given of the equipment in the tender document or of any superior make if makes are not prescribed of the items, conforming to prescribed specifications indicated in the Volume II - "Scope of Work & Technical specifications". The tenderer shall quote only one price for each item mentioned in Schedule of Prices Volume III, irrespective of the finally selected make. The Deptt. Reserves the right to reject the offer if the makes given in Tender Document are not accepted and alternative makes are offered. By signing his offer, the tenderer agrees to supply any one make given in the tender document and/or accepted by the Deptt. For the price quoted in Schedule of Prices. Whichever equipment is proposed in the tender or considered by the tenderer for the financial offer, the equipment to be finally provided in case of award shall correspond to the specifications of the tender documents and shall be subjected to the approval of the Engineer in Charge In case, the Tenderer proposes to use any imported equipment/part of equipment/material he shall indicate so clearly in his tender and shall be responsible for arranging import license etc. for the same. All expenses to be incurred by the Contractor in connection with such Import including customs duty shall be included in the prices quoted.
Tender Form and Schedule of Prices	11.1. The Tenderer shall complete the Schedule of Prices furnished in the tender documents as indicated therein. The terms and conditions for payments shall be in accordance with the provisions of the conditions of contract(s) in Volume-I of tender document referred in ITT Clause 5.1.
Tender Prices	12.1. The Contract shall be for the complete Work as described in clause 1.2, based on the Schedule of Prices submitted in Volume III. 12.2. The Tenderer should quote his rates only numerically in English. Rates should be quoted in figures. 12.3. The tenderer shall quote his Schedule contract on SPR Basis prices for the complete work as given in prescribed format given in Volume III of the tender document as defined in ITT clause 5.1. 12.4. The contractor shall satisfy himself regarding the availability of the material required for execution within the time frame prescribed for the work and if desired <u>shall take into account the cost of superior material</u> to be used as its replacement. No time extension or additional cost shall be allowed on this account. 12.5. The prices and amounts quoted by the Tenderer shall allow for all costs including labour, materials, construction plant and equipment, transport charges, any other expenses to fulfill the obligations towards any ITT clause of the tender document referred in ITT clause 5.1, Custom Duty, Octroi, Excise Duty, Income Tax, GST, Turnover Tax, Professional Tax or any other duties, levies, taxes or charges whatsoever to the State or Central Department or to the Local Bodies on the components or the completed Works or the defect liabilityincluding operation and maintenance) of the works and for satisfactory performance of the Tenderer's obligations under this contract. The cost of water and power shall be payable as per the provisions of General conditions and Special Conditions of contract. 12.6. For all imported equipment(s) or components, the Tenderer under this Contract must provide a copy of the duties paid for the record of the department.
Tender Currency	13.1. All prices shall be quoted in the Indian Rupee. The department will not arrange any foreign currencies for import of any type of material/plant/spares etc.
Earnest Money	14.1. Earnest money as mentioned in NIT must be submitted online 14.2. Tenderers enlisted in appropriate class who shall required to submit bid security decaration for Earnest Money @ ½ % of estimated cost of work (Rs. 195120), in case of work for which they are authorised to tender under Rules for enlistment of Tenderers, but the amount to the extent of full Earnest money shall be liable to be forfeited in the event of circumstances explained in ITT Clause 14.7 below. 14.3. The Bidder shall have to upload scanned copy of proof depositing the Tender cost ,EMD and RISL Fees deposited on E GRAS 14.4. The format of the bank guarantee for earnest money shall be in accordance with

	the form of Earnest Money included as Annexure 2 to ITT in Volume I of the tender documents. 14.5. The Bank Guarantee submitted for earnest money must be valid for six (6) months, from the date of submission of tender as per ITT clause 15.1. Scanned copy of Bank Guarantee must be uploaded on the website. 14.6. The receipt of an Accountant, Cashier or any other official, not authorized to receive such amount, will not be considered as an acknowledgment of payment to the Additional Chief Engineer PHED Region II Jaipur or other duly authorized Engineer. 14.7. In case of the successful bidder, the amount of bid security may be adjusted in arriving at the amount of the Performance Security, or refunded if the successful bidder furnishes the full amount of performance security. 14.8. The Earnest Money may be forfeited (a) when the bidder withdraws or modifies its bid after opening of bids; (b) when the bidder does not execute the agreement, if any, after placement of supply / work order within the specified period; (c) when the bidder fails to commence the supply of the goods or service or execute work as per supply / work order within the time specified; (d) when the bidder does not deposit the performance security within specified period after the supply / work order is placed; and (e) if the bidder breaches any provision of code of integrity prescribed for bidders specified in the Act and Chapter VI of RTPP rules.
Period of Validity of Tender	15.1. The tenders for the works shall remain open for acceptance for the period of 90 days from the date of opening of the Pre-Qualification tender or mutually extended period. A tender valid for a shorter period shall be rejected by the Department as being non-responsive. If any tenderer withdraws his tender prior to expiry of said validity period or mutually extended period or makes modification in the rates, terms and conditions of the tender within the said period, which are not acceptable to the department, or fails to commence the work in the specified period/fails to execute the agreement, the department shall, without prejudice to any other right or remedy, be at liberty to forfeit the amount of earnest money given in any form absolutely. If any Tenderer, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to re-tendering, he shall stand debarred from participating in such re-tendering in addition to forfeiture of Earnest Money/Security Deposit and other action under agreement. 15.2. In exceptional circumstances, the Department may seek the Tenderer's consent to an extension of the tender validity period. The request and responses thereto shall be made in writing or by fax. If a Tenderer accepts to prolong the period of validity, the Earnest Money shall also be suitably extended.
Format and Signing of Tender	16.1. Wherever required, the representative of the firm, as below, must digitally sign the tender document. In the event of the tender being submitted by a firm, it must be digitally signed separately by each partner, thereof, or in the event of the absence of any partner, it must be signed on his behalf, by a person holding a power of Attorney, authorizing him to do so. Such power of Attorney will be submitted with the tender and it must disclose that the firm is duly registered under the Indian Partnership Act, By submitting the copy of registration certificate. In case of a Company, the duly authorised representative of the company holding a valid power of attorney on the date of respective correspondence. Bidder shall have to procure digital certificate as I.T. Act 2000.
Submission of tenders	16.2. Tender shall be electronically submitted on web site http://eproc.rajasthan.gov.in after digitally signing each document. 16.3. The Bid is to be submitted in 3 Covers which shall comprise of – Cover-1 Scanned copy and proof of deposition of EMD, Tender Cost, eprocurement fees on E GRAS website along with documentary proof of depositing the BG in the office of Additional Chief Engineer PHED Region II Jaipur if required.

	Cover-2 Complete Tender Document along with addendums/ amendments issued and uploaded by the Department on the above website, Tender form and schedules for pre-qualification Bid and scanned copies of supporting Documents. Cover-3 Financial offer (BOQ).
	16.4. The uploaded document of the bid shall contain no alteration, or additions, unless notified. In case the bidder makes an addition or correction, the provision written in the original document, read with the addendum or corrigendum issued, shall prevail.
	16.5. Tender documents, as downloaded from website (Clause 5.1), along with all addendums issued till the date of tender submission, must be uploaded on website, with all enclosures, with the tender submission, up till the date of receipt of tenders
	16.6. All tenders, in which any of the prescribed conditions are not fulfilled or which have been vitiated by errors in calculations, totaling or other discrepancies or which contain over-writing in figures or words or corrections not initialed and dated, may be liable to rejection
	16.7. The Tender to the work shall not be witnessed by a Tenderer or Tenderers who himself/themselves has/have not bid or who may not and has/have not bid for the same work
	16.8. Bidders who wish to participate in this tender will have to register on http://eproc.rajasthan.gov.in Further Bidders who wish to participate in online tenders will have to procure Digital Certificate as per Information Technology Act-2000 using which they can sign their electronic bids.
	16.9. Bidder shall submit their offer in Electronic format on above mentioned web site up to the time & date specified in NIT, after signing the same. Online offers, which are not digitally signed, will not be accepted.
	16.10. Online tenders will be opened on the scheduled date at specified time mentioned above in the NIT by tender opening committee in the office Additional Chief Engineer PHED Region II Jaipur
Sealing and Marking of Tenders	17.1. Bidder shall electronically submit the tender along with all addendum/ Corrigendum & Amendments and digitally sign each page of tender document and all other documents submitted.
	17.2. The tenders shall be submitted in Three Covers. Cover-1 Scanned copy of and proof of deposition of EMD, Tender Cost, eprocurement fees on E GRAS website along with documentary proof of depositing the BG in the office of Additional Chief Engineer PHED Region II Jaipur if required Cover-2 Complete Tender Document along with addendums/ amendments issued and uploaded by the Department on the above website, tender form and schedules for pre-qualification Bid and scanned copies of supporting Documents. Cover-3 Financial offer (BOQ).
Contents of Cover 1 & 2 – General Requirements	17.3. Cover 1 – “Tender Fees” should contain Scanned copy of proof of deposition of Tender Fees, Earnest Money and e-proc fees along with documentary proof of depositing the BG the office of Additional Chief Engineer PHED Region II Jaipur if required a. Tender Fees: Rs. 5000 in favor of Executive Engineer, PHED, Division III Duda Jaipur. b. E-Proc Fees: Rs 1000.00 (E-Proc fees is required to be submitted in the manner of deposition of EMD To be paid in favour of Managing Director RISL, payable at Jaipur) c. Earnest Money: The Earnest Money furnished in accordance with Clause 14.1 of ITT in favour of Executive Engineer, PHED, Division III Duda Jaipur along with Bank Guarantees, etc. to fulfill the requirement of clause 14.1. Firms who are availing the benefits of concessional Earnest Money Deposit shall also enclose a certified copy of the valid enlistment order issued by the competent authority of department. d. Copy of valid enlistment certificate 17.4. Cover 2 – “Pre-Qualification or Technical bid” should contain <u>digitally signed</u>

	<u>original downloaded tender document</u>. The cover shall also contain - The name and designation of person signing shall be clearly indicated. In case of partnership firm / limited company / group of companies, a scanned copy of power of attorney for the person authorised to sign issued by the partners or authorised signatory shall accompany the tender. - The Tender Letter, as per Annexure – 1. - An undertaking confirming that “for modifications/deviations to Conditions of Contract / Technical Specifications no price information is indicated in Cover 2, shall be submitted. Tenders not containing such undertaking will not be considered for further evaluation. As per Annexure 4. - A declaration under the official Secrets Act for maintaining secrecy of the tender documents, drawings or other records connected with the work given to him as indicated in clause 1.6 of ITT. As per Annexure 6. - The tender letter in form of “tender for works”, given with General conditions of contract shall be duly filled in and signed by an individual / proprietor of the firm / all partners of the firm or the authorised partner/duly authorised person when the tender is made by an individual / proprietary firm /partnership firm/ limited. - A declaration shall have to be made by the tenderer that he has read, understood and accepted without changes, revisions or conditions, the tender documents and addenda (if any) issued by the Deptt. As per Annexure 5 - Declaration by bidder as per Rajasthan Transparency in public procurement rule, 2013 as per Annexure 11 - Prequalification schedule as per Schedule 1, 2. - Undertaking of deviation as per schedule 3 - Historical Contract Non-Performance as per schedule - The contractor shall submit scanned copy of original/ notarised registration certificate. - The tender should be accompanied with GST Registration from the concerned departmental authorities with latest GST return filed, without which the tenders may not be entertained. - Affidavit of not having any relative in the jurisdiction of procuring entity in prescribed format.
Contents of Cover 2 – Requirements for Pre Qualification of Firms	- Pre-Qualification Schedules as required in this Vol-I along with scanned copy of original/ notarised copy of supporting documents which are to be, consisting of: - Summary of the relevant experience of the work for providing as required in clause 4 of ITT. The completion certificates for this experience shall be duly signed by an officer not below the rank of Executive Engineer or its equivalent, and digitally countersigned by the authorized representative of the tenderer along with copies of respective work orders and successful completion / testing certificates. - Summary of completed & successfully commissioned water supply projects, which best illustrate the experience of the work in execution of Single Responsibility contracts.
Contents of Cover 2 – Requirements for Pre-qualification of tenders	The pre-qualification information has to be prepared very carefully since they will be a basis for the pre-qualification of firms. Only relevant and to the point information shall be indicated. Tenderers must not supply information not requested in the tender documents nor make any comments.
Contents of Cover 2 –Other Requirements	- Volume I & II along with schedule of deviations made as per clause 10.1, with each page initialed with seal. - The GST Registration as per ITT
Contents of Cover 3 –	17.5. Cover 3 -Financial Offer (BOQ) Digitally signed and duly filled Volume III, along with all addendums issued till the date of tender submission. In case of addendum/ corrigendum/ amendment in Volume III of BOQ is made and uploaded by the department the tenderer is required to resubmit its bids on latest version of Vol III or BOQ other wise its bid shall not be considered.

Deadline for Submission of Tenders	18.1. Tenders shall be electronically submitted on website http://www.eproc.rajasthan.gov.in not later than the time and date communicated by the department or extended date thereof.
Late Tenders	19.1. The web site http://www.eproc.rajasthan.gov.in shall not permit the late submission of the tenders. The time and date appearing on website shall be final and can not be disputed.

F. Tender Opening and Evaluation	
Opening of Tenders by Department	20.1. The Additional Chief Engineer or other duly authorized Committee will open the online tenders in the presence of Tenderer(s) or their authorized representative(s) who may choose to be present at the time of tender opening. The tenders shall be opened in two stages. In first stage the pre-qualification bid shall be opened and evaluated. The financial part shall be opened of responsive tenderers pre-qualified by competent authority, at a later date, which will be informed to all responsive and pre-qualified tenderers. 20.2. In first stage, cover 1 of the tenders, who have deposited earnest money, tender fees & E-proc fees in prescribed format physically, as detailed in clause 17 will be opened. The tenderers' names, the presence (or absence) of Earnest Money/ Tender fees/ e-procurement fees will be announced by the Tender Opening Committee at the opening. Then second cover shall be opened and other details such as deviations proposed in Covering letter as per clause 10.1, will be announced by the Tender Opening Committee at the opening.
Preliminary Examination of Tenders	21.1. The contents of the Cover 1 & 2 of the individual tenders will be examined summarily in order to assess their formal conformity and agreement with the instructions and guidance to the Tenderers and the completeness. Any tender not conforming to any of these requirements may be disqualified forthwith at the discretion of Deptt.
Confidential Treatment	21.2. The Deptt will evaluate the tender. Information relating to the examination, clarification and comparison of the tenderers and recommendations for the award of the Contract shall not be disclosed to tenderers or to any other person not officially concerned with the evaluation process until the award to the successful – Tenderer has been announced. Any effort by a Tenderer to influence the evaluation process or the recommendations and decisions for award may result in the rejection of its tender.
Substantial Tender	21.3. Notwithstanding the preliminary examination, the Deptt. Will determine the substantial tenderer. Substantial tenders are those which meet the following requirements: • Properly digitally signed, • Tender fees in the required form • E-Proc Fees in the required form • Earnest money in the required format from a Nationalized / Scheduled bank, • Responsive to all requirements of the tender documents and the instructions to tenderers, • Clarification and substantiation required to assess the quality of the offer, • No deviations other than those specified in clause 10.1 above and reservations affecting the scope and quality of the work, limiting the rights of the Deptt. or the tenderers obligations, or whose rectification would affect the competitive position of the other substantial tenderer. 21.4. If a tender is not substantially responsive it will be rejected by the Deptt. And will not be used for further evaluation. The financial offers of insubstantial tenderer will not be opened. The Department's determination of a tender's responsiveness is to be based on the contents of the tender itself without recourse to extrinsic evidence. It is expressly stated that the information contained in the cover 1 & 2 of the tender will be used to define whether a tender is substantial or not. The Tenderers are, therefore, advised to submit complete tenders only.
Evaluation for Pre-Qualification	22.1. The Department will carry out a detailed evaluation of the tenders previously determined to be substantially responsive in order to determine whether the firm is qualified in accordance with the requirements set forth in the tender documents at

	clause 4. In order to reach such a determination, the Department will examine the information provided in the schedules and the submitted supporting documents, on the basis of the information supplied by the tenderers. 22.2. The firms Qualified will be informed by the Department in due course of time. 22.3. The Department reserves the right not to consider any deviation that in the sole discretion of the Department is found unacceptable. The Department shall require such deviations to be withdrawn, for the unaccepted deviations. The evaluation subsequently will be made on the rates quoted for such items in original offer. 22.4. The Additional Chief Engineer or other duly authorized Engineer reserves the right to ask for submission of the source of procurement for the materials for which the tenderer has quoted his rates before the tender can be considered for acceptance. If the tenderer, who is called upon to do so, does not submit within a reasonable time of written order to do so, the Department shall be at liberty to forfeit the said earnest money absolutely.
Financial Evaluation	23.1. The original financial offer or the revised financial offer, as the case may be, of the Pre qualified tenderers whose tenders are determined responsive will be opened at a date, intimated separately. 23.2. The Additional Chief Engineer or other duly authorized Committee will open the tenders in the presence of any Tenderer(s) or their authorized representatives who choose to be present at the time of opening of financial tenders, and will enter the rate/amount of all tenders in the register of Opening of Tenders. 23.3. If on check, there are some discrepancies, the following procedure shall be followed: - When there is a difference between the rate quoted by the tenderer in words and figures, the lower of the two rates shall be taken as valid and correct rate. When the rate quoted by the contractor in figures and words tallies, but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount worked out. 23.4. The financial evaluation shall be done on basis of total of capital cost and O&M cost (if any) of work quoted. The Tenders shall be ranked on increasing order of the Tender Price.

G. Award of Contract	
Award Criteria	24.1 Subject to ITT, the Department will award the contract normally to the lowest evaluated tenderer.
Department's Right to Accept Any Tender and to Reject Any or All Tenders	25.1. The acceptance of the tender will rest with the Department who does not bind itself to accept the lowest tender and reserves to itself the authority to reject any or all of tenders received without assigning any reason. 25.2. The Department's right to accept or reject any or all tenders at any time prior to award of contract, will not incur any liability, to the affected Tenderer or tenderers or any obligation to inform the affected Tenderer or tenderers, of the grounds for the Department's action.
Notification of Award	26.1. Prior to the expiry of the period of tender validity, the Department will notify the successful Tenderer in writing by registered letter or by fax, to be confirmed in writing by registered letter, that its tender has been accepted. The notification of award will constitute the formation of the contract, for all legal purposes.
Signing the Contract Agreement	27.1. Within ten (10) days of department's notice, the successful tenderer shall sign the contract agreement. The following, duly filled in and signed documents, shall form the contract agreement; a) Agreement (format placed at Annex 7') b) Letter of award and any pre-award correspondence between Department and the Tenderer

	c) Tender documents contained in; - Vol-I & II: Conditions of Contract , Pre-qualification Schedules, Scope of Work and Technical Specification, Annexure and Tender Drawings - Vol-III: Schedule of Prices d) The Tender Offer
	27.2. On acceptance of the tender, the name of the accredited representative(s) of the Tenderer (with a photograph and signature attested), who would be responsible for taking instructions from the Department / Engineer in charge, shall be communicated to the Engineer-in-charge.
	27.3. After acceptance of the tender, the Tenderer or all partners (in the case of partnership firm) or the authorised representative of the firm with a valid power of attorney will append photographs and signatures duly attested, at the time of execution of Agreement.
	27.4. Receipts for payments, made on account of a work when executed, by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.
	27.5. GST on materials, or Income Tax in respect of the contract shall be governed by provisions given in the Conditions of Contract. Deduction of Income Tax at source will be made as per provisions of the Income Tax Act, in force from time to time.
	27.6. If any Tenderer, who having submitted a tender does not execute the agreement or start the work or does not complete the work and the work has to be put to re-tendering, he shall stand debarred from participating in such re-tendering in addition to forfeiture of Earnest Money/Security Deposit and other action under agreement.
Corrupt or Fraudulent Practices	28.1. The department defines, for the purposes of this provision, the terms set forth below as follows: i. 'Corrupt practice' means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution: and ii. 'Fraudulent practice' means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the department and includes collusive practice among tenderers (prior to or after tender submission) designed to establish tender prices at artificial non competitive levels and to deprive the benefits of free and open competition.
	28.2. Any effort by a Tenderer to influence the Department in the Department's tender evaluation, tender comparison or contract award decisions may result in rejection of the Tenderer's tender.
	28.3. The Department will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.
Documents sanctity	29.1 All documents /certificates submitted by the tenderer on line, shall be considered by the department at the time of the prequalification and technical evaluation. If at any point of time on verification of the documents/certificates submitted by the bidder found to be false/fraud/fake/bogus/counterfeit etc. the contract shall be liable to be rejected and necessary action shall be taken against the contractor/firm as per rule/law in force.
Code of Integrity (Rule 80 of RTPP Rules 2013)	30 (1) All the officers or employees of the procuring entity shall,- (a) maintain an unimpeachable standard of integrity both inside and outside their office; (b) act in accordance with the provisions of the Act, these rules, guidelines issued under the Act and instructions; (c) not allow any bidders to have access to information on a particular procurement, before such information is available to the public at large; (d) not intentionally use unnecessarily restrictive or "tailored" specifications, terms of reference or statements of work that can discourage competition;

		(e) not solicit or accept any bribe, reward or gift or any material benefit of any directly or indirectly promise of future employment from anyone, who has sought or is seeking procurement from the procuring entity; (f) not have a financial interest in any bidder(s) responding to a procuring entity's bidding process and any person having financial interest in any bidder shall not participate in that procurement process; (g) not disclose proprietary and source selection information, directly or indirectly, to any person other than a person authorised to receive such information; (h) treat all bidders in a fair and equitable manner in line with the principle of fairness, integrity and transparency in the procurement process; (i) provide all bidders identical information at the same time, during the bidding process; (j) apply the same criteria of evaluation as specified in the bidding documents, bidder registration documents or pre-qualification documents and under no circumstances new evaluation criteria shall be introduced during the evaluation process; (k) not entertain any favour, recreation, presents, services, etc. from the bidders or prospective bidders; (l) protect the interests of the procuring entity under all circumstances while dealing with information and information sources; (m) maintain confidentiality of all bids; (n) ensure that the selection of bidder is as per the bidding documents and is not influenced by personal reasons attributable to concerned officials in any manner; and (o) disclose conflict of interest, if any. (2) Any person participating in procurement process shall,- (a) not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process; (b) not misrepresent or omit information 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 anticompetitive behaviour to impair the transparency, fairness and progress of the procurement process; (d) not misuse any information shared between the procuring entity and the bidders with an intent to gain unfair advantage in the procurement process; (e) not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process; (f) not obstruct any investigation or audit of a procurement process; (g) disclose conflict of interest, if any; and (h) disclose any previous transgressions with any entity in India or any other country during the last three years or any debarment by any other procuring entity
Conflict of Interest (Rule 81 of RTPP Rules 2013)	31	(1) A conflict of interest for procuring entity or its personnel and bidders 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. (2) The situations in which a procuring entity or its personnel may be considered to be in conflict of interest includes, but not limited to, following:- (a) A conflict of interest occurs when procuring entity's personnel's private interests, such as outside professional or other relationships or personal financial assets, interfere or appear to interfere with the proper performance of its professional functions or obligations as a procurement official. (b) Within the procurement environment, a conflict of interest may arise in connection with such private interests as personal investments and assets, political or other outside activities and affiliations while in the service of the

	procuring entity, employment after retirement from the procuring entity's service or the receipt of a gift that may place the procuring entity's personnel in a position of obligation. (c) A conflict of interest also includes the use of procuring entity's assets, including human, financial and material assets, or the use of procuring entity's office or knowledge gained from official functions for private gain or to prejudice the position of someone procuring entity's personnel does not favour. (d) A conflict of interest may also arise in situations where procuring entity's personnel is seen to benefit, directly or indirectly, or allow a third party, including family, friends or someone they favour, to benefit from procuring entity's personnel's actions or decisions. (3) A Bidder may be considered to be in conflict of interest with one or more parties in a bidding process if, including but not limited to:- (a) they have controlling partners in common; (b) they receive or have received any direct or indirect subsidy from any of them (c) they have the same legal representative for purposes of the bid; (d) they 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; (e) A bidder participates in more than one bid in the same bidding process. However, this does not limit the inclusion of the same sub-contractor, not otherwise participating as a bidder, in more than one bid; or (f) A bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the subject matter of procurement of the bidding process. All bidders shall provide in Qualification Criteria and Bidding Forms, a statement that the bidder is neither associated nor has been associated directly or indirectly, with the consultant or any other entity that has prepared the design, specifications and other documents for the subject matter of procurement or being proposed as Project Manager for the contract.
Breach of Code of Integrity by the bidder (Rule 82 of RTPPRules 2013)	32 Without prejudice to the provisions of Chapter IV of the Act, in case of breach of any provision of the code of integrity by a bidder or prospective bidder, as the case may be, the procuring entity may take appropriate action in accordance with the provisions of subsection (3) of section 11 and section 46
Form of Appeal (Rule 83 of RTPPRules 2013)	33 (1) An appeal under sub-section (1) or (4) of section 38 shall be in Form along with as many copies as there are respondents in the appeal. (2) 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. (3) Every appeal may be presented to First Appellate Authority or Second Appellate Authority, as the case may be, in person or through registered post or authorised representative.
Fee for filing appeal (Rule 84 of RTPPRules 2013)	34 (1) Fee for first appeal shall be rupees two thousand five hundred and for second appeal shall be rupees ten thousand, which shall be non-refundable. (2) The fee shall be paid in the form of bank demand draft or banker's cheque of a Scheduled Bank payable in the name of Appellate Authority concerned.
Procedure for disposal of appeal (Rule 85 of RTPPRules 2013)	35 (1) The First Appellate Authority or Second Appellate Authority, as the case may be, upon filing of appeal, shall issue notice accompanied by copy of appeal, affidavit and documents, if any, to the respondents and fix date of hearing. (2) On the date fixed for hearing, the First Appellate Authority or Second Appellate Authority, as the case may be, shall,- (a) hear all the parties to appeal present before him; and (b) peruse or inspect documents, relevant records or copies thereof relating to the matter. (3) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.

	(4) The order passed under sub-rule (3) shall also be placed on the State Public Procurement Portal.
Repeal and savings (Rule 86 of RTPPRules 2013)	36 All rules, regulations, orders, notifications, departmental codes, manuals, by-laws, official memoranda or circulars relating to procurement of goods, services or works provided for in these rules, which are in force on the date of commencement of these rules, in relation to the matter covered by these rules are hereby repealed to the extent they are covered by these rules: Provided that such repeal shall not affect the previous operation of rules, regulations, orders, notifications, departmental codes, manuals, by-laws, official memoranda or circulars, so repealed and the procurement process commenced before the commencement of these rules shall continue as per the provisions of rules, regulations, orders, notifications, departmental codes, manuals, by-laws, official memoranda or circulars, so repealed.
State Public Procurement Portal (Rule 4 of RTPPRules 2013)	37 The State Public Procurement Portal, in addition to information specified in clause (a) to (g) of sub-section (3) of section 17, shall provide access to such other information as may be specified by the State Government, from time to time. Every procuring entity shall upload and publish the required information on State Public Procurement Portal maintained by the State Procurement Facilitation Cell.
Grievance Redressal during Procurement	38 The Grievance Redressal during Procurement (as per Rajasthan Transparency in public procurement rule, 2013) will be as per provisions in Annexure-9
Abnormally Low Bids	39 A Bid is to be considered "Abnormally Low" if the total bid price and/or amount of a particular item quoted by the bidder is less than 85 % of the estimated cost of bid/ particular item. In Case of Abnormally low bid Contractor shall have to pay "Additional Performance Security (APS)" in such tenders.

**Additional Chief Engineer PHED
Region II Jaipur**

Annex 1

Tender Letter

To

Additional Chief Engineer PHED
Region II Jaipur

Subject:	Tender for "Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur
Ref:	Your NIT No 91 /2021-22

Dear Sir,

1. Having carefully examined all the parts of the tender documents and the addenda (if any) for the execution of the above mentioned works, having obtained all requisite information affecting this tender, having visited the site and being aware of all conditions and difficulties likely to affect the execution of the contract, we, the undersigned, hereby offer to execute the **Schedule contract on SPR Basis** as described in the Tender Documents and to hand over the whole of the said works in conformity with the drawings, conditions of contract, technical conditions and scope of work, for the sum indicated in the financial offer and such other sum as may be ascertained in accordance with the Contract.
2. We declare that we have read and understood and that we accept all clauses, conditions, descriptions, drawings of the tender documents volume I to Volume III, and subsequent addenda (if any) without any change, reservations and conditions. If any change, reservation or condition has been made in our tender we herewith withdraw it.
3. We undertake, if our tender is accepted, to commence the work within 10 days of the work order and to complete the work in the stipulated time for completion.
4. If our tender is accepted we will provide a security deposit in the required form in the sums as stipulated in the tender documents.
5. Unless and until the formal agreement is prepared and signed, this tender, together with your written acceptance thereof shall constitute a binding contract between us.
6. We agree to abide by this tender for the period of 90 days from the date of opening of the pre-qualification bids and it shall remain binding upon us and may be accepted by you at any time before the expiry of that period, and not to make any modifications in its terms and conditions which are not acceptable to you.
7. Together with the tender we submit the earnest money of Rs ¹⁾ as ²⁾

Dated this day 20..

³⁾ in the capacity of ⁴⁾

duly authorized to sign the tender for and on behalf of ⁵⁾

Name:

Address:

Telephone:

Telefax:

Telex:

Signature of the authorized representative

-
- 1- Amount of Earnest Money
 - 2- Indicate the firm in which it is provided
 - 3- Signature of authorized representative of the firm
 - 4- Name of Tenderer

RPWA-87
(Rule 335 & 594(iii))

Annex 2

FORM OF BANK GUARANTEE BOND FOR EARNEST MONEY IN EXCESS OF RS. TEN LACS

To

The Governor of the State of Rajasthan

Through Additional Chief Engineer

Whereas the Governor of the State of Rajasthan through Additional Chief Engineer PHED Region II Jaipur, (here-in-after called "the Department") has called for tenders for execution of Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur due on 3.00 PM on 3.02.2022 or any extended date and as per normal rules of the Department, Earnest Money is to be deposited along with the tender, and whereas, the Rules of the State Department permit deposit of Earnest Money up to Rs. 10 lacs in cash, and the balance in the form of Bank Guarantee.

1. In consideration of the Governor of State of Rajasthan having made such a stipulation in Rule 595 (iii) (a) of the Public Works Financial & Accounts Rules, and M/s (name of contractors) are desirous of depositing Earnest Money in excess of Rs. 10 lac i.e. Rs. (Rupees..... only) (excess over Rs. 10 lacs) in the form of Bank Guarantee as Earnest Money in order to participate in the tender for work above mentioned as per said Rules, and will be so permitted on production of a Bank Guarantee for Rs..... (Rupees only), We (indicate name of the "Bank"), here-in-after referred to as the "Bank" at the request of M/s, contractor(s), do hereby undertake to pay to the Department an amount not exceeding Rs. (Rupees..... only) on demand.
2. We..... (indicate the name of Bank), do hereby undertake to pay Rs. only) the amounts due and payable under this guarantee without any demur or delay, merely on a demand from the Department. Any such demand made on the bank by the Department shall be conclusive and payable by the Bank under this guarantee. The Bank Guarantee shall be completely at the disposal of the Department and We (indicate the name of Bank), bound ourselves with all directions given by Department regarding this Bank Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs..... (Rupees..... only).
3. We (indicate the name of Bank), undertake to pay to the Department any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator etc. relating thereto, our liability under these presents being absolute, unequivocal and unconditional.
4. We..... (indicate the name of Bank) further agree with the Department that the Department shall have the fullest liberty without our consent and without affecting in any manner our obligations, hereunder to extend the date of receipt of such tenders for the work as aforesaid or to vary any other terms and conditions of the Notice Inviting Tenders or the tender, extend the validity of tenders, or time for completion of the work, etc. We shall not be relieved from our liability by reason of any such variation or extension or for any forbearance, act or omission on the part of the Department or any indulgence by the Department, to the said contractor(s) or by any such matter or thing whatsoever which would but for this provision, have the effect of so relieving us.
5. The liability of us..... (indicate the name of Bank), under this guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
6. We (indicate the name of Bank), lastly undertake not to revoke this guarantee except with the previous consent of the Department in writing.
7. This Guarantee shall remain valid and in full effect, until it is decided to be discharged by the Department. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs..... (Rupees only).
8. It shall not be necessary for the State Department to proceed against the contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which the State Department may have obtained or obtain from the contractor.

9. The Bank Guarantee shall be payable at the headquarters of the Division, or the nearest District Headquarters. If the last date of expiry of the Bank Guarantee happens to be a holiday of the Bank, the Bank Guarantee shall expire on the close of the next working day.

Dated day of

For and on behalf of the Bank (indicate the Bank)

Signature & Designation

The above Guarantee is accepted by the Department of the State of Rajasthan

For and on behalf of the Governor of State of Rajasthan

Signature

Power of attorney of the representative of a firm**Annex 3.****Power of Attorney for Authorized Representative**

The firm M/s.....authorize the following Representative to sign and submit the tender document, negotiate terms and conditions for the contract, to sign the contract, to deal with the PHED, to issue and receive correspondence related to all matters of the tender "Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur" We / M/s _____ undertake the responsibility due to any act of the representative appointed hear by.

For Partnership Firm's

S. No.	Name of the All Partner	Signature of Partner with Seal
1.		
2.		
3		
4	Name and Designation of the person Authorized	
5	Attested Signature of the Authorized Representative	

For Limited Firm's

Name and Designation of the person Authorized	
Firm	
Address	
Telephone No.	
Fax No.	
Telex No.	
Authority By which the Powers is delegated	
Attested Signature of the Authorized Representative	
Name and Designation of person attesting the signatures	

To be Prepared on Stamp Paper of Rs.100/- duly attested by Notary

Annexure – 4**Undertaking by Tenderer**

I/We undertake and confirm that “for modifications/deviations to Conditions of Contract / Technical Specifications no price information is indicated in Cover 2.

I/We understand that if this Undertaking is found to be incorrect, our tender may not be considered for Evaluation in future for financial evaluation, for which I/WE shall be liable for all consequences and / or damages.

Signature

With Seal

Full Name _____

Designation _____

Address _____

(Authorized representative)

Annexure – 5**Declaration**

I/We _____ the undersigned, hereby certify that I/We have read, understood all the terms and conditions given in the tender document, including those in the addenda issued by the Department and the same are acceptable to us without any deviations.

If this declaration is found to be incorrect then without prejudice to any other action that may be taken, my/our security may be forfeited in full & the tender, if any to the extent accepted may be cancelled.

Signature

With Seal

Full Name _____

Designation _____

Address _____

(Authorized representative)

Annexure – 6**Declaration – Under the official Secrets Act**

"I/We hereby declare that I/We shall treat the tender documents, drawings and other records, connected with the work, as secret confidential documents and shall not communicate information derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same".

I/We understand that failure to observe the secrecy of the tenders will render the tender, liable to summary rejection.

Signature

With Seal

Full Name _____

Designation _____

Address _____

(Authorized representative)

Form of Agreement

Annexure- 7

THIS Agreement made the _____ day of _____ 20____ between the Additional Chief Engineer PHED Region II Jaipur, (hereinafter called PHED) on behalf of the Governor of Rajasthan of the one and _____ of _____ (hereinafter called Contractor) of the other part.

WHEREAS the PHED is desirous for execution of Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambhar Distt Jaipur

WHEREAS the PHED has accepted a tender by the Contractor for the execution, completion and maintenance of such work,

NOW THIS AGREEMENT WITNESSES as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
 - a) Form of agreement
 - b) Letter of award and any pre-award correspondence between Department and the Tenderer
 - c) Tender documents contained in;
 - Vol-I & II: Conditions of Contract, Pre-qualification Schedules, Scope of Work and Technical Specification, Annexure, Tender Drawings
 - Vol-III Schedule of Prices
 - All addenda issued
 - d) The Tender Offer
3. The signed and initialed Tender Documents shall be deemed to form and be read and construed as part of this Agreement.
4. In consideration of the payments to be made by the PHED to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the PHED to provide, execute, and to complete the work, remedy the defects, commission the work and maintain it in conformity in all respects with the provisions of the Contract.
5. The PHED hereby covenants to pay the Contractor in consideration of the provisions, execution, completion of the works, remedying of the defects therein and maintenance of the work the Contract Price or that sum as may become payable under the conditions of the Contract at the times and in the manner prescribed by the Contract.
6. The following are the salient data of the agreement:

Capital Works Rs. _____

Total Contract Amount Rs. _____

Security Deposit: Rs _____ (10 % of the payments)

Time for completion:

Signature of tenderer

Execution Part	9 Months
Defect liability period	12 months
O&M Period	120 months

IN WITNESS thereof the parties to these present have hereto set and subscribed their respective hands the day, month and year first above written.

SIGNED for and on behalf of PHED

Additional Chief Engineer PHED Region II
Jaipur

Witness

SIGNED for and on behalf of the Contractor

Authorized representative

Witness

Model of the Security Deposit Guarantee

Annex 8

To

The Governor of the State of Rajasthan

Through

**Additional Chief Engineer PHED
Region II Jaipur.**

Whereas the Governor of the State of Rajasthan through **Additional Chief Engineer PHED Region II Jaipur**(here-in-after called "the Department") having entered into an agreement No___ dated ___ with M/s _____ (herein after called the contractor) for execution of Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur, herein after called "the said Agreement" under which the contractor(s) M/s _____ have applied to furnish Bank Guarantee to makeup the full Security Deposit.

1. In consideration of the Governor of State of Rajasthan having made such a stipulation in agreement. We _____ (indicate name of the "Bank"), here-in-after referred to as the "Bank" at the request of M/s _____, contractor(s), do hereby undertake to pay to the Department an amount not exceeding Rs. _____ (Rupees _____ only) on demand.
2. We _____ (indicate the name of Bank), do hereby undertake to pay Rs. _____ only) under this guarantee without any demur or delay, merely on a demand from the Department. Any such demand made on the bank by the Department shall be conclusive and payable by the Bank under this guarantee. The Bank Guarantee shall be completely at the disposal of the Department and We _____ (indicate the name of Bank), bound ourselves with all directions given by Department regarding this Bank Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs _____ (Rupees _____ only).
3. We _____ (indicate the name of Bank), undertake to pay to the Department any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator etc. relating thereto, our liability under these presents being absolute, unequivocal and unconditional.
4. We _____ (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue enforceable till all the dues of the Department under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the Department certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor(s) and accordingly discharges this guarantee.
5. We _____ (indicate the name of Bank) further agree with the Department that the Department shall have the fullest liberty without our consent and without affecting in any manner our obligations, hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Department against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or for any forbearance act of omission on the part of the Department or any indulgence by the Department to the said contractor or by any such matter or thing whatsoever which would but for this provision, have effect of so reliving us.
6. The liability of us _____ (indicate the name of Bank), under this guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
7. We _____ (indicate the name of Bank), lastly undertake not to revoke this guarantee except with the previous consent of the Department in writing.
8. This Guarantee shall remain valid and in full effect, until it is decided to be discharged by the Department. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs _____ (Rupees _____ only).
9. It shall not be necessary for the State Department to proceed against the contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which the State Department may have obtained or obtain from the contractor.

10. The Bank Guarantee shall be payable at the headquarters of the Division, or the nearest District Headquarters. If the last date of expiry of the Bank Guarantee happens to be a holiday of the Bank, the Bank Guarantee shall expire on the close of the next working day.

Dated _____ day of _____ for and on behalf of the Bank (indicate the Bank)

Signature & Designation

The above Guarantee is accepted by the Department of the State of Rajasthan

For and on behalf of the Governor of State of Rajasthan

Signature

Note: Guarantee to be made on stamp paper purchased by the bank only.

Annex 9

Grievance Redressed during Procurement

Grievance Redressal during Procurement (as per Rajasthan Transparency in public procurement rule, 2013)

The designation and address of the First Appellate Authority is Joint/ Special Secretary or Secretary PHED (highest rank posted officer)

The designation and address of the Second Appellate Authority is Secretary/ Pr Secretary/ Additional Chief Secretary to GoR, PHED, Rajasthan (highest rank posted officer)

1. Filing an appeal

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

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

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

4. Appeal not to lie in certain cases

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

- a. determination of need of procurement;
- b. provisions limiting participation of Bidders in the Bid process;
- c. the decision of whether or not to enter into negotiations;
- d. cancellation of a procurement process;
- e. applicability of the provisions of confidentiality.

5 Form of Appeal

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

6 Fee for filing appeal

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

7 Procedure for disposal of appeal

- a) The First Appellate Authority or Second Appellate Authority, as the case may be, upon filing of appeal shall issue notice accompanied by copy of appeal, affidavit and documents, if any, to the respondents and fix date of hearing.
- b) On the date fixed for hearing, the First Appellate Authority or Second Appellate

Authority, as the case may be, shall-

- (i) hear all the parties to appeal present before him; and
 - (ii) Peruse or inspect documents, relevant records or copies thereof relating to the matter.
- c) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.
 - d) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.

*Annex 11:***Form FIN-5: HISTORICAL CONTRACT NON-PERFORMANCE**

(The Bidder [each partner firm in case of JV] shall submit an Affidavit in the following format on Rs. 500 non-judicial stamp paper to demonstrate the historical contract non-performance.)

AFFIDAVIT

I/ We , having my/our registered office at submittin
g my/our Bid for the work of" " certify
that my/our firm has/ have not beenblacklisted/ debarred for non performance or due to other breach of contract/
RTTPrules under PWF&AR Rules during last 6 months as per provisions of applicable rulesand has/have not
been,under category of blacklisted/ debarred on the date ofsubmission of bid.

Signature of the Authorized Signatory to the Bidder

Name of the Authorized Signatory to the Bidder

Name & Address of the Bidder

Date:

FORM NO. 1. (See rule83)

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

AppealNo Of.....

Beforethe..... (First/SecondAppellateAuthority)

1. Particularsofappellant:

(i)Nameoftheappellant:

(ii)Officialaddress,ifany:

(iii) Residentialaddress

2. Name and address of the respondents

(i)

(ii)

(iii)

3. Number and date of the order
appealedagainstnameanddesignationoftheofficer/authoritywho
passed the order (enclosecopy), or
astatementofadecision,actionoromissionoftheProcuringEntityincontr
avention totheprovisionsoftheActbywhichtheappellantisaggrieved:

4. IftheAppellant proposes
toberepresentedbyarepresentative,thenameandpostaladdressofthe
representative:

5. Numberofaffidavitsanddocumentsenclosedwith theappeal:

6. Grounds of appeal: (Supported by an affidavit)

7. Prayer:

Place:

Date:.....

Appellant'sSignature

Annexure 11
***(as per Rajasthan Transparency in public
procurement rule, 2013)***

Declaration by the Bidder

In relation to my /our Bid submitted to Additional Chief Engineer PHED Region II Jaipur for Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur in response to the Notice Inviting Bid No ___/2021-22, I/we hereby declare under Section 7 of Rajasthan Transparency 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 department;
2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the Union and the State Government or any local authority as specified in the Bidding Document;
3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of legal proceedings for any of the foregoing reasons;
4. I/we do not have, and our directors and officers not have, been convicted of any criminal offence related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into a procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Signature of bidder:

Name:

Designation:

Address:

Place:

Date:



क्रमांक: प. 6 (5) वित्त/साविलेनि/2018

जयपुर, दिनांक : 27.04.2021

परिपत्र

विषय: ई-ग्रास पर ई-प्रोक्योरमेन्ट प्रक्रिया हेतु एक ही चालान से बोली दस्तावेज मूल्य, बिड सिक्योरिटी एवं RISL फीस जमा कराने एवं RISL फीस को कोषालय सचिवालय में संधारित पी.डी. खाते में हस्तान्तरित किये जाने की प्रक्रिया।

लोक उपापन प्रक्रिया में पारदर्शिता स्थापित करने के उद्देश्य से ई-प्रोक्योरमेन्ट पोर्टल पर ई-निविदाओं के प्रेषण के लिए एक ही चालान से बोली दस्तावेज मूल्य, बिड सिक्योरिटी एवं RISL फीस को ऑनलाईन ई-ग्रास सिस्टम के माध्यम से जमा करवाया जाना आवश्यक है। इसके अन्तर्गत ई-ग्रास पर एक ही चालान से बोली दस्तावेज मूल्य, बिड सिक्योरिटी राशि एवं RISL फीस जमा कराने एवं RISL फीस को कोषालय सचिवालय में संधारित पी.डी. खाते में हस्तान्तरित किये जाने की क्रिया विधि निम्नानुसार है :-

1. बिडर द्वारा ई-ग्रास पर प्रोफाइल बनाने के बाद ई-प्रोक्योरमेन्ट हेतु बोली दस्तावेज मूल्य, बिड सिक्योरिटी एवं RISL फीस का भुगतान एक ही चालान से ऑनलाईन जमा करवाया जायेगा। इस राशि में से बोली दस्तावेज मूल्य एवं RISL फीस रिफण्ड योग्य नहीं होगी। बिड सिक्योरिटी हेतु बजट मद 8443-103, 108 एवं 109 में जमा राशि नियमानुसार संबंधित विभाग द्वारा रिफण्ड किये जाने हेतु सिस्टम में व्यवस्था की गयी है। RISL फीस (i) सिविल विभागों की निविदाओं हेतु बजट मद 8658-00-102-(16)-[01] (सिविल विभाग), (ii) निर्माण विभागों की निविदाओं हेतु बजट मद 8658-00-102-(16)-[02] (निर्माण विभाग) (iii) वन विभाग की निविदाओं हेतु बजट मद 8658-00-102-(16)-[03] (वन विभाग) के अन्तर्गत जमा की जायेगी। बोली दस्तावेज मूल्य हेतु निर्धारित राजस्व मद में बिडर द्वारा राशि जमा कराने हेतु ई-ग्रास पर प्राक्धान उपलब्ध रहेगा।
2. बिड सिक्योरिटी जमा कराने के लिए सभी विभागों हेतु बजट मद 8443-103 जबकि निर्माण कार्यों हेतु बिड सिक्योरिटी बजट मद 8443-108 (निर्माण विभागों) एवं 8443-109 (वन विभाग) में जमा कराने की दशा में डिविजन कोड का चयन ई-ग्रास पर किया जाना अनिवार्य होगा।

- 2 -

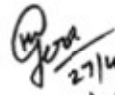
3. इस प्रक्रिया से जमा राशि का लेखांकन ई-कोषालय के स्तर पर किया जायेगा। ई-ग्रास पर उपलब्ध विभागवार/कार्यालयवार रिपोर्ट्स में जमा राशि से संबंधित रिपोर्ट्स प्रदर्शित की जायेगी।
4. ई-कोषालय में बिन्दु संख्या 1 में वर्णित बजट मद 8658-00-102-(16)-[01], [02], [03] के अन्तर्गत जमा RISL फीस को माह में दो बार बजट मद 8782-101 (Inter Treasury Transfer) के माध्यम से कोषालय (सचिवालय) जयपुर में RISL के पी.डी. खाते में जमा किये जाने हेतु समायोजन बिल के माध्यम से हस्तान्तरित किया जायेगा। जिसे कोषालय (सचिवालय) जयपुर द्वारा उसी माह में मद 8782-101 को माईनस क्रेडिट करते हुए RISL के पी.डी. खाते में अलग-अलग समायोजन बिलों के माध्यम से हस्तान्तरित किया जाना अनिवार्य होगा। यह सूचना ई-ग्रास से वॉम पर Seamless Data Sharing की व्यवस्था से हस्तांतरित की जायेगी। सिस्टम पर उपलब्ध रिपोर्ट्स के माध्यम से संबंधित निर्माण खण्ड ई-ग्रास पर जमा राशि व रिफण्ड राशि का स्टेटस भी देख सकते हैं।
5. निर्माण कार्यों से संबंधित बिड हेतु उक्त चालान से संबंधित राशि निर्माण लेखों में फॉर्म 80 में प्रदर्शित होने पर कोषालयों द्वारा चालान की प्रति प्रत्येक मद में जमा राशि के लेखों के साथ महालेखाकार कार्यालय को उपलब्ध करवायी जायेगी।
6. उक्त प्रक्रिया के अन्तर्गत बिडर को प्रारम्भ में ई-प्रोक्योरमेन्ट पोर्टल पर बिड भरने के साथ-साथ ई-ग्रास पर एक चालान के माध्यम से ई-भुगतान का चयन करते हुए अपेक्षित राशि जमा करवाया जाना अनिवार्य होगा। इस प्रक्रिया को एन.आई.सी. द्वारा ई-प्रोक्योरमेन्ट पोर्टल से ई-ग्रास का इन्टीग्रेशन करते हुए अविलम्ब लिंक करने की व्यवस्था सुनिश्चित की जायेगी। व्यवस्था स्थापित होने तक बिडर को ई-ग्रास पर भुगतान होने के उपरान्त चालान CIN नम्बर के साथ जनरेट कर ई-प्रोक साईट पर स्कैन कर अपलोड करना होगा। ई-ग्रास एवं ई-प्रोक्योरमेन्ट का लिंक स्थापित होने के उपरान्त अपलोड किए जाने की आवश्यकता नहीं रहेगी तथा ई-ग्रास सिस्टम ई-प्रोक्योरमेन्ट पोर्टल से बिडर का नाम लेने के स्थान पर सिस्टम जनरेटेड कोड फेच करेगा तथा बिड फाइनल होने के बाद बिडर का नाम पूर्व के कोड से फलेग करते हुए किया जाना सुनिश्चित करेगा जिससे बिडर को होने वाले रिफण्ड भुगतान में असुविधा न हो। उपापन संस्था द्वारा ई-ग्रास पर कार्यालयवार उपलब्ध रिपोर्ट्स एवं ई-कोषालय के TY-33 से जमाओं का मिलान भी सुनिश्चित किया जावेगा।
7. ई-प्रोक्योरमेन्ट पोर्टल के ई-ग्रास पोर्टल से इन्टीग्रेशन के उपरान्त ई-प्रोक्योरमेन्ट पोर्टल पर निर्माण कार्यों से संबंधित बिड भरने हेतु बजट मद 8443-108,109 में बनाये गये चालान की राशि निर्माण लेखों में सम्मिलित किये जाने के उद्देश्य से प्रविष्टि एक कोड के साथ एन.आई.सी. वॉम को उपलब्ध करायी जावेगी। बिड खुलने के बाद उक्त प्रविष्टि हेतु संवेदक का नाम एवं अन्य विवरण एन. आई. सी. (वॉम) को उपलब्ध कराया जायेगा।

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एनआईसी (वॉम) द्वारा तदनुसार ही प्रविष्टि को निर्माण लेखों में सम्मिलित किया जावेगा, जिसके पश्चात् ही बिड सिक्योरिटी राशि रिफण्ड किये जाने हेतु उपलब्ध होगी। इस हेतु ई-ग्रास व ई-प्रोक पोर्टल का इन्टीग्रेशन व लिंक किया जायेगा। ई-प्रोक पोर्टल से भुगतान हेतु संवेदक को ई-ग्रास पर आने का लिंक तथा ई-ग्रास पर भुगतान करने के तुरन्त पश्चात् ई-प्रोक पोर्टल पर जाने का लिंक भी दिया जायेगा।

8. ई-प्रोक्योरमेन्ट हेतु बोली दस्तावेज मूल्य, बिड सिक्योरिटी एवं RISL फीस का भुगतान एक ही चालान से ई-ग्रास के माध्यम से जनरेट किये जाने पर संबद्ध एजेन्सी बैंक को तीनों बजट मदों की कुल राशि एवं जीआरएन नम्बर के साथ प्रेषित किया जायेगा तथा बैंक द्वारा जमा राशि के स्क्रीनल दिये जाने पर सिस्टम पर ई-कोषालय को पृथक-पृथक उक्त तीनों मदों में जमा राशि के अनुसार चालान नम्बर जनरेट करने, लेखा सूचियां तैयार करने एवं लेखांकन करने हेतु व्यवस्था की जायेगी।
9. ई-कोषालय के स्तर पर उक्त जमा राशि का पूर्ण लेखांकन तथा मिलान दैनिक आधार पर अनिवार्य रूप से किया जाना सुनिश्चित किया जायेगा।
10. ई-प्रोक पोर्टल के अतिरिक्त की जाने वाली बिड हेतु (जिनमें RISL Fees जमा नहीं होती) भी बिड सिक्योरिटी हेतु बजट मद 8443-103, 108, 109 व बोली दस्तावेज मूल्य राशि निर्धारित राजस्व बजट मद में जमा कराने हेतु सिंगल चालान से उक्त माध्यम से बिडर/कार्यालय द्वारा जमा करवायी जा सकेगी। इस व्यवस्था में मेन्यूअल एवं ई-मोड उपलब्ध रहेंगे।
11. यह आदेश तुरन्त प्रभाव से लागू होगा।

अतः उक्त दिशा-निर्देशों की अक्षरशः पालना की जावे।


27/4/2020
(हेमन्त कुमार गेरा)
शासन सचिव,
वित्त (बजट) विभाग

PRE-QUALIFICATION SCHEDULES

PREAMBLE TO SCHEDULES

Tenderers are required to provide complete information asked in the schedules. No schedule or item of schedule is to be left blank. In case, a particular schedule or item in schedule is not applicable, the same should be clearly indicated. The information provided in the schedules shall be used for Pre-Qualification evaluation of the tenders to assess the suitability and conformity of the firm/offer. However, it is clarified that, whatever technical particulars are proposed or considered by the Tenderer for his financial offer, all the equipment to be finally provided, in case of award, shall correspond to the specifications of the tender documents and shall be subject to the approval of the Engineer-in-Charge as stipulated in Clause no.9. of Special Conditions of Contract in Vol.-I of the tender documents. No claim for additional payments shall be entertained during the course of the approval process or thereafter on this account.

It is expected that the tenderer will quote with a view to supply equipment of best makes and conforming to the highest standards. Tenderer has to consider for his financial offer, makes specified in the document. For items not covered by the list of equipment for which makes are specified or if the specifications are not specified in the tender document, only makes of reputed manufacturers of equipment corresponding to the state of art technology and / or to the latest Indian standards shall be supplied after approval of Engineer in Charge.

Information provided by the tenderer in the schedules is for preliminary assessment of the offer. However, these details are subject to approval of the Engineer-in-Charge based upon the detailed drawings / designs / data-sheets / specifications to be submitted by the tenderer in conformity with the tender documents.

Signature of authorised representative.....

SCHEDULE - 1 (TENDER FORM)**1. TENDER FORMS**

The Tenderer has to fill in all tender forms (if applicable) in this document and to submit them duly signed and stamped. They shall be used for the evaluation of his offer, the assessment whether his tender is substantial and for his pre-qualification.

The Tenderer shall neither add nor delete the texts of the forms. This might lead to the rejection of the tender. The papers shall remain bound in the tender document issued to the Tenderer. The supporting papers as indicated in Part B, Section 2 of the tender documents shall be bound in a box file, in the same order as they appear hereafter.

Tender forms and supporting papers required

Designation	What to do?	Supporting papers
Tender Letter	to be filled in, signed and stamped	
Statement having read TD and addenda	to be filled in, signed and stamped	
General information about the tenderer	to be filled in, signed and stamped	Powers of attorney, attested by notary on stamp paper of Rs 100; Earnest Money in required form; Evidence of experience of firm in similar jobs; Certificates of clearance of tax on sale and purchase of goods
Tender Letter, Letter for Tender for Work, Declarations & Undertakings	to be filled in, signed and stamped	
Pre Qualification	to be filled in, signed and stamped	Pre-qualification criteria

Signature of authorized representative.....

2. Statement having read the tender documents

We declare that we have read and understood and that we accept all clauses, conditions, descriptions, drawings of the tender documents and subsequent addenda (if any) without any change, reservations and conditions.

Tender documents purchased from PHED

Section	Part	Total pages*
Volume I		
	Notice of Invitation to Tenderers (NIT)	
	Instructions and guidance to Tenderers, schedules	
	Pre-Qualification Schedules	
	General Conditions of Contract	
	Special Conditions of Contract	
Volume – II	Scope of work & Specifications, Annexure	
	Tender Drawings	
Volume – III	Schedule of Prices	

Addenda issued by PHED*

Addendum No.	Dated

*TO BE FILLED IN BY THE TENDERER

Signature of authorized representative.....

Schedule 2 – PREQUALIFICATION OF FIRMS (as applicable)**2.1 Experience of Project execution of Applicant Firm in 10 years. (Pre Qualification Criteria as in Clause of ITT)**

S. No.	Name of Project / Contract	Project Period		Owner / Client	Details of work	Components and capacity	Remark
		Date of Start of Work	Date of Completion of Work				

- 1) The works which have been completed & commissioned during the period mentioned above, though may have commenced earlier, shall be considered for experience purposes.
- 2) Copy of work order and clients certificate of successful completion for the projects/contracts mentioned are to be enclosed.

Company Seal

Tenderer's Authorised Signature

Schedule – 3 – Undertaking & Deviations**3.1 Undertaking**

Undertaking in respect of the Tender for “Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur”, as per NIT No 91 __/2021-22 Dated _____ (to be filled by the tenderer)

I/We hereby agree to all terms and conditions, scope of work, specifications except to the deviation given in schedule 3.2 and 3.3. We undertake that the contents of the submitted tenders, the write-up given, the designs attached herein and the figures/components shown in the drawings submitted with the tender, do not provide any deviations from the terms and conditions, scope of work and specifications.

I/we agree to withdraw all such deviations which indicates any deviation from the terms and conditions, scope of work and specifications other than those given in Schedule 3.2 and 3.3, which can be interpreted from the write up, attached designs, schedules, drawings etc. given in the submitted tender

I/we also agree to provide the equipment / material specified in the approved vendor list / tender document without any additional cost for completion of the work.

I/We understand that the Department can ask us to provide any additional equipment as shown in the drawings or as written in the tender document without any additional cost. I/We also understand that the department may also opt to provide any of the equipment of other makes / specifications quoted by us in the tender document without providing us any opportunity to change the financial offer, without having any effect on the Department right to ask us to supply material of specifications and makes as per the tender document.

I/We also agree that irrespective to the designs and drawings given in this tender offer, we shall execute the work as per the designs and drawings approved by the Engineer in Charge during execution, in consideration to the provisions of the Tender Document.

Company Seal

Tenderer's Authorised Signature

3.2 Deviations from Technical Specification

All deviations from Technical Specifications shall be filled in by the Tenderer, clause by clause, in this Schedule. It may be noted that the Specifications given in the Vol.-II of Tender Document are the minimum acceptable; the tenderers are free to quote standards that are better / higher than the ones referred to in the Tender Document.

Clause Ref. of Vol.- II	Specification	Deviation	Standard to Which offered material / equipment confirms

The tenderer hereby certifies that the above mentioned are the only deviations from Technical Specifications of the Tender and he accepts all the remaining scope and specifications contained in Vol.-II of the Tender document.

Company Seal

Tenderer's Authorised Signature

3.3 Deviations from Conditions of Contract

All deviations from the Conditions of Contract (General Conditions of Contract and Special Conditions) shall be filled in by the Tenderer, clause by clause in this Schedule

Clause Ref. of Vol. - I	Deviation

The Tenderer hereby certifies that the above mentioned are the only deviations from the Conditions of Contract of Vol.-I and he agrees with all remaining conditions.

Company Seal

Tenderer's Authorised Signature

**Additional Chief Engineer PHED
Region II Jaipur**

AGREEMENT NO.-----

Year-----

-----**Circle**

Division-----

Sub – Division-----

Name of Work Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur

Name of Contractor -----

Sanction No.-----

Technical Sanction No.-----

Job No.-----

(a) Stipulated Date of Start of Work -----

(b) Stipulated Date of Completion of Work-----

(c) Actual Date of Completion-----

(d) Extension applied on & sanctioned-----

Vide : C.E./S.E./E.E. No.-----Dt.-----200

Details of Documents

(a) Percentage Rate Tender R.P.W.A. 100

(See rule 322 & note 1 below rule 331)

(b) Schedule A to F

(c) Schedule H

(d) Schedule G

(e) Schedule

No.

Date

Copy forwarded to: 1. The Accountant General, Rajasthan, Jaipur/Chief Accounts Officer

2. The Superintending Engineer

3. The Divisional Accountant/Divisional Accounts Officer/Sr. DAO

4. The Assistant Engineer/JEN

5. Auditor

6. Shri-----

7. M/s-----

Amended up to 25.8.06

**GOVERNMENT OF RAJASTHAN
OFFICE OF THE ADDITIONAL CHIEF ENGINEER PHED REGION II JAIPUR
NOTICE INVITING TENDERS FOR WORKS**

1. Tenders are hereby invited on behalf of the Governor of Rajasthan for the works of Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur from enlisted contractors of the appropriate class. Contractors enlisted with CPWD, Postal, Telcom, Railway, MES, other State Governments/Central Government undertakings/organizations equivalent to AA and A class of /Rajasthan are also eligible after giving prescribed Earnest Money to tender for works as under :-

(i) Contractors equivalent to AA Class of Rajasthan	Works of which cost exceeds Rs. 3.0 crores
(ii) Contractors equivalent to A Class of Rajasthan	Works of which cost exceeds Rs. 1.5 crores but not exceed Rs. 3.00 crores.
(iii) Contractors equivalent to B Class of PHED Region, Jaipur, Rajasthan	Works of which cost exceeds Rs. 0.5 crores but not exceed Rs. 1.50 crores.

2. Contract document consisting of the detailed plan, complete specifications, the Schedule of the quantities of the various classes of work to be done and the set of Conditions of Contract to be complied with by the persons whose tender may be accepted, which will also be found printed in the form of tenders, can be seen at the office of the Additional Chief Engineer PHED Region II Jaipur (name of the officer) every day except on Sundays and Public Holidays, during office hours.
3. Tenders, which should always be submitted in covers with the name of the work written on them, will be received electronically on eproc.rajasthan.gov.in and will be opened by Additional Chief Engineer PHED Region II Jaipur in his office in the presence of such Contractors or their authorized representatives, as are present.
4. Tenders are to be submitted on a prescribed form, which can be downloaded from eproc.rajasthan.gov.in. The sale of tenders will be closed one day before actual time of receipt of tender. Before submitting tenders, it should be ensured that all the tenders papers including Conditions of Contract are signed by the tenderer. Eligibility to get tender forms shall be with reference to the amount mentioned in the NIT.
5. The work is to be completely finished to the satisfaction of Engineer-in-charge within **9 Months from the 10th** day after the date of written order to commence the work.
6. Earnest Money, amounting to Rs. 780480 must accompany each tender, and each tender is to be in a sealed cover, superscribed "Tender for Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur" and addressed to the Additional Chief Engineer PHED Region II Jaipur (name of the officer). Earnest Money in the name of Executive Engineer, PHED, Division III Duda Jaipur should be deposited. In case of tenders for works of which tendered cost is Rs. 5 crores and above, Earnest Money of Rs. 10 lac shall be accepted in cash as above and remaining part of Earnest Money can be accepted either in the form of Bank Guarantee (Form RPWA 87) in cash. Enlisted contractors shall be required to deposit ¼% of estimated cost of work as Earnest Money while tendering within their enlistment zone. For outside their zone, 1% Earnest Money shall be required to be deposited.
7. "The security deposit @ 10% (or as per FD Latest Circular) of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. However, the amount of security deposit deducted from running bills shall not be converted into any mode of securities like bank guarantee, FDR etc. The earnest money deposited shall however be adjusted while deducting security deposit from first running bills of the contractor. There will be no maximum limit of security deposit.

8. A contractor may however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @ 10% of the work order before or at the time of executing the agreement. In that case, earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution for the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills.
9. All compensation or other sums of money payable by the contractor to the Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising there from, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the contractor shall within ten days thereafter, make good in cash or bank guarantee or Nationalised/Scheduled bank as aforesaid, any sum of sums which may have been deducted from or raised by sale or his Security deposit or any part thereof.

a. **Added: The following new proviso is added by the RTPP (Amendment) Rules 2020, namely:**

"Provided that, during the period commencing from the date of commencement of the Rajasthan Transparency in Public Procurement (Second Amendment) Rules, 2020 to 31.12.2021, the performance security shall be taken as under:-1. 2.5%, or as may be specified in the bidding documents, of the amount of supply order in case of procurement of goods and services and 3% of the amount of work order, in case of procurement of works;

"Provided that, during the period commencing from the date of commencement of the Rajasthan Transparency in Public Procurement (Second Amendment) Rules, 2020 to 31.12.2021, in case of procurement of works, the successful bidder at the time of signing of the contract agreement, may submit option for deduction of performance security from his each running and final bill @ 3% of the amount of the bill."

The above (a point) has been amended vide FINANCE (G&T) DEPARTMENT NOTIFICATION number Jaipur, January 12, 2022

G.S.R.398.-In exercise of the powers conferred by section 55 of the Rajasthan Transparency in Public Procurement Act, 2012 (Act No. 21 of 2012), the State Government hereby makes the following rules further to amend the Rajasthan Transparency in Public Procurement Rules, 2013, namely:-

1. Short title and commencement-

(1) These rules may be called the Rajasthan Transparency in Public Procurement (Amendment) Rules, 2022.

(2) They shall come into force from the date of their publication in the Official Gazette.

2. Amendment of rule 75.- In rule 75 of the said rules,-

(i) in proviso to sub-rule (2), for the existing expression "31.12.2021", the expression "31.03.2023" shall be substituted; and

(ii) in proviso to clause (f) of sub-rule (3), for the existing expression "31.12.2021", the expression "31.03.2023" shall be substituted.

10. The acceptance of the tender will rest with the Competent Authority who does not bind itself to accept the lowest tender, and reserves to itself the authority to reject any or all of the tenders received without assigning any reason.
11. Tender forms as issued from the office(s) mentioned above (Para-4), must be returned, with all enclosures, to the following office/officers, on the date of receipt of tenders:

Value of Tenders		Name of Office
(i)	Tenders for which sanctioning authority is Executive Engineer/Superintending Engineer	Divisional Office
(ii)	Tenders for which sanctioning authority is	Circle Office

	Additional Chief Engineer/Chief Engineer	
(iii)	Tenders for which sanctioning authority is Board/State Government	Additional Chief Engineer/ Chief Engineer Office

12. No refund of tender fees is claimable for tenders not accepted or forms returned or for tenders not submitted.

13. If any tenderer withdraws his tender prior to expiry of said validity period or mutually extended period or makes modifications in the rates, terms and conditions of the tender within the said period. Which are not acceptable to the department, or fails to commence the work in the specified period, fails to execute the agreement the department shall without prejudice to any, other right or remedy, be at liberty to forfeit the amount of earnest money given in any form absolutely. If any contractor, who having submitted a tender does not execute the agreement or start the work or does not complete the work and work has to be put to retendering, he shall stand debarred from participating such retendering in addition to forfeiture of Earnest Money/Security Deposit and other action under agreement.
14. All tenders, in which any of the prescribed conditions are not fulfilled or which have been vitiated by errors in calculations, totaling or other discrepancies or which contain over-writing in figures or words or corrections not initialed and dated, will be liable to rejection.
15. Enlisted Contractors, will be required to pay Earnest Money @ $\frac{1}{2}\%$ of estimated cost of work put to tender, in case of work for which they are authorized to tender under Rules for enlistment of contractors, but the amount to the extent of full Earnest Money shall be liable to be forfeited in the event of circumstances explained in Clause 11 above. Degree/ Diploma holder Engineers may pay Earnest Money, equal to one half of the normal rates, subject to the provisions of Rules for enlistment of Contractors
16. The tender should be accompanied with PANGST Registration from the concerned departmental authorities, without which the tenders may not be entertained.
17. The whole work may be split up between two or more contractors or accepted in and not in entirety if considered expedient.

Signature of Engineer-in-charge
For and on behalf of the Governor of Rajasthan

Tender for works

I/We hereby tender for the Execution for the Governor of the State of Rajasthan of the work specified in the underwritten memorandum within the time specified in such memorandum at Lump Sum Amount of Rs.

Signature of tenderer Page 52

..... (in Figures) Rs. (In Words) specified in the Schedule attached in Tender Document.. (Amount may be kept blank). I/We have visited the site of work and am/are fully aware of all the difficulties and conditions likely to affect carrying out the work. I/We have fully acquainted myself/ourselves about the conditions in regard to accessibility of site and quarries/kilns, nature and the extent of ground, working conditions including stacking of materials, installation of tools & Plant, conditions effecting accommodation and movement of labour etc . required for the satisfactory execution of contract.

Memorandum

- (a) General description of work..- Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambhar Distt Jaipur as per details in "Scope of Work" and Specification for Works.
- (b) Estimated cost **Rs 390.24 Lacs**
- (c) Earnest money Rs. 780480 @ 1% for enlisted contractors outside their zone of enlistment and Rs. 195120 @1/2% within their zone of enlistment
- (d) Security Deposit:

(i) "The security deposit @ 10%(or as per latest FD Circular) of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposit shall however be adjusted while deducting security deposit from first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @ 10%(or as per latest FD Circular)of the work order before or at the time of executing the agreement. In that case earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills."

All compensation or other sums of money payable by the contractor to the Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising there from, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the contractor shall within ten days thereafter, make good in cash or bank guarantee or Nationalised/Scheduled bank as aforesaid, any sum of sums which may have been deducted from or raised by sale of his Security deposit or any part thereof.

Added: The following new proviso is added by the RTPP (Amendment) Rules 2020, namely:

"Provided that, during the period commencing from the date of commencement of the Rajasthan Transparency in Public Procurement (Second Amendment) Rules, 2020 to 31.12.2021, the performance security shall be taken as under:-1. 2.5%, or as may be specified in the bidding documents, of the amount of supply order in case of procurement of goods and services and 3% of the amount of work order, in case of procurement of works;

"Provided that, during the period commencing from the date of commencement of the Rajasthan Transparency in Public Procurement (Second Amendment) Rules, 2020 to 31.12.2021, in case of procurement of works, the successful bidder at the time of signing of the contract agreement, may submit option for deduction of performance security from his each running and final bill @ 3% of the amount of the bill."

The above (a point) has been amended vide FINANCE (G&T) DEPARTMENT NOTIFICATION number Jaipur, January 12, 2022

G.S.R.398.-In exercise of the powers conferred by section 55 of the Rajasthan Transparency in Public Procurement Act, 2012 (Act No. 21 of 2012), the State Government hereby makes the following rules further to amend the Rajasthan Transparency in Public Procurement Rules, 2013, namely:-

1. Short title and commencement-

- (1) These rules may be called the Rajasthan Transparency in Public Procurement (Amendment) Rules, 2022.
- (2) They shall come into force from the date of their publication in the Official Gazette.
2. Amendment of rule 75.- In rule 75 of the said rules,-
- (i) in proviso to sub-rule (2), for the existing expression "31.12.2021", the expression "31.03.2023" shall be substituted; and
- (ii) in proviso to clause (f) of sub-rule (3), for the existing expression "31.12.2021", the expression "31.03.2023" shall be substituted.
- (ii) Bank Guarantee shall in all cases be payable at the headquarter of the Division or the nearest district headquarter.
- (e) Time allowed for the completion of work (to be reckoned from the 10th day after the date of written order to commence the work) is **9 Months**. Should this tender be accepted in whole or in Part, I/We hereby agree to abide by and fulfill all the terms and provisions of the conditions of contract annexed hereto and of the detailed notice for technical and financial bids, or in default thereof, to forfeit and pay to the Governor of Rajasthan or his successors in office, the sum of money mentioned in the said conditions.
- (f) A sum of Rs. lacs is forwarded herewith in the form of Cash, Bank Draft, Bankers Cheque as Earnest Money. This amount of earnest money shall absolutely be forfeited to the Governor of Rajasthan or his successor in office without prejudice to any other right or remedies of Governor of Rajasthan or his office, should I/We fail to commence the work specified in the above memorandum.

Signature of Witness
Witness's address & occupation

Signature of Contractor
Address of Contractor

Date

The above tender is hereby accepted by me on behalf of the Governor of Rajasthan

Dated the _____ Engineer-in-charge

("Copy of appendix 11 of PWF&AR, Government of Rajasthan, effective from 1.07.1999 and subsequent addendum dated 19.03.01 & 29.03.01. In case of any typographical error or omission and alteration the original version of the same shall be valid")

GENERAL CONDITIONS OF CONTRACT

Clause 1: Security Deposit

"The security deposit @ 10% or as per latest FD Circular) of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposited shall however be adjusted while deducting security deposit from the first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @10%(or as per latest FD Circular)of the work order before or at the time of executing the agreement. In that case earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills."

All compensation or other sums of money payable by the Contractor to Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising there from, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the Contractor shall within ten days thereafter, make good in cash or Bank Guarantee of Nationalised/Scheduled bank, as aforesaid, any sum or sums which may have been deducted from or raised by sale of his Security Deposit or any part thereof.

In case of Bank Guarantee of any Nationalised/Scheduled Bank is furnished by the Contractor to the Government, as part of the Security Deposit and the bank goes into liquidation or, for any reason is unable to make payment against the said Bank Guarantee, the loss caused thereby shall fall on the Contractor and the Contractor shall forthwith, on demand, furnish additional security to the Government to make good the deficit.

The liability or obligation of the bank under the Guarantee Bond shall not be affected or suspended by any dispute between the Engineer-in-Charge and the Contractor, and the payment, under the Guarantee Bond by the bank to the Government shall not wait till disputes are decided. The bank shall pay the amount under the Guarantee, without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the Contractor. The demand, so made, shall be conclusive as regards to amount due and payable by the bank, under the guarantee limited to the amount specified in the Guarantee Bond. The guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

The Bank Guarantee shall remain valid up to the specified date unless extended on demand by the Engineer-in-Charge which shall include the period of completion of the contract and the defect removal period as per terms of the Agreement. Bank's liability shall stand automatically discharged unless a claim in writing is lodged with the Bank within the period stated in the Bank Guarantee including the extended period. After satisfactory completion of the contract and clearance of all dues by the Contractor, the Chief Engineer or duly authorised Engineer will discharge the Bank Guarantee after expiry of the original or the extended period, as the case may be. In case the date of expiry of the Bank Guarantee is a holiday, it will be deemed to expire on the close of the next working day.

Government is not concerned with any interest accruing to the Contractor on any form of Security (primary or collateral) lodged by him with the bank or any sums payable to sureties obtained by the Bank as counter guarantee to secure its own position. These will be the matters between the Bank and the Contractor.

Added:

Clause 2: Compensation for delay

The time allowed for carrying out the work, as entered in the tender, shall be strictly observed by the Contractor and shall be reckoned from the 10th day after the date of written order to commence the work is given to the Contractor. If the Contractor does not commence the work within the period specified in the work order, he shall stand liable for the forfeiture of the amount of Earnest Money and Security Deposit. Besides, appropriate action may be taken by the Engineer-in-Charge/competent authority to debar him from taking part in future tenders for a specified period or black list him. The work shall, throughout the stipulated period of completion of the

contract, be proceeded with all due diligence, time being essence of the contract, on the part of the Contractor. To ensure good progress during the execution of work, the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month (save for special jobs), to complete 1/8th of the whole of the work before 1/4th of the whole time allowed under the contract has elapsed, 3/8th of the work before 1/2 of such time has elapsed and 3/4th of work before 3/4th of such time has elapsed. If the contractor fails to complete the work in accordance with this time schedule in terms of cost in money, and the delay in execution of work is attributable to the contractor, the contractor shall be liable to pay compensation to the Government at every time span as below: -

A.	Time Span of full stipulated period	1/4 th	1/2 th	3/4 th	Full
B.	Work to be completed in terms of money	1/8 th	3/8 th	3/4 th	Full
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
C.	Compensation payable by the contractor for delay attributable to contractor at the stage of:	Delay up to one fourth period of the prescribed time span – 2.5% of the work remained unexecuted Delay exceeding one fourth period but not exceeding half of the prescribed time span – 5% of the work remained unexecuted. Delay exceeding half of the prescribed but not exceeding three fourth of the time span – 7.5% of the work remained unexecuted Delay exceeding three fourth of the prescribed time span – 10% of the work remained unexecuted			

Note:- In case delayed period over a particular span is split up and is jointly attributable to Government and contractor, the competent authority may reduce the compensation in proportion of delay attributable to Government over entire delayed period over that span after clubbing up the split delays attributable to Government and this reduced compensation would be applicable over the entire delayed period without paying any escalation.

Following illustrations is given:-

(i) First time span is 6 months, delay is of 30 days which is split over as under:-

5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor)
 Total delay is thus clubbed to 15 days (attributable to Government) and 15 days (attributable to contractor).

The normal compensation of 30 days as per clause 2 of agreement is 2.5% which can be reduced as 2.5*15/30-1.25% over 30 days without any escalation by competent authority.

Note : The compensation, levied as above, shall be recoverable from the Running Account Bill to be paid immediately after the concerned time span. Total compensation for delays shall not exceed 10 percent of the total value of the work.

The contractor shall, further, be bound to carry out the work in accordance with the date and quantity entered in the progress statement attached to the tender.

In case the delay in execution of work is attributable to the contractor, the span wise compensation, as laid down in this clause shall be mandatory. However, in case the slow progress in one time span is covered up within original stipulated period, then the amount of such compensation levied earlier shall be refunded. The Price escalation, if any, admissible under clause 45 of Conditions of Contract would be admissible only on such rates and cost of work, as would be admissible if work would have been carried out in that particular time span. The Engineer-in-Charge shall review the progress achieved in every time span, and grant stage wise extension in case of slow progress with compensation, if the delay is attributable to contractor, otherwise without compensation.

However, if for any special job, a time schedule has been submitted by the Contractor before execution of the agreement, and it is entered in agreement as well as same has been accepted by the Engineer-in-charge, the Contractor shall complete the work within the said time schedule. In the event of the Contractor failing to comply with this condition, he shall be liable to pay compensation as prescribed in foregoing paragraph of this clause provided that the entire amount of compensation to be levied under the provisions of this Clause shall not exceed 10% of the value of the contract. While granting extension in time attributable to the Government, reasons shall be recorded for each delay.

Clause 3: Risk & Cost Clause

The Engineer-in-charge or the Competent Authority defined under rules may, without prejudice to his rights against the Contractor, in respect of any delay or inferior workmanship or otherwise, or any claims for damages in respect of any breaches of the contract and without prejudice to any rights or remedies under any of the

provisions of this Contract or otherwise, and whether the date for completion has or has not elapsed, by notice in writing, absolutely determine the Contract in any of the following cases:

- (i) If the Contractor having been given by the Engineer-in-charge, a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirements of such notice for a period of seven days, thereafter, or if the Contractor shall delay or suspend the execution of the work so that either in the judgment of the Engineer-in-charge (which shall be final and binding) he will be unable to secure completion of the work by the date for completion or he has already failed to complete the work by that date,
- (ii) If the Contractor, being a company, shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager, on behalf of a creditor, shall be appointed or if circumstances shall arise, which entitle the court or creditor to appoint a receiver or a manager or which entitle the court to make a winding up order,
- (iii) If the contractor commits breach of any of the terms and conditions of this Contract,
- (iv) If the contractor commits any acts mentioned in, clause 19 thereof.

When the Contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-charge on behalf of the Governor of Rajasthan shall have powers: -

- (a) To determine or rescind the contract, as aforesaid (of which determination or rescission notice in writing to the Contractor under the hand of the Engineer-in charge shall be conclusive evidence), upon such determination or rescission, the earnest money, full security deposit of the contract shall be liable to be forfeited and shall be absolutely at the disposal of Government.
- (b) To employ labour paid by the Department and to supply materials to carry out the work or any part of the work, debiting the Contractor with the cost of the labour and the price of the materials (of the amount of which cost and price certified by the Engineer-in-charge shall be final and conclusive against the contractor) and crediting him with the value of the work done in all respects in the same manner and at the same rates, as if it had been carried out by the Contractor under the terms of this Contract. The certificate of the Divisional Officer, as to the value of the work done, shall be final and conclusive evidence against the Contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the Contractor. Provided also that; if the expenses incurred by the Department are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor.
- (c) After giving notice to the contractor to measure up the work of the contractor and to take such part thereof, as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess, the certificate in writing of the Engineer-in-charge shall be final and conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by Government under this contract or on any other account whatsoever, or from his Earnest Money, Security Deposit, Enlistment Security or the proceeds of sales thereof, or a sufficient part thereof, as the case may be. In the event of any one or more of the above courses being adopted by the Engineer-in-charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of contract. And, in case action is taken under any of provisions aforesaid, the Contractor shall not be entitled to recover or be paid, any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-charge has certified, in writing, the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

Clause 4: Contractor remains liable to pay compensation, if action not taken under clause 3

- (i) In any case in which any of the powers conferred by clause 3 hereof, shall have become exercisable and the same shall have not been exercised, the non-exercise, thereof, shall not constitute waiver of any of the conditions hereof, and such power shall, notwithstanding, be exercisable in the event of any future case of default by the Contractor for which, by any clause or clauses hereof, he is declared liable to pay compensation amounting to the whole of his Security Deposit /Earnest Money/Enlistment security and the liability of the Contractor for past and future compensation shall remain unaffected.

Powers to take possession of, or require removal, sale of Contractor's Plant

- (ii) In the event of the Engineer-in-Charge putting in force, powers vested in him under the preceding Clause 3 he may, if he so desires, take possession of all or any tools, plants, materials and stores, in or upon the works or the site, thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account, at the

contract rates or, in case of these not being applicable, at current market rates, to be certified by the Chief Engineer or duly authorized Engineer (whose certificate thereof, shall be final and conclusive), otherwise the Engineer-in-Charge may, by notice in writing to the contractor or his clerk of the works, foreman or other authorized agent, require him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the contractor failing to comply with any requisition, the Chief Engineer or other duly authorized Engineer may remove them at the contractor's expenses, sell them by auction or private sale on account of the Contractor and at his risk in all respects, and the certificate of the Chief Engineer or other duly authorized Engineer, as to the expense of any such removal, and the amount of the proceeds and expense of any such sale shall be final and conclusive against the Contractor.

Clause 5: Extension of time

If the contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on any other grounds, he shall apply, in writing, to the Engineer-in-Charge within 30 days of the

date of the hindrance, on account of which he desires such extension as aforesaid, and the Authority Competent to grant extension under the rules/delegations of power or other duly authorized Engineer shall, if in his opinion, (which shall be final) reasonable grounds be shown therefore, authorize such extension of time, if any, as may, in his opinion, be necessary or proper, if the period of completion of contract expires before the expiry of the period of one month provided in this clause, the application for extension shall be made before the expiry of the period stipulated for completion of the contract. The competent authority shall grant such extension at each such occasion within a period of 30 days of receipt of application from contractor and shall not wait for finality of work. Such extensions shall be granted in accordance with provisions under clause (2) of this agreement.

Clause 5 A: Monthly Return of Extra Claims

Contractor has to submit a return every month for any work claimed as extra. The Contractor shall deliver the return in the office of the Executive Engineer and obtain Receipt Number of the Receipt Register of the day on or before 10th day of every month during the continuance of the work covered by this contract, a return showing details of any work claimed as extra by the contractor which value shall be based upon the rates and prices mentioned in the contract or in the Schedule of Rates in force in the District for the time being. The contractor shall be deemed to have waived all claims, not included in such return, and will have no right to enforce any such claims not included, whatsoever be the circumstances.

Clause 6: Final Certificate

On completion of the work, the contractor shall send a registered notice to the Engineer-in-charge, giving the date of completion and sending a copy of it to the officer accepting the contract, on behalf of the Governor and shall request the Engineer-in-charge to give him a certificate of completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the site on which the work shall be executed, all scaffolding, surplus materials and rubbish and cleared off the dirt from all wood work, doors, walls, floors, or other parts of any building in, upon or about which the work is to be executed or of which he may have possession for the execution thereof, he had filled up the pits. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and cleaning off dirt and filling of pits on or before the date fixed for completion of the work, the Engineer-in-charge may, at the expense of the contractor, remove such scaffolding, surplus materials, and the rubbish and dispose of the same, as he thinks fit, and clean off such dirt and fill the pits, as aforesaid, and the contractor shall forthwith pay the amount of all expenses, so incurred, and shall have no claim in respect of any such scaffolding or surplus materials, as aforesaid, except for any sum actually realized by the sale thereof. On completion, the work shall be measured by the Engineer-in-charge himself or through his subordinates, whose measurements shall be binding and conclusive against the contractor. Provided that, if subsequent to the taking of measurements by the subordinate, as aforesaid, the Engineer-in-charge had reason to believe that the measurements taken by his subordinates are not correct, the Engineer-in-charge shall have the power to cancel the measurements already taken by his subordinates and acknowledged by the Contractor and to take measurements again, after giving reasonable notice to the Contractor, and such re-measurements shall be binding on the Contractor.

Within thirty days of the receipt of the notice, Engineer-in-charge shall inspect the work and if there is no visible defects on the face of the work, shall give the Contractor, a certificate of completion. If the Engineer-in-charge finds that the work has been fully completed, it shall be mentioned in the certificate so granted. If, on the other hand, it is found that there are certain visible defects to be removed, the certificate to be granted by Engineer-in-charge shall specifically mention the details of the visible defects along with the estimate of the cost for removing these defects. The final certificate of work shall be given after the visible defects pointed out as above have been removed.

(Delete whichever is not applicable). (Ten days will apply to works at the headquarters of Engineer-in-charge and thirty days for works at other place.)

Clause 7: Payment on Intermediate Certificate to be regarded as advance

No payments shall be made for works estimated to cost less than rupees twenty five thousand, till after the whole of the works shall have been completed and a certificate of completion given. But in the case of works estimated to cost more than rupees twenty five thousand, the Contractor shall on submitting the bill therefore, be entitled to receive a monthly payment proportionate to the part, thereof, then approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of sum, so payable, shall be final and conclusive. Running Account Bill shall be paid within 15 days from presentation. But all such intermediate payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed, and shall not preclude the requiring of bad, unsound and imperfect or unskillful work to be removed and taken away and re-constructed or re-erected, or considered as an admission of the due performance of the contract, or any part thereof, in any respect, or the accruing of any claim, nor shall it conclude, determine, or effect in any way the powers of the Engineer-in-charge under these conditions or any of them to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be made / submitted by the Contractor within one month of the date fixed for completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

Clause 7A: Time Limit for Payments of Final Bills

The final bill shall be paid within 3 months on presentation by the contractor after issuance of final completion certificate in accordance with clause 6 of the conditions of contract. If, there shall be any dispute about any item(s) of the work, then the undisputed item(s) only, shall be paid within the said period of 3 months. If a final bill (which contains no disputed item or disputed amount of any item) is not paid within the period of three months from presentation of final bill or 6 months from the date of receipt of registered notice regarding completion of work in accordance with clause 6 of the conditions of the contract, the defects, if any, shall be brought to the notice of the higher authority. The period of 3 months shall commence from the date of rectification of the defects. The higher authority shall ensure that in no case final bill should be left unpaid after 9 months from the receipt of registered notice regarding completion of work. The contractor shall submit a memorandum of the disputed items along with justification in support within 30 days from the disallowance thereof, and if he fails to do so, his claims shall be deemed to have been fully waived and absolutely extinguished.

Clause 8: Bills to be submitted monthly

A bill shall be submitted by the Contractor each month on or before the date fixed by the Engineer-in-charge for all work executed in the previous month and the Engineer-in-charge shall take or cause to be taken the requisite measurement for the purpose of having the same verified and the claim, as far as admissible, authorized or paid, if possible, before the expiry of ten days from the presentation of the bill. If the Contractor does not submit the Bill within the time fixed, as aforesaid, the Engineer-in-charge may depute a subordinate to measure up the said work in the presence of the Contractor, whose signature in the Measurement Book will be sufficient warrant and the Engineer-in-charge may prepare a bill from such Measurement Book, which shall be binding on the contractor in all respects.

Clause 8A: Contractor to be given time to file objection to the Measurements recorded by the Department

Before taking any measurement of any work, as have been referred to in preceding Clauses 6, 7 & 8, the Engineer-in-charge or a subordinate, deputed by him, shall give reasonable notice to the Contractor. If the Contractor fails to be present at the time of taking measurements after such notice or fails to sign or to record the difference within a week from the date of measurement in the manner required by the Engineer-in-charge, then in any such event, the measurements taken by the Engineer-in-charge or by the subordinates deputed by him, as the case may be, shall be final and binding on the Contractor and the Contractor shall have no right to dispute the same.

Clause 8B: Recovery of Cost of Preparation of the Bill

In case of contractor of class "A" and "AA" do not submit the bill within time fixed, the Engineer in Charge may prepare the bill as per the provision of clause 8 of the general conditions of the contract but @ 0.5 % of amount of such a bill shall be made and credited to the general revenue on account of preparation of bill.

Clause 9: Bills to be on printed forms

The Contractor shall submit all bills on the printed forms, to be had on application, at the office of the Engineer-in-charge and the charges in the Bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, at the rates hereinafter provided for such work.

Clause 9A: Payments of Contractor's Bills to Banks

Payments due to the Contractor may if so desired by him, be made to this Bank instead of direct to him, provided that the contractor has furnished to the Engineer-in-Charge (i) an authorization in the form of a legally valid document, such as a Power of Attorney conferring authority on the Bank to receive payments, and (ii) his own acceptance of the correctness of the account made out, as being due to him, by Government, or his signature on the bill or other claim preferred against Government before settlement by the Engineer-in-Charge of the account or claim, by payment to the Bank. While the receipt given by such bank shall constitute a full and sufficient discharge for the payment, the Contractor should, whenever possible, present his bill duly receipted and discharged through his Banker. Nothing, herein contained, shall operate to create in favour of the Bank any rights vis-a-vis the Governor.

Clause 10: Stores supplied by Government

If the specification or estimate of the work provides for the use of any special description of material, to be supplied from Engineer-in-charge's stores, or if, it is required that contractor shall use certain stores to be provided by the Engineer-in-charge, specified in the schedule or memorandum hereto annexed, the contractor shall be bound to procure and shall be supplied such materials and stores as are, from time to time, required to be used by him for the purpose of the Contract only, and the value of the full quantity of materials and stores, so supplied, at the rates specified in the said schedule or memorandum, may be set off or which may be deducted from any sum, then due or thereafter become due, to the Contractor under the Contract or otherwise or against or from the Security Deposit or the proceeds of sale, if the same is held in Government securities, the same or sufficient portion thereof being in this case, sold for this purpose. All materials supplied to the contractor, either from Departmental stores or with the assistance of Government, shall remain the absolute property of Government. The Contractor shall be trustee of the Stores/ Materials, so supplied/ procured, and these shall not, on any account, be removed from the site of work and shall be, all times, open to inspection by the Engineer-in Charge. Any such material, unused and in perfectly good condition at the time of completion or determination or rescinding of the contract, shall be returned to the Divisional officer's Stores, if, by a notice in writing under his hand, he shall so require, and if on service of such notice, the contractor fails to return the materials, so required, he shall be liable to pay the price of such materials in accordance with provision of clause 10 B *ibid*. But the contractor shall not be entitled to return any such materials, unless with such consent, and shall have no claim for compensation on account of any such materials, so supplied to him as aforesaid being unused by him, or for any wastage in or damage to any such materials. For the stores returned by the contractor, he shall be paid for, at the price originally charged excluding storage charges, in case of materials supplied from departmental stores and actual cost including freight, cartage, taxes etc., paid by the Contractor, in case of supplies received with the assistance of Government, which, however, should in no case exceed market rate prevailing at the time the materials are taken back. The decision of the Engineer-in-charge, as to the price of the stores returned, keeping in view its condition etc., shall be final and conclusive. In the event of breach of the aforesaid condition, the Contractor shall, in addition to throwing himself open to account for contravention of the terms of the license or permit and/or for criminal breach of trust, pay to the Government, all advantages or profits resulting, or which in the usual course, would result to him by reason of such breach. Provided that the Contractor shall, in no case be entitled to any compensation or damage on account of any delay in supply, or non-supply thereof, all or any such materials and stores.

Clause 10A: Rejection of materials procured by the Contractor

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion, are not in accordance with the specifications and, in case of default, the Engineer-in-Charge shall be at liberty to employ other person(s) to remove the same without being answerable or accountable for any loss of damage, that may happen or arise to such materials to be substituted thereof, and in case of default, Engineer-in-Charge may cause the same to be supplied and all costs, which may attend such removal and substitution, are to be born by the Contractor.

Clause 10B: Penal rate in case of excess consumption

The Contractor shall also be charged for the materials consumed in excess of the requirements calculated on the basis of standard consumption approved by the department, at double of the issue rate including storage and supervision charges or market rate, whichever is higher. A Material Supply and Consumption Statement, in prescribed Form RPWA 35A shall be submitted with every Running Account Bill, distinguishing material supplied by the Government and material procured by the Contractor himself. The recovery for such material shall be made from Running Account Bill next after the consumption and shall not be deferred. Certificate of such nature shall be given in each Running Account Bill.

Clause 10 C: Hire of Plant and Machinery

Special Plant and Machinery, required for execution of the work, may be issued to the Contractor, if available, on the rates of hire charges and other terms and conditions as per departmental Rules, as per Schedule annexed to these conditions. Rates of such Plant & Machinery shall be got revised periodically so as to bring

them at par with market rate.

Clause 11: Works to be executed in accordance with specifications, Drawings, Orders etc.

The Contractor shall execute the whole and every part of the work in the most substantial and satisfactory manner and both as regards materials and otherwise in every respect, in strict accordance with the Specifications. The Contractor shall also conform exactly fully and faithfully to the designs, drawings (either designed by department or designed by contractor and approved by Engineer-in-charge during additional execution) and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the Contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the Contractor shall, if he so require, be entitled, at his own expense, to make or cause to be made copies of specifications and of all such designs, drawings and instructions, as aforesaid. A certificate of executing works as per approved design, specifications etc. shall be given on each Running Account Bill.

The specifications of work, material, methodology of execution, drawings and designs shall be signed by the Contractor and Engineer-in-charge while executing agreement and shall form part of agreement.

Clause 12:

The Engineer-in-charge shall have power to make any alterations, omissions or additions to or substitutions for the original specifications, drawings, designs and instructions, that may appear to him to be necessary during the progress of the work and the contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-in-charge and such alterations, omission, additions or substitutions shall not invalidate the contract and any altered, additional or substituted work, which the contractor may be directed to do in the manner above specified as part of the work, shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work. The time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work bears to the original contract work, and the certificate of the Engineer-in-charge shall be conclusive as to such proportion. The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective order:

If the rates for the additional, altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work.

If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the such rates will be derived from the rates for a similar class of work as are specified in the contract for the work.

If the rates for the altered, additional or substituted work can not be determined in the manner specified in the sub-clauses (i) to (ii) above, then the rates for such composite work item shall be worked out on the basis of the concerned Schedule of Rates of the District/area specified above minus/plus the percentage which the total tendered amount bears to the estimated cost of the entire work put to tender. Provided always that if the rate for a particular part or parts of the item is not in the Schedule of Rates, the rate for such part or parts will be determined by the Engineer-in-Charge on the basis of the prevailing market rates when the work was done.

If the rates for the altered, additional or substituted work item can not be determined in the manner specified in sub-clauses (i) to (iii) above, then the contractor shall within 7 days of the date of receipt of order to carry out the work, inform the Engineer-in-Charge of the rate which it is his intention to charge for such class of work supported by analysis of the rate or rates claimed and the Engineer-in-Charge shall determine the rate or rates on the basis of prevailing market rates, and pay the contractor accordingly. However, the Engineer-in-Charge, by notice in writing, will be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates on items falling under the clause.

Except in case of items relating to foundations, provisions contained in sub-clauses (i) to (iv) above shall not apply to contract or substituted items as individually exceed the percentage set out in the tender documents under clause 12.A.

For the purpose of operation of clause 12 (v) the following works shall be treated as work relating to foundations :-

- (a) For buildings, compound wall plinth level or 1.2 meters (4 ft.) above ground level whichever is lower, excluding items above flooring and D.P.C. but including base concrete below the floors.
- (b) For abutments, piers, retaining wall of culverts and bridges, walls of water reservoir and the bed of floor level.
- (c) For retaining walls, where floor levels is not determinate 1.2 metres above the average ground level or bed level.
- (d) For roads, all items of excavation and filling including treatment of sub base and soling work.
- (e) For water supply lines, sewer lines under ground storm water drains and similar work, all items of work

below ground level except items of pipe work for proper masonry work.

- (f) For open storm water drains, all items of work except lining of drains.
- (g) Any other items of similar nature which Engineer-in-Charge may decide relating to foundation.

The rate of any such work, except the items relating to foundations, which is in excess of the deviation limit shall be determined in accordance with the provisions contained in Clause 12A.

Clause 12A:

The quantum of additional work for each item shall not exceed 50% of the original quantity given in the agreement and the total value of additional work shall not exceed 20% of the total contract value, unless otherwise mutually agreed by the Engineer-in-charge and the Contractor. This limit shall not be applicable on items relating to foundation work, which shall be executed as per original rates or provision of clause 12 (i) to (iv).

In case of contract substituted items or additional items, which results in exceeding the deviation limit laid down in this clause except items relating to foundation work, which the contractor is required to do under clause 12 above, the contractor shall within 7 days from the receipt of order, claim revision of the rate supported by proper analysis in respect of such items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provision of sub clause (ii) of clause 12 and the Engineer-in-Charge, may revise their rates having regard to the prevailing market rates and the contractor shall be paid in accordance with the rates so fixed. The Engineer-in-Charge shall, however, be at liberty to cancel his order to carry out such increased quantities of work by giving notice in writing to the contractor and arrange to carry it out in such manner, as he may consider advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates of items failing under this Clause.

All the provisions of the preceding paragraph shall equally apply to the decrease in rates of items for quantities in excess of the deviation limit notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provisions of sub-clause(ii) of the preceding clause 12 and the Engineer-in-Charge may revise such rates having regard to the prevailing market rates unless otherwise mutually agreed by the Engineer-in-Charge and the Contractor..

Clause 13: No compensation for alteration in or restriction of work to be carried out.

If, at any time after the commencement of the work the Government shall, for any reason, whatsoever, not require the whole work, thereof, as specified in the tender, to be carried out, the Engineer-in-charge shall give notice, in writing, of the fact to the Contractor, who shall have no claim to any payments or compensation, whatsoever, on account of any profit or advantage, which he might have derived from the execution of the work in full but which he did not derive in consequence of the full amount of the work not having been carried out. Neither, shall he have any claim for compensation by reason of alterations having been made in the original specifications, drawings, and design, and instructions, which shall involve any curtailment of the work, as originally contemplated. Provided, that the Contractor shall be paid the charges for the cartage only, of materials actually brought to the site of the work by him for bonafide use and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof, and taken them back by the Contractor, provided however, that the Engineer-in-charge shall have, in all such cases, the option of taking over all or any such materials at their purchase price or at local market rates whichever may be less. In the case of such stores, having been issued from Government Stores, charges recovered, including storage charges, shall be refunded after taking into consideration any deduction for claim on account of any deterioration or damage while in the custody of the contractor, and in this respect the decision of the Engineer-in-charge shall be final.

Clause 14: Action and compensation payable in case of bad work

If, it shall appear to the Chief Engineer or any authorised authority or the Engineer-in-charge or his subordinates in-charge of the work, or to the committee of the retired officers/officers appointed by the State Government for the purpose that any work has been executed with unsound, imperfect or unskillful workmanship, or with material of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted, or otherwise not in accordance with contract, the Contractor shall on demand in writing from the Engineer-in-charge, specifying the work/materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, will rectify or remove and reconstruct the work, so specified, in whole or in part, as the case may be, remove the materials or articles, so specified, and provide other proper and suitable materials or articles at his own cost, and in the event of his failing to do so, within a period to be specified by the Engineer-in- Charge in his demand as aforesaid, then the Contractor shall be liable to pay compensation at the rate of one percent, on the tendered amount of work for every week not exceeding ten percent, while his failure to do so shall continue, and in the case of any such failure, the Engineer-in-Charge may rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be, at the risk and expense, in all respects of the contractor.

Clause 15: Work to be open to inspection: Contractor or his responsible Agent to be present

All work, under or in course of execution or executed in pursuance of the contract shall, at all times, be opened to inspection and supervision of the Engineer-in-charge and his superior officers e.g. Superintending Engineer, Additional Chief Engineer, Chief Technical Engineer, Chief Engineer, and his subordinates and any other authorised agency of the Government and the contractor shall, at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his subordinate and any other authorised agency of Government or committee of retired officers/officers appointed by the State Government for the purpose to visit the works shall have been given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself.

Clause 16: Notice to be given before any work is covered up

The Contractor shall give not less than 7 days notice, in writing, to the Engineer-in-charge or his subordinate-in-Charge of the work, before covering up or otherwise placing beyond the reach of measurement, any work in order that the same may be measured, and correct dimensions thereof, be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Engineer-in-Charge of the work, and if, any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the Contractor's expense or in default, thereof, no payment or allowance shall be made for such work, or for the materials with which the same was executed.

Clause 17: Contractor liable for damage done and for imperfections

If the Contractor or his work people or servants shall break, deface, injure or destroy any part of a building, in which they may be working or any building, road, fence, enclosure, or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work, while in progress, from any cause, whatsoever, or any imperfections become apparent in it, within a period specified in clause 37, after a certificate, final or otherwise of its completion, shall have been given by the Engineer-in-charge, may cause the same to be made good by other workmen and deduct the expense (of which the certificate of the Engineer-in-charge shall be final) from any sums that may be then, or at any time thereafter, may become due to the Contractor, or from his security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof.

Clause 18: Contractor to supply plant, ladders, scaffolding etc.

The Contractor shall arrange and supply, at his own cost, all material (except such special materials, if any, as may, in accordance with the contract, be supplied from the Engineer-in-charge's stores), plants, tools, appliances, implements, ladders, cordage, tackle, scaffolding and temporary works requisite or proper for the proper execution of the work, whether original, altered, or substituted, and whether included in the specification or other documents, forming part of the Contract, or referred to in these conditions, or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer in-Charge, as to any matter as to which, under these conditions, he is entitled to be satisfied or which he is entitled to require, together with carriage thereof, to and from the work. The Contractor shall also arrange and supply, without charge, the requisite number of persons with the means and materials, necessary for the purpose of setting out work and counting, weighting and assisting in the measurement or examination at any time and from time to time of the work, or materials. Failing his so doing, the same may be provided by the Engineer-in-charge, at the expense of the Contractor, and the expenses may be deducted from any money due to the Contractor under the Contract, or from his Security Deposit or the proceeds of sale thereof, or a sufficient portion thereof. The Contractor shall also provide all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defense of every suit, action or other proceeding at law, that may be brought by any person for injury sustained owing to neglect of the above precautions, and to pay any damages and costs which may be awarded in any such suit, action proceeding to any such person or which may, with the consent of the Contractor, be paid to compromise any claim by any such person.

Clause 19: Work not to be sub-let, Contract may be rescinded and Security Deposit and Performance Forfeited for sub-letting, bribing or if Contractor becomes insolvent.

The Contractor shall not be assigned or sublet without the written approval of the Chief Engineer, and if the contractor shall assign or sublet his contract or attempt so to do, or become insolvent, or commence any insolvency proceedings or mark any composition with his creditors, or attempt so to do, or if any bribe, gratuity, gift, loan, requisite reward or advantage, pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the Contractor or any of his servants or agents to any public officer or person, in the employ of Government, in any way, relating to his office or employment, or if, any such officer or person shall become, in any way, directly or indirectly, interested in the contract, the Chief Engineer may, thereupon, by

notice, in writing, rescind the contract and Security Deposit of the Contractor shall, thereupon, stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensue as, if the contract had been rescinded under Clause 3 hereof, and in addition the Contractor shall not be entitled to recover or be paid for any work therefore, actually performed under the Contract.

Clause 20: Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

Clause 21: Changes in constitution of firm

Where the Contractor is a partnership firm, the previous approval, in writing, of the Engineer-in-charge shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern, such approval, as aforesaid, shall likewise be obtained before the Contractor enters into any partnership agreement there under the partnership firm would have the right to carry out the work thereby undertaken by the Contractor. If, previous approval, as aforesaid, is not obtained, the Contract shall be deemed to have been assigned in contravention of Clause 19 hereof, and the same action may be taken, and the same consequences shall ensue, as provided in the said clause 19.

Clause 22: Work to be under direction of Engineer-in-charge

All the works, to be executed under the contract, shall be executed under the direction and subject to the approval, in all respect, of the Engineer-in-charge of the Government of Rajasthan for the time being, who shall be entitled to direct, at what point or points, and in what manner, they are to be commenced, and from time to time, carried on.

Clause 23: Standing Committee for Settlement of Disputes

If any question, difference or objection, whatsoever shall arise in any way, in connection with or arising out of this instrument, or the meaning of operation of any part thereof, or the rights, duties or liabilities of either party then, save in so far, as the decision of any such matter, as herein before provided for, and been so decided, every such matter constituting a total claim of Rs. 50,000/- or above, whether its decision has been otherwise provided for and whether it has been finally decided accordingly, or whether the Contract should be terminated or has been rightly terminated, and as regards the rights or obligations of the parties, as the result of such termination, shall be referred for decision to the empowered Standing Committee, which would consist of the followings:-

- (i) Administrative Secretary concerned.
- (ii) Finance Secretary or his nominee, not below the rank of Deputy Secretary.
- (iii) Law Secretary or his nominee, not below the rank of Joint Legal Remembrancer.
- (iv) Chief Engineer-cum-Addl. Secretary of the concerned department.
- (v) Chief Engineer concerned (Member-Secretary).

The Engineer-in-charge, on receipt of application along with non-refundable prescribed fee, (the fee would be two percent of the amount in dispute, not exceeding Rs. one Lac) from the Contractor, shall refer the disputes to the committee, within a period of one month from the date of receipt of application.

Procedure and Application for referring cases for settlement by the Standing Committee shall be, as given in Form RPWA 90.

Clause 23A: Contractor to indemnify for infringement of Patent or design

Contractor shall fully indemnify the Governor of Rajasthan against any action, claim or proceeding, relating to infringement or use of any patent or design, or any alleged patent or design, rights, and shall pay any royalties, which may be payable in respect of any article or part thereof, included in the contract, in the event of any claims made under or action brought against Government. In respect of any such matters, as aforesaid, the Contractor shall be, immediately, noticed thereof, and the Contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation, that may arise there from provided that the Contractor shall not be liable to indemnify the Governor of Rajasthan, if the infringement of the patent or design or any alleged patent or design, right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Clause 24: Imported Store articles to be obtained from Government

The contractor shall obtain from the stores of the Engineer-in-charge, all imported store articles which may be required for the work or any part thereof, or in making up articles required thereof, or in connection therewith, unless he has obtained permission, in writing, from the Engineer-in-charge, to obtain such stores and articles from else-where. The value of such stores and articles, as may be supplied to the Contractor by the Engineer-in-charge, will be debited to the Contractor, in his account, at the rates shown in the schedule attached to the contract, and if they are not entered in the schedule, they will be debited at cost price, which for the purposes of

this contract, shall include the cost of carriage and all other expenses, whatsoever, which shall have been incurred in obtaining delivery of the same at the stores aforesaid plus storage charges.

Clause 25: Item/ Percentage/ Lump Sum rates in estimates

When the estimate, on which a tender is made includes Item/ Percentage/ Lump Sum rates, in respect of parts of the work, the Contractor shall be entitled to payment in respect of the item of work involved, or the part of the work in question at the same rates, as are payable under the contract for such items or if the part of the work in question is not, in the opinion of the Engineer-in-charge, capable of measurement, the Engineer-in-charge may at his discretion pay the Item/ Percentage/ Lump Sum rate amount entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive with regard to any sum or sums payable to him under the provisions of this clause.

Clause 26: Action where no Specification

In case of any Class of work for which there is no such specification as is mentioned in the contract document referred in ITB Clause 4.1, such work shall be carried out in accordance with the detailed specification of the department and also in accordance with the instructions and requirement of the Engineer-in-charge.

Clause 27: Definition of work

The expression "works" or "work" where used in these conditions, shall, unless there be some thing either in subject or context, repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed, whether temporary or permanent, and whether original, altered, substituted or additional.

Clause 27A: Definition of Engineer-in-charge

The term "Engineer-in-charge" means the Divisional officer who shall supervise and be incharge of the work and who shall sign the contract on behalf of the Governor.

Clause 28:

It cannot be guaranteed that the work will be started immediately after the tenders have been received. No claims for increase of rate will be entertained, if the orders for starting work are delayed.

Clause 29: Payments at reduced rates on account of items of work not accepted and not completed to be at the discretion of the Engineer-in-charge

The rates for several items of works, estimated to cost more than Rs. 1,000/-, agreed within, will be valid only when the item concerned is accepted as having been completed fully in accordance with the sanctioned specifications. In cases, where the items of work are not accepted, as so completed, the Engineer-in-charge may make payment on account of such items, at such reduced rates, as he may considers reasonable, in the preparation of final or on account bills, and his decision in the matter shall be final and binding.

Clause 29A: Payments at part rates

The rates for several items of works may be paid at part rates provisionally in running bills in proportion to the quantum of items executed at the discretion of Engineer-in-charge. In case of Item/ Percentage/ Lump Sum rates, if the rate quoted for certain items are very high in comparison to the average/overall tendered premium, then the payment at running stages shall not be made more than the average sanctioned premium. The deferred payment, will however be released after successful completion of the work.

Clause 30: Contractor's percentage, whether applied to net or gross amount of bills

The percentage referred to in the "Tender of works" will be deducted/ added-from/to the gross amount of the bill before deducting the value of any stock issued.

Clause 31: Contractor to adhere to labour laws/regulation

The Contractor shall adhere to the requirements of the Workmen's Compensation Act and Labour Legislation in force from time to time and be responsible for and shall pay any compensation to his workmen which would be payable for injuries under the Workmen's Compensation Act, here-in-after called the said Act. If such compensation is paid by the State as Principal employer under Sub Section (1) of section 12 of the said Act, on behalf of the Contractor, it shall be recoverable by the State from the Contractor under Sub Section (2) of the said section. Such compensation shall be recovered in the manner laid down in clause 1 of the Conditions of Contract.

Clause 32: Withdrawal of work from the Contractor

If the Engineer-in-charge shall at any time and for any reasons, whatever, including inability to maintain prorate progress, think any portion of the work should not be executed or should be withdrawn from the Contractor, he may, by notice in writing to that effect, require the Contractor not to execute the portion of the work specified in the notice, or may withdraw from the Contractor the portion of work, so specified, and the Contractor shall not be entitled to any compensation, by reason of such portion of work having been withdrawn from him. The Engineer-

in-charge may supplement the work by engaging another agency to execute such portion of the work at the cost of the original contractor, without prejudice to his rights under clause 2. He shall also be competent to levy compensation for delay in progress. The recovery of excess cost shall be made from next available running bill or any other claim and shall not be deferred.

Clause 33:

The Contract includes clearance, leveling and dressing of the site within a distance of 15 meters of the building on all sides except where the building adjoins another building.

Clause 34: Protect works

The Contractor shall arrange to protect, at his own cost, in an adequate manner, all cut stone work and other work, requiring protection and to maintain such protection, as long as work is in progress. He shall remove and replace this protection, as required by the Engineer-in-Charge, from time to time. Any damage to the work, so protected, no matter how it may be caused, shall be made good by the Contractor free of cost.

All templates, forms, moulds, centering, false works and models, which in the opinion of the Engineer-in-Charge, are necessary for the proper and workman like execution of the work, shall be provided by the Contractor free of cost.

Clause 35: Contractor liable for settlement of claims caused by his delays

If the progress of the work has fallen so much in arrears as to prevent other contractors on the work, from carrying out their part of the work within the stipulated time, he will be liable for the settlement of any claim, put in by any of these contractors for the expenses of keeping their labour unemployed, to the extent considered reasonable by the Engineer-in-Charge.

Clause 36A:

The liability, if any, on account of quarry fees, royalties, Octroi and any other taxes and duties in respect of materials actually consumed on public work, shall be borne by the Contractor.

Clause 36B:

The cost of all water connections, necessary for the execution of work, and the cost of water consumed and hire charges of meters and the cost of electricity consumed in connection with the execution of work, shall be paid by the Contractor, except where otherwise specifically indicated.

Clause 36C: Payment of Sales Tax, and any other Taxes

Royalty or other tax on materials, issued in the process of fulfilling contract, payable to the Government under rules in force, will be paid by the Contractor himself.

Clause 36D:

In respect of goods and materials procured by the Contractor, for use in works under the contract, sales tax will be paid by the Contractor himself. But in respect of all such goods manufactured and supplied by the Contractor and works executed under the contract, the responsibility of payment of sales tax would be that of the Engineer-in-charge.

Clause 36E:

If any rates of Tax are increased or decreased, a new tax is introduced in India only, an existing Tax is abolished, or any change in interpretation or application of any Tax resulting from a change or Introduction in India only due to any National or State Statute, Ordinance, Decree or other law or any regulation or bye-law of any local or other duly constituted authority in India only, in the course of performance of contract, which was or will be assessed on the Contractor, in connection with the performance of the Contract, an equitable adjustment of the Contract price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be.

However, these adjustments would be restricted to direct transactions between the Owner and Contractor only those items which are included in bid. Further, no adjustment of the Contract Price shall be made on account of variation in deemed export benefits, if any. Any increase or decrease which is included in price variation formula incorporated in the contract shall not be accounted for this purpose. Such increase including GST shall not be made in the extended period of contract for which the contractor alone is responsible for delay as determined by authority for extension of time."

Clause 37: Refund of Security Deposit

The Security Deposit will be refunded after the expiry of the period, as prescribed below: -

- (a) In case of contracts relating to hiring of trucks and other T&P, transportation including loading, unloading of materials, the amount of Security Deposit is refundable along with the final bill.
- (b) Supplies of material: As per provisions of G.F. & A.R.

- (c) Ordinary repairs: 3 months after completion of the work provided the final bill has been paid.
- (d) Original works/special repairs/renewal works: Six months after completion except in case of works, such as building works, bridge works, cross drainage works, Dams, Canals, water supply and sewerage schemes (except where provided otherwise in any specified case) etc., the Security Deposit will be refunded 6 months after completion, or expiry of one full rainy season or after expiry of defect liability period, whichever is later, provided the final bill has been paid.

Clause 38: Fair Wage Clause

- (a) The Contractor shall pay not less than fair wages/minimum wages to laboures engaged by him on the work as revised from time to time by the Government, but the Government shall not be liable to pay any thing extra for it except as stipulated in price escalation clause (clause 45) of the agreement.
Explanation: "Fair Wage" means minimum wages for time or piece work, fixed or revised, by the State Government under Minimum Wages Act, 1948.
- (b) The Contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wages to labourers indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work as if the labourers have been immediately or directly employed by him.
- (c) In respect of all labourers immediately or directly employed on the work, for the purpose of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with the Public Works Department Contract's Labour Regulations made, or that may be made by the Government, from time to time, in regard to payment of wages, wages period, deductions from wages, recovery of wages not paid, and unauthorized deductions, maintenance of wages register, wage card, publication or scale of wages and other terms of employment, inspection and submission of periodical returns and other matters of a like nature.
- (d) The Engineer-in-charge shall have right to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers, by reasons of non-fulfillment of the conditions of the contract, for the benefit of the worker or workers, non-payment of wages or of deductions made there from, which are not justified by the terms of the contract, or as a result of non-observance of the aforesaid regulations.
- (e) Vis-a-Vis the Government of Rajasthan, the Contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub-contractors.
- (f) The regulations, aforesaid, shall be deemed to be part of this contract and any breach, thereof, shall be deemed to be breach of the Contract.

Clause 39: Contractor to engage technical staff

The Contractor shall engage the technical staff, as follows, on the contract works:

- (a) For works costing Rs. 100 Lac and above – One Graduate Engineer
- (b) For works costing between Rs. 50 Lac to Rs. 100 Lac - One qualified diploma holder having experience of not less than 2 years.
- (c) For works costing between Rs. 15 Lac and Rs. 50 Lac - One qualified diploma holder

The technical staff should be available at site, whenever required by Engineer-in-charge to take instructions.

Clause 39 A:

The Contractor shall comply with the provisions of the Apprenticeship Act, 1961, and the Rules and Orders issued, there under, from time to time. If he fails to do so, his failure will be a breach of contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

Clause 40: Safety code

The Contractor shall follow the safety code (s) of the department and as specified in special conditions of contract.

Clause 41: Near Relatives barred from tendering

The Contractor shall not be permitted to tender for works in Circle, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Superintending Engineer and Assistant Engineer (both inclusive). He shall also intimate the names of persons, who are working with him in any capacity, or are subsequently employed by him and who are near relatives to any gazetted officer in the

Organization/Department. Any breach of this condition by the Contractor would render him liable to be removed from the approved list of contractors of the Department. If such facts is noticed (a) before sanction of tender, his offer shall be declared invalid and earnest money shall be forfeited, (b) after sanction of the tender then the tender sanctioning authority may at his discretion forfeit his earnest money, security deposit and enlistment deposit and work/remaining work may allot to any registered contractor on the same rates as per rules.

Note: By the term "near relative" is meant wife, husband, parents, and grandparents, children and grand children, brothers and sisters, uncles and cousins and their corresponding in-laws.

Clause 42: Retired Gazetted Officers barred for 2 years

No Engineer of Gazetted rank or other Gazetted officer, employed in Engineering or Administrative duties in an Engineering Department of the Government of Rajasthan, is allowed to work as a Contractor for a period of 2 years of his retirement from Government service without the previous permission of Government of Rajasthan. This contract is liable to be cancelled, if either the Contractor or any of his employee is found, at any time, to be such a person, who had not obtained the permission of Government, as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

Clause 43: Quality Control

The Government shall have right to exercise proper Quality Control measures. The Contractor shall provide all assistance to conduct such tests.

Clause 43 A:

The work (whether fully constructed or not) and all materials, machines, tools and plant, scaffolding, temporary buildings and other things connected therewith, shall be at the risk of the contractor until the work has been delivered to the Engineer-in-charge, and a certificate from him, to the effect, obtained.

Clause 44: Death of Contractor

Without prejudice to any of the rights or remedies under the contractor, if the Contractor dies, the legal heirs of the Contractor or the Chief Engineer or duly authorised Engineer shall have the option of terminating the contract without any compensation.

Clause 45: Price Variation Clause (DELETED as NOT APPLICABLE)

Clause 45A: Price Variation in installation of elevators, supply/installation of Central Air Conditioning and Central Evaporating Cooling Works (DELETED as NOT APPLICABLE)

Clause 46: Force-Measure

Neither party shall be liable to each other, for any loss or damage, occasioned by or arising out of acts of God such as unprecedented floods, volcanic eruptions, earthquake or other invasion of nature and other acts.

Clause 47: General Discrepancies and Errors

In case of percentage rate tenders, if there is any typographical or clerical error in the rates shown by Department in the "G" Schedule, the rates as given in the Basic Schedule of Rates of the Department for the area shall be taken as correct.

Clause 48: Post payment Audit & Technical Examination

The Government shall have right to cause an audit and technical examination of the works, and the final bills of the contractor, including all supporting vouchers, abstracts, etc., to be made within 2 years after payment of the final bill, and if, as a result of such audit and technical examination, any sum is found to have been over paid in respect of any work done by the Contractor under the contract, or any work claimed by him to have been done by him under the Contract and found not to have been executed or executed below specifications, the Contractor shall be liable to refund the amount of over payment, and it shall be lawful for Department to recover the same from him in the manner prescribed in Clause 50 or in any other manner legally permissible, and if it is found that the Contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under-payment shall be duly paid by the Government to the Contractor.

Clause 48A: Pre Check or Post Check of Bills

The Government shall have right to provide a system of pre-check of Contractor's bill by a specified Organization, and payment by an Engineer or an Accounts Officer/sr. Accounts Officer/ chief Accounts Officer/ financial Advisor, as the Government may in its absolute discretion prescribe. Any over-payments excess payments detected, as a result of such pre-check or post-check of Contractor's bills, can be recovered from the Contractor's bills, in the manner, herein before provided, and the Contractor will refund such over/excess payments.

Clause 48B: Check Measurements

The department reserves to itself, the right to prescribe a scale of check measurement of work, in general, or specific scale for specific works, or by other special orders (about which the decision of the department shall be final). Checking of measurement by superior officer shall supersede measurements by the subordinate officer, and the former will become the basis of the payment. Any over/excess payments detected, as a result of such check measurement or otherwise at any stage up to the date of completion and the defect removal period specified elsewhere in this contract, shall be recoverable from the Contractor, as any other dues payable to the Government.

Clause 49: Dismantled materials

The Contractor, in course of the work, should understand that all materials e.g. stone, bricks, steel and other materials obtainable in the work by dismantling etc. will be considered as the property of the Government and will be disposed off to the best advantage of the Government, as per directions, of the Engineer-in-charge.

Clause 50: Recovery from Contractors

Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the contract, the Department shall be entitled to recover such sum by appropriating, in part or whole of the Security Deposit, Security Deposit at the time of enlistment of the Contractor. In the event of the security being insufficient, or if no security has been taken, then the balance or the total sum recoverable, as the case may be, shall be deducted from any sum, then due or which at any time, thereafter, may become due to the Contractor, under this or any other contract with the Governor of Rajasthan. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Department on demand the balance remaining dues.

The department shall, further, have the right to effect such recoveries under Public Demand Recovery Act.

Clause 51: Jurisdiction of Court

In the event of any dispute arising between the parties hereto, in respect of any of the matters comprised in this agreement, the same shall be settled by a competent Court having jurisdiction over the place, where agreement is executed and by no other court, after completion of proceedings under Clause 23 of this Contract.

Note: The standard format as given above is as per PWF&AR and the provisions of the special condition shall over rule the provisions of these general conditions of the contract

**Schedule of Materials to be Supplied by the Department, if available
(Referred to in clause 10)**

S. No	Particulars	Quantity, meters	Rates		Place of Delivery
			Unit	Rupees	

Schedule of Machinery/T&P to be supplied by the Department

The following Machinery/T&P shall be supplied by the Department, if available, to the Contractor, on hire as per "Rules of the Department for supply for machinery and T&P to the Contractor on hire"

(Referred in Clause 10 C)

S. No.	Item	Rate	Place of Delivery and Return

--	--	--	--

Progress Statement referred to in Clause 2 of Conditions of Contract

Name of Work	Date from which the work should be commenced	Date by which the work should be completed	Monthly rate of Progress
1	2	3	4

The contractor has been informed that his tender has been accepted

Dated Signature of Engineer- in -charge

Dated signature of Contractor

Notes:- For Filling in the Progress Statement Form

- Columns 2,3, and 4 must be initialled and dated by the Contractor
- Column 4 must be initialled and dated by the Chief Engineer or other duly authorised Engineer also.
- The date in column 2 should correspond to the date on which the order to commence work is given to the contractor read with Clause 2 of the conditions of contract.
- The date in column 3 must correspond to the period stated in Sub clause(e) of the Memorandum below "Tender for works".
- Column 4. This will ordinarily be worked out proportionately; thus if Rs. 24,000/- is the cost of the whole or portion of work tendered for, and six months period of completion, then the monthly rate of progress should be Rs. 4,000. If necessary, quantities may also be specified in this column at the discretion of the Chief Engineer.
- The Certificate as to intimation of acceptance of tender printed at the foot of the form, must be signed and dated both by the Chief Engineer or other duly authorised Engineer and the Contractor.

ANNEXURE TO APPENDIX XI

RAJASTHAN PUBLIC WORKS DEPARTMENT CONTRACTORS LABOUR REGULATIONS

1.Short Title: These regulations may be called "The Rajasthan public Works Department Contractors- Labour Regulations."

2.Definition : In these regulations unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say :-

- (i) **"Labour"** means workers employed by a Rajasthan P.W. Department contractors directly or indirectly through a sub contractor or other person by an agent on his behalf
- (ii) **"Fair Wage"** means minimum wages for time or piece work fixed or revised by the state Government under the minimum wages Act 1948.
- (iii) **"Contractor"** shall include every person whether sub-Contractor or headman or Agent employing labour on the work taken on Contract.
- (iv) **"Wages"** shall have the the same meaning as defined in the payment of Wages Act and includes time and price rate wages.

3.Display of Notice regarding wages etc. : The contractor shall (a) before he commences his work on contract, display and in conspicuous places on the work notices in English and the correctly maintain in Hindi by the majority of the workers giving the rate of wages which have been certified by the Executive Engineer, Superintending Engineer, the Chief Engineer or Labour Commissioner, as fair wages and the hours of works for which such wages are earned, and (b) send a copy of such notices to the Certifying Officers.

4. Payment of Wages :

- (i) Wages due to every worker shall be paid to him direct.
- (ii) All wages shall be paid in current coin or currency or in born.

5. Fixation of wage periods :

- (i) The contractor shall fix the wage periods in respect of which the wages shall be payable.
- (ii) No wage period shall exceed one month.
- (iii) Wages of every workman employed on the contract shall be paid before the expiry of ten days the last day of the wage period in respect of which the wages are payable.
- (iv) When the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.
- (v) All payments of the wages shall be made on a working day except when the work is completed before the expiry of the wage period, in which case, final payments shall be made within 48 hours of the last working day.

Note : The term "working day" means a day on which the labour is employed in progress.

6. Wage Book and Wage Slips etc.

- (i) The Contractor shall maintain a Wage Book of each worker in such form as may be convenient but the same shall include the following particulars :-
 - (a) Rate of daily or monthly wages.
 - (b) Nature of work on which employed.
 - (c) Total number of days during wage period
 - (d) Total amount payable for the work during each wage period
 - (e) All deductions made from the wages with an indication in each case of the ground for which the deduction is made.
 - (f) Wages actually paid for each wage period.
- (ii) The contractor shall also maintain a wage slip for each worker employed on the work.
- (iii) The Executive Engineer may grant an exemption from the maintenance of the wage books and wageslips to a contractor who, in his opinion, may not directly or indirectly employ more than 50 persons on the work.

Fines and deductions which may be made from wages:

- (i) The wages of a worker shall be paid to him without any deductions of any kind except those authorised, namely the following
 - (a) Fines.
 - (b) Deductions for absence from duty i.e. from the place or places where, by the terms of his employment, he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
 - (c) Deductions for damages to or loss of goods expressly entrusted to the employed person for custody or for loss or any other deductions of money, which he is required to account where such damages or losses are directly attributable to his neglect or default.

- (i-a) The Rajasthan Government may, from time to time, allow deductions other than those specified in clause I above.
 - (ii) No fines shall be imposed on a worker and no deductions for damage or loss shall be made until worker has been given an opportunity of showing cause against each fine or deductions.
 - (iii) The total amount of fines, which may be imposed in any one wage period on a worker, shall not exceed an amount equal to three paise in rupee of the wage payable to him in respect of that wage period.
 - (iv) No fine imposed on any worker shall be recovered from him by installments or after the expiry of 60 days from the date on which it was imposed.
8. **Register of fines etc.** : The contractor shall maintain a register of fines and of all deductions for damage or loss. Such register shall mention the reasons for which fine was imposed or deduction for damage or loss was made.
The contractor shall maintain both in English and local Indian Language, a list approved by the Labour, Commissioner clearly stating the acts and omission for which penalty of fine may be imposed on a workman and display it in a good condition in conspicuous place on the work.
9. **Preservation of Register** : The wage register, the wage card and the register fines deductions required to be maintained under these regulations, shall be preserved for 6 months after the date of the 1st entry made in them.
10. **Powers of Labour Welfare Officer to make investigation of enquiry** : The Labour Welfare Officer or any other person, authorized by the State Government on their behalf, shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and provisions of the regulations. He shall investigate into any complaint regarding default made by the Contractor or Sub-Contractor in regard to such provisions.
11. **Report of Labour Welfare Officer** : The Labour Welfare Officer or other person, authorized as aforesaid, shall submit report of the result of his investigation or enquiry to the Executive Engineer concerned indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractors bill be made and the wage and other dues be paid to the labour concerned in case an appeal is made by contractor under clause 12 of these regulations, actual payment to Labours will be made by the Executive Engineer after the Labour Commissioner had given decision on such appeal.
12. **Appeal against the decision of Labour Welfare Officers** : Any person aggrieved by the decision and recommendation of the Labour Welfare Officer or other persons, so authorised, may appeal against. Such decision to the Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to Executive Engineer concerned but subject to such appeal the decision of the Officer shall be final and binding upon the contractor.
- 12-A. No party shall be allowed to be represented by a lawyer during any investigation, enquiry, appeal or any other proceedings.
13. **Inspection of Wage Books and Slips** : The contractor shall allow inspection of the wage books and wage slips and register of fines and deductions to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Welfare Officer or any other person authorised by the State Government on his behalf.
14. **Submission of Returns** : The Contractor shall submit periodical returns, as may be specified from time to time.
15. **Amendments** : The State Government may, from time to time, add to or amend these regulations and on any questions as to the application, interpretation effect of these regulations, the decision of the Labour Commissioner to the Government of Rajasthan or any other person authorised by the State Government in that behalf, shall be final.

**SCHEDULE OF FAIR WAGE TO BE GIVEN BY EXECUTIVE ENGINEER
LIST OF ACTS AND COMMISSION FOR WHICH FINE CAN BE IMPOSED**

(1) Willful insubordination or disobedience whether alone or in combination with another. (2) The fraud or dishonesty in connection with the contractors business of property of the Rajasthan P.W.D. (3) Taking or giving bribes or any illegal gratification. (4) Habitual late attendance. (5) Drunkenness, fighting riot or disorderly or indecent behaviour. (6) Habitual negligence. (7) Smoking near or around the area where combustible or other materials are stocked. (8) habitual indiscipline. (9) Causing damage work in progress or to property of the Rajasthan P.W.D. or the contractor. (10) Sleeping on duty. (11) Malingering or slowing down work. (12) Giving of false information regarding name, age, father's name. (13) Habitual loss of wage cards supplied by the employers. (14) Unauthorised use of employer's property or manufacturing or making of unauthorised articles at the work places. (15) Bad workmanship in construction and maintenance by skilled workers which is not approved by the department and for which contractors are compelled to undertake rectification. (16) Making false complaints and/or misleading statement. (17) Engaging, in trade within the premises of the establishment. (18) Any delinquency of business affairs of the employers. (19) Collection or canvassing for the collection of an money within the premises of an establishment unless authorised by the employer. (20) Holding meeting inside the premises without previous sanction of the employer. (21) Threatening or intimidating any workman or employee during the working hours within the premises.

**Schedule showing (approximately) materials to be supplied from the Public Works
Store for work contracted to be executed and the rates of which they are to be charged for**

Particulars	Rates which the materials will be charged to the contractor			Place of delivery
	Unit	Rs.	NP.	
Doors, with Chowkhats				
----- do -----				
----- do -----				
Windows with chowkhats				
----- do -----				
----- do -----				
Steel Shapes				
----- do -----				
----- do -----				
Bars Mild Steel				
Sheets Plain, G.I				
----- do ----- Corrugated G.I. etting,				
Wire				
Belts Tower				
----- do -----				
Locks, Mortice				
----- do ----- Rim				
Hinges, Butt				
----- do -----				
Hinges, Spring				
Cement, Portland				

Note : The person or firm submitting the tender should see that the rates in the above schedule are filled up by the Engineer-in-charge on the issue of the form prior to the submission to the tender.

(Signature of Contractor)

(Signature of Engineer)

Progress Statement referred to in Clause 3 of Conditions of Contract

Name of Works	Date from which the work should be commenced	Date by which the work should be completed	Monthly rate of progress
1	2	3	4

The contractor has been informed that his tender has been accepted.

Date:
Engineer-in-charge

Date
Contractor

**NOTES FOR FILLING IN THE PROGRESS STATEMENT FORM
ON THE LAST PAGE**

1. Columns 2,3 and 4 must be initialed and dated by the contractor.
2. Column 4 must be initialed and dated by the Chief Engineer or other duly authorised Engineer also.
3. The date in column 2 should correspond to the date on which the order to commence work is given to the contractor, specified in line 3, clause 2, page 3 of the "condition of contract".
4. The date in column 3 must correspond to the period stated in clause (f) page 2 of the tender.
5. Column 4. This will ordinarily be worked out proportionately; thus if Rs. 24,000/- is the cost of the whole or portion of work tendered for, and six months period of completion, then the monthly rate of progress should be Rs. 4,000/- . If necessary quantities may also be specified in this column at the discretion of the Chief Engineer.
6. The certificate as to intimation acceptance of tender printed at the foot of the form, must be signed and dated both by the Chief Engineer or other duly authorised Engineer and the contractor.

STATEMENT OF PAYMENTS & RECOVERIES TO BE ATTACHED WITH THE AGREEMENT OF WORKS

S.No. of bill	Gross Amt. of bill	Progressive Total Amt. of Bills	Recoveries									Net Amount of payment	C.B. Vr. No. & date	Dated initials of	
			Materials T&P	Quantity Hours	Amount	S.D.	Income tax deduction	Sales Tax	Royalty	Other Recoveries	Total Recoveries			D.A.O.	EE
1	2	3	4(a)	4(b)	4(c)	4(d)	4(e)	4(f)	4(g)	4(h)	4(i)	5	6	7	8

SPECIAL CONDITIONS OF CONTRACT

1.0 DEFINITIONS

"Department" means the Public Health Engineering Department of the Government of Rajasthan. It is the Executing Agency of the Project.

"Engineer In Charge" If otherwise not specified in the work order or specially declared, Executive Engineer PHED Division of area shall be Engineer in charge.

"Additional Chief Engineer" means Additional Chief Engineer PHED Region II Jaipur.

"Materials" means things of all kinds (other than equipment) intended to form or forming part of the permanent works, including the supply of materials to be supplied by the contractor under the contract.

"Equipment" means the apparatus, machinery, articles and things of all kinds to be provided under the contract or intended to form or forming part of the permanent works.

"Contractor's Documents" means the calculations, computer programs and other software, drawings, manuals, models and other documents of the technical nature supplied by the contractor under the contract; as described in sub clause 9.2 [Contractors Documents].

"Specifications" means the specifications according to which the works are to be executed as referred to in the agreement documents and any other specifications agreed thereon.

"Contract Price" means the sum quoted in the tender subject to such additions thereto or deduction there from as may be made under the provisions contained in the Contract.

"Capital works cost" means the contract price without the cost of O & M.

2.0 COMMUNICATION BETWEEN THE PHED AND THE CONTRACTOR

Addresses for notices

Notices with legal and contractual issues shall be addressed to the **"Additional Chief Engineer PHED Region II Jaipur or any changed address"**. Notices with technical issues shall be addressed to the respective Engineer(s) in Charge and copy to **"Additional Chief Engineer PHED Region II Jaipur"**

Any notice given by the Contractor to the **Additional Chief Engineer** or the Engineer in Charge under the terms of the Contract shall be sent by post, courier, cable, telex, or fax to or left at the office of the **Additional Chief Engineer** or the Engineer in Charge only or the addresses as he shall be indicated for this purpose only.

All certificates, notices or instructions to be given to the Contractor by the **Additional Chief Engineer** or the **Engineer in Charge** under the terms of the Contract shall be sent by post, courier, cable, telex, or fax to or left at the Contractor's principal address or the address as the Contractor shall indicate for this purpose only.

It shall be essential for the contractor to obtain a receipt of authorized officer otherwise the notice shall be treated as "null & void".

3.0 CONTRACT

3.1 Type of Contract

The works described in this tender document is considered to be a implementation, testing and commissioning of the work as described in the Bid documents.

3.2 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:

- Letter of award
- Special Conditions of Contract (with annexure)
- General Conditions of Contract
- Instructions to Bidders
- Scope of Work and Technical specifications
- Drawings

➤ Schedule of prices

The addenda issued in the tender document in relevant above sections shall be read with the respective sections while giving priority.

4.0 AUTHORITIES

Additional Chief Engineer, Engineer in Charge, Representatives

The Additional Chief Engineer PHED Region II Jaipur, shall implement the project. He shall appoint Engineer(s) in Charge as Representatives who shall carry out such duties and exercise such authority, as may be delegated to them by government.

The Additional Chief Engineer may also authorize consultants or institutions as Assistants. Such Assistants shall have no authority to issue any instructions to the Contractor save in so far as they are necessary and to secure their acceptance of materials, Equipments and workmanship as being in accordance with the Contract. Any instructions given by them for those purposes shall be deemed to have been given by the Additional Chief Engineer or the Engineer's Representative.

5.0 MONTHLY REPORTS AND MEETINGS

5.1 MONTHLY REPORTS

Monthly progress reports shall be prepared by the Contractor and submitted to the Department in six copies. The first report shall cover the period up to the end of the first calendar month following the commencement date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the month to which it relates.

Reporting shall continue until the contractor has completed all work, which is known to be outstanding at the completion date as stated in Clause 11.2 of these conditions.

Each Report shall include the following but shall not be limited to:

- Charts and detailed descriptions of progress, including each stage of design Contractor's Document, procurement, manufacturing, delivery to site of construction, direction, testing, commissioning and the trial operation and various others related with O & M.
- Photographs/Digital Photograph in soft and hard copy, showing the status of manufacture and of progress on the site.
- for the manufacture of each main item of equipment and materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
 - Commencement of manufacturing,
 - Contractor inspections,
 - Tests and
 - Shipment and arrival at the site;
- Copies of quality assurance documents, test results and certificates of materials;
- Comparisons of actual and planned progress, with the details of any events or circumstances which may jeopardize the completion in accordance with the contract, and the measures being (or to be) adopted to overcome delays.

5.2 MONTHLY MEETINGS

Monthly meeting shall be held in the office of the Additional Chief Engineer or at other places as mutually fixed in advance. The proposed agenda for the meetings shall be exchanged at least 1 week in advance. It is required that a decision-maker of the Contractor is present at the meetings so that binding decisions can be taken about outstanding issues. Generally, the following issues shall be discussed:

- Progress of the work, difficulties
- Revision of time schedule
- Payment issues
- Disputes
- Claims

5.3 FORTNIGHTLY MEETING

A fortnightly meeting shall be arranged between Engineer in charge and the Manager of the Contractor at the field office to solve the local site problems expeditiously.

6.0 RIGHT OF ACCESS TO THE SITE DURING EXECUTION

The Department shall give the contractor right of access to all parts of the site. The site for execution of the work will be made available as soon as the work is awarded. In case, it is not possible for the Department to make the entire site available on the award of the work, the Bidder shall arrange his working program accordingly. No claim, whatsoever, for not giving the site in full on award of the work or for giving the site gradually in parts will be tenable.

However, if and to the extent that the Department's failure was caused by any error or delay by the contractor, including an error in, or delay in the submission of, any of the contractor's documents, the contractor shall not be entitled to such extension of time.

7.0 THE CONTRACTOR

7.1 CONTRACTOR'S GENERAL OBLIGATIONS

The Contractor shall design the system, execute and complete the works in accordance with the contract, and shall remedy any defects in the works.

The contractor is also required to confirm the availability of the material required for the contract in the time schedule given herein after, so as to complete the job within the prescribed time. No time extension shall be provided on this account. If required under such circumstances, the contractor after prior approval of department shall be allowed to use superior type of material so as to complete the job within the prescribed time. No additional payments shall be made on account of use of superior quality material, on this account.

The Contractor shall provide the equipment and Contractor's Documents specified in the contract, and all Contractor's personnel, goods, consumables and other things and services, whether of a temporarily or permanent nature, required in and for this design, execution, completion and remedying of defects in defect liability period of **12 months**

The works shall include any work which is necessary to satisfy the Department's requirements, or is implied by the contract, and all works which (although not mentioned in the contract) are necessary for the completion, or safe and proper operation, of the works.

The Contractor shall be responsible for the adequacy, stability and the safety of all site operations, of all methods of construction and of all the works.

The Contractor shall provide all facilities required for quality control tests, tests for material and equipment(s), and/or all other facilities otherwise referred in the conditions of contract(s) and/or otherwise necessary to complete the works with due supervision of Engineer-in-charge. The testing of material, quality control tests etc. may be got done through recognized labs after approval of EIC.

The Contractor shall, whenever required by the Department, submit details of the arrangements and methods, which the contractor proposes to adopt for execution of the works. No significant alteration to the arrangements and methods shall be made without this having previously been notified to the Department.

7.2 CONTRACTOR'S REPRESENTATIVE

The contractor shall appoint the Contractor's Representative and shall give them all authority necessary to act on the contractor's behalf under the contract.

Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Department for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked, or if the appointed person fails to act as the Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Department, revoke the appointment of the Contractor's Representative or appoint a replacement.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions.

The Contractor's Representative may delegate any powers, functions and authority to any person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Department has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

7.3 SETTING OUT

The contractor shall set out the works in relation to original points, lines and levels of reference specified in the contract. The contractor shall be responsible for the correct positioning of all parts of the works, and shall rectify any error in the positions, levels, the dimensions or alignment of the works.

7.4 THE SAFETY PROCEDURES

The contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all person's entitled to be on the site,
- (c) choose reasonable efforts to keep the site and work clear of unnecessary obstruction so as to avoid danger to these persons,
- (e) Provide any temporary works (including road ways, foot ways, guards and fences) which may be necessary, because of the execution of works, for the use and protection of the public and of owners and occupy a server adjacent land.

7.5 QUALITY ASSURANCE

In addition to the provisions of clause 43 of General conditions of contract, the contractor shall institute a quality assurance system to demonstrate compliance with requirements of the contract. The system shall be in accordance with the details stated in the contract and the Vendor will be got approved from Additional Chief Engineer and Quality Assurance Program will be got approved from Additional Chief Engineer or authorized representative/EIC. The Departments shall be entitled to audit any aspect of the system.

Details of all procedures if adopted other than those laid down in the tender documents and compliance documents shall be submitted to the Department for information before each design and revocation stage is commenced. When any document of a typical nature is submitted to the Department, evidence of the prior approval by the contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the contractor of any of his duties, obligations or responsibilities under the contract.

7.6 SITE DATA

The contractor shall be responsible for verifying and interpreting all site data. The Department shall have no responsibility for the accuracy, sufficiency or completeness of such data.

7.7 UN-FORESEEABLE DIFFICULTIES:

- (a) the contractor shall be deemed to have obtained all necessary information as to risk, contingencies and other circumstances which may influence or affect the works;
- (b) by signing the contract, the contractor accept the total responsibility for having sustained all difficulties and costs of successfully completing the works: and
- (c) the contract price shall not be adjusted to take account of any unforeseen difficulties or costs.

7.8 RIGHTS OF WAY AND FACILITIES

The Contractor shall bear all costs and charges for special and/or temporary rights of Way, which he may require, including those for access to the site. The contractor shall also obtain, at risk and costs, any additional facilities outside the site which he may require further purposes of the works.

7.9 AVOIDANCE OF INTERFERENCE

The contractor shall not interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) in the access to and use and occupation of all roads and other land, irrespective of whether they are public or in the possession of the Department or others.

The contractor shall indemnify and hold the Department harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

7.10 SECURITY OF THE SITE

Unless otherwise stated in particular conditions the contractor shall be responsible for:

- (a) Keeping unauthorized person's off the site, offices, campus etc. within the scope of work and
- (b) Authorized person's shall be limited to the Contractor's personnel and the Department's personnel; and to any other personnel notified to the Contractor, by (or on behalf of) the Department, and
- (c) Providing adequate manpower for the security of the material brought to the site for which payment has been made to the contractor.

7.11 CONTRACTORS OPERATIONS ON-SITE

The Contractor shall confine his operations to the site, and to any additional areas, which may be obtained by the Contractor and agreed by the Department as working areas. The Contractor shall take all necessary precautions to keep Contractor's equipment and Contractor personnel within the site and these additional areas, and to keep them off adjacent land.

During the execution of the works, the Contractor shall keep the site free from all unnecessary obstruction, and shall store or dispose of any Contractor's equipment or surplus materials. The Contractor shall clear away and remove from the site any wreckage, rubbish and temporary works, which are no longer, required.

7.12 LAND FOR THE WORK AND FOR THE CONTRACTOR'S ESTABLISHMENT

The land or the land rights for the sites of the permanent work will be provided by PHED according to the progress of work.

For the purpose of constructing Contractor's yard, godown, site office, staff quarters, etc. the contractor may utilize the land and existing buildings / structures allocated to him by PHED after obtaining requisite permission from the Engineer in Charge. All expenses in connection with purchase or construction or maintenance or removal etc. of such items shall be borne by the Contractor.

PHED may allocate the land and buildings for use by the Contractor according to its possibilities only. If the land or buildings are not sufficient for the purposes of the Contractor's establishment, additional land or buildings will have to be procured/rented by the Contractor himself at his own cost and expenses as per his requirement.

Recovery of rent towards the use of building by contractor for office/store/residence provided by the department shall be done on fair rent assessment basis.

8.0 ORGANIZATION ON THE SITE

8.1 CONTRACTOR STAFF

The contractor shall employ for the execution of work only such persons as are skilled and experienced in all activities required for the completion of the works, from reconnaissance, design, execution and testing to commissioning. The Engineer in charge shall be at liberty to object to and require the contractor to remove from the work any person who in the opinion of EIC misconducts himself or is incompetent or negligent in the proper performance of his duties. Such person shall not again be employed without permission of the EIC

The contractor shall employ labour in sufficient number to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the contract.

8.2 SITE BOOKS

For the purpose of quick communication between the Engineer in Charge and the Contractor, site books shall be maintained at all sites, where work is being carried out, so as to be readily available. Any instructions or order which the Engineer in Charge may like to issue to the Contractor may be recorded by him in the site book and two copies thereof taken by him for his record. Reason of any hindrance or delay in the work shall also be entered in the site book. Format of Site book shall be as per Annexure B

9.0 SUBMISSION AND APPROVAL OF DOCUMENTS AND DRAWINGS

9.1 CONTRACTOR'S UNDERTAKING

The design, the Contractor's Documents, the execution and the completed works shall comply with the relevant standards, building, construction and environmental laws, law as applicable to the product being produced from the works, and other standards specified in the Volume II "Scope of Work & Technical Specifications" applicable to the works, or defined by the applicable laws.

All these laws shall, in respect of the works shall be, the laws prevailing at the time of letter of invitation. References in the contract to published standards shall be understood to the references to the edition applicable on the date of supply / execution as the case may be. Whenever there are contradictory provisions in applicable Indian Standards, the most stringent of the provisions shall apply unless specifically mentioned otherwise.

10.0 SUPPLY OF MATERIAL

All material required for the work, shall be provided by the Contractor himself. No material will be supplied by PHED.

All the material required for the work shall be provided by the contractor himself. Although the contractor is required to supply the material at his own cost but however department shall have powers to provide any material to the contractor even if its rates have been approved in favor of the contractor. The rates of material so supplied will be charged from the contractor at the store issue rates under these circumstances his approved rates will stand cancelled up to the extent of material provided by the department.

NOTE: -

1. The contractor will have to transport material in proper quantity and quality to the site of work at his own cost. The contractor shall arrange for safe custody of issued material at site at his own cost.
2. Cost of stores supplied by the department if damaged or issued in excess of requirement & not returned or missing shall be recovered twice the rates of the stores.
3. Every effort shall be made to supply the material as given but no responsibility for compensation shall be admissible for delay and non supply.
4. The contractor is required to hand over the departmental material including scrapped material to the representative of the department not lower than rank of Jen and would obtain the receipt. The receipt of other person shall not be accepted. The contractor should return the material or scrap material in the stores as desired by Site Engineer at his own cost.

Third part inspection (Pipes, Pumps) by an agency approved by the department shall be got done by the contractor at his own cost. Material shall be accepted only after satisfactory test reports of the agency are received.

10.1 TESTING

The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, labour, materials, and suitably qualified and experienced staff in relation to supply of material and are necessary to carry out the specified test efficiently. The Contractor shall agree, with the Department, the time and place for the specified testing of any equipment, materials and other parts of the works.

The Department may, vary the location or details of specified test, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested equipment, materials or other workmanship is not in accordance with the contract, that cost of carrying out this variation shall be borne by the contractor, notwithstanding other provisions of the contract.

The Contractor shall promptly forward to the Department duly certified reports of the tests. When the specified test has been passed, the Department shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect.

10.2 REJECTION

If as a result of an examination, inspection, measurement or testing, any equipment, materials, designs or workmanship is found to be defective or otherwise not in accordance with the contract, the Department may reject the equipment, materials, designs or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good that effect and ensure that the rejected items compliance with the contract.

If the rejection and re-testing, cause the Department to incur additional costs, the Contractor shall pay these costs to the Department.

10.3 SPECIFIED MAKES OF SOME EQUIPEMENTS

The equipment(s) used by the bidder for the project shall be one of the following makes given for each equipment in Annexure A to this section of the special conditions of the contract or equivalent / superior makes as approved by the tender approving authority.

All the material, equipment and land required for the storage purpose shall be arranged by the contractor at his own cost

11.0 COMPLETION OF THE WORK

11.1 TIME FOR COMPLETION

The whole of the Work, including mobilization, reconnaissance, design, manufacturing, transportation, construction, installation, testing, commissioning and trial runs, and demobilization has to be completed within a period of **9 Months** calculated from the commencement date, which is 10 days after the written order to commence the Work. The duration of the trial runs, tests and commissioning period is included in the completion period, defined in Clause 2 of General Conditions of Contract. Defect liability (including operation) period of 12 months shall commence as per clause 11.4 here below. The Contractor shall submit a detailed time schedule for all the activities to be completed under the Contract. This schedule shall be updated in each monthly meeting. However, this time schedule shall not bear any implications on the provisions of clause 2 of General Conditions of Contract.

11.2 SECTIONAL AND TOTAL PHYSICAL COMPLETION

The part of work or section thereof shall be treated as physically completed when the work or part of work or section thereof as envisaged in the Contract and essential as per site conditions, is complete and has been successfully tested sectionally or entirely under non-operation conditions to the satisfaction of the Engineer in Charge. He shall issue a Sectional Completion Certificate to the Contractor in which he shall certify the date on which the work, part of work, or section thereof has been physically completed to the satisfaction of the Engineer in Charge.

Certificate for Total Physical Completion shall be issued when all the works as envisaged in the contract and essential as per the site conditions are completed in all respect to the satisfaction of Additional Chief Engineer and the pipeline and all other ancillary units are sectionally tested successfully, test gaps are closed and interconnections/connectivity made as required.

The issuance of the Sectional Completion Certificate or Total Physical Completion does not releases the Contractor from his duties to maintain the work in the condition as on dates of at these sectional or total physical completion, until the end of the Defect Liability period.

11.3 COMPLETION OF WORK AND FULLY COMMISSIONING

Immediately after the physical completion, the work of testing and commissioning the entire system on pressure and flow conditions as per the procedure of test given in "Scope of Work & Technical Specifications", shall be taken up. Once the entire system has been successfully tested and commissioned as per the conditions of tests of commissioning referred in "Scope of Work & Technical Specifications", the trial run period shall commence. After successful completion of the trial run period of one month, and removal of all visible defects to the satisfaction of Engineer-in-Charge, the work shall be treated as "**Completed**".

Unless otherwise provided in the contract, after the successful completion of trial run, the 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 or clause 6 and 7 of General Conditions of Contract. From this date of certificate for "Completion of Work".

The date of certificate notifying "completion of work" will be used for the final payment as per clause 6 & 7 of General Condition of Contract. From this date of certificate "completion of work".

12.0 DEFECT LIABILITY

The defect liability period shall be 12 months from the date of issue of the certificate for completion of works. The contractor shall carry out the Operation and Maintenance of the scheme in defect liability period for which no separate payment shall be made. The Contractor shall be responsible for operation, maintenance and satisfactory performance of the work under all design & operation condition for the duration of the defects liability period.

In case of tube/Open wells, Defect Liability shall be 12 months, for submersible pump sets, piping, valves, meters, gauges, starter panel and its related electrical accessories. The Contractor shall be responsible for

satisfactory performance & maintenance of the system under all design and operation conditions for the duration of the defects liability period, except for damage due to unprecedented natural calamities.

Constructional defect such as defects due to premature use of materials, works not executed in accordance with the Contract, hidden faults in material and equipment not discovered during inspection and testing, fault in design, manufacturing, erection and in construction shall be pointed out by the EIC and shall have to be rectified by the contractor during this period. The cost for repair material, spare parts, transport, repairs, tests and repair staff shall have to be borne by the contractor.

The break downs other than defect of power supply are to be rectified by the contractor if rectification is not done within 48 Hours of notification to contractor the delay beyond 48 Hours shall attract compensation of Rs. 1500/- per day. If the Contractor fails to rectify the defect within a specified period after aforesaid notice, the Engineer in Charge may forfeit the security deposit or an amount thereof required for the rectification through a third party without prejudice to any other right the Department may have against the Contractor in respect of his failure to remedy such defects

In the case of delayed "Completion of Work" not caused by the Contractor, the defects liability period shall be extended accordingly but not more than five (5) years after the total physical completion of the entire Work, whichever is earlier.

13.0 DEFECT LIABILITY PERIOD IF USE AND OPERATION IS DONE BEFORE COMPLETION OF WORK

The Engineer in Charge shall be entitled to operate any section or sections after Total Physical Completion but before Completion of work and thereupon the Engineer-in-Charge shall issue a certificate in respect thereof to the Contractor. The Defect Liability period in such case shall start from the start of operation. The Defect Liability period in such circumstances would be obviously in excess of normal period of 12 months and shall be governed by clause above.

In this case the department at any appropriate time may ask the contractor, to perform the required test for "Completion of work" as per clause above during the Defect Liability period. If contractor fails to perform the tests for "Completion of work", he will be liable for action as per General Conditions of Contract.

14.0 OPERATION AND MAINTENANCE

Operation and maintenance period shall be 120 months. O&M period shall start after completion of defect liability period. O&M shall be carried out as per special terms and condition for O&M. The bidder is to quote only lump sum price for O&M for entire period of O&M. If the quotation of bidder for O&M is less than 10% of total quoted price, minimum quotation shall be assumed as 10% of total quoted price and difference shall be adjusted with capital part.

15.0 COST OF WATER & ELECTRICITY FOR TESTING

- 15.1** For all sectional testing(s) in the contract, the contractor shall bear all cost against the arrangement for such sectional testing(s), the contractor has to arrange the water at his own cost.
- 15.2** Water & Electricity required for Construction and testing shall be arranged by the contractor at his own cost. However water filled in RCC ESR, CWR & GLR shall be the property of Department.

16.0 DOCUMENTS REQUIRED FOR PAYMENT:

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

- ✓ Inspection reports/ test reports with acceptable results as per PHED or any other agency
- ✓ representing PHED.
- ✓ Any other such details/documents as may be reasonably specified by the Engineer-in-Charge from time to time during execution of the contract.
- ✓ Bill / Cash memo / challan of original manufacturer / dealer for the material supplied for casing pipe, GI pipe, pump sets, bulk meters, valves, cables & pressure gauge.
- ✓ Certificates, as prescribed, regarding payment of GST, duties etc. applicable on supplies made.

17.0 PAYMENT TERMS

Payment of material and equipment shall be done in stages as mentioned below and in "Schedule of Prices" of the bid document: (which ever is applicable as per major components of works mentioned in scope of work)

17.1 BREAK UP OF PAYMENT

17.1.1 FOR MATERIAL & EQUIPMENT REQUIRES INSTALATION

All materials and Equipment except pipe such as pipe appurtenances, pumps, motors, power cables, flow meters, valves, specials, actuators, electrical equipment, mechanical equipment, instrumentation equipment, etc. which are required to be supplied and installed under this contract shall be paid as per the following breakup, subjected to the deductions as per the general and special conditions of contract:

- (a) 70 % Payment

On receipt of material in good condition at site after all the required tests at the manufacturer premises, acceptance of the inspection report, other papers/warranties, required as per the conditions of contract.

- (b) 20 % Payment

After installation and erection of material at site

- (c) 10 % Payment

After successful pre-commissioning tests as per the provisions given in the volume II.

17.1.2 FOR MATERIAL & EQUIPMENT DOES NOT REQUIRE INSTALATION

All materials and Equipment except pipe such as pipe appurtenances, pumps, motors, power cables, flow meters, valves, specials, actuators, electrical equipment, mechanical equipment, instrumentation equipment, etc. which are required to be supplied and installed under this contract shall be paid as per the following breakup, subjected to the deductions as per the general and special conditions of contract:

- (d) 100 % Payment

On receipt of material in good condition at site after all the required tests at the manufacturer premises, acceptance of the inspection report, other papers/warranties, required as per the conditions of contract.

17.1.3 FOR PIPELINE WORK

For Pipes which are required to be supplied and laid under this contract shall be paid as per the following breakup, subjected to the deductions as per the general and special conditions of contract.

- (a) 60% On receipt of pipes and specials in good condition at site, after conducting all the required tests at the manufacturer premises, acceptance of the inspection and testing reports, other papers/warranties, required as per the conditions of contract.
- (b) 20% of the quoted price on prorata progress, after excavation and laying and jointing of pipes in trench with specials, but gap between laying & sectional testing shall not be more than 5 Km for each type & size of pipe.
- (c) 10% of the quoted price on prorata progress, after sectional testing, refilling of trench & site clearance of the pipeline.
- (d) 10% of the quoted price on prorata progress, after complete commissioning, final site clearance.

There has to be a continuous chain of work to ensure that pipes provided are laid promptly and those laid are sectionally tested in the field without any delay. The difference between providing and laying shall not be more than 2500 m.

17.1.4 FOR CONSTRUCTION OF CIVIL WORKS AND OTHER WORKS.

The payment to contractor shall be made for actual measured quantity of work completed as per specification. The contractor shall have to submit payment breakup of LS items of civil work and get it approved from Engineer in Charge.

17.1.5 FOR OPERATION AND MAINTENANCE.

The payment to contractor shall be made monthly (end of the month cycle) after successful completion of O&M for that month.

No payment shall be made to the Contractor for O&M during defects liability period.

The quoted/re-adjusted O&M price shall be paid to the Contractor in rest of O&M period in increasing trend in subsequent years, keeping yearly rate of increase as 5%

18.0 DEDUCTIONS

18.1 STATUTORY DEDUCTIONS

The Department is required to make statutory deductions at source from all running bills and final bill as in force through relevant statutes in force from time to time at the rates prescribed therein.

18.2 OTHER DEDUCTIONS

Any other deductions to recover any reduction in rates or any other Department's claims accrued as per the contract or in respect to any other liabilities arising, shall be deducted from subsequent interim payments or final payments or from the securities with the Department.

19.0 TAXES AND DUTIES

All taxes, duties, levies applicable by any act of the Government of India and/or State of Rajasthan and/or of the local bodies on the company or its personnel, during the period of work in progress shall be of the Contractor.

All goods manufactured / procured and supplied by the contractor and work executed under this contract, responsibility of payment of GST, octroi and any other tax and levies in force, responsibility of payment of all taxes, duties, levies shall be of the contractor

20.0 INSPECTION OF MATERIAL

The contractor shall supply the DI Pipe after getting it inspected before dispatch from the third party inspection agency nominated by Department. The cost of inspection shall be borne by the contractor

21.0 NONAPPLICABLE CLAUSES OF GENERAL CONDITIONS OF CONTRACT

The clauses of General conditions of contract bearing nos. 5A, 10C, 12, 12A, 24, 25, 30, 37(a), 37(b), 37(c), 37(d), 45, 45A & 47 and table for schedule of material to be supplied by the deptt. If available, (referred to in clause 10) of general conditions of contract shall not be applicable.

22.0 MAKES OF EQUIPMENT

The Equipment(s) used by the bidder for the contract shall be one of the makes given for each equipment mentioned below to this section of the special conditions of contract or duly approved by the Department.

The Deptt. reserves the right to reject the offer if the makes given in Tender Document are not accepted and alternative makes are offered. By signing his offer, the tenderer agrees to supply any one make given in the tender document and/or accepted by the Deptt. for the price quoted in Schedule of Prices.

23.0 MISCELLANEOUS RULES FOR THE EXECUTION OF WORKS:

No public edifices should be destroyed or injured in the execution of works neither without the full and free consent of the persons interested in it nor without the concurrence of the principle civil authority on the spot or under the orders of the Government.

All interruptions of large works-in-progress should be immediately reported to the Addl. Chief Engineer, the cause and the losses in the manufacture of materials must on their occurrence, be reported to the Superintending Engineer.

The Superintending Engineer may, if he deems it necessary, direct the Divisional Officer to suspend the commencement of progress of any work pending the orders of the Government. No payment shall be made for idle labour at any level, any where.

Safety code during execution should be followed as per provisions of relevant ISS and PWD Manual.

For the purpose of quick communication between the Engineer or his representative and the contractor or his agent, site books shall be maintained at all sites, where work is being carried out. These site books shall contain detailed progress of work done on daily basis and signed by the authorized site engineer of the Contractor. Any instructions or order which the Engineer or his representative may like to issue to the Contractor shall be recorded by him in the site book and two copies thereof taken by him for his record.

The contractor shall maintain at site daily records of progress with regard to the works carried out, labour engaged and construction equipment deployed. These will form the basis of periodic reports and returns as may be required by the Engineer and in the manner as directed by him.

The contractor shall, at his own cost, arrange to take periodic colour photographs to show the progress of work or interesting features thereof as per direction of the Engineer-in-charge. Restrictions to photography or security restrictions that may be applicable to any particular area, must be carefully & rigidly observed. The photographs shall be regularly taken as the work progresses and two copies of each of these photographs to an enlarged size of about 25 Cm x 15 Cm together with the negative, shall be supplied to the Engineer with every running bill and these shall become the property of the Department. Each photograph shall be suitably captioned with the date of the photograph, location and other relevant particulars. Further prints of the photographs shall not be kept by the Contractor or reproduced without written permission of the employer. The number of photographs as aforesaid for the complete work is not expected to exceed one hundred.

Till handing over of the site to the department upon completion of all works, the watch and ward shall be the responsibility of the Contractor.

24.0 TERMINATION

24.1 CONTRACTOR'S DEFAULT

The Department shall be entitled to terminate this Contract for the following reasons attributable to the contractor, unless arising as a result of a Force Majeure Event, or any cause related to the obligations of the Department.

- a) Failure to perform obligations under this Contract i.e. for not making the system functional for a continuous period of more than 3 days.
- b) Repudiation of this Contract by the Contractor or the evidencing of an intention by the Contractor not to be bound by the terms of this Contract.
- c) The Contractor is ordered to be wound up by a court or files a petition for voluntary winding up except for the purpose of amalgamation or reconstruction provided that such amalgamation or reconstruction does not adversely affect the ability of the amalgamated or reconstructed entity to perform its obligations under this Contract, the successor has assumed in writing unconditional responsibility for the performance of the Contractor's obligations and the technical, financial and operating capability of the successor is satisfactory to the Department.
- d) The Contractor abandons the operation of the Facility.

24.2 CONSEQUENCES OF TERMINATION BY DEPARTMENT

If the Department with reasonable grounds, terminates the contract the Secured Advances, and any other sums of the contractor with the Department, shall be forfeited and action shall be taken against him as per clause 3 of General Conditions of Contract, if deemed appropriate.

24.3 ADDITIONAL PERFORMANCE SECURITY (APS)

A Bid is to be considered "Abnormally Low" if the total bid price and/or amount of a particular item quoted by the bidder is less than 85 % of the estimated cost of bid/ particular item. In Such cases, the contractors all have to deposit "Additional Performance Security (APS)" as described below:

- i. The following method will be adopted to assess the amount of APS against a abnormally low bid:
 - (i) Items taken in the BOQ having estimated cost of Rs. 10.00 Lakhs or more will be analysed individually and those items, for which the amount quoted by the bidder is less than 85% of the estimated cost shall be selected and total cumulative difference is to be calculated between 85% of estimated cost and quoted amount of the selected items. The APS will be 50% of the cumulative difference calculated as above.
 - (ii) Also, the difference between total bid amount quoted and total amount based on

estimated rates will be calculated. If "A" is the estimated amount of the work, then APS shall be equal to:-

$(0.85 A - \text{Bid amount quoted}) \times 0.50$

$[(\text{point eight five multiplied by "A" minus bid amount}) \text{ multiplied by point four}]$

- ii. The amount of APS to be deposited by the bidder shall be higher of 1(i) and 1(ii) calculated as above.
- iii. The APS shall be deposited in form of cash/ DD/ Bank Guarantee/ Govt Securities before signing the Contract Agreement. This will be refundable after satisfactory completion of entire work.

25.0 INDEMNIFICATION

The Contractor to indemnify the Department against the following:-

- a) The Contractor shall at its own expense make good any physical loss or damage to the Facility occasioned by it in the course of the performance of its obligations under this Contract if and to the extent such loss or damage is caused by the willful misconduct or failure to follow Good Engineering Practices of the Contractor, any sub-contractor or their respective agents or employees.
- b) The Contractor shall indemnify, defend and hold harmless the Department and its officers, employees, agents and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties and in respect of loss of or damage to any third party to the extent that the same arises out of:
 - i) Any breach by the Contractor of its obligations hereunder;
 - ii) Any negligent act or omission on the part of the Contractor, its subcontractors or their respective agents or employees; and
 - iii) Any willful misconduct or breach of statutory duty on the part of the Contractor, its subcontractors or their respective agents and employees.
 - iv) Any other event where such indemnification has been expressly mentioned in this Conditions of Contract for Operation and Maintenance.
- c) The Contractor shall indemnify, defend and hold harmless the Department and its, officers, employees, agents and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection therewith in respect of the death or injury to any person employed by the Contractor or its subcontractors in connection with the performance of the Contractor's obligations.

The Contractor shall indemnify the Department against all losses and claims in respect of:

- a) Death of or injury to any person, or,
- b) Loss of or damage to any property

**Additional Chief Engineer
PHED Region II Jaipur**

ANNEXURE – "A" (List of
SPECIFIED MAKES)



Office of the Chief Engineer(Technical) & Technical Member
Rajasthan Water Supply & Sewerage Management Board(PHED)
"JAL BHAWAN" 2-Civil Lines, Jacob Road, Jaipur-06
Phone 0141- 2222342 e-Mail:- rj_tm@nic.in

No.33/D&S /PHED/2021-22/()/ 3867-3904 Date: 13 / 01 /2022

Chief Engineer, PHED (Urban & NRW)/(R)/(SP)/(Admn.) Jaipur,
Chief Engineer, PHED (P) Jodhpur
Chief Engineer, PHED RRWS&FMP, GOGELAR PUMP HOUSE, NH-
89, PHED, Nagaur, (Rajasthan)
Additional Chief Engineer PHED, Region.....(All)

**Subject: - List of specified makes/acceptable makes of various items to be used in
Water Supply Projects/Schemes. (Up-dated Up-to 31.12.2021)**

A list of specified makes/acceptable makes of various items to be used in Water Supply Projects was circulated vide letter under reference by C E (Tech). The above list was subject to modification, as per subsequent addition /deletion of makes by Technical Committee.

Up-dated list of specified makes/acceptable makes has been prepared and enclosed herewith including the name of make of "M/S Indian Valve Private Limited" and "M/s AVK Valves India Pvt. Ltd" which was approved in 710th meeting of Technical Committee dated 01.11.2021. This up-dated list shall now be made part of tender documents of water supply projects/schemes of the department.

13/01/22
(Sandeep Sharma)
Chief Engineer (Tech.) & TM
RWSSMB, PHED, Jaipur

No.33/D&S /PHED/2021-22/()/ 3867-3904 Date: 13 / 01 /2022

Copy to following:-

- 1- SA to Hon'ble Minister, PHED Government of Rajasthan, Jaipur.
- 2- PS to Principal Secy. PHED, Jaipur.
- 3- FA & CAO, RWSSMB, Jaipur.
- 4- Secretary, RWSSMB, Jaipur.
- 5- Superintending Engineer , PHED Circle(All)

13/01/2022
Superintending Engineer (D &S)
PHED Jaipur

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

SN	PARTICULARS OF ITEMS/ EQUIPMENTS	SPECIFIED MAKES
<u>BREAKER & RELAY</u>		
1.	HIGH VOLTAGE DOUBLE BRAKE ISOLATOR WITH OR WITHOUT EARTH BRAKER	ATLAS / ABB / ELPRO / PRACTIL / SKIPPER SEIL
2.	VACUUM CIRCUIT BRAKER	ABB / BHEL / CGL / SCHNEIDER / JYOTI / STELMEC/ MEGAWIN/
3.	MOULDED CASE CIRCUIT BREAKER	SCHNEIDER / L&T/ C&S / SIEMENS / HAVELLS / ABB/BCH/MITSUBISHI/
4.	PROTECTION RELAYS	SCHNEIDER / ABB / SIEMENS / ER/ MEGAWIN/
5.	HRC FUSES	L&T / SIEMENS / ER / HAVELLS/MEGAWIN/
6.	CONTROL FUSES	SCHNEIDER / L&T / C&S / SIEMENS / HAVELLS
<u>CABLES & WIRES</u>		
7.	HT CABLE	CCI / UNISTAR / RPG / HAVELLS / KEI/ DYNAMIC CABLES/POLYCAB/PARAMOUNT/CMI/
8.	LT CABLE	CCI / INCAB / UNISTAR / RPG / NICCO / HAVELLS / KEI/ DYNAMIC CABLES/POLYCAB/VISHAL/ZENIUM/TEMPSSENS/ PARAMOUNT/AEW/ CMI/ RR KABEL/RCC
9.	CONTROL CABLE	CCI / UNIVERSAL / FINOLEX / GEMSCAB / RPG / KEI / CORDS/ DYNAMIC CABLES /POLYCAB/ ZENIUM/ TEMPSSENS/PARAMOUNT/AEW/ CMI/ RR KABEL/RCC
10.	PVC LIGHTING WIRES	FINOLEX / RPG / GEMSCAB / KEI/ POLYCAB/ ZENIUM/TEMPSSENS/ PARAMOUNT/AEW / RR KABEL/RCC
<u>CENTRIFUGAL PUMPS</u>		
11.	DEWATERING / POLDAR PUMP	KBL / Wilo M+P / KSB / SU/ MBH/WPIL/JASCO/ SINTECH/AQUA/DELITE
12.	BACK WASH PUMPS	KIRLOSKAR / Wilo M+P / JYOTI / WPIL
13.	DOSE METERING PUMPS	ASIALMI / SWELORE / VK/SR
14.	SLUDGE / NON-CLOG SEWAGE PUMP	KIRLOSKAR / Wilo M+P / JYOTI / MBH/WPIL/ JASCO/ SINTECH/ AQUA/CRI/DELITE
15.	VT PUMPS	FLOWMORE / Wilo M+P / KBL / WPIL / JYOTI / AQUA /SINTECH(Up-to 250KW)/CRI(up-to 150KW)/
16.	HSC PUMPS	FLOWMORE / Wilo M+P / KBL / WPIL / JYOTI / LUBI / MAXFLOW (UPTO 45KW) / GRUNDFOS / JASCO(up-to 50KW)/ SINTECH(up-to 250KW)/

G

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

		CRI(up-to 132 KW)/ ANDRITZ
17.	SUBMERSIBLE CENTRIFUGAL PUMP	AQUA/ MBH (UP-to 50KW)/WPIL(50KW TO 450KW) / JASCO(Up-to 50KW)/
<u>FLOW METERS</u>		
18.	ELECTROMAGNETIC FULL BORE TYPE FLOW METER	KROHNE MARSHALL / NIVO CONTROL / E&H / SIEMENS / RLT / SBEM / ABB/ ELECTRONET/ADEPT/AAROHI(up-to 300mm)/ MANAS(Up-to 400MM)
19.	ULTRA SONIC TYPE FLOW METER	E&H / KROHNE MARSHALL / SIEMENS / NIVO CONTROL / CHETAS / RLT/ARAD(up-to 300MM) / ELECTRONET(up-to 300MM)/ ADEPT(Insertion type and Clamp on Type)/
20.	MECHANICAL TURBINE TYPE FLOW METER	ITRON / CAPSTAN / NIVO CONTROL/ AQUAMET / RLT/ ARAD(up-to 300MM)/RAHUL(50MM up-to and including 150 MM), FEDEREL(50MM up-to and including 300MM)/ BELANTO(50MM up-to and including 300MM)
<u>MOTORS</u>		
21.	H.T. MOTORS	KIRLOSKER ELECTRIC CO. LTD. (KEC.) / SIEMENS INDIA LTD. (SIEMENS) / CROMPTON GREAVES LTD. (CROMPTON) / BHARAT HEAVY ELECTRICAL LTD. (BHEL) /GENERAL ELECTRIC CO. LTD. (GEC) /NGEF (NGEF) / JYOTI/JEUMONT(Up-to 600KW)/ WEG (Up-to 5MW)/TMEIC(Up-To 5MW),MARATHON
22.	L.T. MOTOR	KEC/SIEMENS / ABB/NGEF/JYOTI/ LUBI (Up-to 150KW)/HAVELLS(Up-TO 200 KW)/JSL (Up-to 55KW), LHP, MARATHON
23.	INDUCTION MOTOR	KEC/ NGEF/ CGL/ BHEL/ SIEMENS / BHARAT BIJLEE(up-to 200KW)/MARATHON
<u>PROCESS CONROL INSTRUMENTS</u>		
24.	ALTERNATOR	KEC / JYOTI / AVK / CROMPTON
25.	ANNUCIATOR	MASIBUS / LECTROTEK / APLAB / MINILEC / PEACON /
26.	CAPACITOR	L&T/ YASH/ KHATAU JANKAR / UNISTAR/EPCOS/
27.	INDICATING METERS	AE / IMP / RISHAB/ E&H/ MILLBORN
28.	LEVEL INDICATOR	FORBES MARSHAL / YOKO GAWA / BELLS CONTROLS/ SBEM / E&H / RLT/ TECHTROL/ V.AUTOMAT/
29.	LEVEL SENSORS (CAPACITANCE TYPE)	LEVCON / TOSHNIWAL / PUNE TECHTROL/ SBEM / E&H / RLT
30.	LEVEL SENSORS (ULTRA SONIC TYPE)	FISHER ROSE MOUNT / HONEY WELL / VEGA INSTRUMENT/ KROHNE MARSHALL / SIEMENS / SBEM / E&H / RLT/PEPPERL&FUCHS/
31.	LEVEL SWITCH	FISHER ROSE MOUNT / HONEY WELL / SIEMENS / VEGA INSTRUMENT / KROHNE MARSHALL/ SBEM/ E&H / RLT/TECHTROL/V.AUTOMAT/
32.	LEVEL TRANSMITTER	FISHER ROSE MOUNT / HONEY WELL / VEGA INSTRUMENT / KROHNE MARSHALL / SIEMENS / SBEM / E&H / RLT/ELECTRONET/ TECHTROL/

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

		V.AUTOMAT/FUJI
33.	MECHANICAL FLOW MIXER AND INDICATOR	SCHLUMBERGER (ACTRIES) / CAPSTAN
34.	METERING	AE / IMP / RISHAB/ E&H
35.	MULTI FUNCTION METERS	IMP/ SIEMENS / RISHAB / AE/MITSUBISHI
36.	NOISE METER	CYGNET
37.	PRESSURE GAUGE	BELLS CONTROLS/ JN MARSHAL / H GURU / MANOMETER INDIA/ WIKA
38.	PRESSURE INDICATOR	FISHER ROSE MOUNT/ BELLS CONTROLS / HONEYWELL / FOX BORO / E&H/ RLT
39.	PRESSURE LOGGERS	L&T / ABB / MASIBUS / LETROTEK
40.	PRESSURE TRANSMITER	FISHER ROSE MOUNT/ HONEY WELL / FOX BORO / BDO FORBES MARSHAL/ YOKO GAWA / SIEMENS/ E&H / RLT/ELECTRONET/FUJI/ WIKA
41.	RECTIFIER	CANARA ELECTRIC
<u>SWITCHGEAR & SWITCHGEAR PANELS</u>		
42.	33KV SWITCHYARD CONTROL PANEL	L&T / SIEMENS / SCHNEIDER
43.	HT SWITCH GEAR PANEL	SCHNEIDER / ABB / SIEMENS / L&T/ C&S / CGL/ HT SWITCHGEARS/ SWATI SWITCHGEARS/PCE/ MEGAWIN/
44.	LT SWITCH GEAR PANEL	SCHNEIDER / L&T / C&S / SIEMENS / HAVELLS/ DYNAMIC / GK MARKETING / DIVYA/ HT SWITCHGEARS/ SWATI SWITCHGEARS / ENGINEERS & ENGINEERS/ MILLBORN/ SUN AUTOMAT/ JOHNS ELECTRIC/NISH TECHNO PROJECTS/ICAM /PCE/PYROTECH/POWERTECH/ POPULAR/JSL/CORONET/RISHA/BCH/ENERLEC/VASU AUTOMATION/BECO/INDEXEL/ RHYTHM /SIA
45.	CONTACTORS	ABB / L&T / C&S / SIEMENS / BCH / HAVELLS / DIVYA/ MEGAWIN/MITSUBISHI
46.	TOR SWITCH	L&T / KAYEES / SCHNEIDER / SIEMENS / SALZER
<u>TRANSFORMERS</u>		
47.	33/6.6 KV POWER TRANSFORMER	ABB / CGL / ALSTOM / BHARAT BIJLEE / KIRLOSKAR / UTTAM (BHARAT) / VOLTAMP / VARDHMAN /ELECTRO – MECH /SKIPPER/FTS(5MVA 33/11KV)/SWASTIK(Up-to 5MVA)/INDIAN(up-to 5MVA)/ POWERLITE(up-to 5 MVA)/

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

48.	33 OR 6.6/ .433 KV AUXILIARY TRANSFORMER	ABB / CGL / ALSTOM / BHARAT- BIJLEE / KIRLOSKAR / UTTAM (BHARAT) / VOLTAMP / VARDHMAN /ELECTRO – MECH/ SKIPPER/FTS/ SWASTIK/INDIAN/MARSONS/UNITED/POWERLITE
49.	CURRENT TRANSFORMERS (CT)	ABB / BHEL / KAPPA / SKIPPER SEIL/JSL/ MEGAWIN/
50.	POTTENTIAL TRANSFORMERS (PT)	ABB/ BHEL/ KAPPA / SKIPPER SEIL/JSL/ MEGAWIN/
<u>VALVES</u>		
51.	AUTOMATIC FLOW CONTROL VALVE	DARLING MUESCO, VAG,KENNEDY/ T.I.S NUOVAL/R&D(Axial Flow Control Valve Plunger Type) /AIRA-SUZHUK/IVC (Plunger Type up-to 1600mm)/ AVK(Plunger Type and Diaphragm Type up-to 300mm)
52.	PRESSURE REDUCING VALVES	DARLING MUESCO, VAG,KENNEDY/ T.I.S NUOVAL / AIRA-SUZHUK/IVC (Diaphragm Type up-to 600mm)/AVK (Diaphragm Type up-to 400 mm)
53.	BUTTER FLY VALVE	KIRLOSKER BROTHER LTD / INDIAN VALVE COMPANY/ FOURESS ENGINEERING / ADVANCE / DURGA ENGG./ MAYUR/ R&D / DALUI / JUPITER (UPTO 1600MM) / KARTAR (UPTO 250MM) / AVK / UPADHAYA / MARCK (UPTO 600MM)/ PATSONS/ VAG/CALSSENS/ RG (UPTO 600 mm)/SIGMA (up-to 800MM)/KENNEDY(up-to 1200MM)/ LP(Cast Iron Pn 1.0 and Pn 1.6 up-to 300 MM)/CRI(up-to300MM)
54.	DI Resilient (Soft) Seated BUTTERFLY VALVE	AVK /VAG/JUPITER (UPTO 700MM) / IVC / DVPL/RG (UPTO 600 mm)/ KBL (UPTO 2000 mm)/R&D(up-to 900MM)/SIGMA (up-to 1200MM)/SHIVA(up- to700MM)/ KENNEDY(up-to 2400MM)/CRI(Up-to600MM)/DALUI(up-to 2000MM)
55.	SLUICE VALVE	KIRLOSKAR BROTHERS LTD., PUNE / INDIAN VALVE COMPANY/ FOURESS ENGINEERING / DURGA ENGINEERING / SHIV DURGA / KEYSTONE / MAYUR / DALUI / R&D / JUPITER (UPTO1200MM) / KARTAR (UPTO 600MM) / AVK / SHIVA (UPTO 600MM) / UPADHAYA / BEW (UPTO 300MM) / PATSONS/ VAG / SACHDEVA (UPTO 1200 MM)/ CALSENS/HARI (UPTO 250MM)/RAMESH(Up-to 500MM Pn1.0 and Up-to 300MM Pn 1.6)/SIGMA(UP-TO 800MM Pn 1.0 and Pn 1.6)/ KENNEDY(DI up-to 2400MM Pn1.0 and Pn1.6)/ KRANTI(up-to 200MM, CI)/ LP (CAST IRON Pn 1.0 and Pn 1.6 UP-TO 300MM)/CRI(up-to 300MM)
56.	DI Resilient (Soft) Seated SLUICE VALVE	SIGMA (UP-TO 1000MM Pn 1.0 and Pn 1.6)/ AVK / VAG/ JUPITER (UPTO 450MM)/SACHDEVA (UP-TO 1000MM) / SHIVA (UPTO 700MM Pn 1.0 and Pn1.6) / MAYUR (UPTO 300MM) / IVC / DVPL / KARTAR (UPTO 600MM)/ KBL (UP-TO 1300 mm)/R&D(up-to 900MM PN1.0 and up-to 300MM PN1.6)/ KENNEDY(up-to 1200MM Pn1.0 and Pn1.6)/CRI(up-to 600MM)/DALUI(up-to 1200MM)/BEW(up-to600MM),UPADHAYA(UP-TO 600MM)/LP(UP-TO300MM Pn1.0 and Pn1.6)/
57.	DOUBLE PLATE CHECK VALVE	ADVANCE / KBL / IVC / R&D /DURGA / MAYUR / DALUI / PATSONS / VAG/ KENNEDY(up-to 800MM)/BEW(up-to400MM)/ SHIVA(up-to 600MM)/SIGMA(UP-TO 300MM)
58.	NON RETURN VALVE	KIRLOSKAR BROTHERS LTD., PUNE / INDIAN VALVE COMPANY/ FOURESS ENGINEERING / DURGA ENGINEERING / SHIV DURGA / KEYSTONE / MAYUR / DALUI / R&D / JUPITER (UPTO1200MM) / KARTAR

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

		(UPTO 600MM) / AVK / SHIVA (UPTO 600MM) / UPADHAYA / BEW (UPTO 300MM) / PATSONS/ VAG / SACHDEVA (UPTO 1200 MM)/ CALSENS/HARI (UPTO 250MM)/ RG (UP-TO 600mm)/RAMESH(Up-to 250MM)/SIGMA(800MM)/KENNEDY(up-to 600MM)/KRANTI (Up-To 150MM CI)/LP(UP-TO 300MM)
59.	DI Resilient (Soft) Seated NON RETURN VALVE	AVK / VAG / IVC / DVPL/ RG (UPTO 600 mm)/ KBL (UPTO 600 mm)/ KENNEDY(up-to 600MM / SIGMA(600MM)/ SHIVA (UPTO 600MM))/DALUI(up-to 800MM)
60.	KINETIC AIR VALVE	KIRLOSKAR BROTHER LTD. / INDIAN VALVE COMPANY / ADVANCE VALVE / INTER VALVE / FOURESS / R&D / DURGA ENGINEERING / SHIV DURGA / MAYUR / DALUI / SHIVA / UPADHAYA / BEW/ AFT/ PATSONS/ AVK / VAG /CALSENS/JUPITER/ RG (UPTO 200 mm)/SIGMA (up-to200MM)/ KENNEDY(up-to 200MM) / CRI(up-to 200MM)
61.	DI Resilient (Soft) Seated KINETIC AIR VALVE	AVK / VAG / IVC / DVPL/ RG (UPTO 200 mm)/ KBL (UPTO 150 mm)/R&D (UP-to 200MM)/ KENNEDY(up-to 200MM) / SIGMA (up-to200MM)/ SHIVA (UPTO 200MM)/DALUI(up-to200MM)/BEW(up-to150MM) / CRI(up-to 200MM)
62.	SLUICE GATE	JASH / BHARAT INDUSTRIAL CORP./ ORIENTAL / FLUID CONTROLS
OTHER ITEMS		
63.	AIR CONDITIONERS (WINDOW):	VOLTAS LTD.(VOLTAS) / CARRIER AIRCON LTD (CARRIERS) / FEDDERS LLOYD/ AIRCON / BLUE STAR LTD. (BLUE STAR)
64.	AIR CONDITIONERS (MINI SPLIT):	VOLTAS LTD.(VOLTAS) / FEDDERS LLOYD./ AIRCON / BLUE STAR LTD. (BLUE STAR)
65.	BACK WASH BLOWER	KAY INTERNATIONAL / SWAM / EVEREST / WEEPL/USHA/ACME
66.	BATTERY	EXIDE / STANDARD / FUKUWA / AMCO
67.	BATTERY CHARGER	SABNIFE POWER SYSTEM / CHHABIELECT/ UPTRON / AMCO /ELECTRONIC SYSTEM
68.	CHLORINATORS	INDUSTRIAL DEVICES PVT. LTD./ BANACO /IEC FABCAM LTD./ CHLOROCONTROL / TOSHCON/ CONTROLMATIK ABW/SEACLORMAC/CHLORO TECH/PRISTINE/ZION
69.	CHLORINE LEAKAGE DETECTION SYSTEM	METUO
70.	COMPRESSOR FOR AIR VESSEL	ANGERSOL RAND / ELGI / CP
71.	DISMANTLING JOINTS (BELLOWS TYPE)	SUR INDUSTRIES / PRECISE / BELOFLEX/BEW/SHIVA
72.	DISMANTLING JOINTS (TELESCOPIC TYPE)	ORIENTAL / SHIV DURGA / SUR INDUSTRIES / DWRENIND. / MANGALA / QUALITECH / SYSTEC FLEXO PRODUCT / DURGA / MAYUR / SHIVA / BEW / ANANT/BELOFLEX

List of acceptable makes in PHED Rajasthan
(Updated UPTO 31.12.2021)

LIST OF SPECIFIED MAKES (Updated up to 31.12.2021)

73.	ELECTRICAL ACTUATOR	ROTORK / LIMITORK / AUMA INDIA / MARSH / ENTROK / SDTORK/CAIR
74.	EMERGENCY DG SYSTEM ENGINE	KIRLOSKAR / KIRLOSKAR-CUMMINS / GREAVES COTTON / CATER PILLAR / ASHOKA LEYLAND/MAHENDRA POWEROL/
75.	EXHAUST FAN	BAJAJ ELECTRICALS LTD. (BAJAJ) / GEC) / KHAITAN LTD. (KHAITAN) / JAI ENGG. WORKS.
76.	FLASH MIXURE	FABCO / PARAMOUNT / HDO / REMI
77.	INDICATING LAMPS	L&T/ BCH/ SIEMENS/ VAISHNO/ TECHNIC/ RASS/ C&S
78.	LIFTING MACHINES EOT CRANES:	EDDY CRANES ENGINEERS PVT. LTD. (EEPL) / ACME MANUFACTURES ENGINEERS (ACME) / M/S ROCKWELL HOIST CRANES PVT LTD. NEW DELHI / REWA / WH BRADDY/ JAPS
79.	LIFTING MACHINES HOIST.	EDDY CRANES / ACME / INDEX / JAPS
80.	LIGHTING FIXTURES	PHILIPS / BAJAJ / MYSORE LAMPS / GE APAR / HAVELLS
81.	MOULDED WATER STORAGE TANK	SYNTEX/ POLYCON/ POLYLAKE/ LAXMIR/VECTUS/
82.	OUTDOOR LIGHTENING ARRESSTOR	ALPRO / OBLUM / IGE/ SKIPPER SEIL
83.	PAINTS	ASIAN / SHALIMAR / JENSON & NICHOLSON / GOODLAC NEROLAC/ ICL / BRITISH PAINT / CLEAN COATS
84.	PLC SCADA	ABB / HONEY WELL / SCHNEIDER / L&T / SIEMENS/ E&H/GE /PHOENIX CONTACT/FORBES MARSHALL/MITSUBISHI ELECTRIC/ OMRON/ TVASTAR/FUJI/ DELTA
85.	PUSH BUTTON	L&T / BCH / SIEMENS / VAISHNO / TECHNIC / RASS / C&S
86.	SURGE CONTROL DEVICES (AIR VESSEL)	L&T / SHRIDHARAN / SURESEAL
87.	SURGE CONTROL DEVICES (ZVV)	SURESEAL / MANNEMANN MEER / MEGHA ENGINEERING / FLOWNIX
88.	TAPE COATING ON MS PIPE	LLOYD INSULATION/ IWL / BITU-TECH / SEAL FOR LIFE/
89.	WEIGHING DEVICE (BRIDGE WEIGHING DEVICE)	AVERY

These is list is as conveyed by Chief Engineer (Technical) & TM RWSSMB. In case of any change is done after issuing this list up to receiving date of this tender, by RWSSMB the same shall be applicable

ANNEXURE – “B” FORMAT OF SITE
BOOK**PUBLIC HEALTH ENGINEERING DEPARTMENT****SITE BOOK**

1. Name of Circle:
2. Name of Division:
3. Name of Work:
4. Location of site:
5. Name of Contractor:
6. Agreement no. & Date:
7. Date of Commencement of Work:
8. Stipulated date of Completion:
9. Details of In-charge of work:

<u>Designation</u>	<u>Name</u>	<u>Period</u>
<u>SE</u>		
<u>EE</u>		
<u>AE</u>		
<u>JE</u>		

SPECIAL CONDITIONS OF CONTRACT –PART “B”

1. DEFINITIONS

1.1. Adverse Operating Period

The period, during which electricity is not provided by the department at the pump house.

1.2. Billing Period

Billing Period means each calendar month, except:

- 1.1.1. For the first Billing Period shall begin on the Date commencement of contract as defined in clause 1.3 below and shall continue till the last day of the respective month;
- 1.1.2. The last Billing Period shall start on the first date of the month of expiry of contract and end on the date of expiry of contract as defined in clause 1.10 below.

Any computation made on the basis of a Billing Period shall be adjusted on a pro rata basis to take into account any Billing Period of less than the actual number of days in the month to which such Billing Period relates.

1.3. Commencement of O&M Period

From the date of Completion of works or any other date notified after total physical completion respectively, of Special Conditions of contract Part ‘A’.

However, O&M of Zones commissioned during execution period shall be done by the contractor, for which no separate payment shall be made. The contractor shall incorporate all charges thereof in the offer.

1.4. Operation and Maintenance Contract Period

120 months from the commencement of O&M period as per clause 1.3 above or as extended in accordance to clause 2.1.

1.5. Date of Issue of Taking Over Certificate

After the completion of Period, for contract as per clause 1.4 above, provided that the contractor has fulfilled the provision of clause 2.2 of this contract.

1.6. Good Engineering Practice

In respect of the Contractor, practices, methods, techniques and standards, as changed from time to time, that are generally accepted for use pump house along with its electrical &-mechanical equipment(s), all type of pipe line and pipe appurtenances, all type of meters and control equipment(s), and all other facility during construction, operations and maintenance, taking into account conditions in India.

1.7. Non-conformance Event

Any occasion on which the Contractor does not supply the notified per day flow.

1.8. Operation and Maintenance Completion Certificate

As defined in Clause 2.2 of this Project.

1.9. Operations and Maintenance Services

All Services which are the responsibility of the Contractor and are required to fulfil the obligation as detailed in “scope of work” given in Vol. II of bid document and/or in the approved operation and maintenance manual and as defined in any other clauses of this contract.

1.10. Expiry of Contract Period

As per Clause 1.4 above (or) as extended, as per the provisions of Clause 2.2.

2. Extension & Expiry of Contract

2.1. Extension of Operation and Maintenance Period

The Operations & Maintenance Period can be extended for another period of 120 months based on such terms as acceptable to both Parties (“The Contractor” and the “Department”).

In such an event, either Party ("The Contractor" or the "Department") shall notify its intention to extend the Operations & Maintenance Period at least six months before its expiry and commence discussions with the other Party to arrive at a mutually agreed basis of terms and conditions for the extended period.

2.2. Expiry of the Operation and Maintenance Period & Taking Over By the Department

Six months prior to the expiry period, the Department will notify the contractor, the maintenance required for the facilities including all structures and road, plants, materials and equipment(s) therein, so that the facilities may be taken over in an acceptable physical conditions (physical conditions in reference to the initial physical condition at the start of O&M period, after accounting reasonable wear and tear during operation) and in operation conditions.

Notwithstanding to the notification done by department as per clause 2.2.1 above, the contractor shall repair, maintain and operate the facilities as per the terms and conditions of this contract, till

12.00 Noon up to the date of expiry of contract period.

The contractor, shall be liable for all defects, faults, break-downs etc occurred or noticed prior to the 12.00 Noon, up to the date of expiry of contract, even if the facilities are taken over by the department subsequently, due to expiry of contract period, as per clause 2.2.2 above. However, the Department has to notify all such defects/liabilities of contractor within 30 days of taking over of facilities.

Till the date of expiry of contract period, the contractor shall do all routine and periodic/break-down maintenance as prescribed in the O&M manual, in force, at the time of expiry of contract.

On expiry of contract, the contractor shall hand over all spares, tools and for which he has been paid.

After, expiry of the contract, the contractor shall provide 12 copies of the updated O&M manual. The components of communication system used during O&M period in operating condition, the T&P required for maintenance of facilities. The logbooks and all the other records prepared during the O&M period shall be handed over to the Department, in acceptable electronic formats and in hard copies, within 15 days of expiry of contract. Copy of the log books related to performance of units shall be provided every month.

If the contractor does not comply with any of the provisions from 2.2.1 through 2.2.6 above, or any other requirement in pursuance of Good Industrial Practices, the Engineer –In-charge shall estimate the cost of liabilities due to violation of any of the provisions of this contract. Such estimates made by Engineer-In-Charge shall be final and binding for the contractor. However in a reasonable endeavor, such estimates shall be communicated to the contractor, within 30 days of expiry of the contract. The contractor shall be given an opportunity to rectify the damages through his staff/agents, or for supply of required material provided such rectification of defects on maintenance do not require any shut down of the system, within 60 days of such notification of estimates by department.

Within 120 days of expiry of the contract period as per clause 1.6, the Department shall prepare the final estimates for recovery from the contractor and shall prepare the final bill for the work.

If the recoveries to be done by Department are more than the final bill to be paid, the contractor shall deposit the required amount to be recovered from contractor or this amount shall be recovered from the securities/guarantees etc. with the department as deemed suitable.

After the date of expiry of contract and recoveries of all dues payable by the contractor, the Engineer-In-Charge shall issue a "Certificate of Takingover."

3. PAYMENTS

3.1. Basic Service Charge (BS)

3.1.1. The Basic Service Charges shall comprise all expenses for operation and maintaining the Facilities, as provided in the scope of work for O&M in Volume – II of "Scope of Work and Technical Specifications" of bid document. In addition to the cost of material/equipment spares, repair/replacement of equipment and labour, all other expenses such as expenses for patrolling, administration and management, permanent & temporary staff, running office, maintenance of all structures, updating of operation and maintenance manual, etc. and all other incidental and indirect expenses for the works detailed in "Scope of Work for O&M" in Vol-II or for works otherwise required as per good engineering practices for Operation and Maintenance of the

entire system, (except for the cost of electricity) are included in this Basic Service Charges. The Basic Service Charge shall be a lump sum charge to be quoted by Contractor at the time of bidding in Schedule of prices in Volume III of bid document.

3.2. Reduction OF RATES (RR)

Measurement of Flows For Reduction In Rates

For this clause, the day shall mean the duration between 12.00 noon of preceding day and

12.00 noon of the day in question

The flow rate for the day in question will be calculated by dividing the total flow during the day by the duration of operation of system within that day.

For the purposes of payment of Reduction in Rates, Metering is of utmost importance in this contract. For flow measurements, meters shall be installed. One meter each on the tube wells and one each at out of all RCC ESR shall be installed.

Reading of meters shall be recorded everyday and will be signed by representatives of Department and Contractor.

If doubt is raised by any of the party, in reference to the correctness of the meters, an ultra sonic flow meter shall be installed in series and the reading of the meter under question shall be compared with that of ultrasonic meter (the ultra-sonic meter shall be provided by the contractor). If the difference is within $\square$ 4 %, no change of meter will be done. If it is beyond this limit, the meter must be replaced/ repaired within 96 hours by the Contractor.

At all times, the contractor will ensure that sufficient spares for meters are available, so as to keep meters functional for the maximum time at each location.

If any of the main meter(s) installed at each RCC ESRs is not functioning for a continuous period of more than 96 hours, it shall warrant a reduction in rates of Rs. 1000 per day per meter. Meters at locations at other places, if not repaired within 96 hours or a stand-by meter is not installed in its place, shall warrant a reduction in rate of Rs. 500 per day per meter.

The daily flow rates recorded as above shall be totaled for each month and the same shall be used for calculation of reduction in rates of described clause 3.2.2 below.

In event of Break down or shutdown due to other reasons or due to other circumstance, if the flow has been maintained for part of the day, than the average flow rate for such "part day" flows, shall be calculated as referred above.

Reduction in rates for supply of less Quantity of Water & for high percentage of leakages

The total quantity of flow to be released from SR shall be the summation of the per day quantum of out flow desired at SR as notified by the department.

The total losses, estimated on the basis of flow meters installed, shall be limited to 5% of the total flow measured at tube wells. For losses more than 5% of the flow, the reduction in rates @ Rs. 20 per KL of water in excess of permissible 5%, shall be levied. The rate of reduction

i.e. Rs. 20 per KL shall be increased by 10% every year, during the O & M period.

While limiting the total losses in the system to 5%. Failing to supply 90% of desired quantity shall invite a token compensation of Rs. 100/- per day if this happens for a period of more than one day and if complaints are received from respective zones of getting insufficient water.

3.3. Billing and Payment procedure

3.3.1.1. Commencing with the first Billing Period of the Operations & Maintenance period and for each Billing Period thereafter during the Operations & Maintenance Period, the Department shall pay the Contractor a Service Fee for the services provided by the Contractor under the terms of this Conditions of Contract for Operation and Maintenance. The Contractor shall prepare and submit to the Department, for each

Billing Period, invoice for payments receivable by the Contractor with all supporting documents. The calculations shall be submitted between the first and fifth working day of the month for the preceding month.

The payment shall be in accordance with the following formula:

$$SF = BS - RR$$

Where:

SF = Service Fee

BS = Basic Service Charges, as per clause 3.1

RR = Reduction in Rates or any other deduction as per terms and conditions of contract

The Fee payable shall be computed in accordance with this Clause and shall be adjusted from time to time, due to the provisions of clause 3.2 or any other provisions in the contract. The Service Fee is and shall be considered to be a Single Fee payable for O&M of the system. The Department shall pay the Contractor the Service Fee with respect to each Billing Period during the Operations & Maintenance Period, but shall have no obligation to pay the Service Fee till the commencement of O&M period as per clause 1.3. The Service Fee constitutes the entire compensation of the Contractor for performing the Operation & Maintenance Services, as per the scope of work and other obligations due to this contract. The Department shall pay to the Contractor the Basic Service Charge, whether and irrespective of the availability of Water at each pump house and electricity to the Contractor for transmission hereunder, as provided in TD

3.4. Taxes and Duties

The Contractor shall be responsible for paying all taxes/duties including service tax, cess or any other levies imposed by the Government and assessed as due and payable by the Contractor associated with the carrying out of the services. Notwithstanding the provisions of any Clause of this Conditions of Contract for Operation and Maintenance, the Department shall be entitled to withhold or deduct from payment to the Contractor any amount demanded by the competent authority.

All statutory deductions shall be made from all the payments done to the contractor.

3.5. Security Deposit

3.5.1. The provisions of Clause 1 of General Conditions of Contract shall apply for the deductions to be made in reference to the Security Deposit.

3.6. Refund of Security Deposit

3.6.1. An amount equal to 10% of the contract value of O&M, shall be retained on account of Security Deposit for O&M work (Part B) from Security Deposit for execution of Work (Part A), while refunding such Security Deposit. The Security Deposit with the Department shall be released after successful completion of the defect liability period and Operation & Maintenance for execution part & after taking over certificate issued in pursuance of clause 2.2 of Special condition of contract (Part-B) for O & M.

4. OPERATIONS

4.1. Variability of Output

Variation in Supplied Water Quantity required by Department

The Department may alter its demand requests made pursuant to this Clause for any reason whatsoever by giving the Contractor a written notice.

4.1.1. Due to contractor's own inability

If the contractor fails to provide 90% of the required water as notified by the department or as per the designed demand of the village given in volume II, the contractor shall be liable to compensation, as per clause 3.2.2.

4.1.2. Non availability of power

If, due to reasons attributable to the Department, adequate power to operate the Facility is not provided, the Parties shall consult in good faith to arrive at mutually acceptable Alternative Output Standards, which shall be complied with by the Contractor till such time adequate power supply to the Facility is restored by the Department.

All power outages equal to or more than 1 hours (total) in a segment of 24 hours (12:00 Noon to 12:00 Noon next day) shall be used for determining pro-rata reduction on Quantum of Water to be supplied as per Departments instructions.

4.2. Personnel

The Contractor shall appoint the minimum staff defined in scope of work of O&M in Volume - II, before the date of issue of Certificate for Completion of work of special condition of contract part "A". The appointed staff must have the minimum qualification and experience as defined in the Chapter of "Specifications for Operation and Maintenance" of Volume-II. The names along with the qualifications and experience of the minimum staff to be provided as per the conditions of contract shall be got approved from the Department. Such approval shall not be unreasonably withheld or delayed by the Department. If during the O&M period any personals earlier approved by Department are required to be changed, the bidder shall provide CV's of personals of similar or more experience than that of the person to be replaced for approval of Department. Only after such approvals, the bidder shall appoint the person on job.

The Contractor's Representative shall be authorised and empowered to act for and on behalf of the Contractor on all matters relating to the rights and obligations of the Contractor during the O&M Period. In all such matters, the Contractor shall be bound by the written communications, directions, requests and decisions given or made by the Contractor's Representative.

The Contractor's Representative will direct and manage the Contractor's resources and have full responsibility for the operation, maintenance and administration of the Facility.

The Contractor shall identify, interview and hire sufficient number of qualified and trained (and if required, licensed) personnel to perform its obligations during the O&M Period.

All Contractor's personnel employed at any time during the O&M period will be provided by the Contractor. The Department is not liable for personnel in any way and cannot be held responsible in the event of litigation of any sort between the Contractor and members of plant personnel or their representatives or non performance of obligations due to any strike or other industrial action by the Contractor's workmen (including those of its subcontractors, suppliers etc).

The Contractor undertakes to comply with applicable legislation and the code of labour law on matters of health, hygiene and safety, and shall assume responsibility for works required in the event of any change in applicable regulations and shall also require its subcontractors to comply with this clause.

If the Contractor fails to provide the minimum personnel responsible for O&M of the Facility as defined in scope of work, given in volume-II, the Basic Service Charge payable for each year may be reduced proportionately to the schedule of deployment of personnel proposed by the contractor or as per the actual expenditure incurred by the Department to fulfill the duties and liabilities of the Contractor under this contract, which ever is more, at Department's discretion.

Maintenance, Repairs and Replacements and Additions to the Facility

4.3. Maintenance, Repairs and Replacements

The Contractor at its own cost and expense shall maintain and repair the Facility in good working condition, in a neat & orderly way including the cleanup of litter and debris on a daily basis or more frequently, shall maintain a spare parts inventory necessary to performance maintenance required as per the Operation and Maintenance Manual and/or scope of work, and shall maintain the aesthetic quality of the Facility as originally constructed and in accordance with the Technical Specifications, with due allowance for

reasonable wear and tear and depreciation. The Contractor shall provide or make provisions for all labour, materials, and equipment which are necessary for the normal operation and maintenance of the Facility and shall conduct the required predictive and preventive maintenance of the Facility consistent with the Operation and Maintenance Manual and/or scope of work. The Contractor shall maintain maintenance logs in accordance with the preventive maintenance plan set forth in the Operations and Maintenance Manual and as defined in scope of work and shall produce monthly copies of the same to department.

4.4. Additions/Modifications to the Facility

Any additions to the Facility sought by the Department, over and above those required to meet the Contractor's obligations under this Contract, including but not limited to expansion of the Facility, shall be carried out by the Contractor at the expense of the Department on mutually agreed terms and conditions. Such agreement will cover the costs of maintenance of the additional facilities also. The Department shall also bear any incremental expenses (alongwith thepercentagefeefortheContractor)requiredtomaintainsuchadditionsduringtheO&M

Period. The Department may opt for other sources for construction and maintenance for such additions.

Department's rights

Inspection

The Department may periodically check the operation of the Facility or designate an organisation of its choice at the cost of Department to carry out inspections of the Facility to satisfy itself that the Contractor is performing its obligations with due diligence.

The Contractor at its own cost shall provide any assistance required for such inspection of the Facility.

The Department representative can inspect the facility at any moment during the O&M period.

Technical Audit

The Department has the right to conduct a technical audit of the Facility and to perform any analysis or inspection it deems necessary. Before any such inspection, the Department shall give a prior written notice of three days to the Contractor. The Contractor shall at the Contractor's sole cost and expense provide all assistance the Department requires to complete these inspections. Such audits may cover all or any of the obligations of the Contractor, including but without limitation to,

- A. Verification of the system capacity save for normal wear and tear during the O&MPeriod
- B. Verification of the performance standards and useful life of the individual assets of the Facility, save for normal wear and tear during the O&MPeriod
- C. Testing and verification of the waterlosses

4.5. FacilityVisits

At the end of each twelve-month period, or at the initiative of the Department, a visit shall be organized so that both Parties can check the condition of the installations at the Facility.

A report shall be drawn up to record the opinions of both Parties. The Department reserves the right to call in equipment manufacturers or specialized technicians for these visits.

These visits shall provide an opportunity for examining maintenance programs and operating procedures and improvements requiring additionalinvestments.

4.6. Responsibilities of THEDEPARTMENT

4.6.1. The Department willprovide:

Power supply to the Facility as per designed pumping hours. Power shall be supplied to the Contractor solely for the purpose of pumping of water, and for other utilities within the pumping station and for the other utilities desired by the Department and not for any other purpose.

4.6.2. Other Contracts

The Contractor shall not delegate its responsibilities hereunder nor subcontract any part of the services to be provided by him hereunder without the prior written consent of the Department. If the Contractor subcontracts its responsibilities hereunder or subcontracts any part of the services to be provided by him hereunder with the consent of the Department, the Contractor shall not be relieved from any liability or obligation under this Contract and the Contractor shall continue to be responsible for the act, defaults or negligence of any sub-contractor as fully as if it were the acts, defaults or negligence of the Contractor, its officers, employees or agents.

The period of validity of any contractual commitment for provision of services or material or personnel to the Facility or any subcontract entered into by the Contractor with any party shall not and shall not extend beyond the Termination Date.

All such contractual commitments to be entered into by the Contractor should be freely assignable to the Department or to any other contractor, at the discretion of the Contractor.

The Contractor cannot create a charge on any assets of the Department or the assets purchased under the Contract.

5. BREAKDOWNS

5.1. Contractor Action and liabilities

In event of break down, resulting in suspension of supplies and also endangering life and / or property, the contractor shall take such action as may be reasonable and necessary at his cost and expenses, to prevent, avoid, or mitigate injury damage and / or loss as soon as possible and rectify the defects / repair/replace the facilities at his own cost, so as to commence the supplies at the earliest possible. The contractor must report all such incidences, indicating the cause and contractor's response thereto, to the Department.

The contractor shall utilize its personnel and all his resources to take such action as may be reasonable and necessary in the event of a break down. The contractor must incur all expenditure and take all measures, which are necessary (in accordance with good industrial practice) in case of breakdown, affecting the facilities and / or to safeguard lives or property.

The contractor shall be liable to pay all type of claims arising and raised for any loss of lives / property attributed to such break down, unless such break down has resulted due to force majeure.

5.2. Time for Rectification of Defects:

Not limiting to any events listed below the contractor shall be charged for delayed commissioning of the system, after a break down. The reduction in rates for delayed commissioning of events listed below, shall generally be applicable, but can be condoned by the EIC after considering the grounds for delay. For events not listed below, the EIC shall decide the reduction in rates on the merit of case and after considering the action taken by the contractor. The decision of EIC, shall be binding on the contractor.

5.3. Reduction in Rates

5.3.1. Repair for Burst in pipeline:-

In case of any leak which otherwise could be repaired by a clamp or during routine maintenance, the contractor shall not be allowed to shut down the system for these repairs. In case, where the transmission of water is impossible, without the repair of pipeline and when such repairs warrant a shut down, the contractor shall be allowed to have a shut down for 8 hrs to effect such repairs \ charges.

If duration of break down is within 8 hrs, no compensation will be imposed. The delay beyond 8 hrs shall attract a compensation of 0.5 times of daily Basic Service Charges

payable (for material and labour) (Basic Service Charges for the month divided by 30) for subsequent delay up to 6 hrs or part there of, the same rate of reduction shall be applicable for each additional delay of 6 hours or part thereof (e.g. for repair period of 22 hrs. total compensation shall be 1.5 times the daily basic servicecharges.

For this clause and other clauses, the duration of break down shall be taken as the difference of time from the moment the flow rate of receiving water at terminal point becomes 10% of the notified flow rate to the moment when flow at terminal point(s) is 80% of the notified flow rate, received after repair, provided that the required flow rate is maintained for subsequent 6hrs.

5.3.2. Unattended Leakages in water main

A token compensation of Rs. 1000 for unattended leakage shall be leviable if the delay in satisfactory completion of repair is beyond 24 hours from the time of each notice by the department.

5.3.3. Excess power consumption

A token compensation of Rs 250 per day per pumping station shall be leviable after notice issued by the department, in case it is observed that clear water pumps are operating at efficiency lower than 90 % of the approved efficiency at operating dutyhead.

5.3.4. Effect to the provisions of Clause 3.2 in case of BreakDown.

The flow quantity (flow desired by department) to be used for clause 3.2.2 for the day(s) effected by such breakdowns recognized under clause 5.3 shall be calculated in proportion to the effective working hours on the "day(s)" after accounting the hours of breakdown accounted, in any penalties/RR under clause5.3.

5.3.5. Consistent BreakDowns

Notwithstanding to the provision of this clause, in case of consistent "break down" in supplies and with consistent supplies of less than 75% of desired flow in any of the covered zones will make the contractor liable of an action as per clause 6.1below.

6. TERMINATION

6.1. Contractor'sdefault

The Department shall be entitled to terminate this Contract for the following reasons attributable to the Contractor, unless arising as a result of a Force Majeure Event, or any cause related to the obligations of the Department in clause4.5.

- A. Non performance of material obligations or failure to perform material obligations under this Contract i.e. for not maintaining the desired quantities of flow at all the Zones in a continuous period and/or not maintaining the pipe losses within $\pm 10\%$ for a continuous period of more than 15days.
- B. Repudiation of this Contract by the Contractor or the evidencing of an intention by the Contractor not to be bound by the terms of thisContract.
- C. Appointment of a provisional liquidator in providing for winding up of the Contractor unless such appointment has been set-aside within 45days.
- D. The Contractor is ordered to be wound up by a court or files a petition for voluntary winding up except for the purpose of amalgamation or reconstruction provided that such amalgamation or reconstruction does not adversely affect the ability of the amalgamated or reconstructed entity to perform its obligations under this Contract, the successor has assumed in writing unconditional responsibility for the performance of the Contractor's obligations and the technical, financial and operating capability of the successor is satisfactory to theDepartment.
- E. The Contractor abandons the operation of theFacility.
- F. Under conditions expressly mentioned in any Clause of this Conditions of Contract for Operation andMaintenance.

6.2. Consequences of Termination byDepartment

If the Department, with reasonable grounds, terminates the contract under clause 6.1 above, the Secured Advances, and any other sums of the contractor with the Department, shall be forfeited and action shall be taken against him as per clause 3 of General Conditions of Contract, if deemed appropriate.

7. INDEMNIFICATION

7.1. The Contractor to indemnify the Department against the following:

- A. The Contractor shall at its own expense make good any physical loss or damage to the Facility occasioned by it in the course of the performance of its obligations under this Contract if and to the extent such loss or damage is caused by the willful misconduct or failure to follow Good Engineering Practices of the Contractor, any sub-contractor or their respective agents or employees.
- B. The Contractor shall indemnify, defend and hold harmless the Department and its officers, employees, agents and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties and in respect of loss of or damage to any third party to the extent that the same arises out of:
 - (i) Any breach by the Contractor of its obligations hereunder;
 - (ii) Any negligent act or omission on the part of the Contractor, its subcontractors or their respective agents or employees; and
 - (iii) Any willful misconduct or breach of statutory duty on the part of the Contractor, its subcontractors or their respective agents and employees.
 - (iv) Any other event where such indemnification has been expressly mentioned in this Conditions of Contract for Operation and Maintenance.
- C. The Contractor shall indemnify, defend and hold harmless the Department and its officers, employees, agents and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection therewith in respect of the death or injury to any person employed by the Contractor or its subcontractors in connection with the performance of the Contractor's obligations.

7.2. The Contractor shall indemnify the Department against all losses and claims in respect of:

- A. Death of or injury to any person, or,
- B. Loss of or damage to any property (other than the Works).

which may arise out of / in consequence of the Operation and Maintenance of the Facility and the remedying of any defects therein, and against all claims proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, subject to the exceptions below

- I- The permanent use or occupation of land by the Facility, or any part thereof.
- II- The right of the Department to execute the Facility, or any part thereof, on, over, under, in or through any land.
- III- Damage to property that is the unavoidable result of the execution and completion of the Works, or the remedying of any defects therein, in accordance with the contract.

8. INTELLECTUAL PROPERTY

All Intellectual Property conceived, originated, devised, developed or created by the Contractor specifically for the Facility or the carrying out of the obligations under this Contract shall vest in the Department as sole beneficial owner and shall be disclosed to the Department upon its [the Intellectual Properties] coming into existence.

Source code for computer programmers and associated documentation, storage media shall be made available to the Department by the Contractor free of cost

Any Intellectual Property of the Department that is required in connection with the performance of the obligations of the Contractor shall be made available to the Contractor free of charge for the purposes of this Contract alone

The Contractor shall, at its own cost and expense, ensure availability at all times during the Term of this Conditions of Contract for Operation and Maintenance, of any proprietary spares/consumables/equipment that it may have sourced for purposes of ensuring proper functioning of the Facility as per this Conditions of Contract for Operation and Maintenance.

The Contractor shall, as far as practicable, use its best efforts

- A. To procure that Intellectual Property owned or developed by third parties and utilized by the Contractor in connection with the performance of its obligations under this Contract for the production of treated water from the Facility and otherwise for the Facility but for no other purpose on reasonable terms
- B. To ensure that no Intellectual Property of a third party is otherwise used in the performance of the Contractor's obligations under this Contract without the approval from the Department.

On Termination of this Conditions of Contract for Operation and Maintenance, the Contractor shall transfer all such Intellectual Property whatsoever to the Department and/or to the Successor Operator at the discretion of the Department.

**Additional Chief Engineer
PHED Region II Jaipur**

**Government of Rajasthan
Public Health Engineering Department
Tender Document
(NIT No 91 /2021-22)**

**Work of P/L/J testing and commissioning of
DI Pipe Line, Providing and Installation of
Pump Set with EMI, Construction of Pump
House and SITC of Grid Ties Solar Power
Plant including defect liability period of of
12 months and O&M period of 120 months
at Railway Colony Phulera Block Sambher
Distt Jaipur**

Volume-II

**Technical Bid
Scope of Work, Specifications, Drawings,
Annexure.**



**ESTIMATED COST
Rs 390.24 Lacs**

**OFFICE OF THE ADDITAIONAL CHIEF ENGINEER,
PHED Region II, Gandhi Nagar Jaipur
Telephone No.: 0141-2702700 E-mail:
ace2.jpr.phed@rajasthan.gov.in**

SCOPE OF WORK

1. BACK GROUND

The project include Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur

2. EXTENT OF SCOPE OF WORK

The scope of work under this Schedule contract on SPR Basis includes Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur.

The Contractor shall also undertake the responsibility of defect liability of system for **12 months** after completion of all works under the contract. Liaison with the local authorities and other offices to have required clearances shall be the responsibility of the contractor.

The details of components listed hereinafter are the main components identified by the department, but the contractor shall be responsible for installations of all other equipment(s)/construction of other facilities, required to achieve the objectives defined above within the stipulated completion period.

3. GENERAL PRINCIPLES

The contractor shall carryout all works wholly in accordance with the terms and conditions of the contract to fulfill the requirement of the project. All the material used, and the equipment installed shall be as per the specifications defined in the contract and the work shall be executed with state of art engineering practices.

Generally the following activities shall be carried out for each component of this contract but shall not be limited to:

- (i) Carry Preparation and submission of structural designs and reinforcement drawings for all civil structures of the work. All expenses for this shall be borne by the contractor.
- (ii) Preparation and submission of all detailed working drawings on the basis of conceptual designs and plans approved by the Engineer-in-Charge.
- (iii) Liaison with the local authorities and other offices to have required clearances shall be the responsibility of the contractor. To co-ordinate with the O&M staff and personnel of local water supply system (for carrying out the installation of new equipment), concerned officers of PHED, Nagar Palika, Telecom, PWD, Railway, Forest, Mining, electric supply company and the district administrative offices and other offices for necessary approvals.
- (iv) Manufacturing, shop testing, pre-dispatch inspection, transportation to site, providing transit insurance, storage, handling at site, installation, sectional testing, pre-commissioning testing, commissioning and trial-runs for all components of the system and the system as a whole, including the hydraulic, mechanical, electrical, Electro-Mechanical and instrumentation equipment.
- (v) Construction of all buildings and water retaining structures, chambers, thrust blocks, anchor blocks, saddle supports and other civil and engineering structures.
- (vi) Ancillary Civil works, campus development and Buildings as defined herein after.
- (vii) For road crossings, department will apply for the permissions at its level. The best The contractor shall be responsible for any damage occurred to the telephone lines, OFC cables, cutting of trees, power and other cables, distribution/rising water mains, service connection pipes, sewers, drains, gas pipes etc. while laying clear water pipeline and shall be liable to pay the amount levied by respective department(s) for the repair and/ or compensation for damages so occurred.
- (viii) Construction, testing & commissioning of all civil works as per scope of work, approved drawings & detailed specifications.
- (ix) The submission of the as-built drawings of the works is the precondition for the final payment of execution part. The final drawings shall be submitted in one reproducible set and 5 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.

- (x) Providing spares, tools and tackles at the end of the execution of physical works as per list enclosed.
- (xi) Submission of photographs of all replaced service connections before and after the work.
- (xii) Maintaining the site office(s) with all reasonable office facilities for use of project staff of the department. Providing local transport facility for the supervisory staff engaged by the department within the scheme area and other work related places.
- (xiii) Arrangement of adequate security, watch and ward of the system during the execution period to safeguard the equipment and completed section of the work from any type of mishandling, theft, fire and other hazards etc. and all safety precautions at the time of storage of material, execution of work and defect liability period to avoid any mishap.
- (xiv) Restoration of PHED premises/ road etc. after completion of the work.
- (xv) Design reviews and appraisals at regular interval.
- (xvi) Submission of the design/specifications, product brochures, technical data sheets, test and performance certificates etc of all mechanical equipment (pumps, valves, fittings etc), electrical/ instrumentation/ automation system, appurtenances required for surge protection (if any), design of the electrical components, taking into account the interfaces to the other project components/packages and the future extensions of the project.
- (xvii) Electric design and electric load calculation, data sheet, QAPs and fulfillment of IEC requirement.
- (xviii) Construction/Installation, testing & commissioning of all civil, mechanical, electrical and instrumentation works strictly as per scope of work, approved drawings, designs, relevant IS codes and specifications.
- (xix) Pre- commissioning checks and inspections as per requirement.
- (xx) Testing of hydraulic, mechanical, electrical and instrumentation system as per relevant IS codes and specifications and guidelines.
- (xxi) Commissioning of the whole system and optimization as per design parameters after commissioning of all the components i.e pumping station , Transfer Pumping mains, Cluster Pumping mains, cluster ESR's and village transfer chambers & village distribution net work in all respect.
- (xxii) Providing spares, tools and tackles at the end of the execution of physical works as per list enclosed.

In addition to the above, the following shall also form a part of the scope of work:

- Arrangement of adequate security, watch and ward of the system during the execution period to safeguard the equipment and completed section of the work from any type of mishandling, theft, fire and other hazards, etc.
- Maintaining the site office(s) at all head works with all reasonable office facilities for use of project staff of the department.

4. MAJOR COMPONENTS OF WORK

4.1 Carryout topographical survey of the system. Prepare L- Section and townplans.

Survey, topographical and Geo-technical investigation required for proper design and execution of the various component of the project shall be done by the contractor. L-sections shall be prepared along the pipeline alignment with levels at 50 m interval or in between, if the drop in level in between two consecutive points is more than 1.0 meters. All drawings of survey along with the marked L-section of proposed pipe line, location of all types of valves etc shall be submitted on scale for approval by the Engineer-in-Charge in soft as well as hard copies. The L-section should indicate ground levels, invert levels, depth of cutting, working pressure, co- ordinates of HGL, along with a route key-plan. L-sections should be submitted in parts (Pumping Mains first) so as to take-up the work of laying and jointing of pipes at an early date. The plan is not required to be submitted at the commencement of the project. However, the contractor shall have to submit the plan also along with L-sections while

submitting as built drawings. No separate payment shall be made for this work.

Submit detailed Hydraulic design of distribution system, rising main, pump house etc duly marked on MAP and getting it approved from competent authority. No separate payment shall be made for this work.

- 4.2 Providing, Laying, Jointing, testing & commissioning of below mentioned pipe lines as rising mains and distribution mains, with specials and interconnection with the existing system with road cut and repair. The work include construction of Anchor/ Thrust Block etc civil works required for stability of the pipe line. The length is tentative and may vary as per the actual survey and alignment proposed by the contractor and approved by the engineer in charge.

- 4.2.1 Providing , Laying & Jointing of pipe line with earth work, road cut and repair

150 mm DI CML CI 7	8975
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- 4.3 Supply and installation of Pump Set with all required civil and EMI work of duty condition as below

SN	Location	Duty Discharge	Duty Head	Type
1.	PH Sambher Lake	8.33 LPS	80 M	Centrifugal HSC Pump sets with motor

- 4.4 Pump House 6 m x 4 m
4.5 Construction of Boundary Wall 240 m
4.6 Grid Connected Solar System 53.60 KW
4.7 Operation and maintenance of works for 10 Years

A. PROVIDING, LAYING, JOINTING, TESTING & COMMISSIONING OF PIPE LINES AND RELATED CIVIL WORKS.

The work of pumping mains includes preparatory works, survey, investigations, hydraulic design of pipeline, manufacturing, testing at factory, supply, delivery and storage at site, lowering, laying and jointing, sectional testing, re-filling and commissioning of pipelines of various diameters, along with supply of specials, pipe appurtenances and associated civil works so as to achieve the objective of the project. All the DI pipe lines shall also be checked for maximum surge pressure and class of DI pipe should be adopted in view of allowable maximum operating pressure including surge as per IS:8329-2000.

DI pipes shall be used for transfer and cluster pumping mains in the project. All pipes and specials shall be provided by the Contractor. This work shall include inspection & testing at manufacturers works, packing, transportation, supply of pipes as per specifications along with all types of specials, valves and other material to be used, stacking and/or storage of material, re-handling, excavation of trenches, laying and jointing of the pipes as per approved L-sections, construction of thrust blocks and pedestals/anchor blocks for pipe support to lay pipes above/below ground or by excavation, and carry out sectional testing, pre-commissioning checks, full commissioning tests and trial runs. For payment and other purposes, the actual lengths of connected pipes including specials shall be considered.

All specials like bends, tees, reducers, dismantling joints, rubber rings, flanges, gaskets, nuts & bolts, rubber sheets, etc to be used in the laying and jointing of all types of pipes shall be supplied by the contractor as per given specifications.

The contractor is required to undertake following work for Providing, Laying, Jointing, testing & commissioning of pipe lines

- (i) The work includes supply and testing at works, transportation, packing all type of specials, valves and other materials to be used. Stacking and/or storage of material, re-handling as per specifications, and carry out sectional testing, pre-commissioning checks, full completion test and trial runs.
- (ii) Laying and Jointing of above mentioned pipe lines as per specifications mentioned in relevant IS code and water supply manual published by CPHEEO. The pipeline alignment in general shall be as per enclosed copy of drawing, however exact alignment shall be as per the directions of Engineer in charge. The alignment approved by the Engineer-In-Charge shall be final and binding to the contractor.
- (iii) Providing, testing and installing all materials such as bends, tees, reducers, dismantling joints, insulating joints, transition joints, rubber rings, flanges, nuts & bolts, rubber sheets etc. of required specifications for the installations. All specials shall be of HDPE/ CI / DI/ Mild steel as per the requirements of site conditions desired at the point of installation as per hydraulic considerations & as per the directions of Engineer in charge.
- (iv) All material required for complete project shall be arranged by contractor himself. No material shall be provided by the department. However department may choose to provide HDPE, DI pipe lines for rising mains and distribution system. If so no payment shall be made to contractor on account of providing pipe lines.
- (v) Providing thrust blocks at horizontal bends wherever required or at locations given by Engineer in Charge for the combination of loads as per site conditions. The permissible deflection in each pipe length shall be as per the provisions of relevant standards.
- (vi) Construction of Air Valve Pillar at the approved location as per Approved Drawing and design, which is to be submitted by the contractor. The general drawing and design is enclosed with this tender document.
- (vii) Construction of Masonary Valve Chamber as per approved drawing, which is to be submitted by the contractor.
- (viii) Any damage caused while laying, testing, and commissioning or during execution to the private properties or any other structure etc. shall be got repaired by the contractor at no additional cost to the department.
- (ix) The best available technology for cutting the road with bare minimum damage shall be used. Concrete road cutting is permitted only by CC cutting tool/ machine.

Pipe shall be laid along the roads leading to the villages, as far as possible on the outer edge of the road boundary. The alignment adopted in this contract has been taken along the roads, wherever possible. However, during execution of the works, if a shorter alternate and feasible route to a village is found, the department may opt to lay pipeline along that shorter route. Expenses on account of damages to field boundaries or any other damages in field or of private property during laying of pipes shall be borne by the contractor. The slopes required shall be such that in normal conditions, the clear cover over the laid pipe barrel should not be more than 2.0 meters in general and minimum 1.0 meter. However, in general, the limitation for cover shall be as given in chapter 'Specification of pipeline'.

The following common activities have been identified for Gravity/ Pumping mains:

- a. Procurement and supply of pipes after pre-dispatch inspection by EIC or his authorized engineer or Third Party
- b. Procurement and supply of required specials after pre-dispatch inspection by EIC or his authorized engineer or Third Party
- c. Submission of L-section and plan for approval of Engineer in Charge prior to commencement of work and after approval take up the work and submit as built drawings after final laying and testing of pipeline
- d. The work of laying and jointing of pipes and pipe appurtenances should be done at required levels. The pipeline alignment in general shall be kept on the outer edge of the existing / proposed right of way of road boundaries. Wherever this is not possible, on approval of

Engineer-In-Charge, the pipe can be laid near the road or within the carriageway. No extra payment shall be made on account of additional excavation required for placing pipes further away from the road centres. No additional payment shall be made for excavation of road surface or any other strata for the approved pipe alignment. The alignment approved by the Engineer-In-Charge shall be final and binding to the contractor.

- e. For gravity Mains also, if there is any valley in the alignment, NRVs of the same diameter shall be provided at suitable locations, as decided by the EiC, to safe guard the pipeline from the back pressure at the time of closure of valve.

The scope under the item should consist the following requirements;

- I. Manufacturing and Testing at works, transportation, packing, supply of all sizes of DI-K9/K7 pipes, specials, jointing material etc to be used. Stacking and/or storage of material, re-handling and to lay pipes below ground by excavation and refilling the trench to ensure minimum cover of 1.0 meters generally and construction of pedestals / portals for pipe support to lay pipe above ground, if required and then to carry out sectional testing, pre-commissioning checks, full completion tests and trial runs. The water required for sectional testing after laying of pipe shall be arranged by the contractor at his own cost ;

Setting out of works;

- II. Cutting of the vegetation for the purpose of excavation. However, it will be contractor's responsibility to obtain all kind of clearances, if required to cut the vegetation for laying of pipe line and other civil works, if the forest department will raise the amount against the cutting the said vegetation, the amount will be deposited by the department, but the contractor has to be watched the wood of damaged vegetation and hand over to forest authorities as per directions on contractor cost.
- III. Laying and jointing of pipeline including lowering, placing at proper alignment, cutting pipes, chamfering complete in all respects;
- IV. Excavation of trenches in ordinary soil/ hard dense soil/ hard dense soil mixed with boulders/decomposed rocks/hard rock/saturated soil for laying pipeline below ground as per the L-section approved by the department. A minimum clear cover of 1.0 m shall generally be maintained;
- V. Preparation of trench bed, providing sand bedding where pipe is laid below ground in stretches having boulders / rocky strata;
- VI. Refilling & compaction of trenches;
- VII. Providing support structures such as saddle supports or portal frames for pipe laying above ground, wherever required. Generally ground clearance of 45cm shall be provided below pipe / supporting slab / beam;
- VIII. Construction of thrust blocks at each deflection in horizontal and vertical alignment of pipeline exceeding 5 degree for vertical bends and 10 degrees for horizontal bends;
- IX. The pipeline above ground shall be suitably clamped, to prevent floating of pipes in submerged conditions;
- X. Interconnection of pipelines to existing pipelines, existing ESRs, existing CWRs including providing all specials, civil & mechanical works as per directions of Elc.
- XI. To repair damage to pipelines, electrical poles, telephone poles, optical fiber cables etc. and providing suitable structures for crossing the existing other rising mains during laying clear water mains;
- XII. Providing, testing and installing all materials such as bends, tees, reducers with long radius, dismantling joints, insulating joints, rubber rings, flanges, nuts & bolts, rubber sheets etc. of required specifications for the installations;
- XIII. Providing anchor blocks wherever necessary;
- XIV. Providing protection for foundations of pedestals/portals against soil erosion;
- XV. Sectional testing of pipeline;

- XVI. Removal of defects in laying and jointing works of all pipelines, valves and specials;
- XVII. Any damages of road during the laying & jointing of pipe line and other activities, the contractor has to be liable to deposit the amount demanding by concern authority for restoration of the same.
- XVIII. Compliance of all safety rules at work sites;
- XIX. Making connection of new pipes to existing pipes in transmission and distribution as per directions of EIC;
- XX. Cleaning, Disinfections, testing and commissioning of all pipelines laid;
- XXI. Other ancillary works;

Road /Rail /Nullah Crossing :

- XXII. The department shall apply for the required road/rail/nullah crossing permissions and the contractor shall peruse the case for an early sanction. Any charges paid for the permission shall be born by the department.
- XXIII. Encasing with MS pipe of carrier main, as DI/MS pipe line or as per specifications of concerned department, shall be provided at all Railway / canal / NH or SH Road / drain crossing and drawing and specifications of concern department shall be adopted by contractor.
- XXIV. Encasing the M.S. pipeline in associated lengths as per requirement of concern departmental specifications.
- XXV. It shall be sole responsibility of the contractor to obtain permission for Road / Rail crossing from concern authority by furnishing all details/ drawing / design, required amount of bank guarantee and undertaking etc. required for the same time to time. However department PHED may assist the contractor. Any lapse/delay occur to the project due to late approval and thereof execution shall be the contractor's responsibility. The contractor shall be responsible for any damage occurred to the telephone lines, distribution/rising main water and gas pipe lines, sewerage pipe line, roads, drains while laying pipeline and shall be liable to pay the amount levied by respective department for the repair and / or damages so occurred;
- XXVI. The cost of complete job shall be born by the contractor and is to be included in LS cost for this item of water transmission mains as a single job in price bid;
- XXVII. The contractor should identify the number of crossings on National/State highways and district roads etc. The scope under this item includes all crossings where pipelines are expected to cross any road/rail/nullah as finalized by EIC. Actual location shall be finalized after survey and finalization of alignment by the contractor. No additional payment on account of variation in road/rail/ nullah crossings shall be admissible. The contractor should assess these crossings before submission of tender.

B. INSTALATION OF PUMP SETS

Construction of pump house and installation of Pump sets including all electrical, mechanical, and instrumentation work shall be done as per PWD Manual, water supply manual, relevant IS code and manufacturer's requirement. The scope of work of pump house shall be as below but not limited to:

1. Installation of pump sets of duty condition as per scope of work & as per specification.
2. Construction of foundation of size as per manufacturer's requirement and fixing of base plate over it as per requirement.
3. Suction pipes shall connect each pump to common header which is further connected to CWR Puddle Collar mentioned above or suction header as per approved drawing. Each pipe shall have one sluice valve and one dismantling joint and one eccentric reducer. The pipe connecting suction header to puddle collar of CWR should have one dismantling joint and one sluice valve. The size should be as per approved design
4. Delivery side of the pump shall be of MS pipes. This shall be provided with one enlarger, Two sluice valve, one Duel plate reflux valve, pressure guage and one dismantling joint. Delivery pipes of the pumps shall be merged into one common delivery pipe, which then connects to the rising main as

per drawing enclosed. One Electro Magnetic flow meter shall be provided in the common delivery pipe for each pumpset. In case of common header, one sluice valve and dismantling joint is to be provided on the pipe connecting common header to CWR. The size should be as per approved design.

5. Electrical work: One panel should be installed in each pump house. The work is to be carried out on the approved drawing and design.

C. CONSTRUCTION OF CIVIL WORKS

Construction of Civil works shall be as per approved drawings & design as per CPHEEO Water Supply Manual, PWD specification and technical specification of Tender Document. The contractor shall submit lay out drawing and design for approval and work should be executed as per approved drawing and design.

D. ELECTRICAL WORK (Panel & Starter):

One panel should be installed in each pump house. The requirement shall be as per requirement of BOQ and approved drawing and design. The work is to be carried out on the approved drawing and design. Some of the required items may not be mentioned separately in the BOQ (price Bid), they are included in the item for Supply of panel and related EMI Work.

E. OPERATION AND MAINTENANCE

The contractor shall have to operate and maintain entire scheme which include existing and proposed works for its full design capacity as directed by Engineer In Charge. This includes but not limited to repair of pipe lines, cleaning of reservoir, Operation of valves, breakdown and preventive maintenance of pump sets, upkeeping of civil works etc. The department shall provide chemicals for disinfection and electricity free of cost to contractor.

All other material required for successful operation and maintenance shall be arranged by contractor at its own expense. Contractor shall also be responsible for effective monitoring of the system and shall take water samples regularly as directed by EIC and get them tested from PHED Laboratory. The fees of testing if any shall be borne by department. The contractor shall have to keep record of such sampling.

He shall have to maintain and keep the record of Log Books of the Pump House/ TW etc. as per direction of EIC.

Preventive and Breakdown Maintenance of Solar System to keep it working in optimum condition and give desired rated output.

F. SAFETY MEASURES

Hon'ble Supreme Court in the Writ Petition (Civil) No. 36 of 2009, vide its order dated 11.2.2010 has given following guidelines / safety measures to be strictly observed:

- a. The department before taking any step for constructing bore well/ tube well must inform in writing at least 15 days in advance to the concerned authorities in the area, i.e. District Collector about the construction of bore well/ tube well.
- b. Registration of all the drilling agencies, viz, Govt. /Semi Govt. /Private etc. should be mandatory with the district administration.
- c. Erection of signboard at the time of construction near the well with the following details:-
 - (a) Complete address of the drilling agency at the time of construction/ rehabilitation of well
 - (b) Complete address of the user agency/ owner of the well.
- d. Erection of barbed wire fencing or any other suitable barrier around the well during construction
- e. Construction of cement/concrete platform measuring 0.50x 0.5x 0.60 meter (0.30 meter above ground level and 0.30 meter below ground level)around the well casing.
- f. Capping of well assembly welding steel plate or by providing a strong cap to be fixed to the casing pipe with bolts and nuts.

- g. In case of pump repair, the tube well should not be left uncovered.
- h. Filling of mud pits and channels after completion of works.
- i. Filling up abandoned bore wells by clay/sand/ boulders/pebbles/drill cuttings etc. from bottom to ground level.
- j. On completion of the drilling operations at a particular location, the ground conditions are to be restored as before the start of drilling.
- k. District Collector should be empowered to verify that the above guidelines are being followed and proper monitoring check about the status of boreholes/tube wells are being taken care through the concerned State/Central Government agencies.
- l. If a tube well is 'abandoned' at any stage, a record must be kept by EIC that the 'abandoned' tube well is properly filled up to the ground level. Random inspection of the abandoned wells is also to be done by the Executive Engineer of the department. Information on all such data on the above are to be maintained in the division office of PHED.
- m. The abandoned tube well or bore well is to be properly filled up to the ground level by the tenderer.

All above instructions/ works are to be strictly followed by tenderer for which no separate payment will be made to the tenderer by the department. The tenderer has to quote his rates accordingly.

**Additional Chief Engineer PHED
Region II Jaipur**

TECHNICAL SPECIFICATIONS

1. **CENTRIFUGALLY CAST D.I. (SPUN) PIPES (As per IS 8329:2000, amended up to date)**

1. **SCOPE**

Centrifugally Cast (SPUN) Ductile Iron Pressure Pipes for water with socket Spigot ends and tyton joints conforming to IS 8329:2000 in standard working lengths of 5.5 & 6m for classification K-7 & K-9 as per details given below suitable for Push on-Joint (Rubber Gasket D Jointing) with cement mortar lining inside the pipes. The Scope includes supply of ISI marked EPDM quality Rubber Gaskets (5% in excess of the requirement for jointing ordered pipes).

2. **REFERENCE**

- 2.1 The Indian Standards listed in 'Annexure-C1' are required to be referred with IS 8329:2000.

3. **MATERIAL**

- 3.1 The material used for manufacturing the pipes shall be of good quality, commensurate with the mechanical requirements laid down in clause 10 of IS 8329:2000. It shall be centrifugally cast (spun) pipes and be heat-treated in order to achieve the necessary mechanical properties and to relieve casting stresses caused due to the method of manufacture and repair work.
- 3.1.1 If necessary the pipes may be subjected to reheat treatment to ensure that Brinell hardness does not exceed the specified value and the other mechanical properties specified in the standard are achieved.
- 3.2 The pipes shall be stripped with all precautions to avoid warping or shrinkage defects, detrimental to their good quality. The pipes shall be sound and free from surface or other defects.

4. **CLASSIFICATION**

Pipes shall be classified by a whole number coefficient 'K', the value of which depends on service conditions and manufacturing process. For the requirement of this NIT the pipes shall be of class 'K-7 & K-9'.

5. **SIZE**

- 5.1 The Standard nominal diameter (DN) of pipes under scope of these specifications is as follows:- 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 750, 800, 900, 1000, 1100.
- 5.2 Critical dimensions for socket and spigot of pipes for push-on flexible joints for class K-7 & K-9 are as per table-2 of IS 8329:2000.

6. **DIMENSIONS OF PIPES**

- 6.1 Length:-
The standard working length of socket and spigot pipes shall be 5.0m, 5.5m and 6m.
- 6.2 Internal Diameter:-
The nominal value of the internal diameters of centrifugally cast pipes expressed in millimeters are approximately equal to the numbers indicating their nominal sizes(DN).
- 6.3 Wall thickness:-
The nominal wall thickness of pipes shall be as per table 2 or be calculated as a function of the nominal size (DN) as per clause 4.3 of IS 8329:2000.

7. **TOLERANCES**

- 7.1 Diameter:
7.1.1 External diameter:

The value of external diameter (DE) of the spigot end of socket & spigot pipes and when measured circumferentially shall confirm to the requirement as per clause 12 of IS 8329:2000. The positive tolerance is + 1mm and applies to all sizes for thickness class K-7 & K-9. Whereas the negative tolerance of the external diameter depends on the design of each type of joint shall be limited as per table -7 of IS 8329:2000.

7.1.2 For requirement of interchange-ability all pipes should be within the tolerance specified. Push-on flexible joints may need closer tolerance for its effective performance.

7.1.3 In addition, the ovality of the spigot end of pipes shall (i) remain within the tolerances on DE for DN 80 to 200. (ii) not exceed 1 percent for DN 250 to 600 (iii) not exceed 2% for DN above 600.

7.2 Tolerance on ovality:

7.2.1 Pipes shall be as far as possible circular internally and externally. The tolerance for out-of-roundness of the socket and spigot ends in the jointing zone for push-on-joints is as per table -8 and for mechanical joints as per table-9 of IS 8329:2000.

7.3 Tolerance on Thickness:

The tolerance on the wall thickness (e) and the flange thickness (b) of the pipes shall be as per clause 15.4 of IS: 8329-2000.

7.4 Tolerance on length:

The tolerance on length of pipes shall be as below:-

Type of Castings	Tolerance (in mm)
Socket & Spigot and Plain ended pipes	± 100

8. JOINTS

Push-on-joints shall be as per clause 6.1 of IS 8329:2000.

9. RUBBER GASKET

9.1 Rubber gasket used with push-on-joints shall conform to IS: 5382. Other requirements of gaskets are as per clause-8 of IS 8329:2000. Rubber Gaskets to be ISI marked EPDM quality.

10. SAMPLING

10.1 Sampling criteria for various, tests, unless specified in IS 8329:2000, shall be as laid down in IS: 11606.

11. TESTS

All tests prescribed in IS 8329:2000 shall have to be carried out.

NOTE: 1) Hydrostatic test shall be witnessed on all samples drawn not withstanding 100% Hydrostatic tests by manufacturer.

2) Note 1 below 10.1.6 be read as "0.2% proof stress shall be measured and shall not be less than 300 Mpa."

3) Note 2 below clause 10.1.6 shall not be applicable.

12. External protection shall be of Metallic zinc with finishing layer as included in Annex.'A' of IS 8329:2000 as per its clause 16.2.

13. INTERNAL LINING

The pipes shall be with cement mortar internal lining as per clause 16.3/ Anneuxre 'B' of IS 8329:2000.

14. MARKING

14.1 Each pipe shall have as cast or stamped on legibly and indelibly painted. The marking shall show the following:-

- (i) The Manufacturer's name or trade mark on each pipe.
- (ii) The nominal diameter of pipes.
- (iii) Batch Number.
- (iv) Class of Pipes: K-7 & K-9.
- (v) ISI certification mark on each pipe.
- (vi) Rising Main pipe (in case of ED exemption only, to distinguish from ED applicable pipes)
- (vii) Purchaser's name i.e. "PHED KDL RAJASTHAN" on each pipe.
- (viii) Any important information that the manufacturer deems fit to be inscribed on pipe.
- (ix) Year of purchase.

NOTE: Wherever there is reference of IS No. it shall be considered amended up to date at the time of inspection of supply/ replacement by inspection agency. Any amendment shall be effective only when it is implemented by BIS.

2. SOLAR SYSTEM

Supply, installation, testing and commissioning of MNRE approved Grid tied Solar Panels with inverter, meter, cable etc. suitable for Rooftop as well as Utility Scale Solar Power Projects with 25 years of Linear Generation warranty.

Work includes Designing of solar panel area and MS frame and foundation on ground/roof of Pump house or CWR, showing arrangement of panel in available space, installation of PV module on MS frame as per approved design and drawings. Mounting structure shall be suitably designed to withstand wind velocity up to 150km/hr.

Grid Tie Transformer less inverters, Multiple independent MPPTs, Peak efficiency of >98%. Connect up to multiple strings PV arrays, Easy & fast connection, Built-in string-level monitoring, IP65 protection level, Wi-Fi / internet based remote monitoring with 5 years warranty.

All cabling up to panel and metre, earthing etc. required accessories and taxes are inclusive. The work shall be executed as per detailed technical specifications, approved drawing and direction of Engineer in Charge.

Note: There shall be 5-year service warranty for panel, inverter, meter, cable etc. and suitable provision shall be included in tender document.

3. FLOW METERS (MECHANICAL)

1. SCOPE

The Flow Meter shall be as per ISO 4064/1 and shall also conform to IS code 2373 : 1981 (latest proposed 4th revision draft specifications under approval, which specify that terms used in the code are as per ISO 4064/1 :1993 and EEC Council directive. The meter will be Magnetic type Class B with removable mechanism. The meter will have hermetically sealed register press, which will be waterproof, and the unit will be provided with maximum corrosion protection. The consumption registering mechanism shall be removable without interrupting supply of water.

The Flow meter shall be of modular Range compatible radio reading device.

2. CASING

The casing of the meter shall be made of cast iron conforming to FG 200 of IS 210: 1978.

3. CONNECTIONS

The water meter shall be provided with flanges at both the ends as per IS 1538 : 1993 (latest revision), the internal diameter of which shall be equal to the nominal size of the meters.

4. IMPELLERS

The impeller shall be of tensile brass conforming to IS 320: 1980 or stainless steel conforming to designation 07 Cr 18 Ni 9 of IS 6911 (Part V): 1992 or nickel alloys conforming to IS 4131: 1963. The

impeller of meter shall be of suitable plastic and shall be accurately balanced and shall work with as low a frictional resistance as possible.

5. GEARS

The gears shall be so constructed as to fully and smoothly mesh with each other and shall be firmly fitted on their shaft. Gears coming in contact with water shall be of stainless steel conforming to 07 Cr 18 Ni 9 of IS 6911 (Part V): 1992 or plastic conforming to clause 6.1.1 of IS code 2373: 1981 (latest proposed 4th revision draft specifications under approval).

6. BEARINGS

The bearings shall be of agate, sapphire or graphite filled with ebonite suitably ground and polished.

7. COUNTING MECHANISM

The registration mechanism shall be hermetically sealed and the counting mechanism shall be of straight reading cyclometer type counter. The rollers of cyclometer counter shall be made of nickel or plastic specially suitable for the purpose and shall be self lubricating. The meter shall have a range of registration of minimum 10 liters and maximum 100 million liters.

8. DIAL

The dial shall be of vitreous enamel, copper or suitable plastic ensuring indestructible markings and good legibility. The unit of measurement in Kilo Liters shall be marked on dial in boldface.

9. REGULATOR

The meter shall be provided with an external regulating device with a suitable key. Serial number of the meter shall be clearly indicated at a suitable place.

10. TEMPERATURE AND HYDROSTATIC PRESSURE

The meter shall be suitable for use with water up to 45 °C. It shall satisfactorily withstand a pressure of 1.6 MPa.

11. ACCURACY

The metering accuracy shall be + 2 % and shall be complied with at least up to intermediate flows.

12. MARKINGS

Each meter shall be marked with the following information:

- (a) Manufacturers name or Trade Mark
- (b) Nominal size
- (c) Direction of flow of water on both sides of meter

SPECIFICATIONS FOR L, J AND SECTIONAL TESTING OF PIPELINES

General

The contractor will inspect the route along which the pipe line is proposed to be laid. Efforts shall be made by the contractor to make minor deviations from the marked alignment so as to keep the pipe alignment as straight as possible and to avoid damage of public and private properties along the alignment. The alignment of pipe line and location of specials & chambers may be changed at site in co-ordination and with prior approval of the Engineer In Charge. The final alignment on which the pipeline shall be laid shall be marked in field and got approved from the Engineer in Charge or his representative.

Where ever 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 relevant standards). The alignment as proposed should be marked on ground with a line of white chalk and got approved from Engineer In-Charge. The position of fittings, valves, shall be as per directions of engineer-in-charge.

The quality of pipes, inner mortar lining and the quality of laying shall ensure that the considered co-efficient of friction of value ($C_f=1$) is obtained during the designed period, so that the design is validated and the designed quantities of flow can be delivered. Thus the contractor shall ensure that the conditions of pipes its lining and the laying are perfect in all respect.

Standards

Except 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. The laying of pipeline shall be done in confirmations to the following standards:

IS 6530-1972 for AC Pressure pipe lines.
IS 7634 for uHDPE Pressure pipe lines.
IS:12288:1987 FOR Ductile Iron Pipes lines
IS7634 for HDPE Pipes lines

Alignment and the L-Sections

The slopes provided shall be such that in existing ground level conditions, the maximum cover over the laid pipe is neither more than 1.5 m nor less than 0.9 m, if the pipe is to be laid above ground. The average cover generally should not be less than 0.9 meters. In case of AC/uHDPE pipes, the pipes shall have a minimum cover of 900 mm when laid under roads with light traffic or under cultivated soils and 1.25 m when laid under roads with heavy traffic. When the soil has poor bearing capacity and is subject to heavy traffic, the pipes shall be laid on a concrete cradle.

Tools and equipment

Earth Work

General

The Contractor shall furnish all tools, plant, instruments, qualified supervisory personnel, labour, materials, any temporary works, consumables, any and everything necessary, whether or not such items are specifically stated herein for completion of the work in accordance with the Departments Requirements.

The excavation shall be carried out to correct lines and levels. This shall also include, where required, proper shoring to maintain excavations and also the furnishing, erecting and maintaining of substantial barricades around excavated areas and warning lamps at night.

Excavated material shall be dumped in regular heaps, bunds, riprap with regular slopes within the lead specified and leveling the same so as to provide natural drainage. Rock/soil excavated shall be stacked properly as approved by the Engineer in Charge. As a rule, all softer material shall be laid along the center of heaps, the harder and more weather resisting materials forming the casing on the sides and the top. Rock shall be stacked separately.

Topsoil shall be stock piled separately for later re-use.

Clearing

The area to be excavated/filled shall be cleared of fences, trees, plants, logs, stumps, bush, vegetation, rubbish, slush, etc. and other objectionable matter. If any roots or stumps of trees are encountered during excavation, they shall also be removed. The material so removed shall be disposed off as approved by the Engineer in Charge. Where earth fill is intended, the area shall be stripped of all loose/ soft patches, top soil containing objectionable matter/ materials before fill commences.

Pipe Laying below Ground

Trench Excavation

General

The earth work shall be carried out as specified above.

Before excavating the trench the alignment of pipeline and L-section shall be approved by Engineer-in-Charge. 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 3 days ahead of work of laying and jointing of pipeline unless otherwise directed by the Engineer-in-Charge. It is proposed to ensure the following:

Safety precautions have to be incorporated in the work process

Hindrances to the public have to be minimized

The trench shall not be allowed to erode

The trench must not be filled with water

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.

Trench Excavation For Laying Pipeline below ground

The trench excavation of pipe line shall be in accordance with IS 6530-1972 for AC pipes and IS 7634 for uHDPE pipes /or as per the general provisions given above. Pipe trenches shall be excavated to the lines and levels approved by the Engineer in Charge. The width of the trench at bottom between the faces of sheeting shall be such as to provide minimum 200 mm clearance on both sides of the pipe. 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 walls of the trench shall be cut to stable side slopes preferably to a slope of $\frac{1}{4} : 1$ or $\frac{1}{2} : 1$ depending on the nature of soil.

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. For trench bottom with boulders or rock, sand bedding as per details detailed herein after shall be provided.

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 drive ways.

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 under ground 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 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 in sandy or loose formations.

Trench excavation to commensurate with the laying progress

The work of trench excavation should be commensurate with laying and jointing of the pipe line. 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 to the pipe grades so that uniform support is assured for the full length of the pipe.

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.

Adequate soil cushion of minimum 15 cm depth shall be provided under the pipes if the strata, on which the pipes are laid, are rocky. The soil used for cushion should be free from stones, lumps and other hard objects that may injure the pipes or their coating.

Laying and jointing of pipes Below Ground

General

Before commencing the work the bidder shall submit the proposed L-Section and plan for approval of Engineer in Charge. No work shall be taken until such approval is received. The pipe laying shall be as per the approved L-Section. The pipes will be cleaned in the whole length with special care of the spigot and sockets/other ends 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 / or with permissible deflection as prescribed in the respective pipe material code between bends and/or between high and low points.

The pipes shall rest continuously on the bottom of the trench. The pipes should not rest on lumps of earth or on the joints.

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 with 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.

Where the gradient of the bed slopes is more than 15 degrees, it may be necessary to anchor pipes against their sliding downwards, by providing suitable gradient blocks and straps. Suitable cut off walls shall also be provided in these sections to protect the trench soil to be washed out during rains.

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 pipe line 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.

Laying and jointing of pipes

The laying of AC pipes as per IS 6350 and IS 7634 for uHDPE pipes. However the specific references given herein shall prevail on the provisions of the standards. 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.

Back filling and tamping of the pipe trench

Back-filling of trenches shall be done as specified below with watering and compacting in layers under "Optimum Moisture Content" conditions to achieve required density of refilling and strength after compaction. For the purpose of back-filling, the depth of the trench shall be considered as divided into the following three zones from the bottom of the trench to its top:

Zone A: From the bottom of the trench to the level of the centre line of the pipe

Back-filling by hand with sand, fine gravel or other approved material placed in layers of 150 mm and compacted by tamping. The back-filling material shall be deposited in the trench for its full width of each side of the pipe, specials and appurtenances simultaneously. Special care shall be taken to avoid damage of the pipe and the coating or moving of the pipe.

Zone B: From the level of the centre line of the pipe to a level 300 mm above the top of the pipe

Back-filling and compaction shall be done by hand or approved mechanical methods in layers of 150 mm, special care shall be taken to avoid damage of the pipe and the coating or moving of the pipe.

Zone C: From a level 300 mm above the top of the pipe to the top of the trench.

Back-filling shall be done by hand or approved mechanical methods in 15 cm layers after compacting and carried to the level necessary to allow for the temporary restoration of road and path surfaces, and also for hard-core (if and where ordered) on roads or to such level as will leave the requisite space for the top soil, road surface etc. to be reinstated as directed by the Engineer in Charge.

Where the excavation is made through permanent pavements, curbs, paved footpaths, or where such structures are undercut by the excavation, the entire back-fill to the sub grade of the structures shall be made with sand in accordance with IS 12288 and IS 6530. for AC pipes and IS: 7634 for uHDPE pipes.

The excavated material may be used for back-fill in the following cases, provided it complies with clause 10 of IS 6530 for AC pipes and 7634 for uHDPE pipes.

- a) In Zone C: In cases where settlement is unimportant the back-fill shall be neatly rounded over the trench to a sufficient height to allow for settlement to the required level.

- b) In any zone, when the type of back-fill material is not indicated or specified, provided that such material consists of loam, clay, sand, fine gravel or other materials which are suitable for back-filling in the opinion of the Engineer In Charge.

All excavations shall be backfilled to the level of the original ground surfaces unless otherwise ordered by the Engineer in Charge, and in accordance with the requirements of the specification. The material used for backfill, the amount thereof, and the manner of depositing and compacting shall be subject to the approval of the Engineer in Charge, but the Contractor will be held responsible for any displacement of pipe or other structures, any damage to their surfaces, or any instability of pipes and structures caused by improper depositing of backfill materials.

Trenches shall be backfilled with selected material placed in layers not exceeding 15 cm in thickness after compacting, wetted and compacted to a density of not less than 90 percent of the maximum dry density at optimum moisture content for zone A, Zone B and Zone C of the surrounding material. Any deficiency in the quantity of material for backfilling the trenches shall be supplied by the Contractor at his expense. Water for compaction shall be arranged by the contractor at his cost.

The Contractor shall at his own expense make good any settlement of the trench backfill occurring after backfilling and until the expiry of the defects liability period.

On completion of pressure and leakage tests exposed joints shall be covered with approved selected backfill placed above the top of the pipe and joints in accordance with the requirements of the above specifications. The Contractor shall not use backfilling for disposal of refuse or unsuitable soil.

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

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.

Sand Bedding

The pipeline shall generally be laid in ordinary sandy soil for which no extra bedding shall be provided. In such case, while doing the excavation, the bottom of the trench shall be prepared in a manner so as to match the curvature of the pipe as far as possible subtending an angle of about 120° at the centre of pipe. Wherever the bottom of the trench is of such a nature (i.e. decomposed rock/ hard soil/ boulder) which is likely in the opinion of the Engineer-in-Charge to cause damage to the pipe or coating or an unsuitable material is encountered which cannot support the pipe, the contractor shall excavate the trench to an additional depth below the required depth and shall refill to required level with suitable material such as loose soil/ sand, to be approved by the Engineer-in-Charge. The bedding thickness shall be not less than 15 cm under the barrel of the pipes. The complete pipe has to be covered and surrounded by the same material as used for bedding so that a total cover of 30cm above the barrel can be achieved as shown in the drawing in volume III. The excavated hard/dense soil can be refilled after bedding and covering of the pipe with the loose soil/sand.

The bedding shall be compacted with a light hand rammer. Any reduction in thickness due to compaction shall be made up by adding sand during ramming. For the purpose of the bedding under this item only screened fine sand of grain size not larger than 2mm shall be used. The sand shall be clean, uncoated and free from clay lumps, injurious amounts of dust, soft particles, organic matter, loam or other deleterious substances.

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. Nominal steel shall be provided as per the provisions of CPHEEO manual and the construction of block shall be done in M15 grade of concrete.

Testing of the 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. 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, and other chamber).

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:

Complete setting of the thrust blocks.

partial backfilling and compaction to hold the pipes in position while leaving the joints exposed for leakage control

opening of all intermediate valves (if any)

fixing the end pieces for tests and after temporarily anchoring them against the soil (not against the preceding pipe stretch)

at the lower end with a precision pressure gauge and the connection to the pump for establishing the test pressure

at the higher end with a valve for air outlet

If the pressure gauge cannot be installed at the lowest point of the pipeline, an allowance in the test pressure to be read at the position of the gauge has to be made accordingly

Slowly filling the pipe from the lowest point(s).

the water for this purpose shall be reasonably clear and free of solids and suspended matter

Complete removal of air through air valves along the line.

Closing all air valves and scour valves.

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- i. Complete setting of the thrust blocks.
- ii. partial backfilling and compaction to hold the pipes in position while leaving the joints exposed for leakage control
- iii. opening of all intermediate valves (if any)
- iv. fixing the end pieces for tests and after temporarily anchoring them against the soil (not against the preceding pipe stretch)
- v. at the lower end with a precision pressure gauge and the connection to the pump for establishing the test pressure
- vi. at the higher end with a valve for air outlet
- vii. If the pressure gauge cannot be installed at the lowest point of the pipeline, an allowance in the test pressure to be read at the position of the gauge has to be made accordingly
- viii. Slowly filling the pipe from the lowest point(s).

- ix. the water for this purpose shall be reasonably clear and free of solids and suspended matter
- x. Complete removal of air through air valves along the line.
- xi. Closing all air valves and scour valves.
- xii. Slowly raising the pressure to the test pressure while inspecting the thrust blocks and the temporary anchoring.
- xiii. Keeping the pipeline under pressure for the duration of the pre-test / saturation of the lining by adding make-up water to maintain the pressure at the desired test level. Make up water to be arranged by Contractor himself at his own cost.
- xiv. Start the test by maintaining the test pressure at the desired level by adding more make-up water; record the water added and the pressure in intervals of 15 minutes at the beginning and 30 minutes at the end of the test period.
- xv. Water used for testing should not be carelessly disposed off on land which would ultimately find its way to trenches.
- xvi. The field testing pressures for pipelines & duration of test shall be follows:

S.No	PIPE MATERIAL	MAXIMUM WORKING PRESSURE	TEST PRESSURE	TEST DURATION
1.	uHDPE PIPES	6.0 kG / Sqcm	1.5 TIMES THE WORKING PRESSURE	30 SEC (Pipe to be filled for 24 hours before testing)
2	AC PIPES	7.5 kG / Sqcm	1.5 TIMES THE WORKING PRESSURE	30 SEC (Pipe to be filled for 24 hours before testing)
3	DI Pipe	8.0 kG/ Sqcm	1.5 TIMES THE WORKING PRESSURE	30 SEC (Pipe to be filled for 24 hours before testing)
4	HDPE Pipe	6.0 kG/ Sqcm	1.5 TIMES THE WORKING PRESSURE	30 SEC (Pipe to be filled for 24 hours before testing)

The acceptance criteria for pipes shall be that the pressure test pressure should be maintained for test duration.

The sectional tests shall be accepted if the quantity of water required to be added to maintain test pressure during test duration of

No section of the pipe work shall be accepted by the Engineer in Charge until all requirements of the test have been obtained.

For pipes, the test pressure shall be kept as 1.5 times the actual operating pressure. Maximum field test pressures shall be as per table of relevant IS Code. After the line is filled,, it should be allowed to stand for 24 hours, before pressure testing and the line shall again be filled. The test pressure shall gradually be raised at the rate of one kg sq cm/min

When the field test pressure is less than 2/3 the works test pressures the period of test should be at least 24 hours. The test pressure shall be gradually raised at a rate of 0.1 N/mm² per minute.

If a drop in pressure occurs, the quantity of water added in order to reestablish the test pressure should be carefully measured. This should not exceed 0.1 liter/ mm of pipe diameter per km of pipeline per day for each 30 m head of pressure applied.

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

Pre-Commissioning & Commissioning Tests

After successful sectional testing & leakage test, Pre-Commissioning & commissioning tests shall be performed when the work in the section is completed in all respect and the gaps / interconnections are made. These tests shall be performed as per the procedure and provisions given in Chapter 12 of this document.

Sequence of works for ensuring good pipe laying

The required fittings, valves and jointing material should be carefully worked out in beginning. This material should be received in full first of all on site and stored as per directions of manufacturer or as directions given elsewhere in this manual on Standards.

The pipes should be received on site only after the above fittings, valves and material for joints has been received and all necessary preparation for laying has been made.

The material received should be checked for inspection certification as per contract and damage during transportation. All damaged material should be separated and not used.

The pipes received should be stored strictly as per directions of the manufacturer or as mentioned elsewhere in this manual or standards.

The pipes and other material should be again inspected for any damage before use in the trench.

The fittings and valves should be installed in sequence with the laying of pipes without leaving any gaps.

It is desirable to lay the pipe lines from the end from where it can be connected to the water source to enable regular flushing of laid pipes.

The entry of dirt or any foreign material in the pipe should be religiously prevented.

Each joint should be carefully checked for its completeness before covering up.

There should be a commensurate progress in trench excavation, laying and jointing of pipes, fittings, valves etc. and testing of laid pipes in sections so as to complete testing of all pipes laid in quick follow up of completing laying and jointing.

Disinfection of pipe lines should be carried out before commissioning.

Damage to Public Utilities

All precautions shall be taken during excavation and laying operations to guard against possible damage to any existing structure/pipeline of water, gas, sewage etc. After excavation of trenches, pipe shall not be lowered unless the dimensions of trenches and bedding for work for pipes at the bottom of the trenches are approved by Engineer-in-Charge. Pipes and fittings/specials shall be carefully lowered in the trenches. Special arrangements such as cranes, tripods with chain pulley block for lowering the pipes and fittings/specials shall be made by contractor. In no case pipes and fittings/specials shall be dropped.

Reinstatement of Road/ Footpath

Wherever the road is required to be cut, the Deptt. shall obtain prior permission from the concerned authorities. The Contractor has to prepare a negotiable diversion, at his cost, before taking up road cutting. After the line has been laid and the trench refilled to the original level, the traffic may be allowed to pass through. After the pipe is laid the road must be properly re-graded and the damaged portion of road as well as the re-graded portions must be made good.

Clearing the Site

All surplus materials, and all tools and temporary structures shall be removed from the site as directed by Engineer-in-Charge and the construction site left clean to the satisfaction of Engineer-in-Charge.

Damage to Other Services

Contractor shall take the necessary precautions avoid the damage to other services such as water supply lines, telephone cables, electrical cables, storm water drains etc. in case of any damages to any of the services, contractor shall be responsible for restoring the facilities in bare minimum time at his own cost. The other utility services and traffic shall be maintained as per standard engineering practices.

Civil Works

Grade of Cement:

For construction of Valve Chambers, Anchor blocks, pedestal support and thrust blocks, M20 grade of concrete shall be used. The leveling course, wherever provided shall be of M10 grade.

Chambers for valves on pipe line

General

The valve chamber shall be provided to house the different valves. A leveling course of 100 mm thick PCC (1:3:6) shall be provided at the base.

The general arrangement is shown in the drawing of chambers of the Tender document. At all important chambers locking arrangements shall be provided, such locations shall be given by Engineer in Charge. The walls shall be designed to withstand lateral earth pressures. Pre-casted removable Ferro cement covers shall be provided to provide access within the chamber.

The chambers shall be constructed after the laying of the pipes and the assembly of specials and valves. The size of the chambers shall be according to the following criteria as per direction of engineer in charge.

Construction Features

The minimum clear opening of the valve chambers shall be as tabulated below:

Size of Valve in mm	Minimum dimensions In direction of flow in mm	Minimum dimensions across the direction of flow in mm
80-100	900	1200
150-300	1200	1200

The valve chambers shall be made of M15 grade of concrete or in stone or brick masonry as per directions of Engineer in Charge.

Thrust blocks / Anchor Block

It is proposed to provide anchorage in the form of “thrust block” at each deflection in horizontal as well as in vertical alignment of the pipeline as per requirement of designs, which shall resist the unbalanced pressure at bends. Gravity type of thrust blocks shall be provided at horizontal and vertical deflection in pipeline and shall be designed according to the test pressure and the soil conditions at the site of the thrust block. The thrust shall be according to the field test pressure of the pipe, acting on the outer diameter including the compressed rubber gasket. Before designing the thrust block the Contractor, in coordination with the Engineer-in-Charge shall assess the stability of the soil considering erosion due to wind and water.

The thrust blocks shall be of concrete M15 or grade as specified in IS 456, cast on site with surface reinforcement of about 5 kg/m². The calculations for the dimensioning and the shape of the thrust blocks have to be approved by the Engineer-in-Charge.

Design of thrust block shall be done in accordance to the provisions laid down in IS 5330-1984.

The thrust blocks shall be of reinforced cement concrete on site as per design and drawings to be approved by Engineer.

4. PRESSURE GAUGES

1. SCOPE:

The Pressure Gauge shall conform to IS 3624: 1987 dial type indicating pressure gauge. The elastic pressure responsive element shall be Bourdon Tube.

2. NOMENCLATURE:

The gauge shall be direct mounting type.

3. TERMINOLOGY:

3.1. The gauge shall be pressure gauge to measure and indicate pressure greater than atmospheric using atmospheric pressure as the datum point.

3.2. Service Classification:

The gauge shall be designed to measure and indicate the hydrostatic head of a liquid. The dial shall be graduated in units of head height such as meters of water.

3.3. Pressure Element:

The gauge shall have Bourdon tube as pressure sensing element in the form of a curved tube, which changes its curvature with changes in internal pressures.

3.4. Method of Mounting:

The gauge shall be of direct mountings type in which it is mounted and supported by its screwed connection. The screwed connection shall be at the bottom of the periphery of the case.

3.5. Components:

3.5.1. Baffle Wall

The baffle wall shall be provided as a barrier in between sensing element and dial so that in pipe event of leakage or burst in the pressure responsive element, the blast would be dissipated away from the front.

3.5.2. Bezel ring:

Bezel ring shall be provided and fitted. It shall be removable from the case.

3.5.3. Blow-out device:

A safety device shall incorporated in the case to permit the rapid and safe dissipation of internal pressure in the event of a leakage or burst in the pressure sensing element.

3.5.4. Case:

This is an outer casing which contains the pressure responsive element and the movement.

3.5.5. The gauge shall also have connecting link, connection, dial, element anchorage, movement, pointer, Pointer stop, removable back plate, scale, shank, window, zero adjustments etc.

3.5.6. Over range Protection:

A device shall be provided to protect the measuring element is the event of over pressure and also to prevent disengagement of the movement gearing. This may be in the form of internal stops.

3.5.7. Nominal diameter of gauge:

The gauge shall have 100 mm diameter dial and concentric scale.

3.5.8. Range of gauge:

The gauge shall have a range of 0 -10 Bars (0 -100 meters of water head) and fluctuating and steady reading of 6.5 and 7.5 Bars respectively.

4. MATERIAL OF CONSTRUCTION:

The material of construction shall be as per IS 3624:1987 suitable for measuring and indicating water pressure in horizontal pipes.

5. DIMENSIONS FOR THE SHANK AND SCREWED CONNECTION:

As per IS : 3624 , 1987. The diameter shall be 3/8".

6. SPECIFICATION FOR PRESSURE GAUGES

1.	Manufacturing Standard	IS 3624 : 1987
2.	Type	Industrial, Weather Proof, Bourdon
3.	Accuracy	$\pm 1 \%$
4.	Pressure range	0 to 10 Kg / cm ²
5.	Numbers	50 Nos (1 on each tube well)
6.	Dial Size	100 mm
7.	Case	Die Cast Aluminum
8.	Dial Display	Background-White, Pressure Rate Marking-Black
9.	Bourdon Material	SS304
10.	System	SS304
11.	Connection	10 mm (NPT)
12.	Accessories	Nipple, 10 mm 3 way gauge cock

5. SPECIFICATION OF CAST IRON AIR VALVE

1. SCOPE

This specifications covers the supply of single and double air valves conforming to fig. H-4 and H-40 of G.K. Catalogue in size 25mm to 200mm.

2. SINGLE AIR VALVES (25mm)

- 2.1. C.I. small orifice type single air valve in size 25mm conforming generally to fig.H-4 of G.K. Catalogue. The BUOYANT ball will rest on a bronze/extruded brass orifice nipple. The BUOYANT ball will have a timber core with rubber covering. It shall have G.M./Brass screwed nipple at bottom with 1" BSP thread.

The dimensions/pressures etc. shall be as under.

Ball dia	Dimensions in inches min			Max. W.P. Kg/Cm ²	App. Wt. in Kg. H-4
	A.	B.	C.		
3 7/8"	10"	5 3/4 Sq	1(25mm)	10	10.5

Assemblies tested hydraulically for strength to 20 Kg/Cm²

3. DOUBLE AIR VALVES ; (Size 40 mm to 200mm)

- 3.1 The Air Valve shall be of double orifice type conforming to Fig. H-40 of G.K. Catalogue. The small orifice BUOYANT ball for high pressure chamber will rest on a bronze/ Extruded Brass orifice nipple. The BUOYANT ball will have a timber core with rubber covering. The large orifice ball for low pressure chamber will rest on Neoprene moulded seat. The ball shall have a timber core with valcanite covering.
- 3.2 The air valve shall be provided with an integral screw down type isolating valve. The operating rod shall be made from extruded high tensile brass of quality grade HT-1 as per IS:320-1980 (430 Mpa is minimum tensile strength and minimum elongation of 20% on 5.65 50 gauge length.)
- 3.3 All Flanges shall be drilled conforming to IS:1538-1976.
- 3.4 The dimension, size of valve, parts, test pressure, weight of different components ferrous and non-ferrous and total weight shall be as under.

Valve Size A.	Ball Large orifice	Dia. small orifice	Dimensions in inches			Max W.P Kg/	Total Wt. Kg.	Wt. of Non ferrous	Suitable For mains MM dia.
			B Max.	C Min.	D Min.				
40 mm	2 1/2"	3 1/8"	14 5/8"	7 5/8"	16 1/6"	10	24.5	0.900	Upto 100
50 mm	3"	3 7/8"	16 1/2"	7 5/8"	16 1/2"	10	40.0	1.250	125 to 200
80 mm	3 7/8"	3 7/8"	18 1/4"	8 5/8"	18 1/4"	10	54.0	1.750	225 to 350
100 mm	5"	5"	21 7/8"	10 3/4"	23 7/8"	12	83.0	2.600	400 to 500
150 mm	8"	5"	26 1/2"	17"	32 3/8"	12	153.0	3.600	600 to 900
200 mm	10"	5 1/2"	32 1/8"	20"	38 3/8"	12	317.0	5.000	1000to1200

Assemble tested Hydraulically for strength to 20 Kg./Cm

- 3.5 The cast iron for various parts shall be of grade FG-200 of IS 210/1973 (Amended upto date).
- 3.6 The non-ferrous parts except the orifice plug and spindle shall be made from Gunmetal as per IS: 318-1981 Grade LTB-2.(Amended up to date)

4. MANUFACTURE: (Applicable for single & Double Air Valves)

- 4.1 The Air Valves shall be manufactured according to modern workshop practice to give good finish high quality. The design of orifices and vents should ensure properly regulated flow of air.
- 4.2 Tolerance in weight -5% & + no limit.

5.0 TESTING

- 5.1 The valve should be tested to a hydrostatic test pressure, non shock type, of 20 Kg./Sqcm. for two minutes, before despatch. There shall be no permanent distortion of any component part under this test.

5.2 The Air Valve should be suitable for a working pressure 10Kg/Cm.

6.0 COATING:

- 6.1 Immediately after casting and before machining all cast iron parts shall be thoroughly cleaned and before rusting commences shall be coated with a composition having a tar base.
- 6.2 The coating shall be such that it shall not impart any taste, or smell to water. It shall be smooth, glossy, tenacious, sufficiently hard so as not to flow when expose to a temperature of 77 C and not so brittle at a temperature 15 C . As to chip off when scratched lightly with the point of a penknife.
- 6.3 Alternatively two coats of black Japan paint conforming to type 8 of IS: 341-1971 or paint conforming to type 2 of IS: 158-1968 shall be applied.

7. MARKING:

- 7.1 Each Valve shall have cast on it the following information:
- Manufacturer's name or trade mark.
 - Size of valve.
 - Year of manufacturing

SLUICE VALVES (AS PER IS 14846)

- 1 This section covers the requirements for non-rising stem type sluice valve as per IS 14846. The valves will be used for water supply on line installations in upright positions, up to 450 C working temperature, with double flange and cap or hand wheel, for manual operation. Manually operated sluice valves shall be provided as indicated in drawing according to the diameter and of class PN 1.0. The valves shall be installed between flanges. Dismantling shall be possible by the use of rigid or flexible dismantling pieces or flange adopter at one side

2 Nominal pressure and dimensions

Dimensions and mass of the sluice valves shall be in accordance with IS 14846. The flanges and their dimensions of drilling shall be in accordance with IS: 1538 (part-I to XXII).

3 Material

The material for different component parts of sluice valve shall conform to requirements given below:

1.	Standard	IS 14846:2000. And ISI marked.	
2.	Size range and quantity	As per Appendix to the data sheet	
3.	Fluid	Water	
4.	Rating	PN : 1.0 (10 Kg. / cm ²)	
5.	Stem	Non rising	
6.	Ends	Flanged, flat faced flanges as per IS-1538 Table IV & VI having off center bolt holes	
7.	Bonnet	Bolted	
8.	Disc.	Solid wedge	
9.	Operation	Hand wheel	
10.	Seat	Body - Renewable	Disc - Renewable
11.	Other requirements	Valves shall close in clockwise rotation of the hand wheel.	
12.	Body / bonnet	C.I. IS 210 GR 260	
13.	Disc	C.I. IS 210 GR 260	
14.	Stem	S.S. AISI – 410	
15.	Body seat	Bronze IS 318 GR LTB 2	
16.	Disc seat	Bronze IS 318 GR LTB 2	
17.	Stem nut	Bronze IS 318 GR LTB2	
18.	Stuffing box	C.I. IS 210 GR 260	
19.	Gland	C.I. IS 210 GR 260	
20.	Packing	Graphite Asbestos	

21.	Bolts, studs & nuts	Carbon Steel IS 1367 Class 4.6 / 4
22.	Shell test	15 Kg / Cm ²
23.	Seat test	10 Kg / Cm ²
24.	Back seat test	10 Kg / Cm ²

4 Coating

All sluice valves shall be coated by dipping in a bath of tar base composition as given in clause 7 of IS: 780 for sizes from 50 mm to 300 mm and clause 8 of IS : 2906 for sizes from 350 mm to 600.

All components susceptible to corrosion attack shall be coated internally and externally. Protective coating shall always be applied to the individual components before they are assembled, following shot blasting to give good adhesion.

5 Marking, testing and inspection

The standard marking and packing of the valves shall be done as per clause 10 and 11 of IS: 780. The direction of rotation for OPEN, CLOSE position shall be marked on the hand wheel and on the bonnet of the valve.

Testing of sluice valve shall be done for close end in accordance with IS: 780 for sizes from 50 mm to 300 mm and IS : 2906 for sizes from 350 mm to 600.

All the valves shall be inspected for flow detection test in accordance with IS : 780. for sizes from 50 mm to 300 mm and IS : 2906 for sizes from 350 mm to 600.

6. SOFT SEATED SLUICE VALVE

Manufacturing, supply and delivery of DI D/F Sluice Valves (Soft sealing Sluice Valve/Sluice Valve) with body and bonnet of ductile cast iron of grade GGG-40, wedge fully rubber lined with EPDM of grade W-270 (approved for drinking water) and seals of NBR. Stem of Stainless Steel 420 (1.4021) with rolled threading. The valves should be of vacuum tight under low pressure condition and 100% leak proof when shut. Face-to-face dimensions as per BS 5163-89 and flange connections as per BS 4504; resilient seated as per EN 1171. With replaceable stem nut and all the valves should be with electrostatic epoxy powder coating both inside and outside with pocket less straight through uninterrupted body passage.

- 1) Gate valve will be capable of buried applications without chamber Construction.
- 2) The wedge will have plastic rectangular sliding block at each side which ensures smooth travelling of the wedge and reduces the torque and wear and tear during operation.
- 3) Gate valves will have straight through pocket less body passage without any wedge sack.
- 4) Gate valves stem sealing will not be of gland packing type and the sealing is by 3 O-ring system which ensures 100% leak tightness under full testing pressure of 1,5 times the rated pressure.
- 5) As required by the department, the cut models of the valves should be presented for verification
- 6) The product shall have three year satisfactory performance certificate of State / central Government. The certificate shall be issued by Central / State Government official not below the rank of Executive Engineer .
- 7) The manufacturer having testing and manufacturing facilities in India.

Material of Construction:

Body	Ductile iron to EN-JS 1030 (GGG-40)
Wedge	Ductile iron to EN-JS 1030 (GGG-40), fully vulcanized with EPDM rubber [Grade-W 270]
Stem	Stainless Steel 420 with 13% chromium (1.4021), rolled thread
Stem Nut	Brass
Bonnet Gasket	EPDM Rubber grade W-270
Stem Sealing	3 O-rings of NBR

Surface Protection	Electro static epoxy powder coating min. 250 microns thickness, color RAL 5005 Blue.
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7. MS PIPES SPECIALS

1. MS PIPELINE

2. SPECIFICATIONS

This part of the specification covers manufacturing, supply, delivery, lowering, laying, jointing, internal lining, outer coating, testing and commissioning of mild steel pipes. Manufacturing of MS pipes shall be done in conformity with IS: 3589. The MS pipes shall be fabricated out of steel plates or strips of fresh mild steel coils, spirally welded / longitudinal welded, having butt-welded joints with beveled ends, as per IS 3589.

The minimum thicknesses of MS pipes to be provided in this project are 6mm.

"The outer surface shall be coated with high built epoxy paint to RDSO specification no. M&C/PCN/III/88 to give a dry film thickness of 250 microns".

3. MS SPECIALS

The MS specials, wherever required, shall be made out of MS pipes not less than 6mm thick and shall be internally and externally coated with anti corrosive paint with red oxide as primer coat.

4. MS LEAK REPAIR CLAMPS

The MS Leakage Clamps used during testing or maintenance shall be made out of 5mm thick MS strip and of appropriate width.

8. SPECIFICATION CI / DI SPECIALS FOR PIPE LINE

This part of specifications covers manufacturing, supply, delivery, lowering, laying, jointing, testing and commissioning of pipes.

CI / DI Specials such as Tee, tapers, spigots, puddle collars, bends etc. shall be confirming to IS 5531-1988 (Amended up to date).

The general requirements relating to the supply of material shall be as per IS 1387-1993. (Amended up to date)

The metal used for manufacture of specials shall be of requisite quality confirming to any of the grade specified in IS 210-1978 but in case of D/F fittings it shall be not less than that specified for grade FG-150 for IS 210-1978. (Amended up to date)

The castings shall be stripped with all the precautions necessary to avoid wrapping or shrinkage defects. The fittings shall be free from defects other than any unavoidable surface imperfections which result from the method of manufacture and which do not affect the use of the fittings.

In case of flanged joints, the flanges shall be at right angle to the axis of joint. The bolt holes shall be drilled.

The castings shall be such that they could be cut, drilled or machined and may be accepted provided the hardness of external un-machined surface does not exceed 215 HBS.

Mechanical tests shall be carried out during manufacture. Two tests per day of casting may be adequate.

Tensile tests and Brinell hardness tests shall be carried out as specified in IS 5531-1988. (Amended up to date)

Hydrostatic test shall be carried out as specified in IS 5531-1988 (amended up to date). For hydrostatic tests, the fittings shall be kept under pressure for 15 seconds; they may be struck moderately with a 700 gm hammer. They shall withstand the pressure test without showing any leakage, sweating or other defect of any kind. The hydrostatic test shall be conducted before coating the fittings.

Test Pressure for Plain End fittings as per IS 5531-1988 shall be equal to that for class of pipes with which they are to be used i.e. 1.5 Mpa.

All the dimensions and mass and tolerance in dimensions/ mass shall be as per IS 5531-1988.

After inspection and hydrostatic test, each fitting shall be with hot applied (dip) bitumen paint. Coating shall not be applied to any fitting unless its surface is clean, dry and free from rust. All fittings shall be coated externally and internally with same material. The coating material shall set rapidly with good adherence and shall not scale off. The inside coating shall not contain any constituent soluble in water or any in-gradient which could impart any taste or odour.

Each fitting shall have cast, stamped or indelibly painted on it following appropriate marks:

Manufacturer's name, initials or identification mark.

The nominal diameter.

Mass of fitting (for D/F fittings as per IS 1538)

The last two digits for the year of manufacture.

9. TECHNICAL SPECIFICATION OF CI PIPES

The working length of double flange CI pipes shall be 0.5m, 1m, 1.5m, 2m, 2.75m and 3.0m. The pipes shall be ISI marked, and shall be straight and permissible deviation from straight line shall be in accordance with IS : 7181. The pipes of heavier mass than the maximum shall be accepted provided they comply in every other respect with the requirement of IS: 7181. The pipes shall be supplied with the required bolts, nuts and rubber gaskets. The flanges and their dimensions of drilling shall be in accordance with IS: 1538.

The working pressure for the double flanged pipes shall be 10 kg/cm²(1Mpa). The pipes shall be tested hydrostatically at a specified pressure in accordance with IS : 7181. The pipes shall not show any sign of leakage, sweating or other defect of any kind. The factory test pressure for pipe sizes up to and including 300 mm shall be 25 kg/cm² and for pipe sizes over 300 mm up to and including 600 shall be 20 kg/cm². The pipes shall be internally and externally coated with hot applied (dip) bituminous paint in accordance with IS: 7181. Alternatively Ductile iron D/F pipe class K-9 as per IS 8329 may be used.

10. CIVIL 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 campus development, repair/new works 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/International Standard and/or good engineering practices. 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 is being supplied to and got 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 in the 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

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 comprises 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/m²
- ii) Live load on floors supporting equipment such as pumps, blowers, compressors, valves etc. : 10.00 kN/m²
- lii) Live load on all other floors walkways, stairways and platforms : 5.00 kN/m²

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, travelling 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 in buildings 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 of water retaining structures, as per IS-3370.

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

- (i) The minimum depth of foundations for all structures, equipments, buildings and frame foundations and load bearing walls shall be as per IS 1904.
- (ii) Bearing capacity of soil shall be determined as per IS: 6403.
- (iii) 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.
- (iv) 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.
- (v) Where there is level difference between the natural ground level and the foundations of structure or floorslabs, this difference shall be filled up in the following ways.
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.
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.
- (vi) 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.

Requirements for Construction of RCC Reservoirs

General

The RCC reservoirs are to be constructed as per the type and size detailed in the "Scope of Work" defined in this Volume II of tender document. The conceptual drawings of CWR/ ESR are given in the drawings in Volume III of the tender document which are for general understanding of department requirements but shall have no bearing on the submissions for approval, the requirements as given in this document are required to be fulfilled. The facilities and general arrangements of the reservoirs shall be as shown in the drawings in Volume III.

The contractor shall submit detailed general arrangement drawings, structural drawings and design of each structure for the approval of Engineer in charge. The designs shall adhere to the provisions given in this chapter. The design shall be got approved from the agencies defined in the contract before submission to the Engineer-in-Charge.

The ESRs shall be of Intze type shape, supported on raft foundation. The arrangements for lightening arrestor, conductors and earthing system shall be made by the contractor.

The construction of reservoirs shall be carried out in accordance with the specifications mentioned herein and relevant IS amended upto date. The general arrangement drawings of the piping system and other drawings like layout plan of site, structural drawings and designs, working drawings, etc shall be submitted by the contractor for approval of the department prior to start of work. 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/or as per sound engineering practice after approval of Engineer-in-Charge.

Preparatory Works

The Contractor shall provide and maintain a benchmark with a level at a location approved by the Engineer in Charge at each reservoir construction sites. All levels shall be deemed to refer to that benchmark. The Contractor may establish other secondary benchmarks on the site.

Soil & Geo Technical Investigation

For RCC ESR: SBC tests shall be got done through MNIT Jaipur/ COE Kota/ BITS Pilani/ IIT Delhi/ Any Govt Engineering collage. For foundations to be laid on sandy strata, the structural design and reinforcement drawings shall be prepared assuming maximum SBC of soil as 10 T/Sqm even if the SBC testing is found to be 10 T/Sqm or more at foundation depth. If the SBC testing is found to be less than 10 T/Sqm at foundation depth, the structure shall be designed on the basis of actual SBC found on testing for which no extra payment will be made to contractor.

For CWR: Foundation shall be designed for SBC equal to 10 t/sqm

Material of Construction

The building/construction material to be used shall be as per the specifications given in this chapter. The pipes & specials to be used shall be as per the specifications given in Chapter 3 for Pipes. The valves and instruments shall be as per the specifications given in this volume II containing specifications for Valves and Instrumentation respectively.

Design Considerations for Reservoirs

GENERAL PRINCIPLES:

- Maximum height of live storage in water reservoirs shall be 4.0 meters.
- Height of dome shall be $1/5^{\text{th}}$ to $1/6^{\text{th}}$ of span of dome.
- Staging in case of overhead reservoirs is defined as the difference of levels between the finished ground level or the level of Road/ Kuchha Rasta just outside the campus which ever is higher and bottom of the water retaining structure (top of the bottom ring beam of bottom dome).

Design Requirements

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

Cement concrete (plain or reinforced) shall comply with the requirement of specifications of Rajasthan PWD (B&R) Specification and Explanatory Notes for Building 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 the following :

-	Water bearing structure, beam, platform in the reservoir and roof for ESR & CWR	M 35
-	Water bearing structure, beam, platform in the reservoir and roof for GLR	M 25
-	Other structural concrete	M 25
-	Lean concrete in foundation	M 15

Concrete mix of richer than M20 shall be got designed from MBM College of Engineering/ MNIT Jaipur/ COE Kota/ BITS Pilani/ IITs/ Any Govt Engg Collage at contractors cost.

The Synthetic Polyolefin (Polypropylene and Polyethylene) Fiber shall be used as admixture. The fibre shall be as per enclosure. The dose shall be as per design approved.

The reinforced concrete for water retaining structures shall have a minimum cement content of 300 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.

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 for liquid retaining structures and as per IS:457 for other structures.

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 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 latest IS 456 and IS 3370 amended upto date, whichever is more stringent.

Loads

All loads shall be considered as per the provisions of IS 875 and other references as defined in this chapter. The design shall be suitable for the worst possible conditions of loading during construction and operation.

Concrete Grade, cover, minimum cement content and thickness

Grade of concrete to be used for the reservoirs shall be as per the provisions of IS 456 for moderate environmental exposure conditions. The minimum cement content for reservoir members shall be 360 Kg/cum. For other works such as plinth protection etc., the minimum cement content shall be as per the respective codes. Minimum cover as prescribed in IS 456 shall be provided. The minimum thickness of reservoir members shall be in accordance to the provisions of IS 456 and IS 3370. However the following minimum thicknesses shall be provided for different reinforced concrete members, irrespective of design thicknesses as follows:

Walls for liquid retaining structures	150 mm
Spherical Dome/Flat roof slab of RCC reservoirs	125 mm
Bottom slabs of CWRs	150 mm
Floor slabs including roof slabs, walkways, canopy slabs	150 mm
Wall of cables/ pipe trenches, underground pits etc.	125 mm
Wall of cables/ pipe trenches, underground pits etc.	125 mm
Column footings	150 mm
Parapets, Chajja	75 mm
Pre-Cast trench cover	50 mm
Free board depth to be provided (below the bottom of Top Ring Beam)	300 mm
Dead storage depth	100 mm
Thickness of lean concrete below foundation	100 mm
Depth of foundation for ESR	3000mm or on solid rock.
Depth of foundation for CWR	1000mm or on solid rock.
Age factor shall not be more than	1(one)

The above dimensions are minimum prescribed. In case of any code requires them to on higher side, the provision of that IS code shall prevail

Final Finishing

The contractor will ensure that the entire structure along with all its installations are in a finished and in new and fully operative condition when handed over, after the D.L.P. period is over. He shall have repaired and removed 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 has been finished properly and the entire site is cleared of all extra construction material, debris and excavated soil. This shall have to be done to the satisfaction of the Engineer in Charge.

Miscellaneous Items of Reservoirs

Puddle collars

Puddle collars shall be used for connecting the inlet, outlet, overflow & washout pipes to the reservoir. All puddles shall be fixed at right angle to the RCC wall during casting of wall. All puddle collars shall be of C.I. The minimum length shall be at least 100 mm more than the total finished thickness of the walls and size of the puddle collars shall be equal to the size of the respective pipe.

Pipes

The working length of double flange CI pipes shall be 0.5m, 1m, 1.5m, 2m, 2.75m and 3.0m. The pipes shall be ISI marked, and shall be straight and permissible deviation from straight line shall be in accordance with IS : 7181. The pipes of heavier mass than the maximum shall be accepted provided they comply in every other respect with the requirement of IS: 7181. The pipes shall be supplied with the required bolts, nuts and rubber gaskets. The flanges and their dimensions of drilling shall be in accordance with IS: 1538.

The working pressure for the double flanged pipes shall be 10 kg/cm² (1Mpa). The pipes shall be tested hydrostatically at a specified pressure in accordance with IS : 7181. The pipes shall not show any sign of leakage, sweating or other defect of any kind. The factory test pressure for pipe sizes up to and including 300 mm shall be 25 kg/cm² and for pipe sizes over 300 mm up to and including 600 shall be 20 kg/cm².

The pipes shall be internally and externally coated with hot applied (dip) bituminous paint in accordance with IS: 7181.

Alternatively Ductile iron D/F pipe class K-9 as per IS 8329 may be used.

All flanged Specials

The cast iron flanged specials (all flanged tee, flanged tapers, bends, blank flanges, and Puddle collar) shall be according 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 10 kg/cm² (1Mpa).

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

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. Pipe make shall be got approved from Executive Engineer, District Division I Jaipur before using it on site.

Ladder

M.S. ladder 450 mm wide, made up of 50mm x 50mm x 6mm M.S. angle iron and 25mm M.S. bars welded at 300mm c/c shall be provided outside from the balcony to top dome in ESR. MS cage shall also be provided on this ladder. Similarly MS ladder/RCC Staircase shall be provided at CWR for access to the top dome. M.S. ladder with all its components should be suitably painted as per approval of EIC.

The ladders in all type of reservoirs (i.e. CWR & ESR) from top dome roof to inside platform and from platform to bottom dome in the container shall be of aluminium. Its drawing shall be got approved from EIC before dispatch.

Railing

Hand railing shall be provided along the stairs of ESR and on the top dome of ESR. Hand railing around the platforms, Balcony, stairs and landings shall be consisting of 25 mm diameter medium B class GI pipes in two rows (one at the top and other at middle level) and 750mm high vertical post 50x50x6 mm angle iron @ > 750mm centre to centre properly embedded in the concrete (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 shall be installed on the ESR. Water level indicator consisting of an approved copper float and iron counter weight and connected by steel flexible wire passing over aluminium pulleys fixed on 25mm 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 M.S. sheet 20 gauge fixed over wooden plank with an M.S. angle iron frame of 35mm x 35mm x 5mm and painted with white enamel base, letters in black and red. The scale shall be located and fixed with RCC column at 2m above the ground for ESR.

RCC Ventilator

RCC Ventilators shall be provided for all reservoirs. The size of ventilator shall be approved by EIC in consideration to the tank size. The drawing of ventilator shall be got approved from EIC. For smaller reservoirs CI vent pipes of dia as per approval of EIC shall be provided.

Lightening arrester

Lightning arrester shall be of copper bar of 25mm dia and 2m long to be provided at the top of ESR. This is to be connected by a GI strip 25 mm wide & 3mm thick. This conductor strip shall be connected to a 450 mm x 450mm x 3mm thick copper plate to be embedded below the average ground level by digging a pit. 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 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.

Plinth Protection

Plinth protection works for ESR and CWR is to be provided all around each reservoir in a 1 m circular strip. It shall consist of laying lean concrete 100 mm thick in M10, over compacted soil. Over the lean concrete brick on edge flooring or RR stone flooring in 1:4 cement sand mortar shall be provided. Along this plinth protection provision of toe wall of M15 grade cement concrete 150 mm wide over the base of lean concrete of M10 shall be provided. Side slope of plinth protection shall be 1 in 50 outward & peripheral slope should be 1 in 500.

Plinth protection works to be constructed below the OH Service Reservoir, 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 100 mm thick in M10, over compacted soil.

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

Slogan and logo

The contractor shall paint 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. The Size & shade for painting the slogan will be approved and directed by Engineer in Charge. The logo should indicate the name of the project, name of the village and the capacity of the reservoir. The slogan shall be as directed by the Engineer-in-charge.

Pipe Clamp

At least two clamp on one staging shall be provided of 6mm thick 50mm wide MS flat fixed on pipe & column.

Man Hole Cover

Square manhole cover 600X600 mm shall be provided. The cover shall be made of 5 mm thick MS flat. The frame shall be made of MS angle 50*50*6. The cover shall be connected to this frame by using two nos. strung hinges. Locking arrangement shall be provided.

Ladder

Aluminium ladder from top dome to the bottom, 450 mm wide, made up of aluminium section of sufficient size as per design approved by Engineer in charge with horizontal sections provided at with at 300mm c/c shall be provided..

Gate

To prevent the unauthorized entry to structure, the gate of height 2.1 m, made up of Angle iron and MS Sheet, shall be installed at stair case first landing above 3 m height from plinth protection work. The Angle shall be 35x35x5 mm size and sheet shall be of 20 gauge. The frame for the gate shall be made up of angle 50x50x5 mm. The gate shall be grouted in the concrete. The gate shall be accompanied by a cover made up of Angle Iron and MS Sheet. The enclosure shall be 2 meter in length. It shall be fabricated and installed as per directions of Engineer In Charge.

Jali (at the delivery pipe of RCC ESR)

The CI Jali of suitable size shall be provided on the Delivery Pipe to prevent entry of any unwanted material in the pipe.

Treatment of Joints in continuous portion

Two hours after pouring the concrete, the slurry would be washed with high pressure water jet & air jet. Before pouring the next layer of concrete the old surface shall be brushed, painted with approved joining compound.

Water bar of G.I. sheet 150 mm wide 20 gauge shall be provided as per IS 3370 Part-I 1965 as construction joints in vertical wall. Overlaps in sheets shall be 300 mm. Alternatively water stopper of HDPE can be used.

Valves

The material to be supplied under this sub-section shall include but not be limited to the following:

- All necessary fittings including bolts, nuts, gaskets, backing rings, counter flanges, jointing material, strainers etc. as required.
- Valves to start/stop and regulate flow
- Painting, anti-corrosive coating etc., inside and outside of the valves.

The design, construction material, manufacture, inspection, performance and testing shall comply with all applicable Indian Standards and Codes. Nothing in the specification will be construed to relieve the supplier of this responsibility.

Testing for water tightness

The contractor shall carry out a water tightness test as per IS: 3370 for the maximum water head condition i.e. with the water standing at full supply level. All cost of testing shall be borne 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 flood lights, circulators etc. for carrying out proper inspection of surfaces 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 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 exceeds 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 structures 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.

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.

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)
IS No.	Title
7969 :	Safety code for handling and storage of building materials
EARTHWORK	
3764: 1992	Excavation work - Code of safety (first revision)
4081	Safety code for blasting and related drilling operations
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)
456	Code of practice for plain and reinforced concrete (Reaffirmed 1991)
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)
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)
6403	Code of practice for determination of bearing capacity of shallow foundations.
PLAIN AND REINFORCED CONCRETE	
269	33 grade ordinary Portland cement
383	Coarse and fine aggregates from natural resources for concrete
456	Code of practice for plain and reinforced concrete
516	Method of test for strength of concrete
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
1199	Methods of sampling and analysis of concrete
1786	High strength deformed steel bars and wires for concrete reinforcement
2502	Code of practice for bending and fixing of bars for concrete reinforcement
2505	Concrete vibrators - Immersion type - General requirements
4926	Ready mixed concrete
8112	43 grade ordinary Portland cement
9012	Recommended practice for Concreting
9103	Admixtures for concrete
10262	Recommended guidelines for concrete mix design
12269	53 Grade ordinary Portland Cement
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
7205	Safety code for erection of structural steel work
FLOORS AND FLOOR COVERINGS	
1237	Cement concrete flooring tiles
1443	Code of practice for laying and finishing of cement concrete flooring tiles
8042	White Portland cement
WHITE WASHING, COLOUR WASHING AND PAINTING OF MASONRY, CONCRETE AND PLASTER SURFACES (CALCAREOUS SURFACES)	
44	Iron oxide pigments for paints
109	Ready mixed paint, brushing, priming, plaster, to Indian Standard Colour No. 361 and 631 White and off white
133	Enamel, interior : (a) undercoating, (b) finishing

158	Ready mixed paint, brushing, bituminous, black lead-free, acid alkali and heat resisting
168	Ready mixed paint, air drying, for general purpose
427	Distemper, dry, colour as required
428	Distemper, oil emulsion, colour as required
2395 (Part 1)	Code of practice for painting concrete masonry and plaster surfaces : Part 1 Operation and workmanship
2395 (Part 2)	Code of practice for painting concrete masonry and plaster surfaces : Part 2 Schedule
5410	Cement paint
6278	Code of practice for whitewashing and colour washing
9862	Ready mixed paint, brushing, bituminous, black lead-free, acid alkali, water and chlorine resisting

All codes are amended up to Date.

Samples and Tests of Materials

The Contractor shall submit samples of such materials as may be required by the Engineer-in-charge and shall carry out the specified tests directed by the Engineer-in-charge at the Site, at the supplier's premises or at a laboratory approved by the Engineer-in-charge.

Samples shall be submitted and tests carried out sufficiently early to enable further samples to be submitted and tested if required by the Engineer-in-charge.

Approval by the Engineer-in-charge as to the placing of orders for materials or as to samples or tests shall not prejudice to any of the Employer's powers under the Contract.

Standards

Materials and workmanship shall comply with the relevant Indian Standards (with amendments upto date). 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 in this chapter 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.

Earthwork For Buildings/Reservoirs

General

The Contractor shall furnish all tools, plant instruments, qualified supervisory personnel, labour, materials, any temporary works, consumables, any and everything necessary, whether or not such items are specifically stated herein for completion of the work in accordance with the Department's Requirements.

The Contractor shall survey the site before excavation and set out all lines and establish levels for various works such as grading, basement, foundations, plinth filling, roads, drains, cable trenches, pipelines etc. Such survey shall be carried out by taking accurate cross sections of the area perpendicular to established reference/grid lines at 8 m in case of buildings and 30 m in case of roads and pipe lines works intervals or nearer, if necessary, based on ground profile and thereafter properly recorded.

The excavation shall be carried out to correct lines and levels. This shall also include, where required, proper shoring to maintain excavations and also the furnishing, erecting and maintaining of substantial barricades around excavated areas and warning lamps at night.

Excavated material shall be dumped in regular heaps, bunds, riprap with regular slopes and levelling the same so as to provide natural drainage. Rock/soil excavated shall be stacked properly as approved by the Engineer-in-charge. As a rule, all softer material shall be laid along the centre of heaps, the harder and more weather resisting materials forming the casing on the sides and the top.

Topsoil shall be stock piled separately for later re-use.

Clearing

The area to be excavated/filled shall be cleared of fences, trees, plants, logs, stumps, bush, vegetation, rubbish, slush, etc. and other objectionable matter. If any roots or stumps of trees are encountered during excavation, they shall also be removed. The material so removed shall be disposed off as approved by the Engineer-in-charge. Where earthfill is intended, the area shall be stripped of all loose/ soft patches, top soil containing objectionable matter / materials before fill commences.

Excavation

Excavation for permanent work shall be taken out to such widths, lengths, depths and profiles as are shown on the approved drawings or such other lines and grades as may be agreed with the Engineer-in-charge. Rough excavation shall be carried out to a depth of 150 mm above the final level. The balance shall be excavated with special care. Soft pockets shall be removed below the final level and extra excavation filled up with material as approved by the Engineer-in-charge. The final excavation should be carried out just prior to laying the blinding course.

To facilitate the permanent works the Contractor may excavate, and also backfill later, outside the lines shown on the approved drawings or as agreed with the Engineer-in-charge. Should any excavation be taken below the specified elevations, the Contractor shall fill it up with material as approved by EIC upto the required elevation at no cost to the department.

All excavations shall be to the minimum dimensions required for safety and ease of working. Prior approval of the Engineer-in-charge shall be obtained by the Contractor in each individual case, for the method proposed for the excavation, including dimensions, side slopes, dewatering, disposal, etc. This approval, shall not in any way relieve the Contractor of his responsibility for any consequent loss or damage. The excavation must be carried out in the most expeditious and efficient manner. Side slopes shall be as steep as will stand safely for the actual soil conditions encountered. Every precaution shall be taken to prevent slips. Should slips occur, the slipped material shall be removed and the slope dressed to a modified stable slope.

Rock

Stripping Loose Rock

All loose boulders, detached rocks partially and other loose material which might move therewith not directly in the excavation but so close to the area to be excavated as to be liable, in the opinion of Engineer-in-charge, to fall or otherwise endanger the workmen, equipment, the work shall be stripped off and removed from the area of the excavation. The method used shall be such as not to render unstable or unsafe portion, which was originally sound and safe.

Any material not requiring removal in order to complete the permanent works, but which, in the opinion of Engineer-in-charge, is likely to become loose or unstable later, shall also be promptly and satisfactorily removed.

Fill, Backfilling and Site Grading

General

All fill material shall be subject to the Engineer-in-charge's approval. If any material is rejected by Engineer-in-charge, the Contractor shall remove the same forthwith from the site. Surplus fill material shall be deposited/disposed off as directed by Engineer-in-charge after the fill work is completed.

Material

To the extent available, selected surplus soil from excavations shall be used as backfill. Backfill material shall be free from lumps, organic or other foreign material. All lumps of earth shall be broken or removed unless otherwise stated. Where excavated material is mostly rock, the boulders shall be broken into pieces not larger than 150 mm size, mixed with properly graded fine material consisting of murrum or earth to fill the voids and the mixture used for filling.

If fill material is required to be imported, the Contractor shall make arrangements to bring such material from outside borrow pits. The material and source shall be subject to the prior approval of the Engineer-in-charge. The approved borrow pit areas shall be cleared of all bushes, roots of trees, plants, rubbish, etc. Top soil containing foreign material shall be removed. The materials so removed shall be disposed of as directed by Engineer-in-charge. The Contractor shall provide the necessary access roads to borrow areas and maintain the same if such roads do not exist.

Filling in pits and trenches around foundations of structures, walls, etc.

The spaces around the foundations, structures, pits, trenches, etc., shall be cleared of all debris, and filled with earth in layers not exceeding 15 cm, each layer being watered, rammed and properly consolidated to the satisfaction of Engineer-in-charge. Earth shall be rammed with approved compaction mechanism. Usually no manual compaction shall be allowed unless the Engineer-in-Charge is satisfied that in some cases manual compaction by tampers cannot be avoided. The final backfill surface shall be trimmed and leveled to a proper profile to the approval of the Engineer-in-charge.

The filling shall be done after the concrete or masonry is fully set and done in such a manner as not to cause undue thrust on any part of the structure.

Plinth Filling

Plinth filling shall be carried out with approved material such as soil, sand or murum as in layers not exceeding 15 cm, watered and compacted with approved compaction mechanism. When filling reaches the finished level, the surface shall be flooded with water, unless otherwise directed, for at least 24 hours, allowed to dry and then the surface again compacted as specified above to avoid settlement at a later stage. The finished level of the filling shall be trimmed to the level/slope specified.

Compaction of large areas be carried out by means of 12 ton rollers smooth wheeled, sheep-foot or wobbly wheeled rollers. In case of compaction of granular material such as sands and gravel, vibratory rollers shall be used. A smaller weight roller may be used only if permitted by the Engineer-in-charge. As rolling proceeds, water sprinkling shall be done to assist consolidation. Water shall not be sprinkled in case of sandy fills.

The thickness of each unconsolidated fill layer can in this be upto a maximum of 300 mm. The Contractor will determine the thickness of the layers in which fill has to be consolidated depending on the fill material and equipment used and the approval of the Engineer-in-charge obtained prior to commencing filling.

The process of filling in the plinth, watering and compaction shall be carried out by the contractor in such a way as not to endanger the foundation columns, plinth walls etc. already built up. Under no circumstances Black cotton soil shall be used for plinth in filling.

For mechanical compaction rolling shall commence from the outer edge and progress towards the centre and continue until compaction is to the satisfaction of Engineer-in-charge, but in no case less than 10 passes of the roller will be accepted for each layer.

The compacted surface shall be properly shaped, trimmed and consolidated to an even and uniform gradient. All soft spots shall be excavated, then filled and consolidated.

At some locations/ areas, it may not be possible to use rollers because of space restrictions, etc. The Contractor shall then be permitted to use pneumatic tampers, rammers, etc. and he shall ensure proper compaction.

Sand Filling in Plinth and Other Places

Where backfilling is required to be carried out with local sand it shall be clean, medium grained and free from impurities. The filled-in-sand shall be kept flooded with water for 24 hours to ensure maximum consolidation. The surface of the consolidated sand shall be dressed to required level or slope. Construction of floors or other structures on sand fill shall not be started until the Engineer-in-charge has inspected and approved the fill.

General Site Grading

Site grading shall be carried out as indicated in the approved drawings. Excavation shall be carried out as specified in the Department's Requirements. Filling and compaction shall be carried out as specified elsewhere unless otherwise specifications indicated below.

If no compaction is called for, the fill may be deposited to the full height in one operation and levelled. If the fill has to be compacted, it shall be placed in layers not exceeding 200 mm and levelled uniformly and compacted as indicated above before the next layer is deposited.

To ensure that the fill has been compacted as specified, field and laboratory tests shall be carried out by the Contractor.

Field compaction tests shall be carried out in each layer of filling until the fill to the entire height has been completed. This shall hold good for embankments as well. The fill will be considered as incomplete if the desired compaction has not been obtained.

The Contractor shall protect the earth fill from being washed away by rain or damaged in any other way. Should any slip occur, the Contractor shall remove the affected material and make good the slip.

Fill Density

Unless otherwise specified the compaction, where so called for, shall comply with minimum 90% compaction by Standard Proctor at moisture content differing not more than 4% from the optimum moisture content. The Contractor shall demonstrate adequately by field and laboratory tests that the specified density has been obtained.

Timber Shoring

The provisions of relevant ISS shall apply.

Dewatering

The Contractor shall ensure at his cost that the excavation and the structures are free from water during construction and shall take all necessary precautions and measures to exclude ground/ rain water so as to enable the works to be carried out in reasonably dry conditions in accordance with the construction

programme. Sumps made for dewatering must be kept clear of the excavations/ trenches required for further work. The method of pumping shall be approved by Engineer-in-charge, but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due to differential head of water during pumping. Pumping arrangements shall be adequate to ensure no delays in construction. The dewatering shall be continued for at least (7) seven days after the last pour of the concrete. The Contractor shall, however, ensure that no damage to the structure results on stopping of dewatering.

The Contractor shall study the sub-soil conditions carefully and shall conduct any test necessary at the site with the approval of the Engineer-in-charge to test the permeability and drainage conditions of the sub-soil for excavation, concreting etc., below ground level.

The scheme for dewatering and disposal of water shall be approved by the Engineer-in-charge. The Contractor shall suitably divert the water obtained from dewatering from such areas of site where a build up of water in the opinion of the Engineer-in-charge obstructs the progress of the work, leads to unsanitary conditions by stagnation, retards the speed of construction and is detrimental to the safety of men, materials, structures and equipment.

When there is a continuous inflow of water and the quantum of water to be handled is considered in the opinion of Engineer-in-charge, to be large, a well point system-single stage or multistage, shall be adopted. The Contractor shall submit to the Engineer-in-charge, details of his well point system including the stages, the spacing number and diameter of well points, headers etc., and the number, capacity and location of pumps for approval.

If any foundation pits are filled due to accumulation of surface flow during the progress of work or during rainy season, or due to any other cause all pumping required for dewatering the pits & removing silt shall be done without extra cost.

Rain Water Drainage

Grading in the vicinity of excavation shall be such as to exclude rain/ surface water draining into excavated areas. Excavation shall be kept clean of rain and such water as the Contractor may be using for his work by suitably pumping out the same. The scheme for pumping and discharge of such water shall be approved by the Engineer-in-charge.

Concrete

General

The Engineer-in-Charge shall have the right at all times to inspect all operations including the sources of materials, procurement, layout and storage of materials, the concrete batching and mixing equipment and the quality control system. Such an inspection shall be arranged and the Engineer-in-Charge's approval obtained, prior to starting of concrete work. This shall, however, not relieve the Contractor of any of his responsibilities. All materials which do not conform to the Specifications shall be rejected.

Materials should be selected so that they can satisfy the design requirements of strength, serviceability, safety, durability and finish with due regards to the functional requirements and the environmental conditions to which the structure will be subjected. Materials complying with codes/standards shall generally be used. Other materials may be used after approval of the Engineer-in-Charge and after establishing their performance suitability based on previous data, experience or tests.

Materials

Cement

Unless otherwise called for by the Engineer-in-charge, cement shall be ordinary Portland cement (Grade 43) conforming to IS : 2697, IS : 8112 or IS : 12269. Super Sulphated cement conforming to IS 6909 or super resistant Portland cement conforming to IS 12330.

Sulphate resistant cement conforming to IS 12330 shall be used for all cement concrete works below ground level if the soil resistivity is less than 2000 ohm-cm.

Only one type of cement shall be used in any one mix. The source of supply, type or brand of cement within the same structure or portion thereof shall not be changed without approval from the Engineer-In-Charge.

Cement which is not used within 90 days from its date of manufacture shall be tested at a laboratory approved by the Engineer-In-Charge and until the results of such tests are found satisfactory, it shall not be used in any work.

Aggregates (General)

It shall comply with requirement of IS 383 and as specified in IS 456-2000. Aggregates shall consist of naturally occurring stones (crushed or uncrushed), gravel and sand. They shall be chemically inert, strong, hard, clean, durable against weathering, of limited porosity, free from dust/silt/organic impurities/deleterious

materials such as iron pyrites, cod, mica, slate, clay alkali, soft fragments, sea shells and conform to IS : 383. Aggregates such as slag, crushed over burnt bricks, bloated clay aggregates, sintered fly ash and tiles shall not be used.

Aggregates shall be washed and screened before use where necessary or if directed by the Engineer-in-Charge.

Aggregates containing reactive silica shall not be used.

The maximum size of coarse aggregate shall be as stated on the drawings but in no case greater than $\frac{1}{4}$ of the minimum thickness of the member.

Plums 160 mm and above of a reasonable size may be used in mass concrete fill where directed. Plums shall not constitute more than 20% by volume of the concrete when specifically permitted. The plums shall be distributed evenly and shall not be closer than 160 mm from the surface. For heavily reinforced concrete members as in the case of ribs of main beams the nominal maximum size of aggregate shall be restricted to 5 mm less than minimum clear distance between the main bars or 5 mm less than the minimum cover to reinforcement whichever is smaller. Coarse and fine aggregates shall preferably be batched separately, specially for design mix concrete.

The largest possible size, properly graded should be used in order to reduce water demand.

Graded aggregate shall confirm to requirements in Table 1, 2, 3 & 4. All in aggregate shall confirm to requirements in Table 5.

Table 1

Graded Aggregate

IS Sieve Designation	Percentage Passing for Normal size of Aggregate			
	40 mm	20 mm	16 mm	12.5 mm
Mm	40 mm	20 mm	16 mm	12.5 mm
80	100	-	-	-
40	95-100	100	-	-
20	30-70	95-100	100	100
16	-	-	90-100	-
12.5	-	-	-	90-100
10	10-35	25-55	30-70	40-85
4.75	0-5	0-10	0-10	0-10
2.36	-	-	-	-

Table 2

Single Sized Aggregate (Ungraded)

IS Sieve Designation	Percentage Passing for Normal size of Aggregate					
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm
Mm	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm
80	100	-	-	-	-	-
63	85-100	100	-	-	-	-
40	0-30	85-100	100	-	-	-
20	0-5	0-20	85-100	100	-	-
16	-	-	-	85-100	100	-
12.5	-	-	-	-	85-100	100
10	0-5	0-5	0-20	0-30	0-45	85-100
4.75	-	-	0-5	0-5	0-10	0-20
2.36	-	-	-	-	-	0-5

Table 3

Making Single Sized to Graded Aggregate

Cement Concrete Mix	Nominal size of Graded Aggregate Required	Part of Single Size Aggregate to be Mixed to Get Graded Aggregate (by Volume)				
		50 mm	40 mm	20 mm	12.5 mm	10 mm
1:6:12	63	9	-	3	-	-
	40	-	9	3	-	-
1:5:10	63	7.5	-	2.5	-	-
	40	-	7.5	2.5	-	-

Cement Concrete Mix	Nominal size of Graded Aggregate Required	Part of Single Size Aggregate to be Mixed to Get Graded Aggregate (by Volume)				
		50 mm	40 mm	20 mm	12.5 mm	10 mm
1:4:8	63	6	-	2	-	-
	40	-	6	2	-	-
1:3:6	63	4.5	-	1.5	-	-
	40	-	4.5	1.5	-	-
1:2:4	20	-	-	4.5	-	1.5
	40	-	2.5	1	-	0.5
1:1.5:3	20	-	-	3	-	1
	12.5	-	-	-	3	1
1:1.5:3	20	-	-	2	-	1

Note : Proportions indicated are by volume. If single sized aggregate specified is not available, the volume of single sized aggregates shall be varied with a view to obtain the graded aggregate.

Table 4

Grading of Fine Aggregates

IS Sieve Designation	Percentage Passing for			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

Note : For crushed stone sands, the possible limit on 150 micron IS sieve is increased to 20 percent. This does not affect 5 percent allowance permitted to other sieves.

Table 5

All-in-Aggregate Grading

IS Sieve Designation	Percentage Passing All-in-Aggregate Grading of	
	40 mm Nominal Size	16 mm Nominal Size
Mm		
80	100	-
40	95-100	95-100
20	45-75	95-100
4.75 mm	25-45	30-50
600 micron	8-30	10-35
150 micron	0-6	0-6

Fine aggregates are divided into 4 zones. Typical good sand falls in Zone II grading, however, finer or coarse sand may be used with suitable adjustment in the ratio of quantities of coarse to fine aggregates. Very fine sands as included in Zone IV grading should not be used except when the concrete is closely controlled by design mixes.

Water

Water used for both mixing and curing shall conform to IS : 456-2000 and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials that may be deleterious to concrete or steel. The pH value of water shall not be less than 6.

Reinforcement

Reinforcement shall be any of the following :

- (vii) TMT bars.
- (viii) Rolled steel Grade A made from structural steel to IS 2062.

All reinforcement shall be free from loose mill scales, loose rust and coats of paints, oil, mud or other coatings which may destroy or reduce bond.

Admixtures

Accelerating, retarding, water reducing and air entraining admixtures shall conform to IS : 9103 and integral water proofing admixtures to IS : 2645.

Admixtures may be used in concrete as per manufacturer's instructions only with the approval of the Engineer-in-Charge. An admixture's suitability and effectiveness shall be verified by trial mixes with the other materials used in the works. If two or more admixtures are to be used simultaneously in the same concrete mix, their interaction shall be checked and trial mixes done to ensure their compatibility. There should also be no increase in risk of corrosion of the reinforcement or other embedments.

Calcium chloride shall not be used for accelerating set of the cement for any concrete containing reinforcement or embedded steel parts. When calcium chloride is permitted such as in mass concrete works, it shall be dissolved in water and added to the mixing water by an amount not exceeding 1.5 percent of the weight of the cement in each batch of concrete. The designed concrete mix shall be corrected accordingly.

Samples and Tests

All materials used for the works shall be tested before use.

Manufacturer's test certificate shall be furnished for each batch of cement /steel and when directed by the Engineer samples shall also be got tested by the Contractor in a laboratory approved by the Engineer-in-Charge.

Sampling and testing shall be as per IS : 2386 under the supervision of the Engineer-in-Charge.

Water to be used shall be tested to comply with requirements of IS : 456.

The Contractor shall furnish manufacturer's test certificates and technical literature for the admixture proposed to be used. If directed, the admixture shall be got tested at an approved laboratory at no extra cost.

Concrete

General

Concrete grade shall be as designated on approved drawings. In concrete grade M15, M20 etc. the number represents the specified characteristic compressive strength of 150 mm cube at 28 days, expressed in N/sq. mm as per IS: 456. Concrete in the works shall be "DESIGN MIX CONCRETE" or "NOMINAL MIX CONCRETE". All concrete works of grade M5, M7.5, M10, and M15 shall be NOMINAL MIX CONCRETE. Grade M20 can be nominal or design mix as per the requirement whereas all other grades, above M20 necessarily be DESIGN MIX CONCRETE.

Design Mix Concrete

The mix design shall produce concrete having reduced workability (consistency) and strength not less than approximate values given in table below. Workability shall be controlled by direct measurement of water content and checking it at frequent intervals by method prescribed in IS 1199.

a) Mix Design and Testing

For Design Mix Concrete, the mix shall be designed according to IS: 10262 and SP 23 to provide the grade of concrete having the required workability and characteristic strength not less than appropriate values given in IS: 456. The design mix shall be cohesive and does not segregate and should result in a dense and durable concrete and also capable of giving the finish as specified. For liquid retaining structures, the mix shall also result in watertight concrete. The Contractor shall exercise great care while designing the concrete mix and executing the works to achieve the desired result.

The minimum cement content for Design Mix Concrete shall be as per IS: 456.

The minimum cement content stipulated above shall be adopted irrespective of whether the Contractor achieves the desired strength with less quantity of cement. The Contractor's quoted rates for concrete shall provide for the above eventuality and nothing extra shall become payable to the CONTRACTOR in this account. Even in the case where the quantity of cement required is higher than that specified above to achieve desired strength based on an approved mix design, nothing extra shall become payable to the CONTRACTOR.

It shall be the Contractor's sole responsibility to carry out the mix designs at his own cost. He shall furnish mix design to the Engineer-in-Charge well in advance of the concreting operations, a statement of proportions proposed to be used for the various concrete mixes and the strength results obtained. The strength requirements of the concrete mixes ascertained on 150 mm cubes as per IS : 516 shall comply with the requirements of IS : 456.

Grade of Concrete	Minimum Compressive Strength N/sq.mm at 7 days	Specified Characteristic Compressive Strength N/sq. mm at 28 days
M15	10.0	15.0
M20	13.5	20.0
M25	17.0	25.0
M30	20.0	30.0
M35	23.5	35.0
M40	27.0	40.0

Grades lower than M20 shall not be used for reinforced concrete (general). Grading lower than M25 shall not be used for reinforced concrete in liquid retaining structures.

A range of slumps which shall generally be used for various types of construction unless otherwise instructed by the Engineer-in-Charge is given below:

Structure / Member	Slump in millimeters	
	Maximum	Minimum
Reinforced foundation walls and footings	75	25
Plain footings, caissons and substructure walls	100	25
Slabs, Beams and reinforced walls	75	25
Pump & miscellaneous Equipment Foundations	100	25
Building columns	50	25
Pavements	50	25
Heavy mass construction	50	25

b) Batching & Mixing of Concrete

Proportions of aggregates and cement, as decided by the concrete mix design, shall be by weight. These proportions shall be maintained during subsequent concrete batching by means of weigh batchers capable of controlling the weights within one percent of the desired value.

Amount of water added shall be such as to produce dense concrete of required consistency, specified strength and satisfactory workability and shall be so adjusted to account for moisture content in the aggregates. Water-cement ratio specified for use by the Engineer-in-Charge shall be maintained. Each time the work stops, the mixer shall be cleaned out and while recommencing, the first batch shall have 10% additional cement to allow for sticking in the drum.

Arrangement should be made by the Contractor to have the cubes tested in an approved laboratory or in field with prior consent of the Engineer-in-Charge. Sampling and testing of strength and workability of concrete shall be as per IS:1199, IS : 516 and IS : 456.

Nominal Mix Concrete

Mix Design & Testing

Mix Designing and preliminary tests are not necessary for Nominal Mix Concrete. However works tests shall be carried out as per IS : 456. Proportions for Nominal Mix Concrete and w/c ratio may be adopted as per Table 9 of IS : 456. However it will be the Contractor's sole responsibility to adopt appropriate nominal mix proportions to yield the specified strength.

Batching & Mixing of Concrete

The Proportions of materials used for concrete of grades shall be as given below:

Proportions for Nominal Mix of Concrete

Grade of Concrete	Total Quantity for Dry Aggregate by Mass per 50 kg of Cement (as Sum of Fine and Coarse Aggregates), in kg, Max	Proportion of Fine Aggregate to Coarse Aggregate (by Mass)	Quantity of Water per 50 kg of Cement, Max in Litres
M 5	800	Generally 1:2 Subject to an upper limit of 1:1.5 and a lower limit of 1:2.5	60
M 7.5	625	-do-	45
M 10	480	-do-	34
M 15	350	-do-	32
M 20	250	-do-	30
NOTES			

The proportions of the fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and maximum size of coarse aggregate becomes larger. Graded coarse aggregate (see Table 5.1) shall be used.

Example: For an average grading of fine aggregate (that is, Zone II of IS 383 :1970, Table 4) the proportions shall be 1:1.5, 1:2 and 1:2.5 for maximum size of aggregates 10 mm, 20 mm and 40 mm respectively.

This table envisages batching by weight,. Volume batching when done the nominal mixes would roughly be 1:3:6, 1:2:4 and 1:1.5:3 for M 10, M 15 and M 20 respectively.

For underwater concreting the quantity of coarse aggregate, either by volume or mass, shall not be less than 1.5 times nor more than twice that of the fine aggregate.

Mixing

Concrete shall be mixed in a mechanical mixer conforming to IS 1791. The mixing shall be continued until there is uniform distribution of materials and the mass is uniform in colour and consistency. If there is segregation after unloading, the concrete should be remixed.

Formwork

Formwork shall be all inclusive and shall consist of but not be limited to shores, bracings, sides of footings, walls, beams and columns, bottom of slabs etc. including ties, anchors, hangers, inserts, falsework, wedges etc.

The design and engineering of the formwork as well as its construction shall be the responsibility of the Contractor. However, if so desired by the Engineer-in-Charge, the drawings and calculations for the design of the formwork shall be submitted to the Engineer-in-Charge for the approval.

Formwork shall be designed to fulfill the following requirements:

- (ix) Sufficiently rigid and tight to prevent loss of grout or mortar from the concrete at all stages and appropriate to the methods of placing and compacting.
- (x) Made of suitable materials.
- (xi) Capable of providing concrete of the correct shape and surface finish within the specified tolerance limits.
- (xii) Capable of withstanding without deflection the worst combination of self weight, reinforcement and concrete weight, all loads and dynamic effects arising from construction and compacting activities, wind and weather forces.
- (xiii) Capable of easy striking out without shock, disturbance or damage to the concrete.
- (xiv) Soffit forms capable of imparting a camber if required
- (xv) Soffit forms and supports capable of being left in position if required
- (xvi) Capable of being cleaned and/or coated if necessary immediately prior to casting the concrete; design temporary openings where necessary for these purposes and to facilitate and the preparation of construction joints.

The formwork may be of timber, plywood, steel, plastic or concrete depending upon the type of finish specified. Sliding forms and slip form may be used with the approval of the Engineer-in-Charge. Timber for formwork shall be well seasoned, free from sap, shakes, loose knots, worm holes, warps and other surface defects. Joints between formwork and structures shall be sufficiently tight to prevent loss of slurry from concrete, using seals if necessary.

The faces of formwork coming in contact with concrete shall be cleaned and two coats of approved mould oil applied before fixing reinforcement. All rubbish, particularly chippings, shavings, sawdust, wire pieces dust etc. shall be removed from the interior of the forms before the concrete is placed. Where directed, cleaning of forms shall be done by blasting with a jet of compressed air at no extra cost.

Forms intended for reuse shall be treated with care. Forms that have deteriorated shall not be used. Before reuse, all forms shall be thoroughly scraped, cleaned, nails removed, holes suitably plugged, joints repaired and warped lumber replaced to the satisfaction of the Engineer-in-Charge. The Contractor shall equip himself with enough shuttering to allow for wastage so as to complete the job in time.

Permanent formwork shall be checked for its durability and compatibility with adjoining concrete before it is used in the structure. It shall be properly anchored to the concrete.

Wire ties passing through beams, columns and walls shall not be allowed. In their place bolts passing through sleeves shall be used. Formwork spacers left in-situ shall not impair the desired appearance or durability of the structure by causing spalling, rust staining or allowing the passage of moisture.

For liquid retaining structures, sleeves shall not be provided for through bolts nor shall through bolts be removed if provided. The bolts, in the latter case, shall be cut at 25 mm depth from the surface and the hole made good by cement mortar of the same proportion as the concrete just after striking the formwork.

Where specified all corners and angles exposed in the finished structure shall have chamfers or fillets of 20 mm x 20 mm size.

Forms for substructure may be omitted when, in the opinion of the Engineer-in-Charge, the open excavation is firm enough (in hard non-porous soils) to act as a form. Such excavations shall be larger, as approved by the Engineer-in-Charge, than that required as per drawing to compensate for irregularities in excavation.

The Contractor shall provide adequate props carried down to a firm bearing without overloading any of the structures.

The shuttering for beams and slabs shall be so erected that the side shuttering of beams can be removed without disturbing the bottom shuttering. If the shuttering for a column is erected for the full height of the column, one side shall be built up in sections as placing of concrete proceeds or windows left for placing concrete from the side to limit the drop of concrete to 1.0 m or as approved by the Engineer-in-Charge. The Contractor shall temporarily and securely fix items to be cast (embedments/ inserts) in a manner that will not hinder the striking of forms or permit loss of grout.

Formwork showing excessive distortion, during any stage of construction, shall be repositioned and strengthened. Placed concrete affected by faulty formwork, shall be entirely removed and formwork corrected prior to placement of new concrete at Contractor's cost.

Preparation Prior to Concrete Placement

Before concrete is actually placed in position, the inside of the formwork shall be cleaned and mould oil applied, inserts and reinforcement shall be correctly positioned and securely held, necessary openings, pockets, etc. provided.

All arrangements- formwork, equipment and proposed procedure, shall be approved by the Engineer-in-Charge. Contractor shall maintain separate Pour Card for each pour as per the approved format.

Check for Reinforcement and concreting

All reinforcement shall be checked and recorded prior to pouring of concrete by an authorised representative of the engineer in Charge. Similarly the entire concrete pouring work shall be done in the presence of authorised representative. The contractor shall therefore give a notice of a minimum three days to the engineer in Charge or his representative such that the works can be checked by him or his authorised representative.

Transporting, Placing and Compacting Concrete

Concrete shall be transported from the mixing plant to the formwork with minimum time lapse by methods that shall maintain the required workability and will prevent segregation, loss of any ingredients or ingress of foreign matter or water. During hot or cold weather, concrete shall be transported in deep containers or by other suitable measures to reduce loss of water by evaporation and heat loss in cold weather may also be adopted.

In all cases concrete shall be deposited as nearly as practicable directly in its final position to avoid rehandling. To avoid segregation, concrete shall not be rehandled or caused to flow. For locations where direct placement is not possible and in narrow forms, Contractor shall provide suitable drops and "Elephant Trunks". Concrete shall not be dropped from a height of more than 1.0 m. Care shall be taken to avoid displacement of reinforcement or formwork.

Concrete shall not be placed in flowing water. Under water, concrete shall be placed in position by tremies or by pipeline from the mixer and shall never be allowed to fall freely through the water.

While placing concrete the Contractor shall proceed as specified below and also ensure the following:

- (i) Continuously between construction joints and pre-determined abutments.
- (ii) Without disturbance to forms or reinforcement
- (iii) Without disturbance to pipes, ducts, fixings and the like to be cast in; ensure that such items are securely fixed. Ensure that concrete cannot enter open ends of pipes and conduits etc.
- (iv) Without dropping in a manner that could cause segregation or shock.
- (v) In deep pours only when the concrete and formwork designed for this purpose and by using suitable chutes or pipes.

- (vi) Do not place if the workability is such that full compaction cannot be achieved
- (vii) Without disturbing the unsupported sides of excavations; prevent contamination of concrete with earth. Provide sheeting if necessary in supported excavations, withdraw the linings progressively as concrete is placed.
- (viii) If placed directly onto hardcore or any other porous material, dampen the surface to reduce loss of water from the concrete.
- (ix) Ensure that there is no damage or displacement to sheet membranes.
- (x) Record the time and location of placing structural concrete.

Concrete shall normally be compacted in its final position within thirty minutes of leaving the mixer. Concrete shall be compacted during placing with approved vibrating equipment without causing segregation until it forms a solid mass free from voids thoroughly worked around reinforcement and embedded fixtures and into all corners of the formwork. Immersion vibrators shall be inserted vertically at points not more than 450 mm apart and withdrawn slowly till air bubbles cease to come to the surface, leaving no voids. When placing concrete in layers advancing horizontally, care shall be taken to ensure adequate vibration, blending and melding of the concrete between successive layers. Vibrators shall not be allowed to come in contact with reinforcement, formwork and finished surfaces after start of initial set. Over-vibration shall be avoided; under vibration is likewise harmful.

The vibrator should penetrate rapidly to the bottom of the layer and at least 15 cm into the preceding layer if there is any. It should be held generally 5 to 15 sec. until the compaction is considered adequate and then withdrawn slowly at thereof about 8 cm/s.

Concrete may be conveyed and placed by mechanically operated equipment after getting the complete procedure approved by the Engineer-in-Charge. The slump shall be held to the minimum necessary for conveying concrete by this method. When concrete is to be pumped, the concrete mix shall be specially designed to suit pumping. Care shall be taken to avoid stoppages in work once pumping has started.

Except when placing with slip forms, each placement of concrete in multiple lift work, shall be allowed to set for at least 24 hours after the final set of concrete before the start of subsequent placement. Placing shall stop when concrete reaches the top of the opening in walls or bottom surface of slab, in slab and beam construction, and it shall be resumed before concrete takes initial set but not until it has had time to settle as approved by the Engineer-in-Charge. Concrete shall be protected against damage until final acceptance.

Mass Concrete Works

Sequence of pouring for mass concrete works shall be as approved by the Engineer-in-Charge. The Contractor shall exercise great care to prevent shrinkage cracks and shall monitor the temperature of the placed concrete if directed.

Curing

Curing and protection shall start immediately after the compaction of the concrete to protect it from

Premature drying out, particularly by solar radiation and wind;

- leaching out by rain and flowing water;
- rapid cooling during the first few days after placing;
- high internal thermal gradient;
- low temperature of frost;
- vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement
- After the concrete has begun to harden i.e. 1 to 2 hr. after laying curing shall be started.
- All concrete, unless approved otherwise by the Engineer-in-Charge, shall be cured by use of continuous sprays or ponded water or continuously saturated coverings of sacking, canvas, hessian or other absorbent material for the period of complete hydration with a minimum of 10 days. The quality of curing water shall be the same as that used for mixing.
- Where a curing membrane is approved to be used by the Engineer-in-Charge, the same shall be of a non-wax base and shall not impair the concrete finish in any manner. The curing compound to be used shall be approved by the Engineer-in-Charge before use and shall be applied with spraying equipment capable of a smooth, even textured coat.
- When concrete is used as subgrade for flooring, the flooring may be commenced

before the curing period of subgrade is over, but curing of subgrade shall be continued along with the top layer of flooring for a minimum period of 10 days.

- Curing may also be done by covering the surface with an impermeable material such as polyethylene, which shall be well sealed and fastened.

Construction Joints and Keys

The position and arrangement of construction joints shall be as indicated by the contractor in his working drawings dually approved by the department. Concrete shall be placed without interruption until completion of work between construction joints. If stopping of concreting becomes unavoidable anywhere, a properly formed construction joint shall be made with the approval of the Engineer-in-Charge.

Dowels for concrete work, not likely to be taken up in the near future, shall be coated with cement slurry and encased in lean concrete as indicated on the drawings or as approved by the Engineer-in-Charge.

Before resuming concreting on a surface which has hardened all laitance and loose stone shall be thoroughly removed by wire brushing/hacking and surface washed with high pressure water jet and treated with thin layer of cement slurry for vertical joints and horizontal layers.

When concreting is to be resumed on a surface, which has not fully hardened, all laitance shall be removed by wire brushing, the surface wetted, free water removed and a coat of cement slurry applied. On this, a layer of concrete not exceeding 150 mm thickness shall be placed and well rammed against the old work. Thereafter work shall proceed in the normal way.

For horizontal joints, the surface shall be covered with a layer of mortar about 10-15 mm thick composed of cement and sand in the concrete mix. This cement slurry or mortar shall be freshly mixed and applied immediately before placing concrete.

Foundation Bedding

All earth surfaces upon which or against which concrete is to be placed, shall be well compacted and free from standing water, mud or debris. Soft or spongy areas shall be cleaned out and filled with either soil-cement mixture, lean concrete or clean sand compacted as approved by the Engineer-in-Charge. The surfaces of absorptive soils shall be moistened.

Concrete shall not be deposited on large sloping rock surfaces. The rock shall be cut to form rough steps or benches by picking, barring or wedging. The rock surface shall be kept wet for 2 to 4 hours before concreting.

Excavation, in clay or other soils that are likely to be affected by exposure to atmosphere, shall be concreted as soon as they are dry. Alternatively, unless otherwise mentioned the bottom of the excavation shall be protected immediately by 8 cm thick layer of cement concrete not leaner than M10 or in order to obtain a dry hard bottom, the last stretch of excavation of about 10 cm shall be removed just before concreting.

Repair and Replacement of Unsatisfactory Concrete

Immediately after the shuttering is removed, all defective areas such as honey-combed surfaces, rough patches, holes left by form bolts etc, shall be inspected by the Engineer-in-Charge who may permit patching of the defective areas or reject the concrete work.

All through holes for shuttering shall be filled for full depth and neatly plugged flush with surface.

Rejected concrete shall be removed and replaced by the Contractor at no additional cost to the Employer.

For patching of defective areas all loose materials shall be removed and the surface shall be prepared as approved by the Engineer-in-Charge.

Bonding between hardened and fresh concrete shall be done either by placing cement mortar or by applying epoxy. The decision of the Engineer-in-Charge as to the method of repairs to be adopted shall be final and binding on the Contractor. The surface shall be saturated with water for 24 hours before patching is done with cement sand mortar. The use of epoxy for bonding fresh concrete shall be carried out as approved by the Engineer-in-Charge.

Hot Weather Requirements

Concreting during hot weather shall be carried out as per IS 7861 (Part I).

Adequate provision shall be made to lower concrete temperatures which shall not exceed 40 deg C at time of placement of fresh concrete.

Where directed by the Engineer-in-Charge, the Contractor shall spray non-wax based curing compound on unformed concrete surfaces at no extra costs.

Cold Weather Requirements

Concreting during cold weather shall be carried out as per IS: 7861(Part II).

The ambient temperature during placement and upto final set shall not fall below 5 deg. C. Approved

antifreeze/accelerating additives shall be used where directed.

For major and large scale concreting works the temperature of concrete at times of mixing and placing, the thermal conductivity of the formwork and its insulation and stripping period shall be closely monitored.

Liquid Retaining Structures

The Contractor shall take special care for concrete for liquid retaining structures, underground structures and those others specifically called for to guarantee the finish and water tightness.

The Contractor shall make all arrangements for hydro-testing of structure, all arrangements for testing such as temporary bulk heads, pressure gauges, pumps, pipe lines etc.

The Contractor shall also make all temporary arrangements that may have to be made to ensure stability of the structures during construction.

Any leakage that may occur during the hydro-test or subsequently during the defects liability period or the period for which the structure is guaranteed shall be effectively stopped either by cement/epoxy pressure grouting, guniting or such other methods as may be approved by the engineer-in-charge. All such rectification shall be done by the contractor to the entire satisfaction of the engineer-in-charge at no extra cost to the department.

Water stops

Material

The material for the HDPE waterstops shall be a plastic compound with the basic resin of polyvinyl chloride and additional resins, plasticizers, inhibitors, which satisfies the performance characteristics specified below as per IS : 12200. Testing shall be in accordance with IS : 8543.

- | | | | |
|----|-------------------------|---|---------------------------------|
| a) | Tensile strength | : | 3.6 N/mm ² minimum |
| b) | Ultimate elongation | : | 300% minimum |
| c) | Tear resistance | : | 4.9 N/mm ² minimum |
| d) | Stiffness in flexure | : | 2.46 N/mm ² minimum |
| e) | Accelerated extraction | | |
| | i) Tensile strength | : | 10.50 N/mm ² minimum |
| | ii) Ultimate elongation | : | 250% minimum |
| f) | Effect of Alkali | : | 7 days |
| | i) Weight increase | : | 0.10% maximum |
| | ii) Weight decrease | : | 0.10% maximum |
| | iii) Hardness change | : | ± 5 points |
| g) | Effect of Alkali | : | 28 days |
| | i) Weight increase | : | 0.40% maximum |
| | ii) Weight decrease | : | 0.30% maximum |
| | iii) Dimension change | : | ± 1% |

HDPE waterstops shall be either of the bar type, serrated with centre bulb and end grips for use within the concrete elements or of the surface (kicker) type for external use.

HDPE waterstops shall be of approved manufacture. Samples and the test certificate shall be got approved by the Engineer-in-Charge before procurement for incorporation in the works.

Workmanship

Waterstops shall be cleaned before placing them in position. Oil or grease shall be removed thoroughly using water and suitable detergents.

Waterstops shall be procured in long lengths as manufactured to avoid joints as far as possible. Standard L or T type of intersection pieces shall be procured for use depending on their requirement. Any non-standard junctions shall be made by cutting the pieces to profile for jointing. Lapping of waterstops shall not be permitted. All jointing shall be of fusion-welded type as per manufacturer's instructions.

Waterstops shall be placed at the correct location/level and suitably supported at intervals with the reinforcement to ensure that it does not deviate from its intended position during concreting and vibrating. Care shall also be taken to ensure that no honey-combing occurs because of the serrations/ end grips, by placing concrete with smaller size aggregates in this region. Projecting portions of the waterstops embedded in concrete shall be thoroughly cleaned of all mortar/concrete coating before resuming further concreting operations. The projecting waterstops shall also be suitably supported at intervals with the reinforcement to maintain its intended position during concreting so as to ensure that it does not bend leading to formation of pockets. In addition, smaller size aggregates shall be used for concreting in this region also.

Preformed Fillers and Joint Sealing Compound

Materials

Preformed filler for expansion / isolation joints shall be non-extruding and resilient type of bitumen impregnated fibres conforming to IS : 1838 Part I or IS 1838 Part 2.

Bitumen coat to concrete/masonry surfaces for fixing the preformed bitumen filler strip shall conform to IS:702. Bitumen primer shall conform to IS : 3384.

Sealing compound for filling the joints above the preformed bitumen filler shall conform to Grade 'A' as per IS:1834.

Other organic solvents such as polysulphate based joint sealants to IS:1433 Part 1 or IS 12118 Part 1 may be used with the approval of Engineer-In-Charge.

Civil Works Details

Brickwork

Materials

Bricks used in the works shall conform to the requirements laid down in IS : 1077, IS 2180, IS 2222, IS 2691, IS 3952, IS 6165. The class of the bricks shall be as specifically indicated in the respective items of work prepared by the Contractor.

Bricks shall have following dimensions :

	Length Mm	Width mm	Height mm
Non Modular Bricks	230	110	70
	230	110	30

Common burnt clay bricks are classified on the basis of compressive strength as given below:

Class designation	10	7.5	5	3.5
Avg. compressive strength N/ mm ²	10	7.5	5	3.5

Bricks shall be sound, hard, homogenous in texture, well burnt in kiln without being vitrified, hand/ machine moulded, deep red, cherry or copper coloured, of regular shape and size and shall have sharp and square edges with smooth rectangular faces. The bricks shall be free from pores, cracks, flaws and nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be uniform in colour, tolerance of brick dimension shall be $\pm 3\%$ for designation 10 & above and $\pm 8\%$ for lower designation. Hand moulded bricks shall be moulded with a frog and those made by extrusion process may not be provided with a frog. Bricks shall give a clear ringing sound when struck.

The sample size for all the tests shall be as follows :

Brick	Lot size	Sample Size
Class 10	more than 50000 bricks	20 bricks
7.5, 5, 3.5	more than 100000 bricks	20 bricks

The sampling shall be at random & samples shall be stored in a dry place until tests are done.

Compressive strength :

Five bricks shall be tested. The average compressive strength shall be as per class designation. The compressive strength of individual brick shall not be less than 20 % of the specified value.

Water absorption :

Five bricks shall be tested for water absorption and shall not exceed 20 % by weight upto class 12.5 & 15% by weight for higher classes.

Efflorescence:

Five bricks shall be tested for efflorescence. The efflorescence shall be 'nil' to 'moderate'

Sample bricks shall be submitted to the Engineer-in-Charge for approval and bricks supplied shall conform to approved samples. If demanded by Engineer-in-Charge, brick samples shall be got tested as per IS : 3495 by Contractor. Bricks rejected by Engineer-in-Charge shall be removed from the site of works within 24 hours.

Mortar for brick masonry shall consist of cement and sand.

Mortar leaner than 1:5 and richer than 1:3 shall not be used.

Preparation of mortar

Materials

1) Water :

Water used shall be clean and reasonably free from injurious or deleterious materials such as oils, acids, alkalis, salts. The pH value of water shall not be less than 6.

2) Cement :

Cement shall conform to any of the following :

33 Grade	Ordinary	Portland	Cement	IS : 2697
43 Grade	Ordinary	Portland	Cement	IS : 8112
53 Grade	Ordinary	Portland	Cement	IS : 12269

3) Sand :

Sand for masonry mortars shall confirm to IS 2116

Preparation of mortars :

Mortars shall be prepared and tested as per IS 2250. Mixing of cement mortar shall be done in a mechanical mixers.

Workmanship

Workmanship of brick work shall conform to IS : 2212. All bricks shall be thoroughly soaked in clear water for at least one hour immediately before being laid. The cement mortar for brick masonry work shall be as specified in the respective item of work prepared by the Contractor. Brick work 230 mm thick and over shall be laid in English Bond unless otherwise specified. 100mm/ 115 mm thick brickwork shall be laid with stretchers. For laying bricks, a layer of mortar shall be spread over the full width of suitable length of the lower course. Each brick shall be slightly pressed into the mortar and shoved into final position so as to embed the brick fully in mortar. Only full size bricks shall be used for the works and cut bricks utilised only to make up required wall length or for bonding. Bricks shall be laid with frogs uppermost.

All brickwork shall be plumb, square and true to dimensions shown. Vertical joints in alternate courses shall come directly one over the other and be in line. Horizontal courses shall be levelled. The thickness of brick courses shall be kept uniform. In case of one brick thick or half brick thick wall, atleast on e face should be kept smooth and plane, even if the other is slightly rough due to variation in size of bricks. For walls of thickness greater than on e brick both faces shall be kept smooth and plane. All interconnected brickwork shall be carried out at nearly one level so that there is uniform distribution of pressure on the supporting structure and no portion of the work shall be left more than one course lower than the adjacent work. Where this is not possible, the work be raked back according to bond (and not saw toothed) at an angle not exceeding 45 deg. But in no case the level difference between adjoining walls shall exceed one meter. Brick work shall not be raised more than one metre per day.

Bricks shall be so laid that all joints are well filled with mortar. The thickness of joints shall not be less than 6 mm and not more than 10 mm. The face joints shall be raked to a minimum depth of 10 mm/ 15 mm by raking tools during the progress of work when the mortar is still green, so as to provided a proper key for the plastering/ pointing respectively to be done later. When plastering or pointing is not required to be done, the joints shall be uniform in thickness and be struck flush and finished at the time of laying. The face of brickwork shall be cleaned daily and all mortar droppings removed. The surface of each course shall be thoroughly cleaned of all dirt before another course is laid on top.

During harsh weather conditions, newly built brick masonry works shall be protected by tarpaulin or other suitable covering to prevent mortar being washed away by rain.

Brickwork shall be kept constantly moist on all the faces for at least seven days after 24 hrs of laying. The arrangement for curing shall be got approved from the Engineer-in-Charge.

Double scaffolding having two sets of vertical supports shall be provided to facilitate execution of the masonry works. The scaffolding shall be designed adequately considering all the dead, live and possible impact loads to ensure safety of the workmen, in accordance with the requirements stipulated in IS : 2750 and IS : 3696 (Part - I). Scaffolding shall be properly maintained during the entire period of construction. Single scaffolding shall not be used on important works and will be permitted only in certain cases as decided by the Engineer-in-Charge. Where single scaffolding is adopted, only minimum number of holes, by omitting a header shall be left in the masonry for supporting horizontal scaffolding poles. All holes in the masonry shall be carefully made good before plastering/ pointing.

In the event of usage of traditional bricks of size 230 mm x 115 mm x 75 mm, the courses at the top of the plinth and sills as well as at the top of the wall just below the roof/ floor slabs and at the top of the parapet shall be laid with bricks on edge.

All brickwork shall be built tightly against columns, floor slabs or other structural members.

To overcome the possibility of development of cracks in the brick masonry following measures shall be adopted.

For resting RCC slabs, the bearing surface of masonry wall shall be finished on top with 12 mm thick

cement mortar 1:3 and provided with 2 layers of Kraft paper Grade 1 as per IS : 1397 or 2 layer of 50 micron thick polyethylene sheets.

RCC/ steel beams resting on masonry wall shall be provided with reinforced concrete bed blocks of 150 mm thickness, projecting 150mm on either sides of the beam, duly finished on top with 2 layer of Kraft paper Grade 1 as per IS : 1397 or 2 layers of 50 micron thick polyethylene sheets.

Steel wire fabric shall be provided at the junction of brick masonry and concrete before taking up plastering work.

Bricks for partition walls shall be stacked adjacent to the structural member to predeflect the structural member before the wall is taken up for execution. Further, the top most course of half or full brick walls abutting against either a deshuttered slab or beam shall be built only after any proposed masonry wall above the structural member is executed to cater for the deflection of the structural element.

Reinforced cement concrete transoms and mullions of dimensions as indicated in the construction Drawings to be prepared by the Contractor are generally required to be provided in the half brick partition walls.

Where the drawings prepared by the Contractor indicate that structural steel sections are to be encased in brickwork, the brickwork masonry shall be built closely against the steel section, ensuring a minimum of 20 mm thick cement-sand mortar 1:4 over all the steel surfaces. Steel sections partly embedded in brickwork shall be provided with bituminous protective coating to the surfaces at the point of entry into the brick masonry.

Uncaused Random Rubble Masonry, in Foundation Plinth and Superstructure

Materials

Stones for the works shall be of the specified variety which are hard, durable, fine grained and uniform in colour (for superstructure work) free from defects like cracks, sand holes, patterns of soft / loose materials veins, other defects. Quality and work shall conform to the requirements specified in IS : 1597 (Part-I). The percentage of water absorption shall not exceed 5 percent as per test conducted in accordance with IS: 1124. The Contractor shall supply sample stones to the Engineer-in-Charge for approval. Stones shall be laid with its grains horizontal so that the load transmitted is always perpendicular to the natural bed.

Cement-sand mortar for stone masonry works shall be as per IS 2250.

Scaffolding

Double scaffolding having two sets of vertical supports shall be provided to facilitate execution of the masonry works. The scaffolding shall be designed adequately considering all the dead, live and possible impact loads to ensure safety of the workmen, in accordance with the requirements stipulated in IS : 2750 and IS : 3696 (Part - I). Scaffolding shall be properly maintained during the entire period of construction. Single scaffolding shall not be used on important works and will be permitted only in certain cases as decided by the Engineer-in-Charge. Where single scaffolding is adopted, only minimum number of holes, by omitting a header shall be left in the masonry for supporting horizontal scaffolding poles. All holes in the masonry shall be carefully made good before plastering/ pointing.

Workmanship

For all works below ground level the masonry shall be random rubble uncoursed with ordinary quarry dressed stones for the hearting and selected quarry dress stones for the facing.

For all R.R. masonry in superstructure the masonry shall be well bounded, faced with hammer dressed stones with squared quoins at corners. The bushing on the face shall not be more than 40 mm on an exposed face and on the face to be plastered it shall not project by more than 12 mm nor shall it have depression more than 10mm from the average wall surface.

Face stones shall extend back sufficiently and bond well with the masonry. The depth of stone from the face of the wall inwards shall not be less than the height or breadth at the face. The length of the stone shall not exceed three times the height and the breadth on base shall not be greater than three-fourths the thickness of wall nor less than 150 mm. The height of stone may be upto a maximum of 300 mm. Face stones or hearting stones shall not be less than 150 mm in any direction.

Chips and spalls shall be used wherever necessary to avoid thick mortar joints and to ensure that no hollow spaces are left in the masonry. The use of chips and spalls in the hearting shall not exceed 20 percent of the quantity of stone masonry. Spalls and chips shall not be used on the face of the wall and below hearting stones to bring them to the level of face stones.

The maximum thickness of joints shall not exceed 20 mm. All joints shall be completely filled with mortar. When plastering or pointing is not required to be done, the joints shall be struck flush and finished as the work proceeds. Otherwise, the joints shall be raked to a minimum depth of 20 mm by a raking tool during the progress of the work while the mortar is still green.

Through or bond stones shall be provided in wall upto 600 mm thick and in case of wall above 600mm thickness, a set of two or more bond stones overlapping each other by at least 150mm shall be provided in

a line from face to back. Each bond stone or a set of bond stones shall be provided for every 0.5 sq.m of wall surface.

All stones shall be sufficiently wetted before laying to prevent absorption of water from the mortar. All connected walls in a structure shall be normally raised uniformly and regularly. However if any part of the masonry is required to be left behind, the wall shall be raked back (and not saw toothed) at an angle not exceeding 45 deg. Masonry work shall not be raised by more than one metre per day.

Green work shall be protected from rain by suitable covering. Masonry work shall be kept constantly moist on all the faces for a minimum period of seven days for proper curing of the joints.

Damp - proof Course

Materials and Workmanship

All the walls in a building shall be provided with damp-proof course covering plinth to prevent water from rising up the wall. The damp-proof course shall run without a break throughout the length of the wall, even under the door or other opening. Damp-proof course shall consist of minimum 50mm thick cement concrete of 1:2:4 nominal mix with nominal reinforcement and approved water-proofing compound admixture conforming to IS: 2645 in proportion as directed by the manufacturer. Concrete shall be with 10mm down graded coarse aggregates.

The surface of brick work/stone masonry work shall be levelled and prepared before laying the cement concrete. Side shuttering shall be properly fixed to ensure that slurry does not leak through and is also not disturbed during compaction. The upper and side surface shall be made rough to afford key to the masonry above and to the plaster. Damp-proof course shall be cured properly for at least seven days after which it shall be allowed to dry for taking up further work.

Miscellaneous Inserts, Bolts etc.

All the miscellaneous inserts such as bolts, pipes, plate embedments etc., shall be accurately installed in the building works at the correct location and levels, all as detailed in the construction Drawing to be prepared by the Contractor. Contractor shall prepare and use templates for this purpose, if so directed by the Engineer-in-Charge. In the event, of any of the inserts are improperly installed, contractor shall make necessary arrangement to remove and reinstall at the correct locations/levels all as directed by the Engineer-in-Charge.

Base Concrete

The thickness and grade of concrete and reinforcement shall be as specified in items of works prepared by the Contractor.

Before placing the blinding concrete, the sub-base of rubble packing shall be properly wetted and rammed. Concrete for the base shall then be deposited between the forms, thoroughly tamped and surface finished level with the top edges of the forms. Two or three hours after the concrete has been laid in position, the surface shall be roughened using steel wire brush to remove any scum or laitance and swept clean so that the coarse aggregates are exposed. The surface of the base concrete shall be left rough to provide adequate bond for the floor finish to be provided later.

Cement Plastering Work

Materials

The proportions of the cement mortar for plastering shall be 1:4 (one part of cement to four parts of sand). Cement and sand shall be mixed thoroughly in dry condition and then just enough water added to obtain a workable consistency. The quality of water and cement shall be as per relevant IS standards. The quality and grading of sand for plastering shall conform to IS: 1542. The mixing shall be done thoroughly in a mechanical mixer unless hand mixing is specifically permitted by the Engineer-in-Charge. If so desired by the Engineer-in-Charge sand shall be screened and washed to meet the Specifications. The mortar thus mixed shall be used as soon as possible preferably within 30 minutes from the time water is added to cement. In case the mortar has stiffened due to evaporation of water this may be re-tempered by adding water as required restoring consistency but this will be permitted only upto 30 minutes from the time of initial mixing of water to cement. Any mortar which is partially set shall be rejected and removed forthwith from the site. Droppings of plaster shall not be re-used under any circumstances.

Workmanship

Preparation of surfaces and application of plaster finishes shall generally conform to the requirements specified in IS: 1661 and IS: 2402.

Plastering operations shall not be commenced until installation of all fittings and fixtures such as door/window panels, pipes, conduits etc. are completed.

All joints in masonry shall be raked as the work proceeds to a depth of 10 mm / 20mm for brick/ stone

masonry respectively with a tool made for the purpose when the mortar is still green. The masonry surface to be rendered shall be washed with clean water to remove all dirt, loose materials, etc., Concrete surfaces to be rendered shall be roughened suitably by hacking or bush hammering for proper adhesion of plaster and the surface shall be evenly wetted to provide the correct suction. The masonry surfaces should not be too wet only damp at the time of plastering. The dampness shall be uniform to get uniform bond between the plaster and the masonry surface.

Interior plain faced plaster

This plaster shall be laid in a single coat of 12 mm thickness. The mortar shall be dashed against the prepared surface with a trowel. The dashing of the coat shall be done using a strong whipping motion at right angles to the face of the wall or it may be applied with a plaster machine. The coat shall be trowelled hard and tight forcing it to surface depressions to obtain a permanent bond and finished to smooth surface. Interior plaster shall be carried out on jambs, lintel and sill faces, etc. as shown in the drawing and as directed by the Engineer-in-Charge.

Plain Faced Ceiling plaster

This shall be applied in a single coat of 6 mm thickness. Application of mortar shall be as stipulated in above paragraph.

Exterior plain faced plaster

This plaster shall be applied in 2 coats. The first coat or the rendering coat shall be approximately 14 mm thick. The rendering coat shall be applied as stipulated above except finishing it to a true and even surface and then lightly roughened by cross scratch lines to provide bond for the finishing coat. The rendering coat shall be cured for atleast two days and then allowed to dry. The second coat or finishing coat shall be 6mm thick. Before application of the second coat, the rendering coat shall be evenly damped. The second coat shall be applied from top to bottom in one operation without joints and shall be finished leaving an even and uniform surface. The mortar proportions for the coats shall be as specified in the respective item of work. The finished plastering work shall be cured for atleast 7 days.

Interior plain faced plaster 20 mm thick if specified for uneven faces of brick walls or for random/ coursed rubble masonry walls shall be executed in 2 coats similar to the procedure stipulated in above paragraph.

For external plaster, the plastering operation shall be commenced from the top floor and carried downwards. For internal plaster, the plastering operations for the walls shall commence at the top and carried downwards. Plastering shall be carried out to the full length of the wall or to natural breaking points like doors/ windows etc. Ceiling plaster shall be completed first before commencing wall plastering.

Double scaffolding to be used shall be as specified in clause 6.6.1.8.

The finished plaster surface shall not show any deviation more than 4mm when checked with a straight edge of 2 m length placed against the surface.

To overcome the possibility of development of cracks in the plastering work following measures shall be adopted.

Plastering work shall be deferred as much as possible so that fairly complete drying shrinkage in concrete and masonry works takes place.

Steel wire fabric shall be provided at the junction of brick masonry and concrete to overcome reasonably the differential drying shrinkage/ thermal movement.

Ceiling plaster shall be done, with a trowel cut at its junction with wall plaster. Similarly trowel cut shall be adopted between adjacent surfaces where discontinuity of the background exists.

Cement Pointing

Materials

The cement mortar for pointing shall be in the proportion of 1:3 (one part of cement to three parts of fine sand). Sand shall conform to IS : 1542 and shall be free from clay, shale, loam, alkali and organic matter and shall be of sound, hard, clean and durable particles. Sand shall be approved by Engineer-in-Charge and if so directed it shall be washed/ screened to meet specification requirements.

Workmanship

Where pointing of joints in masonry work is specified, the joints shall be raked at least 15 mm/ 20 mm deep in brick/ stone masonry respectively as the work proceeds when the mortar is still green.

Any dust/ dirt in the raked joints shall be brushed out clean and the joints shall be washed with water. The joints shall be damp at the time of pointing. Mortar shall be filled into joints and well pressed with special steel trowels. The joint shall not be disturbed after it has once begun to set. The joints of the pointed work shall be neat. The lines shall be regular and uniform in breadth and the joints shall be raised, flat, sunk or 'V' as may be specified in the respective items of work. No false joints shall be allowed.

The work shall be kept moist for atleast 7 days after the pointing is completed. Wherever coloured pointing has to be done, the colouring pigment of the colour required shall be added to cement in such proportions as recommended by the manufacturer and as approved by the Engineer-in-Charge.

Water-Proofing Admixtures

Water-proofing admixtures shall conform to the requirements of IS: 2645 and shall be of approved manufacture. The admixture shall not contain calcium chloride. The quantity of the admixture to be used for the works and method of mixing etc. shall be as per manufacturer's instructions and as directed by the Engineer-in-Charge.

Miscellaneous requirements

Nameplates, signboards, nomenclature

Each item of the plant shall have permanently attached to it in a conspicuous position a nameplate, on which shall be engraved or stamped the manufacturer's name, type and serial number, year of manufacture, details of the design capacity etc. Such labels shall be of non-hygroscopic material to be approved by the Engineer in Charge.

Near by or on each item of the plant, shall be fixed a plate with the name and nomenclature (code) of the item according to the project nomenclature. It shall be visible from a distance of several metres.

The Bidder shall also provide bilingual signboards and instruction tables of durable material, throughout the plant, for the purposes of operation, maintenance and security:

- Danger and caution signs (English and local language)
- Preventive maintenance schedules (local language)
- Operating instructions (local language)
- Unit names (English and local language)
- Nameplates at the doors to the units (English and local language)

Signboards and plates shall be appropriately sized in relation to the relevant item and its surroundings. Details of the proposed inscription, size, material and colours shall be submitted to the Engineer in Charge for approval before any signboards or plates are manufactured. They shall be compatible with the instructions in the operation manual.

All cables shall be provided with clip-on identification numbers on both ends and at all terminations in between, for identification. The nomenclature shall correspond to the electrical as-built drawings.

The nomenclature and labelling of the plant shall be decided in close co-operation with the Engineer in Charge.

11. SYNTHETIC FIBER ADMIXTURE FOR RCC WORKS (As Per Circular : SECY/ RWSSMB/ Circular /2014-15/1089-1113 Dated :- 09.06.2015)

1. PROPERTIES:-

The fiber should be as per guideline of ASTM C 1116 (type III) The Synthetic Polyolefin (Polypropylene and Polyethylene) Fiber used RCC of water retaining structure should be having followings properties-

- 1.1 Length of fiber :- Minimum 12 mm
- 1.2 Construction :- Straight + Fibrillated Mesh Fiber
- 1.3 Melting Point :- 165 Degree Celsius
- 1.4 Absorption :- Nil
- 1.5 Acid Resistance :- High
- 1.6 Alkali Resistance :- Full
- 1.7 Salt Resistance :- High
- 1.8 Thermal Conductivity :- Low
- 1.9 Tenacity :- 6.5 GPD + Elongation : 19% maximums
- 1.10 Specific Gravity :- 0.92g/cc
- 1.11 Size of fiber :- 1 to 4 (in.X10⁻³)
- 1.12 Elastic Modulus :- 500-700 ksi

2. DOSAGE:-

For reinforced cement concrete minimum dosage of fiber admixture shall be as 0.900 Kg per cum of cement concrete or @ 125 g/50 kg bag of cement whichever is more.

3. MIXING PROCESS:-

The Synthetic fiber is a physical micro-reinforcement hence no additional water shall be required for this. The admixture shall be directly mixed with cement.

12. NON RETURN VALVE

1. SCOPE

This specification covers the design requirements, features of construction, inspection testing, painting, delivery installation and commissioning of Dual Plate type non-return valves for vertical applications.

2. CODES AND STANDARDS

The design and manufacture of the valves shall comply with all currently applicable status, regulations and safety codes in the locality where the equipments will be installed. Nothing in this specification shall relieve the vendor of this responsibility. The valve shall be confirming to API 594 and API 598.

3. DESIGN REQUIREMENT FOR NON RETURN VALVES

- a) The Non return valves shall be of dual plate type check valve and provided with metal to metal seating for raw water and with soft seating for clear water.
- b) The valves shall be suitable for mounting on vertical pipeline. The valves shall be designed for minimum head loss.
- c) The valves shall have flat faced flanged ends. The back side of the flanges shall be fully or spot faced.
- d) Hydraulic passage shall be designed to avoid cavitations.
- e) By pass arrangement shall have non slam characteristic. This is to be achieved by suitably designed spring.

4. CLEANING

Prior to factory inspection, all manufacturing waste such as metal chips debris and all other foreign material shall be removed from interior of valve. All mill scale, rust, oil, grease, chalk and all other deleterious material shall be removed from the interior and exterior surfaces.

5. PAINTING

Valves shall first be given two coats of zinc base primer after completely cleaning the surface and then it shall be coated with three coats of coal tar epoxy paint. The resulting coating shall be uniform and smooth and shall adhere perfectly to the surface.

Valves used in pipes carrying water, the inside coating shall not contain any constituent soluble in water or any ingredient which could impart any taste or odour to the water.

6. DIRECTION OF FLOW

Direction of flow shall coincide with the flow direction indicated by arrow cast on the valve body.

7. TESTS OF AND INSPECTION

Valves shall be tested as the relevant Indian Standards. Specification API 594 and API 598 with latest revisions.

Valves shall be offered for visual inspection and dimensional checks.

The hydrostatic and water tightness testing shall be witnessed by the purchaser.

- Valve shall be offered for inspection and following tests. (before painting) at Vendor's shop.
- Visual inspection with dimensional checks.
- Hydrostatic test.

8. PRELIMINARY OUTLINE DIMENSIONAL DRAWINGS.

- Typical cross section drawings.
- Flow v/s head loss curve for Non-return valves and also surge control curves.
- Vendor to submit list of spares also, along with the offer.

1.0	Mfg. Standard	API 594 and 598
2.0	NRV size in mm	65 mm

2.1	NRV numbers	80 numbers
3.0	Maximum working pressure	6 kg/cm ²
4.0	Type	Non slam dual plate, spring action
5.0	Ends	Flanged flat faced flanges as per IS 1538 Table IV and VI having off center bolt holes
6.0	Seat	Body - Renewable Plate - Renewable
7.0	Liquid	Clear water
8.0	MATERIAL OF CONSTRUCTION	
8.1	Body	C. I. IS 210 GR 260
8.2	Plate	ASTM A 216 GR WCB
8.3	Seat Rings	EPDM
8.4	Spring	S. S. AISI 316
8.5	Bearings	Teflon
8.6	Hinge Pins	S.S. AISI 304
8.7	Bolts, Studs and Nuts	Carbon Steel IS : 1367 Class 4.6/4
9.0	Shell Test	9 kg/Cm ²
10.0	Seat Test	6kg/Cm ²

13. ELECTROMAGNETIC FULL BORE TYPE FLOW METER.

1. General

This section of specifications defines the general requirement of Instrumentation system to be installed for the contract works For selection of instruments and control system or anything related to instrumentation, the Contractor shall follow the specifications contained here in.

Irrespective of the detailed specifications of the respective items detailed in the chapters of pumping stations & scope of work, the contractor shall be required to provide all equipment, accessories, cabling, earthing.

2. Electromagnetic full bore type flow meter.

If not provided with the flow meter, the flow indicator and integrator as per clause 9.4 below shall be provided.

SN	Details	Parameter
1.	Principal of working	Faradays law of electromagnetic induction
2.	Type	Full Bore Type with integral flow transmitter
3.	Size	As per requirements.
4.	Signal out put	4-20 mA DC
5.	Time contact	1 second to 20 second adjustable
6.	Pulse out put	10 – 18000 pulses per hour a) Out put to drive external electromagnetic counter of 12 V / 24 V DC directly
7.	Maximum load resistance	1000 Ohm
8.	Local display	3.5 Dijet LCB
9.	Ingress Protection	IP 65
10.	Flow velocity	0.25 m/sec to 10 m/sec
11.	Accuracy	+/- 2.0 % of actual flow at reference condition
12.	Repeatability	+ or – 0.15% of span
13.	Power supply	Normal 240 Volt AC + or – 15 % 50 Hz
14.	Media pressure	As per requirement
15.	Power consumption	Maximum 20 W
16.	Materials	
a)	Liner	Neoprene /Polyurethane
b)	Pipe	SS316
c)	Flanges	SS316
d)	Coil housing	SS
e)	Transmitter	Cast Aluminum epoxy painted

3. Flow Indicator and Integrator

1.	Type	:	Microprocessor based
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2.	Display	:	Digital, seven segment back lit LCD/LED display
3.	Digit Height	:	14 mm or Higher
4.	No. of Digits for - Flow indicator - Flow integrator	: : :	5 Digits 6 Digits
5.	Input	:	4-20 mA DC (Isolated) from flow transmitter through analogue signal multiplier
6.	Zero and span adjustment	:	Required
7.	Manual Reset Facility for flow integrator	:	Required (shall be key operated)
8.	Engineering units for		
9.	- Flow rate indicator - Flow integrator	: :	Cum/hr ml
10.	Battery backup for integrator	:	Required

Note: Digital flow indicator and flow integrator shall be a combined unit

14. SPECIFICATION OF SOFT STARTERS FOR PUMP APPLICATION

1) GENERAL SPECIFICATIONS :

- The softstarter shall be rated at 475 A . It will be fully digital microprocessor based incorporating latest Technologies. in India . All settings shall be settable through digital Keypad and Digital Display.
- It will allow Voltage variation 415 V – 15% ,+ 10% atleast .
- It shall be capable of withstanding ambient temp of 50°C ,with Bypass Contactor.
- It shall have a cooling fan which will activate only if it gets overheated .
- The enclosure shall be free standing ventilated type with sheet steel body .
- The enclosure shall be provided with Ammeter /Voltmeter with selector switch.Start /Stop pushbuttons and indicating Lights .
- Incoming short circuit protection shall be MCCB with Earth Fault Protection of min 35 KA breaking capacity .
- The softstarter shall be 3 wire line connected . Only one cable shall be Required between softstarter and motor .

2) CONTROL PHILOSOPHY, PROTECTIONS AND INTERFACING .

- The softstarter shall incorporate latest control methodology of **Torque Control** or equivalent.It should provide Linear acceleration /Deceleration to pump motor irrespective of Load.
- Braking Torque level shall be programmable and Torque deceleration ramp shall be provided to provide linear deceleration in order to reduce Water Hammer.
- It shall be provided with End of start bypass facility with no need of External timer .The end of start bypass contactor shall only bypass thyristor bridge and not control circuit .All monitoring and protections Including Locked rotor protection will be available during bypass mode.The softstarter shall have inbuilt CT which shall be in circuit even in Bypass mode .No external CT is preferred .In case external CT is required A multifunction microprocessor based protection relay shall be provided .
- In addition to above the softstarter shall provide additional pump Protection of dry run (underload),and reverse run protection .
- Motor nominal current shall be adjustable from 0.4 times to 1.3 times Starter nominal current .Also current limit shall be adjustable from 1.5 times to 7 times motor nominal current .
- Starter Protection : It shall incorporate Thermal ,Phase Failure (Thru Internal CT) ,Phase imbalance ,Undervoltage .
- Motor Protection : It shall incorporate overload ,Phase failure ,Stall and Jam detection ,locked rotor condition even during bypass mode .Time Delay before restarting shall be programmable to prevent excessive no of Starts.Facility for PTC Probe connection shall be provided as standard.
- Motor preheating function shall be provided to prevent condensation and Therefore loss of insulation during long periods of shut down and maintainance .
- The softstarter shall provide atleast 3 outputs for Fault ,End of start and Freely programmable (configurable).

- j) The softstarter shall have atleast 2 digital inputs other than start /Stop which shall be configurable .
- k) It shall have facility to connect on Modbus /Ethernet TCP/IP for future Connectivity to Energy management systems .

15. CENTRIFUGAL HSC COUPLED PUMPING SETS

1. SCOPE

These specifications cover for Supply of Centrifugal Pumps generally conforming to IS 6595 (Part-2) 1993 (Amended upto date) directly coupled to A.C. induction motor generally conforming to IS:325 : 1978 (amended upto date) through a flexible coupling mounted on a common sturdy and robust C.I./Fabricated M.S Plate manufactured by Pump Manufacturer. The base plate should be designed to withstand load and vibrations of complete unit. After proper alignment of unit base plate should not show any vibration during the entire range of pump operation, coupling guard should be provided to give safety against accidental breakage of coupling.

2. MATERIAL OF CONSTRUCTION AND OTHER DETAILS

2.1. PUMP

- Specification : IS : 6593 (Part-2) 1993 (amended upto date)
Type : Horizontal split Casing (As Specified at duty conditions)
Speed at duty condition : Matching with nominal speed of prime mover.
Suction (in Mtrs.) : 4 Meter

Material of Construction

(a) **Casing:** Grey cast iron of grade FG: 200 as per IS:210-1978 (Amended or revised upto date).

(b) **Impeller, Casing Ring and Impeller Ring** (if provided):

Bronze grade LTB- 2 of IS: 318-1981 (amended up to date). The impeller should be dynamically balanced and keyed to the shaft passage provided through hubs, to give hydraulic balance and also to relieve stuffing box from any untoward loads. As an alternative, providing of radial ring of appropriate size on the back of impeller for hydraulic balancing is also acceptable. In case PH is between 6.5 to 8.5 and the chlorides content in excess 100 ppm. only zinc free bronze fitted construction or stainless steel construction shall be permitted.

(c) **Shaft Sleeve :** Bronze grade LTB-2 of IS: 318-1981 or Chrome Steel 07 gr. 13 of IS : 1570 part (B) 1986.

(d) **Stuffing Box:** Gray cast iron of grade a FG: 200 as per IS 210-1978 mechanically sealed.

(e) **Gland:** Gray cast iron of Grade FG: 200 as per IS: 210-1978.

(f) The direction of rotation should be casted so as to be visible when viewed from driving end (Clockwise or Anti clockwise).

(g) **SHAFT:** Pump shaft should be 40 C8 of IS: 1570 (Part 2) section 1979.

2.2. MOTOR

(a) AC 3 phase 50 HZ, TEFC IP-55, 415 volts squirrel cage induction motor as per IS 12615: 2004 with minimum efficiency 80% suitable for operation in voltage range of 415 volts + 10% and –15% without getting overloaded. Winding insulation shall be class F insulation (Temp. rise limit shall be as per class-B insulation) and impregnated to exclude moisture. It shall be suitable for tropical service condition. The temperature rise (measured by resistance method) shall be in accordance to IS: 12615-2004. The temperature rise shall not exceed the specified temperature rise limit in table 1 by more than 10°C when motor is continuously operated at 350 volts.

(b) **Rotor** : Squirrel cage type.

(c) **Shaft** : Grade 40 C8 of IS 1570 (Part 2) 1979

(d) **Motor Enclosure** : TEFC IP 55

(e) **Synchronous Speed** : Above 15 HP – 1500 (sync)

Pump RPM should be designed on the basis of actual speed available corresponding to Synchronous speed of 1500 RPM.

(f) **Efficiency Rating** : IE3

(g) **PERFORMANCE** : As per IS:325-1996 (amended or revised up to date) but for voltage range it shall be +10% & -15% of 415 V.

(h) Motor should not get over-loaded in the entire operating range of pump from + 10% to -25% of specified duty point head. Motor rating should be higher or equal to higher of the following :

(a) Consumption at + 10% of the duty head of pump.

(b) Consumption at -25% of the duty head of pump.

(c) Consumption at duty point of pump plus margin as given in table 11.4 of "Manual of Water Supply & Treatment" which is as follows :

SN	BKW Required at the operating point	Multiplying factor to decide drive rating
1.	Up to 1.5	1.5
2.	1.5 to 3.7	1.4
3.	3.7 to 7.5	1.3
4.	7.5 to 15	1.2
5.	15 to 75	1.15
6.	above 75	1.1

3. Negative tolerance on quoted pump efficiency shall not be allowed. The test at duty point shall be carried out at given suction condition. The NPSH required on duty point shall not exceed four(4.00) meters or as prescribed specifically.

4. Minimum, guaranteed efficiency at duty point should be quoted without negative tolerance. The pumping set shall be suitable for satisfactory operation with in the range of + 10% and -25% of the specified duty point head and entire range of operation of pump (without noise or cavitations) shall be on the stable portion of the curve. Specific duty point should be as close to the maximum efficiency point as possible. Pump test, tolerance, Guarantee of pump performance shall be specified as per IS:6595 (Part-2) 1993 (amended upto tolerance).

5. The firm should submit specific duty point curve covering complete working range. The curve should indicate following relations as minimum requirement of the curve : -

Discharge	v/s	Head
Discharge	v/s	Pump Efficiency
Discharge	v/s	Pump input.
Discharge	v/s	NPSH required.

6. The performance curves and various related data for pump and motor submitted with the offer should be authenticated by respective manufacturers. Offers received without an authentication shall be liable for summarily rejection.

7. All routine test certificate of electric motor as per stipulation IS 325: 1993, shall be provided by manufacturer of electric motor and these test certificates will be furnished before the inspecting agencies for review. Pump and motor shall be tested at works of respective manufacturers.

8. Pump shall be tested as per provision given in IS:6595 (Part-2) 1993 amended up to date and IS 9137-1978 (amended up to date) by the inspecting authority.

9. Inspection

Signature of tenderer

Testing of pump and motor will be carried out separately at pump manufacturer and motor manufacture's place as per specification. Not with standing the clearance of the inspecting agency regarding pumps & motors separately the contractor/supplier shall have to give guarantee for the over all satisfaction of the prescribed duty condition. Proper and adequate facility shall be provided free of cost by the tenderer for conducting tests as per ISS by inspecting Agency. No testing charge will be paid extra by the Departmentt. Efficiency shall be tested without any extra coating on internals of pump.

10. Quoted minimum efficiency of the pump set shall be higher of Minimum specified in relevant IS code and as mentioned in scope of work.
11. ANNEXURE "B" TECHNICAL DETAILS OF OFFER (To be filled in by the Tenderer for each Pump Set offered)

S.No.	Particulars		
1.	Make of Pumps :	:	
2.	Type of Pump	:	Centrifugal Pump Set
3.	Type of casing	:	H.S.C.
4.	Suction size (mm)	:	
5.	Delivery size (mm)	:	
6.	Number of stages	:	
7.	Discharge at duty head (LPS)	:	
8.	Duty Head (Mtr.)	:	
9.	Pump Efficiency at duty point (%)	:	
10.	Motor Efficiency at duty point (%)	:	
11.	Overall efficiency at duty point (%)	:	
12.	Motor rating in KW	:	
13.	Pump input at duty point (in KW)	:	
14.	Motor input at duty point (in KW)	:	
15.	Shut off head (M)	:	
16.	Discharge at - 25% of duty point head (LPS) Pump efficiency at - 25% of duty point head in (%) Pump input at - 25% of duty point head (in KW)	:	
17.	Discharge at + 10% of duty point head (LPS) Pump efficiency at 10% of duty point head in (%) Pump input at + 10% of duty point head (in KW)	:	
18.	NPSH required at duty point (M)	:	
19.	Type of starting	:	
20.	Recommended cable size	:	
21.	Make of Motor	:	
22.	Motor enclosure (TEFC)	:	
23.	Synchronous Speed of Motor	:	

24.	Nominal speed of motor	:	
25.	Deviation in material of construction (if necessary a separate sheet giving details may be enclosed)	:	
26.	<u>Details of characteristic curves enclosed</u>	:	
	1. Discharge v/s Head		Yes/No
	2. Discharge v/s Pump & efficiency		Yes/No
	3. Discharge v/s Pump input		Yes/No
	4. Discharge v/s NPSH required		Yes/No
27.	Pump MOC : Casing/Stuffing Box/Gland Impeller / Ring Shaft Sleeve Pump Shaft		

12. Civil Works for pump installation

12.1. Pump Foundation, Leveling And Grouting of Machinery

The pumps and motors shall be properly and accurately leveled and aligned on the concrete plinth by means of tapered metal wedges and metal packing pieces before any grout is poured. After correct alignment and leveling the foundation bolts shall be nipped up to hold the machine firmly in position and it shall be the Bidder's responsibility to check that the position is maintained after the grout has been poured but before it sets. The grout which will contain an approved expanding agent will be mixed and poured by **the Bidder. ACC shrinkomph, grout mixer or** equivalent as approved by Engineer in Charge, is to be used for grouting.

The horizontality of base plate top shall be within 0.05 mm/meter. The base plate top surface and pump motor box are to be blue matched to get a contact area of at least 80%.

After the grouting mixture has set, the foundation bolts shall be pulled up hard and the alignment and level rechecked. The Engineer in Charge shall be informed at all times of the progress of this work and when any checks on alignment and level are to be carried out so that he may witness the checks if he so requires. The approval of the Engineer in Charge or his intimation that the alignment or level of the machines is to his satisfaction shall in no way relieve the Contract of his obligation under contract to properly install and align the machines and Pipe work and shall in no way prejudice the Engineer in Charge's rights to order rectification of any installation work later found to be improperly carried out.

16. SPECIFICATION FOR OPERATION, MAINTENANCE & REPAIRS

Specification and Procedure for Operation, Maintenance and Repairs shall be followed as O&M manual of concerned manufacturer/constructing contractor. However following guide lines are also given for O&M of plants/ machinery.

1.0 Procedures for Operation, Maintenance & Repairs

The section details general guidelines and procedures for operation, maintenance and repairs of various components/equipment in water supply system. The components covered are:

- a) Pumping Stations and Equipment
 - i) Pumping Machinery
 - ☐ Operation including starting and stopping of pumps and associated electrical and mechanical equipment
 - ☐ Preventive maintenance
 - ii) Ancillary equipment

- ☐ Operation, maintenance and testing of
 - o lifting equipment
 - o water hammer (surge) control device
 - o Screen
 - o Penstock/gate
- iii) Pump house
 - ☐ House keeping
 - ☐ Other important aspects

2.0 Operation of the Pumps

2.1 Important Points for Operation

Important points as follows shall be observed while operating the pumps.

- a) Dry running of the pumps should be avoided.
- b) The variation in level of river shall be simultaneous with VT pumps.
- c) Centrifugal pumps have to be primed before starting.
- d) Pumps should be operated only within their recommended range on the head discharge characteristics of the pump.
 - ☐ If pump is operated at point away from duty point, the pump efficiency normally reduces.
 - ☐ Operation near the shut off should be avoided, as the operation near the shut off causes substantial recirculation within the pump, resulting in over heating of water in the casing and consequently, in over heating of the pump.
- e) Voltage during operation of pump motor set should be within $\pm 10\%$ of rated voltage. Similarly current should be below the rated current as per name plate on the motor.
- f) In order to reduce starting load on motor, pump shall be started against closed delivery valve.
- g) It is also necessary to control opening of delivery valve during pipeline filling period so that the head on the pump is within its operating range in order to avoid operation on low head and consequent overloading. This is particularly important during charging of the pumping main initially or after shutdown. As head increases the valve shall be gradually opened.

The pumps of high specific speed draw more power at shut off. Such pumps should be started with the delivery valve open.
- h) The delivery valves should be operated gradually to avoid sudden change in flow velocity which can cause water hammer pressures.
- i) When the pumps are to be operated in parallel, the pumps should be started and stopped with a time lag between two pumps. The time lags should be adequate to allow stabilizing head on the pump, as indicated by pressure gauge.
- j) When the pumps are to be operated in series, they should be started and stopped sequentially, but with the minimum time lag as possible. Any pump, next in sequence should be started immediately after the delivery valve of the previous pump is even partly opened. Due care should be taken to keep the air vent of the pump next in sequence open, before starting that pump.
- k) The stuffing box should be free of leakage to ensure that no air is passing in to the pump and that the packing is getting adequate water for cooling and lubrication. When the stuffing box is grease sealed, adequate refill of the grease should be maintained.

- l) The running of the duty pumps and the standby should be scheduled so that no pump remains idle for long period and all pumps are in ready-to run condition. Similarly an equal running should be ensured so that all pumps do not wear equally and become due for overhaul simultaneously.
- m) If any undue vibration or noise is noticed, the pump should be stopped immediately and cause for vibration or noise be checked and rectified.
- n) By pass valves of all reflux valve, sluice valve and butterfly valve shall be kept in closed position during normal operation of the pumps.
- o) Frequent starting and stopping should be avoided as start or stop causes overloading of motor, starter, contactor and contacts. Though overloading lasts for few seconds, it reduces life of the equipment.

2.2 Energy Conservation

The operation should ensure energy conservation to the maximum possible extent

Recommendations for operation plan

- ☐ W/L in the reservoirs serving as suction sump to the pumps shall be at maximum permissible level at the time of switching on the pumps
- ☐ Over flow in the reservoir should be avoided
- ☐ The aspect that the motor does not get overloaded due to operation at lower head shall be ensured.

2.3 Undesirable Operations

Following undesirable operations should be avoided.

i) Operation at Higher Head

The pump should never be operated at head higher than maximum recommended. Such operation results in excessive recirculation in the pump, overheating of the water and the pump. As useful guide, appropriate marking on pressure gauge be made.

Such operation is also inefficient as efficiency at higher head is normally low.

ii) Operation at Lower Head

If pump is operated at lower head than recommended minimum head, radial reaction on the pump shaft increases causing excessive unbalanced forces on shaft which may cause failure of the pump shaft. As useful guide, appropriate markings on both pressure gauge and ammeter be made.

Such operation is also inefficient as efficiency at lower head is normally low.

iii) Operation with Strainer/ Foot Valve Clogged

If the strainer or foot valve is clogged, the friction loss in strainer increases to high magnitude which may result in pressure at eye of the impeller falling below water vapour pressure, causing cavitation and pitting.

The strainers and foot valves should be periodically cleaned particularly during monsoon.

iv) Operation of the pump with Low Submergence

Minimum submergence above the bellmouth or strainer is necessary so as to prevent air entry into the suction of the pump which give rise to vortex phenomenon causing excessive vibration, overloading of bearings, reduction in discharge and efficiency. As useful guide the lowest permissible water level be marked on water level indicator.

v) Operation with Occurrence of Vortices

If vibration continues even after taking all precautions, vortex may be caused. All parameters necessary for vortex-free operation should be checked. Chapter of manual on water supply and treatment discusses the aspects in details.

2.4 Starting the Pumps

2.4.1 Checks before starting

Following points should be checked before starting the pump.

- ☐ Power is available in all 3 phases.
- ☐ Trip circuit for relays is in healthy state.
- ☐ Check voltage in all 3 phases.
- ☐ The voltage in all phases should be almost same and within $\pm 10\%$ of rated voltage, as per permissible voltage variation.
- ☐ Check functioning of lubrication system. Specifically for oil lubricated or clear water lubricated VT pumps and oil lubricated bearings.
- ☐ Check stuffing box to ensure that it is packed properly.
- ☐ Check and ensure that the pump is free to rotate.
- ☐ Check over-current setting if the pump is not operated for a week or so.
- ☐ Before starting it shall be ensured that the water level in the sump/ intake is above low water level and inflow from the source or preceding pumping station is adequate.

2.4.2 Starting and Operation of Pumps

Procedures for starting and operation of different types of pumps are as follows.

2.4.2.1 Centrifugal Pump

- i) To start centrifugal pump, the suction pipes and the pumps should be fully primed irrespective of whether the pump is with positive (flooded) suction or suction lift.

The centrifugal pump with positive suction can be primed by opening valve on suction side and letting out air by opening air vent.

Centrifugal pump on suction lift necessitates close attention to prime the pump fully. To achieve this, the suction pipe and the pump casing must be filled with water and entire air in suction piping and the pump must be removed. If vacuum pump is provided, the pump can be primed by operating vacuum pump till steady stream of water is let out from delivery of vacuum pump. In absence of vacuum pump, priming can be done by pouring water in casing and evacuating air through air vent or by admitting water from pumping main by opening by pass of reflux valve and delivery valve. Check all joints in the suction pipe and fittings.

- ii) Close the delivery valve and then loosen slightly.
- iii) Switch on the motor, check that direction of rotation is correct. If the pump does not rotate, it should be switched off immediately.
- iv) Check vacuum gauge if the pump operates on suction lift. If the pointer on gauge gradually rises and becomes steady the priming is proper.
- v) Pressure gauge should be observed after starting the pump. If the pump is working correctly the delivery pressure gauge should rise steadily to shut off head.
- vi) When the motor attains steady speed and pressure gauge becomes steady, the delivery valve should be gradually opened in steps to ensure that the head does not drop below recommended limit. (In absence of

recommendation, the limit shall be about 85% of duty head for centrifugal pump).

- vii) Check that ammeter reading is less than rated motor current.
- viii) Check for undue vibration and noise.
- ix) When in operation for about 10-15 minute, check the bearing temperature, stuffing box packing, and leakage through mechanical seal and observe vibrations, if any.
- x) Voltage should be checked every half an hour and should be within limit.

2.4.2.2 Submersible Pumps

Starting of submersible pump is similar to vertical turbine pump except that steps ii, v, and xi are not applicable and since motor is not visible correctness of direction of rotation is judged from pressure gauge reading which should indicate correct shut off head.

2.4.2.3 Vacuum Pump

The procedure for starting vacuum pump is similar to centrifugal pump except that priming is not necessary and valves on both suction & delivery side of vacuum pump should be fully open.

2.5 Stopping the Pump

2.5.1 Stopping the Pump under Normal Condition

Steps to be followed for stopping the pump of low and medium specific speed are as follows:

- i) Close the delivery valve gradually (sudden or fast closing should not be resorted to, which can give rise to water hammer pressures).
- ii) Switch off the motor.
- iii) Open air vent in case of V.T. and submersible pump.
- iv) Stop lubricating oil or clear water supply in case of oil lubricated or clear water lubricated VT pump as applicable.

2.5.2 Stopping after Power Failure/ Tripping

If power supply to the pumping station fails or trips, following actions should be immediately taken to ensure that the pumps do not restart automatically on resumption of power supply. Though no-volt release or under volt relay is provided in starter and breaker. Possibility of its malfunctioning and failure to open the circuit can not be ruled out. In such eventuality, if the pumps start automatically on resumption of power supply, there will be sudden increase in flow velocity in pumping main causing sudden rise in pressure due to water hammer which may prove disastrous to pumping main. Secondly due to sudden acceleration of flow in the pumping main from no-flow situation, acceleration head will be very high and the pumps shall operate near shutoff region during acceleration period which may last for few minutes for long pumping main and cause overheating of the pump.

Hence, precautions are necessary to prevent auto-restarting on resumption of power. Following procedure should be followed.

- i) Close all delivery valve soon pumps if necessary, manually as actuators can not be operated due to non-availability of power.
- ii) All switches and breakers shall be operated to open i.e. off-position.
- iii) Open air vent in case of V.T. or submersible pump and close lubricating oil or clear water supply in case of oil lubricated or clear water lubricated V.T. pump.

- iv) Information about power failure should be given to all concerned, particularly to up stream pumping station to stop pumping so as to prevent overflow.

1.0 Preventive Maintenance of Pumping Station

3.1 Maintenance of Pumps

3.1.1 Daily Observations and Maintenance

3.1.1.1 Daily Maintenance

- ☐ Clean the pump, motor and other accessories.
- ☐ Check coupling bushes/ rubber spider.
- ☐ Check stuffing box, gland etc.

3.1.1.2 Routine observations of irregularities

The pump operator should be watchful and should take appropriate action on any irregularity noticed in the operation of the pumps. Particular attention should be paid to following irregularities.

- ☐ Changes in sound of running pump and motor.
- ☐ Abrupt changes in bearing temperature
- ☐ Leakage from stuffing box or mechanical seal.
- ☐ Changes in voltage.
- ☐ Changes in current.
- ☐ Changes in vacuum gauge and pressure gauge readings.
- ☐ Sparks or leakage current in motor, starter, switch gears, cable etc.
- ☐ Over heating of motor

3.1.2 Monthly Maintenance

- i) Check free movement of the gland of the stuffing box, check gland packing and replace if necessary.
- ii) Clean and apply oil to the gland bolts.
- iii) Inspection of mechanical seal for wear and replacement if necessary.

3.1.3 Quarterly Maintenance

- i) Check alignment of the pump and the drive. The pump and motor shall be decoupled while correcting alignment, and both pump and motor shafts shall be pushed to either side to eliminate effect of end play in bearing.
- ii) Clean oil lubricated bearings and replenish fresh oil. If bearings are grease lubricated, the condition of the grease should be checked and replaced/ replenished to correct quantity. An anti-friction bearing should have its housings packed with grease that the void space in the bearing housing should be between 1/3rd to half. A fully packed housing will over heat the bearing and will result in reduction of life of the bearing.
- iii) Tighten the foundation bolts and holding down bolts of pump and motor mounting on base plate or frame.
- iv) Check vibration level with instruments if available; otherwise by observation.

3.1.4 Annual Inspections and Maintenance

A very thorough, critical inspection and maintenance should be performed once in a year. Following items should be specifically attended.

- i) Clean and flush bearings with kerosene and examine for flaws developed, if any, e.g. wear and scratches. Check end play. Immediately after cleaning,

the bearings should be coated with oil or grease to preventing ressof dirt or moisture.

- ii) Clean bearing housing and examine for flaws, e.g. wear, grooving etc. Change oil or grease in bearing housing.
- iii) Examine shafts leaves for wear or scour and necessary rectification. If shaft sleeves are not used, shaft should be examined for wear.
- iv) Check stuffing box, glands, lantern ring, mechanical seal and rectify if necessary.
- v) Check clearance in wearing ring. Clearances at the wearing rings should be within the limits recommended by the manufacturer. Excessive clearance reduces discharge and efficiency of the pump. If the wear is only on one side, it is indicative of misalignment. The misalignment should be set right, and the causes of misalignment should be investigated. When the clearances have to be restored, general guidelines detailed in table below shall be followed. Normally, if the clearance in wearing rings increase by about 100%, the rings shall be renewed or replaced to get the original clearance.

The tolerances given in the table are to be strictly followed. For example, while machining the internal diameter of the casing wearing ring of basic size, say 175mm, the limits for machining would be 175.00 minimum and 175.05 maximum. For the corresponding outer diameter at the hub of the impeller or impeller ring, the basic size will be with a clearance of 0.4 mm, i.e. 174.60mm and the machining limits will be 174.60mm maximum and 174.55mm minimum.

Taking into consideration that part dismantling of the pump is involved in checking wearing ring clearance and as it is not advisable to dismantle vertical turbine pump every year, the frequency for checking wearing ring in case of V.T. pump shall be once in two years or less if discharge test indicates discharge reduction beyond limit of 5%-7%.

- vi) Check impeller hubs and vane tips for any pitting or erosion.
- vii) Check interior of volute, casing and diffuser for pitting, erosion, and rough surface.
- viii) All vital instruments i.e. pressure gauge, vacuum gauge, ammeter, voltmeter, wattmeters, frequency meter, tachometer, flowmeter etc. shall be calibrated.
- ix) Conduct performance test of the pump for discharge, head and efficiency.
- x) Measures for preventing ingress of flood water shall be examined. Ingress of flood water in sump, well shall be strictly prevented.

3.1.5 Overhaul of Pump

It is difficult to specify the periodicity or interval for overhaul in form of period of service in months, year or operation hours, as deterioration of pump depends on nature of service, type of installation i.e. wet-pit or dry-pit, quality of water handled, quality of material of construction, maintenance etc.

However generally, following periods or hours may be taken as broad guidelines.

☐ Submersible pump	- 1 ½ to 2 years
☐ Vertical turbine pump	- 3 years or ~5000
☐ Centrifugal pump	- 4 year or ~15000

3.2 Maintenance Schedule for Motors

3.2.1 Daily Maintenance

- i) Clean external surface of motor.
- ii) Examine earth connections and motor leads.
- iii) Check temperature of motor and check whether overheated. The permissible maximum temperature is above the level which can be comfortably felt by hand. Hence temperature observation should be taken with RTD or thermometer. (Note: In order to avoid opening up motors, a good practice is to observe the stator temperature under normal working conditions. Any increase not accounted for, by seasonal increase in ambient temperature should be suspected.)
- iv) In case of oil ring lubricated bearing.
 - ☐ Examine bearing to check whether oil rings are working.
 - ☐ Note bearing temperature.
 - ☐ Add oil if necessary.

3.2.2 Monthly Maintenance

- i) Check belt tension. In case where this is excessive it should immediately be reduced.
- ii) Blow dust from the motor.
- iii) Examine oil in oil lubricated bearing for contamination by dust, grit, etc. (this can be judged from the colour of the oil).
- iv) Check functioning and connections of anti-condensation heater (space heater).

3.2.3 Quarterly Maintenance

- i) Clean oil lubricated bearings and replenish fresh oil. If bearings are grease lubricated, the condition of the grease should be checked and replaced/replenished to correct quantity. An anti-friction bearing should have its housings so packed with grease that the void space in the bearing housings should be between 1/3rd to half. A fully packed housing will overheat the bearing and will result in reduction of life of the bearing.
- ii) Wipe brush holder and check bedding of brushes of slip-ring motors.
- iii) Check insulation resistance of the motor.
- iv) Check tightness of cable gland, lug and connecting bolts.
- v) Check and tighten foundation bolts and holding down bolts between motor and frame.
- vi) Check vibration level with instrument if available; otherwise by observation.

3.2.4 Half Yearly Maintenance

- i) Clean winding of motor, bake and varnish if necessary.
- ii) In case of slip ring motors, check slip-rings for grooving or unusual wear, and polish with smooth polish paper if necessary.

3.2.5 Annual Inspections and Maintenance

- i) Clean and flush bearings with kerosene and examine for flaws developed, if any, e.g. wear and scratches. Check end play. Immediately after cleaning, the bearings should be coated with oil or grease to prevent ingress of dirt or moisture.
- ii) Clean bearing housing and examine for flaws, e.g. wear, grooving etc. Change oil or grease in bearing housing.
- iii) Blow out dust from windings of motors thoroughly with clean dry air. Make sure that the pressure is not so high as to damage the insulation.

- iv) Clean and varnish dirty and oily windings. Revarnish motorssubjected to severe operating and environmental conditions e.g. operation in dust-laden environment, polluted atmosphere etc.
- v) Check condition of stator, stamping, insulation, terminal box, fan etc.
- vi) Check insulation resistance to earth and between phases of motor windings, control gear and wiring.
- vii) Check air gaps.
- viii) Check resistance of earth connections.

3.3 Valves

Following 5 types of valves are generally used in pumping installation

- a) Foot valve
- b) Sluice valve
- c) Reflux (non-return) valve
- d) Butterfly valve
- e) Air Valve

Maintenance as follows shall be carried out.

a) Foot Valve

- ☐ Clean foot valve once in 1-3 months depending on ingress of floating matters.
- ☐ Clean flap of the foot valve once in 2 months to ensure leak-proof operation.
- ☐ Inspect the valve thoroughly once in a year. Check for leakage through foot valve after priming and observing level in volute casing.

b) Sluice Valve

- ☐ Check gland packing of the valve at least once in a month. It should be ensured that packings inside the stuffing box are in good trim and impregnated with grease. It may be necessary to change the packing as often as necessary to ensure that the leakage is within limit.
- ☐ Grease should be applied to reduction gear once in a month.
- ☐ Check tight closure of the valve once in 3 months.
- ☐ A valve normally kept open or closed should be operated once every three months to full travel of gate and any jamming developed due to long use shall be freed.
- ☐ Inspect the valve thoroughly for flaws in guide channel, guide lugs, spindle, spindle nut, stuffing box etc. once in a year.
- ☐ Important DONT for sluice valve is that it should never be operated with oversize hand wheel or cap or spanner as this practice may result in rounding of square top and hand wheel or cap or spanner may eventually slip.
- ☐ Another important DONT for sluice valve is that it should never be operated under throttled i.e. partially open condition, since such operation may result in undue chatter, wear and failure of valve spindle.

c) Reflux (non-return) valve

- ☐ Check proper operation of hinged door and tight closure under no-flow condition once in 3 months.
- ☐ The valve shall be thoroughly inspected annually. Particular attention should be paid to hinge and pins and soundness of hinged door.

- ☐ Condition of dampening arrangement should be critically examined once in a year and necessary maintenance and rectification as per manufacture instructions shall be carried out.

d) Butterfly valve

- ☐ Check earling and tight shut off once in 3 months.
- ☐ Lubricate gearing arrangement once in 3 months.
- ☐ Inspect the valve thoroughly including complete operation once in a year.
- ☐ Change oil or grease in gearing arrangement once in a year.

e) Air Valve

Inspect the air valve regularly for ensuring satisfactory operation. Each valve should be thoroughly inspected once in a month for the following:

- ☐ Nipples and nozzles are free from foreign matters
- ☐ Surface of float coating which ensures the positive sealing when closed
- ☐ Leakage through the valve and joint should be checked once in a month
- ☐ Any misuse of the valve for the flow of water should be checked during patrolling.

f) General

- ☐ Operate by-pass valve wherever provided once in 3 months.
- ☐ Flange adapter dismantling joint provided with valve shall be loosened and retightened once in 6 months.

3.4 L. T. Starters, Breakers and panel

i) Daily

- Clean the external surface.
- Check for any spark or leakage current.
- Check for overheating.

ii) Monthly

- ☐ Blow the dust and clean internal components in the panel, breaker and starter.
- ☐ Check and tighten all connections of cable, wires, jumpers and bus-bars. All carbon deposition shall be cleaned.
- ☐ Check relay setting.

iii) Quarterly

- ☐ Check fixed and moving contacts and clean with smooth polish paper, if necessary.
- ☐ Check oil level and condition of oil in oil tank. Replace the oil if carbon deposit in suspension is observed or colour is black.
- ☐ Check insulation resistance.
- ☐ Check condition of insulators.

iv) Yearly

- ☐ Dismantle and check all components, thoroughly clean and reassemble.
- ☐ Calibrate voltmeter, ammeter, frequency meter etc.

3.5 Contactors and Protection Relays

Maintenance schedules specified for L.T. breakers is also applicable to L.T. system and contactors. In addition, following important points shall be attended to:

i) Monthly

- ☐ Check spring charging mechanism and manual crankin garrangement for operation.
- ☐ Clean all exposed insulators.
- ☐ Check trip circuit and alarm circuit.

ii) Quarterly

- ☐ Check control circuit including of breakers and transformer.
- ☐ Check oil level in MCB / and topup with tested oil.

iii) Yearly/ Two yearly

- ☐ Testing of protection relay with D.C. injection shall be carried out once in a year.
- ☐ Servicing of HT breaker and contactors shall be carried out once in 2-3 years.

3.6 Capacitors

3.6.1 Pre-requisites for Satisfactory Functioning of Capacitors

Ensure following points :

- i) A capacitor should be firmly fixed to a base.
- ii) Cable lugs of appropriate size should be used.
- iii) Two spanners should be used to fasten or loosen capacitor terminals. The lower nut should be held by one spanner and the upper nut should be held by the other spanner to avoid damage to or breakage of terminal bushings and leakage of oil.
- iv) To avoid damage to the bushing, a cable gland should always be used and it should be firmly fixed to the cable-entry hole.
- v) The capacitor should always be earthed appropriately at the earthing terminal to avoid accidental leakage of the charge.
- vi) There should be a clearance of at least 75 mm on all sides for every capacitor unit to enable cooler running and maximum thermal stability. Ensure good ventilation and avoid proximity to any heat source.
- vii) While making a bank, the busbar connecting the capacitors should never be mounted directly on the capacitor terminals. It should be indirectly connected through flexible leads so that the capacitor bushings do not get unduly stressed.
- viii) Ensure that the cables, fuses and switchgear are of adequate ratings.

3.6.2 Operation and Maintenance of Capacitors

- i) The supply voltage at the capacitor bus should always be near about the rated voltage. The fluctuations should not exceed $\pm 10\%$ of the rated voltage of the capacitor.
- ii) Frequent switching of the capacitor should be avoided. There should always be an interval of about 60 seconds between any two switching operations.
- iii) The discharge resistance efficiency should be assessed periodically by sensing, if shorting is required to discharge the capacitor even after one minute of switching off. If the discharge resistance fails to bring down the voltage to 50V in one minute, it needs to be replaced.
- iv) Leakage or breakages should be rectified immediately. Care should be taken that no appreciable quantity of impregnant has leaked out.

- v) Before physically handling the capacitor, the capacitor terminals shall be shorted one minute after disconnection from the supply to ensure total discharging of the capacitor.

3.7 Lifting Equipments

Relevant points in the maintenance schedule as follows shall be applicable for lifting equipments, depending on the type of lifting equipment i.e. chain pulley block, EO Throist (travelling trolley and chain pulley block), manually operated overhead crane and electrically operated travelling crane.

i) Quarterly:

- ☐ Check oil level in gear box and top up if required.
- ☐ Check for undue noise and vibration.
- ☐ Lubricate/ grease bearings, gear trains as applicable.
- ☐ Check insulation resistance of motors.

ii Half yearly:

- ☐ Clean limit switches.
- ☐ Clean all electrical contacts.

iii) Yearly:

- ☐ Change oil in gearbox.
- ☐ Conduct load test of crane for rated load.
- ☐ All fast moving components which are likely to wear should be thoroughly inspected once in a year and if necessary shall be replaced.

3.8 Water Hammer Control Devices

Maintenance requirements of water hammer devices depend on type of water hammer control device, nature of its functioning, water quality etc. Type of water hammer control devices used in this project is as under :

- ☐ Air cushion valve.

General guidelines for maintenance of air cushion valves are as follows:

Foreign matters entangled in valve shall be removed by opening all handholes and internal components of the valve including ports, disk, stem, springs, passages, seat faces etc. should be thoroughly cleaned and checked once in 6 months for raw water and once in a year for clear water application.

3.9 Pump House

- i) The pump house should be cleaned daily. Good house keeping and cleanliness is necessary for pleasant environment.
- ii) Entire pump house, superstructure and sub-structures shall be adequately illuminated and well ventilated. Poor lighting, stale air etc. create unpleasant environment and have an adverse effect on will of the staff to work.
- iii) Wooden flooring and M.S. grating wherever damaged should be repaired on priority.
- iv) It is observed that at many places, roof leaks badly and at times the leakage water drips on the panel/motor which is dangerous and can cause short circuit and electric accidents. All such leakages should be rectified on priority.
- v) All facilities in sub-structure i.e. staircase, floors, walkway etc. should be cleaned daily.
- vi) Painting of civil works should be carried out at least once in two years.

3.10 Predictive Maintenance –Pump and Bearing

Predictive maintenance is term used to examine and predict likely failure of components. As this requires experience, anticipation, good judgment and expertise and involves costs for repairs for predicted failures, it can be adapted at important, vital and large pumping station.

Some factual evidence i.e. declining of pump performance, excessive noise or bearing temperature, increase of vibration can indicate that the pump probably need to be overhauled or bearing need to be replaced.

Efforts should be made to rectify noise and vibration level by critical study and adopting measures for rectifications. If noise or vibration still persist, the pump should be opened.

If significant reduction in discharge is suspected, performance test at site shall be conducted with calibrated instruments and the results of the tests are compared with initial results of new pump. After fully ascertaining that the performance is considerably declined, decision to overhaul may be taken.

In some installations particularly if raw water is corrosive or contains grits and sand, the pump may become due for overhaul due to deterioration caused by corrosion or erosion. In such cases, the decision for overhaul should be based on circumstantial evidence i.e. previous history. As long term solution, the manufacturers should be consulted for use of better material of construction for affected components.

4.0 Trunk Mains

4.1 Operation of Trunk Mains

Operation of trunk main in the water supply is very important as any abnormal operation of any of the appurtenances will lead to catastrophic failure of the main. The operation of the trunk main is therefore divided into following three main categories:

- i. Day to Day operation
- ii. Special planned operation
- iii. Emergency operation

i. Day to Day Operation

Trunk main is generally running into kilometers of length. It is provided with various appurtenances viz. Air valve, Scour valve, Zero velocity valve, Butterfly valves etc. The flow of water may vary as per downstream end installations like pumping stations or distribution requirement. This variation of flow is carried by means of operating no. of pumps in the network either those may be main pumps or intermediate pumps or booster pumps. All the operations of the valves in the trunk main are carried out in co-ordination with upstream and downstream operating personnel so as to avoid any pressure surge or formation of vacuum in the pipe. In order to co-ordinate the operational activities daily, wireless communication or telephone messages system is used. For this purpose the instructions from the Master Control Station are issued from time to time. It is therefore very essential to keep all scour valves on the main leak-tight. It will be also essential to monitor pressures at all crucial points.

ii. Special Planned Operation

This is carried out when there is any repair or maintenance or modification work in a particular section of the trunk main to be attended. It is necessary to isolate that section, carry out the work, recharge the section and establish the original pattern of the system. The sequence of operations for such work are as follows:

1. Shut down the pump on main section one by one on taking the instructions from Master Control Centre.
2. Close the main valves on all the sections at pumping end for each section.
3. Observe pressure readings at each end of the section.

4. Close middle valves upstream and downstream of the subsection where work is to be carried out.
5. Open scour valves of the sub-section where work is to be carried out.
6. As soon as pressure in the pipeline starts reducing and comes down to approx. at the level of height of highest air valves, remove the float from that air valve so as to enter the air without difficulty into the pipe.
7. When the water spilling reduces from the highest air valve, the next lower air valve should be operated by removing its float. Like wise the complete pipeline section should be drained fully without formation of vacuum inside.
8. When complete pipe section is emptied, the man hole cover on the trunk main where work is required to be carried should be removed if necessary.
9. Carry out the repair or modification work on the pipe section.
10. After completion of repair work close man hole cover if it is ready to be opened.
11. Close all the scour valves.
12. Start charging the pipe section by opening up stream middle valve slowly.
13. Put the floats in the air valve one by one when they start pilling in ascending order of the levels.
14. After opening of middle valve, the water does not spill out from higher level air valves, it shows that the water is not sufficient in the section.
15. Then start one pump in pumping station at upstream end and open the main valve slowly which was closed earlier on the trunk main.
16. As soon as complete pipe section is charged with water the air valve at the highest level will start spilling.
17. Put back the floats in the air valve with ascending order if the same were not spilling earlier.
18. Then start additional pumps if required one by one and restore the system in original pattern by starting the pumps in other sections also.

iii. Emergency Operation

The emergency operations are carried out in case of emergency like bursting of pipeline etc. In such cases isolation of the affected section of the trunk main is of prime importance. In such condition the pumping is stopped by putting off one by one pump of that section. The pumping of other section can also be stopped slowly.

Then the operation mentioned under ii above are carried out except removal of the floats from the air valves, which will reduce the time period of overall isolation. If necessary for charging the pipeline, the floats from the air valve may be removed and replaced one by one again as the water level rises in the pipe line during recharging.

4.2 Maintenance and Repair of Pipeline

4.2.1. Removing Leakages in Pipeline

1. Leakage Removal without mechanical joint

The leakage if it occurs at the joints, it is required to excavate the joint with sufficient space to work with. It is required to dewater the space before carrying out repairs to the leaking joint. The leakage can be stopped by caulking the joint with ad wool, hemp, cement, sand, mortar, epoxy resin, hard crete etc. After confirming the stoppage of leakage, excavated portion is refilled with normal soil.

2. Leakage Removal with mechanical joint

In this case the existing mechanical joint has to be removed and refixed after excavating the portion of the pipeline & dewatering the working space. While refixing the mechanical joint, it is necessary to remove and reapply hard crete.

On confirmation of leak tight joint the dug up portion is restored with normal soil.

3. Leakage Removal with Fixing New mechanical joint

When the leakage takes place due to cracking of the pipe within limited range or a hole, the leakage can be stopped by fixing new mechanical joint after carrying out excavation, dewatering and applying hard crete etc.

On confirmation of the stoppage of leakage the trench can be refilled

4.2.2 Repair of Burst in Pipes

In this case there could be two possibilities;

- i. Removing a part of the Pipeline piece and
- ii. Removing a complete piece of the Pipeline.

For the purpose of jointing, above damaged portion is cut systematically by means of grinder or chisel and the same is replaced with the new one with the equal length. Then both ends of the new piece is joined with the existing pieces with the help of mechanical joint

For the purpose of ii above the complete damaged piece is removed after breaking it. In place of it a new pipe piece is taken and cut into two pieces so as to make the alignment with existing piping work. These are lowered and fixed in the socket and spigot end and then using mechanical joint the two pieces are joined together.

4.3 Time Schedule and other condition for breakdown repairs in Pipelines

4.3.1 Time Schedule to completion of repair of burst and leakages etc.

4.3.1.1 Major Breakdown :

Each major breakdown shall have to be replaced within 24 hours, However repair in burst of DI pipelines shall be within 36 hours. The time taken for the repair of the job shall be counted from time of occurrence of breakdown.

4.3.1.2 Minor Leakage

Minor leakage generally do not require removal of leaking pipe piece or joint from the system, a maximum period of 8 hours shall be allowed for the repair of such leakages.

4.3.2 Execution of the Work against the risk and cost of contractor

The department shall reserve the right to get the work done on the risk and cost of contractor without rescinding the contract after a notice given to the contractor and he fails to commence the work within 2 hours. In such case compensation for delay in rectification of leakage/ burst shall be levied as per relevant clause.

4.3.3 Patrolling of Pipeline and other Pipelines

4.3.3.1

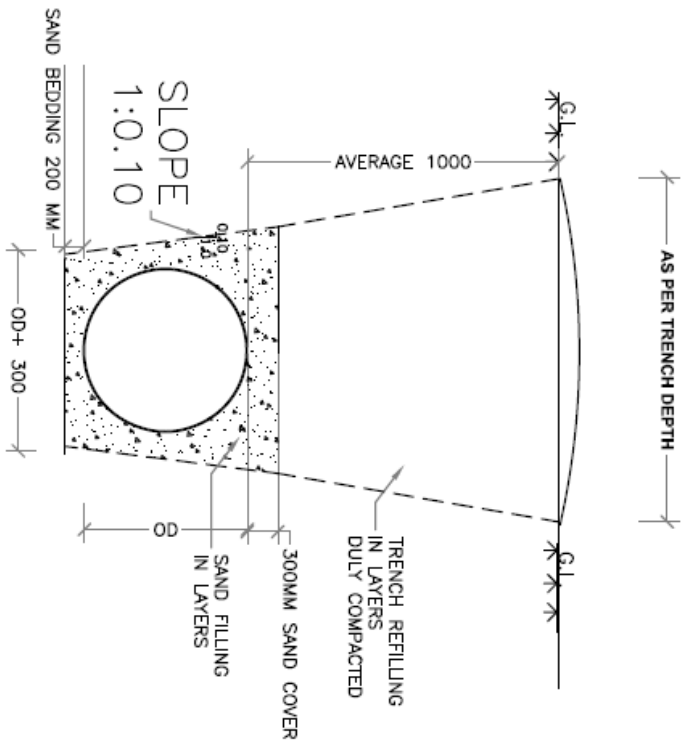
Daily patrolling of pipelines shall be done by the contractor by his own vehicle. He shall submit the consolidated report of patrolling upto 10.00 AM of next day and immediately after the major events occurs to the Engineer-in-charge or his authorized representative. If the patrolling work is not found satisfactory by the Engineer-in-charge, payments shall be deducted Rs.3000/- per day patrolling charges for the number of patrolling days when the performance was not found satisfactory.

- ☐ A person starting from with origin of pumphouse for patrolling must record the time of initial departure and get it signed by authorized person and on reaching at next pumping station mark the time duly signed by authorized person at that pumping station.
- ☐ No payment shall be made to the contractor for work which is the consequences of defective work or faulty preventive maintenance or failure in preventive maintenance on the part of contractor.
- ☐ Contractor shall be responsible for safety and security of all pipelines and their appurtenances, valve chambers etc. Any loss or damages occurred due to negligence on the part of the contractor, the same will be repaired by contractor free of cost. Also damaged parts will be replaced free of cost by him.
- ☐ In order to facilitate the patrolling the contractors shall provide sufficient staff.

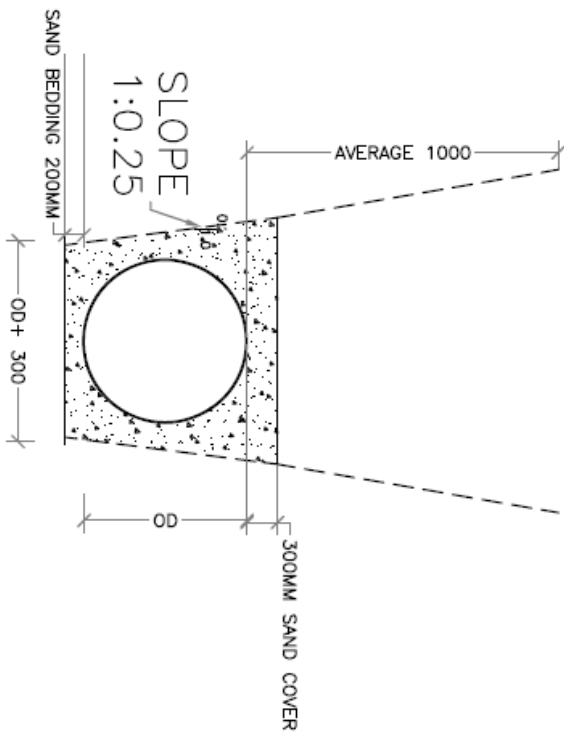
The patrolling of pipelines will detect the surface leakage, the fit and Dmage of the appurtenances of the pipelines. This pipeline should be patrolled daily and if any fault/leakage is detected while patrolling, the same should be rectified as earliest by the mobile/patrolling team. However, in case, any information about leakage in the system is received then that shall be attended by the mobile party within 24 hours of intimation.

Additional Chief Engineer
PHED Region II Jaipur

Trench Section In Boulder/ Rocky Area

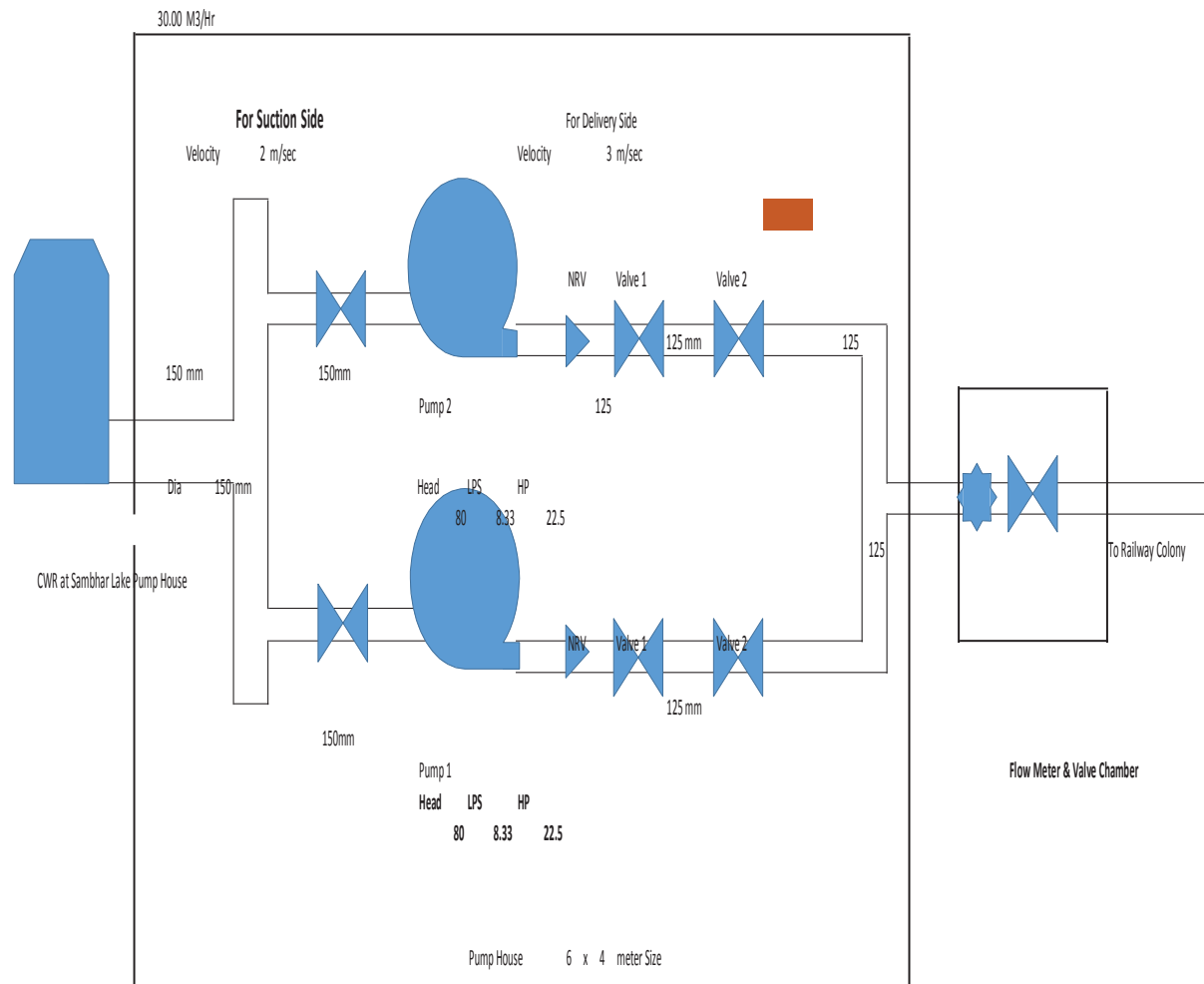


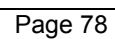
Trench Section In Clay/ Soft Soil / Hard Soil

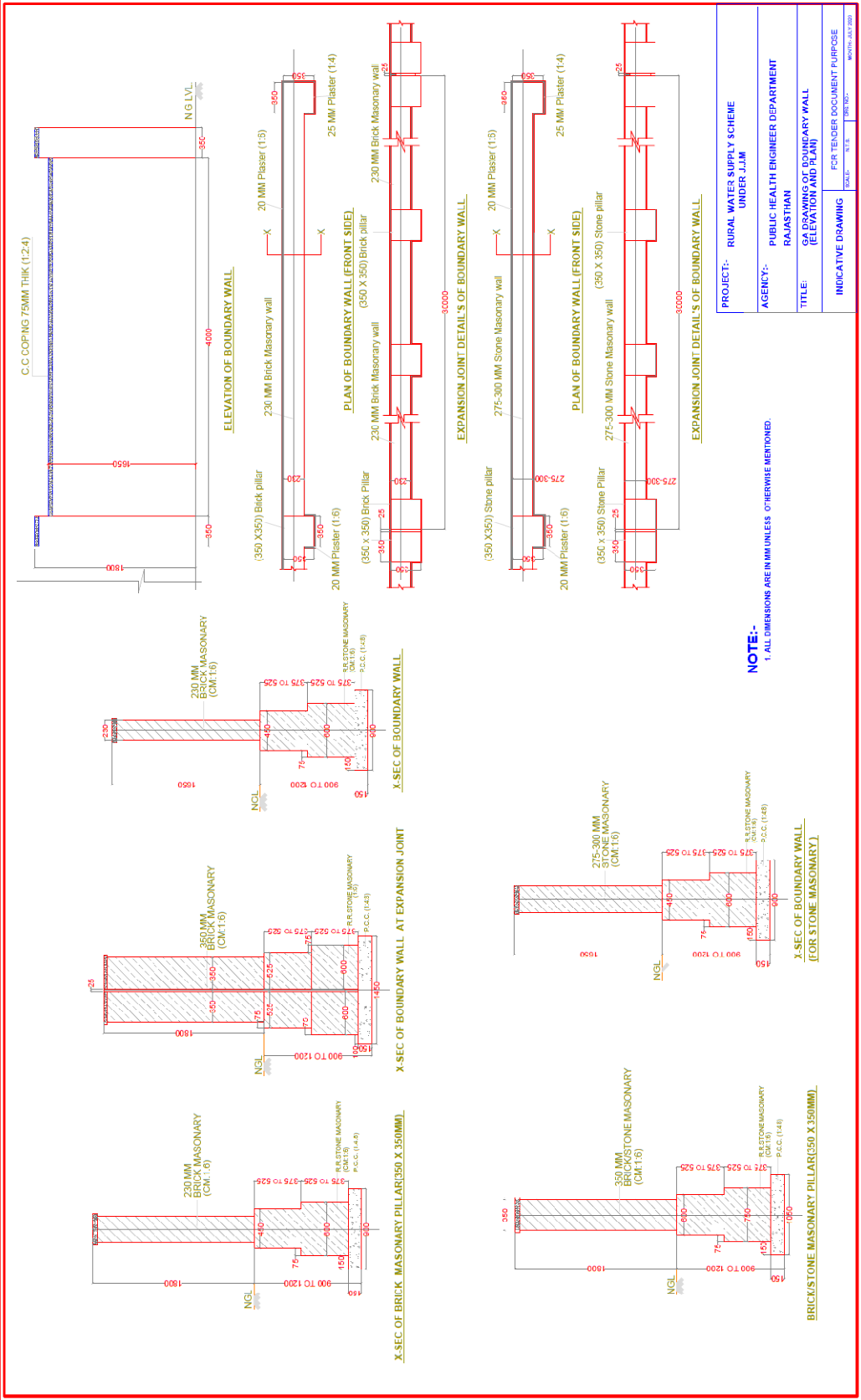


3. For refilling river sand screened at source shall be used.
4. Other details shall be as per scope & specification of work

1/MS







**Government of Rajasthan
Public Health Engineering Department
Tender Document
(NIT No 91 __/2021-22)**

**Work of P/L/J testing and commissioning
of DI Pipe Line, Providing and Installation
of Pump Set with EMI, Construction of
Pump House and SITC of Grid Ties Solar
Power Plant including defect liability
period of of 12 months and O&M period
of 120 months at Railway Colony Phulera
Block Sambher Distt Jaipur**

Volume-III

Financial Bid



**ESTIMATED COST
Rs 390.24 Lacs**

**OFFICE OF THE ADDITIONAL CHIEF ENGINEER,
PHED Region II, Gandhi Nagar Jaipur
Telephone No.: 0141- E-mail:
ace2.jpr.phed@rajasthan.gov.in**

1. PREAMBLE TO SCHEDULE OF PRICES

- 1.0 The Contract is for design (selected part), providing/ manufacturing, construction, commissioning, testing, and operation during defect liability.

Bidder has to quote percentage above and below for BOQ -1 item i.e. BSR Items as per the detailed scope of work and specifications in the Bid Form. The major items envisaged in the contract are stipulated in the schedule of prices. The rates quoted for the individual units of capital works construction must be logical as they can be negotiated individually. No separate payment shall be made for operation of scheme during defect liability period.

- 1.1 The Bidder is advised to examine all instructions, forms, terms, specifications and other information in the bidding documents and consider and evaluate fully the price implications therein contained before filling the contract amount.
- 1.2 The bidder should acquaint him self with the site conditions including the access to Work site. The contractor shall have to make suitable access to work sites, at his own cost.
- 1.3 Items not specifically listed in this PRICE BREAKUP SCHEDULES but required to be executed for satisfactory working of the system as specified, will be separately paid for by the Department. However no extra excess work shall be done before obtaining prior permission as per rule.
- 1.4 Each item is to be individually priced and no column in the Schedule of prices shall be left blank. The wording in the item description is for subject matter guidance only. The prices shall allow for all the works covered under the bid and all liabilities and contractual obligations whether separately specified or not.
- 1.5 The bidder shall be deemed to have allowed in his price, provision for, site clearance, maintenance and final removal of all temporary works of whatsoever nature required for construction including temporary bunds, diverting water, pumping, dewatering etc. for the proper execution of works. The rates shall also be deemed to include any works and setting out that may be required to be carried out for laying out of all the works involved.
- 1.6 The pipe lengths have been defined in the Scope of Work for all the stretches. The lengths are worked out as per preliminary survey and may vary at the time of actual execution due to any change in alignment etc. In case there is any increase or decrease in length of pipe line in any section that is considered in bid price the payment to the contractor shall be made on the basis of actual length laid considering the unit rates quoted by the contractor and approved by department, in that section for that particular material / diameter. Also in case, if there is any change in alignment due to unforeseen reason(s) the payment to the contractor shall be regulated as per quoted rates in that schedule/ sections on per meter length basis. Nothing extra shall be payable due to change in circumstances. The diameters in all the stretches shall remain as specified, irrespective of actual lengths.
- 1.7 It will be entirely at the discretion of the department to accept or reject the bidders' proposals without giving any reasons whatsoever. The bidder must carefully go through the provisions laid

down in the ITB regarding the deviations allowed, and the likely reasons, which may lead to the rejection of bids and / or forfeiture of the earnest money.

- 1.8 Tenderer should ensure that Item Rate/schedule total price quoted should be same as reflected in sum total of price break ups. In case there is any discrepancy in the amount quoted, lower of the two amounts shall be considered for tender evaluation.
- 1.9 Contractor shall have to carry out topographical survey and prepare village plan and L section as required and prepare Hydraulic Design and start the work after getting it approved from competent authority. No separate payment shall be made for this item.
- 1.10 The contractor shall carry out the Operation and Maintenance of the scheme in defect liability period for which no separate payment shall be made.

TENDER FORM

Additional Chief Engineer
PHED Region II Jaipur

Subject: Tender for Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur

Dear Sir,

1. Having visited the site and examined the tender documents, drawings, conditions of contract scope and specification, preamble to price tender and price schedule etc including addenda (if any) for the execution of the above-mentioned contract we the undersigned offer to procure Engineering items construct complete, commission the whole of the said work as given in the tender document comprising of Volume I & II including addenda if any at the total cost quoted below.

NAME OF WORK	AMOUNT
Work of P/L/J testing and commissioning of DI Pipe Line, Providing and Installation of Pump Set with EMI, Construction of Pump House and SITC of Grid Ties Solar Power Plant including defect liability period of 12 months and O&M period of 120 months at Railway Colony Phulera Block Sambher Distt Jaipur	Rs in figures: Rs in words:

1. The breakup of the above prices has been given in the price schedule to facilitate interim/final payment. We understand that this breakup is subject to approval of Department.
2. We undertake that if our Bid is accepted, we are prepared to complete the Capital Works including complete testing of all facilities in accordance with the Contract within 9 Months, from the date of commencement, which is reckoned from the 10th day after the date of letter of award for the work, inclusive of monsoon periods.
3. We understand that we have to commission the part system of this work, if required by Department, and to maintain that part work till the complete system is declared commissioned for all purposes, as per the provision described in the scope of work for which no extra payment will be admissible.
4. We agree to abide by this Bid within the validity period as defined in Instructions to bidders clause (Volume I of Bid Document).
5. In the event of our Bid being accepted, we agree to enter into a formal Contract Agreement with you incorporating the conditions of Contract there to annex but until such agreement is prepared, this Bid together with your written acceptance shall constitute a binding Contract between us.
6. We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this _____ day of _____

Company Seal

(Signature)

(Name of the Person)

(In the capacity of)

(Name of firm)

Duly authorized to sign Bid for and on behalf of (Fill in block capitals)