

MILITARY ENGINEER SERVICES
CHIEF ENGINEER JALANDHAR ZONE, JALANDHAR CANTT
CONTENT SHEET

E-TENDER FOR PROVN OF MD ACCN FOR 16 x OFFICER AT FEROZPUR MIL STN
(TENDER ID : 2025_MES_742975_2)

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(Signature of Contractor)

AAD (Contracts)
For Accepting Officer

REGISTERED/ACK DUE

Headquarters
Chief Engineer
Jalandhar Zone
Military Engineer Services
Pin-901209 C/O 56 APO

No. 81090/ 70 /E8

08 Apr 2026

All Eligible Bidders**NAME OF WORKE-TENDER FOR PROVN OF MD ACCN FOR 16 x OFFICER AT FERAZPUR
MIL STN.(TENDER ID: 2025_MES_742975_2)**

Dear Sir(s),

1. Tender documents in respect of above work are uploaded on the site <https://defproc.gov.in>. The tender is on single stage two cover e-tendering system. The contents of Cover-1 & Cover-2 are specified in NOTICE OF TENDER.
2. Bids will be received online by ACCEPTING OFFICER upto the date and time mentioned in the **NOTICE INVITING TENDER (NIT)**. No tender/ bid will be received in physical form and any tender/ bid received in such manner will be treated as non bonafide tender/ bid.
3. Bid will be opened on line on a due date and time fixed for opening in the presence of tenderers / bidders or their authorised representatives, who have uploaded their quotation bid and who wish to be present at the time of opening the bids.
4. Your attention is also drawn to instructions on filling and submission of tender attached herewith. You may forward your points on tender documents and/ or depute your technical representative for discussion on tender/ drawings and to clarify doubts, if any, before the bid submission start date/ revised bid submission start date. You are requested not to write piece meal points and forward your points duly consolidated in one go before bid submission start date.
5. Un-enlisted contractors are required to submit the scanned copies (in pdf file) of documents required as per eligibility criteria mentioned in instructions for filing the tender documents and Appendix 'A' to **NIT** alongwith EARNEST MONEY DEPOSIT (EMD) (wherever applicable) and tender fee on Defence eProcurement portal and submit the physical documents in the office of HQ Chief Engineer Jalandhar Zone Jalandhar Cantt within time limit specified in **NIT**. Inadequacy/ deficiency of documents shall make the bid liable for rejection resulting in disqualification for opening of finance bid.
6. Contractor having not executed standing security bond and standing security deposit in any MES formation shall upload scanned copy of EARNEST MONEY DEPOSIT (EMD) mentioned in Notice of Tender and shall ensure receipt of hard copy of EMD in the office of tender issuing authority before date and time fixed for this purpose. In case of failure to abide by any these two requirements, the finance bid will not be opened.
7. Enlisted contractors of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentioned in Appx 'A' to **NIT** on Defence eProcurement portal and submit physical documents in the office of HQ Chief Engineer Jalandhar Zone Jalandhar Cantt before date and time fixed for this purpose.
8. The contractor must ensure that the tender/ bid on the proper form is uploaded in time as the Accepting Officer will take no cognizance of any quotations/ offer received in any other electronic or physical form like email/ fax/ by hand/ through post from tenderer/ bidder even if they are received in time.
9. Keeping in view of delays due to system failure or other communication related failures, it is suggested that the tender/ bid be uploaded, if necessary, sufficiently in advance of the last due date and time fixed on portal.
10. General Conditions of Contracts (IAFW-2249) (1989 Print) and errata and amendments thereto, Schedule of minimum fair wages and MES SSR (Part-I and Part-II) are not enclosed with these documents. These are available for perusal in the Office of GE concerned and this office. The tenderers are deemed to have made themselves acquainted and fully conversant with contents of the aforesaid documents before submission of tender and no claim whatsoever on this account shall be entertained.
11. Tenderer shall note that information technology Act, cyber Act along with other Act as relevant shall be applicable.
12. Instruction for participating & filling of tender and all documents referred along with this letter shall be forming part of tender documents and shall be complied with.

Contd/....

13. **PERFORMANCE SECURITY**

After acceptance of the tender, contractor will be required to lodge with the Accepting Officer a PERFORMANCE SECURITY DEPOSIT calculated @ 5% of the accepted amount of the contract as notified by the Accepting Officer. The amount is required to be lodged within 28 (Twenty Eight) days of the receipt by the letter of the acceptance of tender/bid, failing which action as stipulated in Condition 19 of General Conditions of Contracts (IAFW-2249 shall be taken.

14. ANY TENDERER/ BIDDER, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITIONS, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR ANY NEW CONDITION, WHATSOEVER IS LAIBLE TO BE REJECTED.

Yours' faithfully,

AAD (Contracts)
for Accepting Officer

(Signature of Contractor)

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER

1. EARNEST MONEY DEPOSIT (EMD)

Contractor(s) who are not enlisted with MES / who are enlisted but have not executed the Standing Security Bond shall submit Earnest Money Deposit **(wherever applicable)** as detailed in Notice of Tender in any one of the following forms alongwith their tender/ bid:-

- (a) Deposit at Call Receipt from a Scheduled Bank in favour of Garrison Engineer concerned.
- (b) Receipted Treasury challan, the amount being credited to the Revenue Deposit of Garrison Engineer concerned.

It is advisable that Earnest Money is deposited in the form of deposit call receipt from an approved Scheduled Bank for easy refund. In case the tenderer/ bidder wants to lodge 'EARNEST MONEY DEPOSIT' in any other form allowed by MES, a confirmation about its acceptability will be obtained from the Accepting Officer well in advance of the bid submission end date and time. Earnest Money Deposit shall be submitted in the name of concerned Garrison Engineer.

NOTES: - Earnest Money Deposit (EMD) in the form of Cheque / Bank Guarantee etc. will not be accepted. NON-SUBMISSION OF EARNEST MONEY DEPOSIT (EMD) (Scanned copy alongwith Technical Bid and hard copy before the date & time fixed for opening of BOQ) WILL RENDER THE BID DISQUALIFIED FOR OPENING OF COVER-II (FINANCE BID).

2. PERFORMANCE SECURITY

In case the tender/ bid submitted by any contractor whether enlisted or not-enlisted with MES is accepted, the contractor will be required to lodge with the Accepting Officer a PERFORMANCE SECURITY DEPOSIT calculated @ 5% of the accepted amount of the contract as notified by the Accepting Officer. The amount is required to be lodged within 28 (Twenty Eight) days of the receipt by the letter of the acceptance (See Condition 19 of General Conditions of Contracts (IAFW-2249)). The condition-19 of IAFW-2249 is reproduced here for ready reference. Work Order No. 1 shall be placed only on submission of performance security deposit.

"19 Performance Security

19.1 Within 28 days of receipt of the Letter of Acceptance, the successful contractor shall deliver to the Accepting Officer a Performance Security in any of the forms given below for an amount equivalent to 5% of the contract sum :-

- (a) A Bank Guarantee in the prescribed form.
- (b) Government Securities, FDR or any other Government Instruments stipulated by the Accepting Officer.

19.2. If the performance security is provided by the successful Contractor in the form of a Bank Guarantee, it shall be issued by Nationalized/ Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.

19.3. Failure of the successful contractor to comply with the requirements of sub clause 19.1 shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

19.4. All compensation or other sums of money payable by the contractor to the Government under the terms of this contract or under any other contract with Government may be deducted from, or paid by the sale of a sufficient part of the Performance Security or from the interest arising there from or from any sums which may be due or become due to the contractor by the Government on any account whatsoever and in the event of his Performance Security being reduced by reason of any such deduction, or sale as aforesaid, the contractor shall within ten days thereafter made good in cash or securities, endorsed as aforesaid, any sum or sums which may have been deducted from or realized by the sale of his Performance Security or any part thereof.

Government shall not be responsible for any loss of securities or any depreciation in the value of securities while in their charge nor for loss of interest thereon.

19.5. In the event of contract being cancelled, under Condition-52, 53 & 54 of General Conditions of Contract, the Performance Security shall be forfeited in full and shall be credited into Consolidated Fund of India."

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER (Contd)

2.1 The performance security shall be in favour of Accepting Officer and shall be in any of the forms mentioned above. Work order No. 1 shall be placed only after submission of performance security of adequate value by the contractor. In case a fixed deposit receipt of any Bank is furnished by the contractor to the government as part of the performance Guarantee and the Bank is unable to make payment against the said fixed deposit receipt 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.

3 GENERAL INSTRUCTIONS FOR COMPLIANCE

- 3.1 The bids received only in the electronic form will be considered. All bids shall be submitted on '<https://defproc.gov.in>' portal. Documents should be scanned and forwarded in 'pdf' form and 'xls' form as indicated.
- 3.2 Bids shall be uploaded on '<https://defproc.gov.in>' on or before the bid closing date mentioned in the tender. No tender/ bid in any other electronic or physical form like email/ fax/ by hand/ through post will be considered.
- 3.3 Bid should be DIGITALLY signed using valid DSC. All pages of tender documents, corrections/ alterations shall be signed/ initially by the lowest bidder after acceptance.
- 3.4 Drawings, if issued in physical form, must be returned duly initialed by the tenderer/ bidder in separate envelope indicating his name and address.
- 3.5 The tender shall be signed, dated and witnessed at all places provided for in the documents after acceptance. All corrections shall be initialed. The contractor shall initial every page of tender and shall sign all drawings forming part of the tender. Any tender/ bid, which proposes alterations to any of the conditions whatsoever, is liable to be rejected.
- 3.6 In the technical bid, a scanned copy of Power of Attorney in favour of the person uploading the bid using his/ her DSC shall be uploaded. In case the digital signatory himself is the sole proprietor, scanned copy of an affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' form. In case of partnership concern or a limited company, digital signatory of the bid/ tender shall ensure that he is competent to bind the contractor (through partnership deed, general power of attorney or Memorandum and Articles of Association of the Company) in all the matters pertaining to the contracts with Union of India including Arbitration Clause. A scanned copy of the documents confirming of such authority shall be attached with the tender/ bid in 'pdf' form, if not submitted earlier. The person uploading the bid on behalf of another partner(s) or on behalf of a firm or company using his DSC shall upload with the tender/ bid a scanned copy (in 'pdf' form) of Power of Attorney duly executed in his favour by such other or all of the Partner(s) or in accordance with constitution of the company in case of Company, stating that he has authority to bind such other person of the firm or the Company, as the case may be, in all matters pertaining to the contract including the Arbitration Clause.
- 3.7 Even in case of Firms or Companies which have already given Power of Attorney to an individual authorizing him to sign tender in pursuance of which bids are being uploaded by such person as a routine, fresh Power of Attorney duly executed in his favour stating specifically that the said person has authority to bind such partners of the firm, or the Company as the case may be, including the condition relating to Arbitration Clause, should be uploaded in 'pdf' form with the tender/ bid; unless such authority has already been given to him by the Firm or the Company. It shall be ensured that power of attorney shall be executed in accordance with the constitution of the company as laid down in its Memorandum & Article of Association.

4. REVOCATION/ REVISION OF OFFER UPWARD/ OFFERING VOLUNTARY REDUCTION AFTER CLOSING OF BID SUBMISSION DATE & TIME

In the event of lowest tenderer/ bidder revoking his offer or revising his rates upward/ offering voluntary reduction after closing of bid submission date & time, his offer will be treated as revoked and the Earnest Money deposited by him shall be forfeited. In case of MES enlisted contractors, the amount equal to the earnest money stipulated in the Notice of tender shall be notified to the tenderer/ bidder for depositing the amount through MRO. Bids of such contractors/ bidders shall not be opened till the aforesaid amount equal to the earnest money is deposited by him in Govt. Treasury. In addition, bids of such tenderer/ bidder and his related firm(s) shall not be opened in second call or subsequent calls. Reduction offered by the tenderer/ bidder on the freak high rates referred for review shall not be treated as voluntary reduction.

5. CPM (Critical Path Method)

5.1 The project planning for work covered in the scope of tender is based on CPM.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER (Contd)

- 5.2 The tenderer/ bidder is expected to be fully conversant with the CPM technique and employ technical staff who can use the technique in sufficient details. Sufficient books and other literature on the subject are widely available in the market which the tenderer/ bidder may make use of.
- 5.3 The tender's/ bidder's attention is drawn to special condition of the tender regarding preparation of the detailed network analysis and time schedule for the work and his liability for employing sufficient resources to adhere to this schedule. Any inability on the part of the tenderer/ bidder in using the technique will be taken as his technical inefficiency and will affect his class of enlistment and future prospect/ invitation to tenders for future works.
6. **BOQ**
- 6.1 The tenderer/ bidder shall quote his rate on the BOQ file only. No alteration to the format will be accepted; else the bid will be disqualified and summarily rejected.
- 6.2 In case the tenderer/ bidder has to revise/ modify the rates quoted in the BOQ (excel sheet), he can do so only in the BOQ, through <https://defproc.gov.in> site only before the bid closing time and date.
- 6.3 After uploading of tender, Department may issue amendments/ errata in form of **CORRIGENDUM** to tender/ revised BOQ to the tender documents. The tenderer/ bidder should submit their offer considering the errata/ amendments carried out through corrigendum issued time to time.
- 6.4 While uploading the bid, the tenderers/bidders should specifically check whether any revised BOQ has been uploaded by department through corrigendum prior to Bid submission start date. Tenderers/bidders attention is specifically drawn to the fact that they should submit their offer on revised BOQ only. In case any tenderer/bidder submits offer on pre-revised BOQ in lieu of revised BOQ, it will be considered as a willful negligence by the tenderer/bidder and quotation shall be considered Non-Bonafide.
7. Tenderers/ bidders who uploaded their priced tenders/ bids and are desirous of being present at the time of opening of the tenders /bids, may do so at the appointed time.
8. Hard copies of all above documents should be sent by the contractor to the tender issuing authority well in advance to be received before the date & time fixed for the same.
10. The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to special condition 3 referred hereinafter and also condition 24 & 25 of IAFW-2249 (General Conditions of Contracts).
11. These instructions shall form part of the tender documents.

(Signature of Contractor)

AAD (Contracts)
for Accepting Officer

MILITARY ENGINEER SERVICES
NOTICE OF TENDER IAFW-2162

1. A tender is invited for the work as mentioned in Appendix 'A' to this Notice Inviting Tender (NIT).
2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate, however, is not a guarantee and it is merely given as rough guide and if the work costs more or less, the tenderer will have no claim on this account. The tender shall be based as mentioned in aforesaid Appendix 'A'.
3. The work is to be completed within the period as indicated in aforesaid Appendix 'A' in accordance with phasing, if any, indicated in the tender from the date of handing over site which will be on or about two weeks after the date of Acceptance of tender.
4. Normally contractors whose names are on the MES approved list and within whose financial category the estimated amount would fall, may tender/ bid but in case of term contracts, contractors of class 'SS' to 'E' may tender/ bid. Contractors whose names are borne on the MES approved list of any MES formation and who have deposited standing security and have executed standing security bond may also tender/ bid without depositing earnest money along with the tender/ bid and if the tender/ bid submitted by such a tenderer/ bidder is accepted, the contractor will be required to lodge with the controller of Defence Accounts concerned the amount of 'Performance Security Deposit' within twenty eight days of the receipt by him of notification of acceptance of his tender/ bid, failing which contract will be cancelled in terms of Condition-19 of IAFW-2249. Not more than one tender/ bid shall be submitted/ uploaded by one contractor or one firm of contractors. Under no circumstances will a father and his son(s) or other close relations, who have business dealing with one another be allowed to tender/ bid for the same contract as separate competitors. A breach of this condition will render the tenders/ bids of both parties liable to rejection.
5. The office of **CHIEF ENGINEER JALANDHAR ZONE, JALANDHAR CANTT** will be the Accepting Officer here-in-after referred to as such for the purpose of this contract.
6. The Technical and Financial Bid (Cover-1 & 2) shall be uploaded by the tenderer/ bidder on or before the date & time mentioned in **NIT**. A scanned copy of DD with enlistment details/ documents shall be uploaded as packet 1/ cover-1 ('T' bid) of the tender/ bid on e-tendering portal. DD is refundable in case 'T' bid is not accepted resulting in non-opening of 'Q' bid. The applicant contractor shall bear the cost of bank charges for procuring and encashing the DD and shall not have any claim from Government whatsoever on this account.
 - 6.1 Tender forms and conditions of contract and other necessary documents shall be available on **<https://defproc.gov.in>** site for download and shall form part of contract agreement in case the tender/ bid is accepted.
 - 6.2 In the case of a contractor who has not executed the '**Standing Security Bond**', the cover-1 shall accompanied by '**Earnest Money**' of amount as mentioned in Appendix 'A' in the form of deposit at call receipt in favour of concerned GE (see Appendix 'A') by a Scheduled Bank or in receipted Treasury Challan, the amount being credited to the revenue deposit of the concerned GE (see Appendix 'A').
 - 6.3 GE will return the earnest money wherever applicable to all unsuccessful tenderers/bidders by endorsing an authority on the deposit at call receipt for its refund, on production by the tenderer/bidder a certificate of the Accepting Officer that a bonafide tender/ bid was received and all documents were returned.
 - 6.4 GE will either return the 'Earnest Money' to the successful tenderer/ bidder by endorsing an authority on the deposit at call receipt for its refund on receipt of an appropriate amount of security deposit or will retain the same in part or full on account of security deposit if such a transaction is feasible.
 - 6.5 Copies of the drawings and other documents pertaining to the work signed for the purpose of identification by the Accepting Officer or his accredited representative, sample of materials and stores to be supplied by the contractor will also be available for inspection by the tenderers/bidders at the office of Accepting Officer and concerned GE during working hours.
7. The tenderers/bidders are advised to visit the site of work by making prior appointment with the concerned GE who is also the executing agency of the work (see Appx 'A'). The tenderers/ bidders are deemed to have full knowledge of all relevant documents, samples, site etc., whether they have inspected them or not.
8. Any tenderer/ bid which proposes any alterations to any of the conditions laid down or which proposes any other condition or prescription whatsoever, is liable to be rejected.

NOTICE OF TENDER IAFW-2162 (Contd)

9. Uploading of bid implies that the bidder has read this notice and the conditions of the contract and has made himself aware of the scope and specifications of work to be done and of the conditions and rates at which stores, tools and plants etc. will be issued to him and local conditions and other factors having bearing on the execution of the work.
10. Tenderer must be in possession of a copy of applicable MES Standard Schedule of Rates (see Appx 'A') including amendments/ errata thereto.
11. Invitation for e-tender does not constitute any guarantee for validation of 'T' bid and subsequent opening of finance bid of any applicant/ bidder, even of enlisted contractors of appropriate class, merely by virtue of enclosing demand draft. The Accepting Officer reserves the right to reject the 'T' bid and not open the finance bid of any applicant/ bidder. 'T' bid validation shall be decided by the Accepting Officer based on, inter alia, capability of the firm as per criteria given in Appendix 'A' to this NIT. The applicant contractor/ bidder will be informed regarding non validation of his 'T' bid assigning reasons thereof through the Defence e-Procurement website. The applicant contractor/ bidder, if he so desires may appeal to the next higher Engineer authority i.e. Chief Engineer Western Command on email id **dydrcontceengrclmes@gov.in** with copy to the Accepting Officer on email id **cejeze8@gmail.com** before the scheduled date of opening of finance bid. The decision of the Next Higher Engineering Authority (NHEA) shall be final and binding. The contractor/ bidder shall not be entitled for any compensation, whatsoever for rejection of his bid.
12. The Accepting Officer reserves the right to accept a tender submitted by a public sector undertaking giving a price preference over other tender(s)/ bids which may be lower, as are admissible under the Govt. Policy. No claim for any compensation or otherwise shall be admissible from such tenderer/ bidder whose tender/ bid is rejected.
13. The Accepting Officer does not bind himself to accept the lowest or any tender/ bid or to give any reason for not doing so.
14. This Notice Inviting Tender (NIT) including Appendix 'A' shall form part of the contract.

(Signature of Contractor)

AAD (Contracts)
for Accepting Officer

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT)
(TENDER ID : 2025_MES_742975_1)

HQ Chief Engineer Jalandhar Zone, Jalandhar Cantt- 144005 on behalf of the President of India invites E-tenders (on line in two cover system) from eligible enlisted contractors of MES and enlisted/ un-enlisted contractors working with other Govt./ semi Govt. departments meeting eligibility criteria for selection of contractors for issue of tender of under mentioned work:-

1.	Name of work	:	PROVN OF MD ACCN FOR 16 x OFFICER AT FEROZPUR MIL STN															
2.	Estimated cost	:	Rs. 1114.16 Lakhs (At par market rate).															
3.	Period of completion	:	548 days															
4.	Cost of tender documents	:	Rs. 3000/- in the shape of Demand Draft/ Banker's Cheque from any Nationalized/ Scheduled Bank in favour of Garrison Engineer (West) Ferozepur and payable at Ferozepur. (Note:- In case of retendering, the contractor who had quoted in the previous call is not required to submit the cost of tender).															
5.	Website/portal address	:	www.defproc.gov.in															
6.	Type of contract	:	The tender shall be based on (IAFW-2159) and General Condition of Contracts (IAFW-2249) with Schedule 'A' pre-priced by MES. The Contractor is required to quote lump sum amount for parts of Schedule 'A'.															
7.	Timeline details :-																	
	(a) Bid submission start date	:	01 Jan 2026	}	Refer critical dates on website													
	(b) Bid submission end date	:	08 Jan 2026															
	(c) Date of bid opening	:	15 Jan 2026															
8.	Eligibility criteria :-																	
	(a) For MES enlisted contractors	:	Contractor shall be enlisted with MES in Class 'S' and above and Category 'a(i)' shall be considered qualified provided they do not carry any adverse remarks in work load return of competent engineering authority.															
	(b) For contractors not enlisted with MES.	:	<p>The firms not enlisted with MES shall meet the following criteria:-</p> <p>(a) The firms not enlisted with MES shall meet the enlistment criteria of 'S' class MES contractors and category 'a(i)' i.e. with regard to having satisfactorily completed requisite value works, annual turnover, solvency, working capital, T&P, engineering establishment, no recovery outstanding in any Govt. department, police verification/ Passport etc. Enlistment criteria may be seen in para 1.4 & 1.5 of Section 1 of Part-I of MES Manual on Contracts- 2020 as available in all MES formations.</p> <p>(b) They shall also submit copy of police verification, from police authority of the area where the registered office of the firm is located/notarised copy of valid passport of proprietor/each partner/each director.</p> <p>(c) Firm should not carry any adverse remarks in WLR/ or any other similar report of any authority.</p> <p>(d) Details of works completed and under progress in MES be submitted in the following format:-</p> <table border="1"> <thead> <tr> <th>Srl No</th> <th>CA No & Name of Work</th> <th>Value of CA</th> <th>Date of Commencement</th> <th>Date of Completion</th> <th>Extended date of Completion</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>(e) Un-enlisted contractor who have secured two works in MES should get themselves registered in the appropriate designated class with any registering authority, else the firm will not be eligible for participation in the tender unless until the firm is enlisted with the MES.</p>				Srl No	CA No & Name of Work	Value of CA	Date of Commencement	Date of Completion	Extended date of Completion						
Srl No	CA No & Name of Work	Value of CA	Date of Commencement	Date of Completion	Extended date of Completion													

Contd/....

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) Contd...
(TENDER ID : 2025_MES_742975_1)

	(c) For all contractors	Contractor will not be allowed to execute the work by subletting or through power of attorney holder on his behalf to a third party/ another firm except sons/daughters/spouse of proprietor/ partner/ Director and firm's own employees, Director, Project Manager. This shall be subject to certain conditions which will be prescribed in the NIT forming part of the tender documents.
9.	Tender issuing and Accepting Officer	Name:- Chief Engineer Jalandhar Zone, Jalandhar Cantt Address:- Chief Engineer Jalandhar Zone, Jalandhar Cantt-144005 Contact Details (Phone No. & Email Id of concerned officer):- (Phone No. 0181- 2661600 & Email Id cejze8@gmail.com)
10.	Executing agency	Garrison Engineer (West) Ferozepur
11.	Earnest money	Rs. 8,82,100.00 in the form of Deposit at Call Receipt (FDR not acceptable) from any Scheduled Bank in favour of Garrison Engineer (West) Ferozepur and payable at Ferozepur Note:- (i) All bidders shall be exempted from submission of EMD except those who are ineligible from such exemption vide Note here-in-below. (ii) All bidders shall be required to sign and submit the Bid Securing Declaration as below:-

NOTES:-

1. In case after opening of Cover-1, the number of MES enlisted contractors of eligible class as well as eligible un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT is less than 7 (Seven), applications in respect of MES contractors of one class below the eligible class shall also be considered subject to fulfillment of other eligibility criteria given in the NIT. Therefore, MES contractors' one class below may also bid for this tender. Such contractors (Contractor of one class below the eligible class) shall not be considered in case their present residual work in hand is more than FIVE TIMES their present tendering limit. However in case such contractors fulfill the criteria of upgradation to the stipulated eligible class based on past experience of completed works (Individual work experience and/ or average annual turnover, as applicable) and financial soundness (Solvency/ Financial soundness and working capital), the ceiling of present residual work will not apply and they will be considered for issue of tender. Such bidders shall upload in their Cover-1 bid details related to residual work in hand like details of works in hand showing names of work, names of Accepting Officers, Contract amounts, dates of commencement and completion (stipulated) and progress as on bid submission date. Such contractors, if claim to fulfill the criteria of upgradation shall also upload the requisite information/ documents in support of upgradation. These details shall be verified by the Tender Issuing Authority from concerned formations in case bids of such contractors are considered for evaluation.

2. In case after opening of Cover 1, the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligible criteria given in NIT, are 7 (Seven) or more, applications of only those one class below the eligible class bidders shall be considered who have previously completed similar works satisfactorily and are meeting the criteria of upgradation in respect of past experience of completed works (individual work experience and/ or average annual turnover as applicable) and financial soundness (solvency/financial soundness and working capital) as per details given in Manual on Contracts. Therefore such contractors shall upload the requisite information/documents in the Cover-1.

3. Un-enlisted contractors shall be considered provided he meets the criteria. However, Foreign firms shall not be eligible for this tender. However Indian Firms having foreign national/ Indian nationals staying abroad/ Indian national having taken foreign citizenship, as director(s) shall be considered subject to security clearance from the concerned authorities.

4. Contractors enlisted with MES will upload the following documents in Cover 1 for checking eligibility:-

- Application for tender on Firm's letter head.
- Enlistment letter issued by the Registering Authority duly renewed for the cycle period in vogue.
- Scanned copy of DD/ Bankers Cheque toward cost of tender and EMD instrument in case SSD bond is not signed at the time of registration.
- Copy of Provident Fund Code Number issued by Employees Provident Fund Organization, Registration of Goods and Services Tax (GST) registration No and Registration under Employees' State Insurance Act 1948.

Contd/....

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) Contd...
(TENDER ID : 2025_MES_742975_1)

- (e) Scanned copy of Integrity Pact duly signed on each page.
- (f) Any other document required as described in this Appendix.
5. Contractors not enlisted with MES will be required to upload the following documents in Cover 1 for checking eligibility.
- (a) Application for tender on Firm's letter head.
- (b) Scanned copy of DD/ Bankers cheque toward cost of tender and EMD (Earnest Money Deposit) Instrument.
- (c) Copy of Police Verification Report/Police Clearance Certificate/ Character Certificate from the Police Authority of the area where the registered office of the firm is located/notarized copy of valid passport of Proprietor/each Partner/each Director.
- (d) All documents required for enlistment in MES for SS class mentioned in Para 8(b) here-in-before as per para 1.5 of section 1 of MES Manual on Contracts 2020.
- (e) Details of works being executed in MES, if any.
- (f) Copy of Provident Fund Code Number issued by Employees Provident Fund Organization, Registration of Goods and Services Tax (GST) registration No and Registration under Employees' State Insurance Act 1948.
- (g) Scanned copy of Integrity Pact duly signed on each page.
- (h) Any other document required as described in this Appendix.
6. Tenders not accompanied by scanned copies of requisite DD/Banker's Cheque towards cost of tender and earnest money (as applicable) in Cover 1 shall not be considered for validation of 'T' bid and their Financial Bids will not be opened.
7. Contractors should ensure that their original physical DDs and Earnest Money Deposit (EMD) instruments (as applicable) reach the office of Accepting Officer within 07 days of bid submission end date failing which following action shall be taken:-
- (a) In case of tenders from an enlisted contractor of MES, where scanned copies of requisite DD/Bankers Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will be opened. However non-submission of physical copies of cost of tender shall be considered as willful negligence of the tenderer with ulterior motives and such tenderer shall be banned from bidding for a period of six months commencing from the date of opening of Financial Bid (Cover 2).
- (b) In case of tenders from un-enlisted contractor, where scanned copies of requisite DD/Bankers Cheque towards cost of tender have been uploaded in Cover1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will not be opened. Name of such contractors along with complete address shall be circulated for not opening of their bids for a period of six months commencing from the date of opening of Financial Bid (Cover 2).
- (c) In case of tenders from enlisted and un-enlisted contractors, where scanned copies of instruments for Earnest Money Deposit (as applicable) have been uploaded in Cover-1 but the same are not received in physical form within stipulated period, such tenders shall not qualify for opening of Financial Bid (Cover 2).
8. Contractor will not be allowed to execute the work by subletting or through power of attorney to a third party/ another firm on his behalf. However a contractor can execute the work through power of attorney to sons/ daughters/ spouse of Proprietor/ Partner/ Director and firm's own employees, director, project manager provided they are not having a separate enlisted firm in MES in their Name as Proprietor/ Partner/ Director.
9. After opening of Cover-1 and during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderers as per NIT, a communication in the form of e-mail/SMS/Speed Post etc shall be sent to the contractor to rectify the deficiency within a period of seven days from date of communication failing which their financial bid (Cover-2) shall not be opened and contractor shall not have any claim on the same.
10. Invitation for e-tender does not constitute any guarantee for validation of Technical bid and subsequent opening of financial bid of any applicant/bidder merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the Technical bid and not to open the financial bid of any applicant/ bidder. Technical bid validation shall be decided by the Accepting Officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/ bidder will be informed regarding non-validation of his Technical bid assigning reasons therefore through tender evaluation report which shall be uploaded on the website. Such tenderer, if desires, may appeal to the Next Higher Engineer Authority (NHEA) viz HQ Chief Engineer Western Command on email id dydrcontcengrcl-mes@gov.in with copy to the Accepting Officer on email before the scheduled date of opening of Cover 2. NHEA shall decide the matter within a period of seven working days from the date of receipt of appeal. The decision of the NHEA shall be final and binding. The tenderer/bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

Contd/....

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) Contd...
(TENDER ID : 2025_MES_742975_1)

11. In case the BOQ is revised through the corrigendum and the bidder has failed to quote on revised BOQ (i.e. he has quoted on pre revised BOQ), such bid shall be treated as willful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases, the lowest tender shall be determined from amongst the valid/ bonafide bids only. Accepting Officer may decide whether to re-tender or consider the lowest bonafide tender for acceptance.

12. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after opening of cover-2 shall be considered as a willful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an un-enlisted tenderer, Earnest Money deposited by him shall be forfeited. In case of MES enlisted tenderer having deposited the Standing Security Bond, an amount equal to the earnest money stipulated in the NIT, shall be notified to the tenderer for depositing through MRO and consideration of such tenderer in tender evaluation for future works shall remain suspended till the aforementioned amount is deposited in the Government Treasury. No other disciplinary/administrative action shall be taken against such tenderers. In such a situation, the next lowest offer shall not be considered for acceptance. Instead, retendering shall be restored to in a transparent and fair manner and the defaulting tenderer and his related firm, if any, shall not be eligible for this tender in second call or subsequent calls.

13. Irrespective of whatsoever is mentioned in condition 19.3 of IAFW-2249 with regard to suspension of tender on account of non-submission of Performance Security, issue of tenders to such tenderers shall remain suspended for a period of six months from the date of cancellation of contract under condition 19.3 of IAFW-2249 in case of un-enlisted contractors. In case of MES enlisted contractor, issue of tenders shall remain suspended till deposit of EMD or six months from date of cancellation whoever is later.

14. Tender to related firms shall not be issued simultaneously. Firms shall be termed as related if Proprietor/one or more Partners/Directors are common. Decision of Accepting Officer on issue/deny the tender to any one of the related firms shall be final and binding.

15. Integrity Pact (IP) as per Annexure-I to Appx 'A' to Notice Inviting Tender is integral part of contract and both parties are bound by its provision. All bidders shall upload signed copy of integrity pact (IP) alongwith technical bid (Cover-1).

16. This appendix shall form part of tender documents.

Sd/-x-x-x-x
(Raj Kumar)
AE (QS&C)
AAD (Contracts)
for Accepting Officer

(Signature of Contractor)

File No. 81090/ 40 /E8

Headquarters
Chief Engineer Jalandhar Zone
Military Engineer Services
Jalandhar Cantt- 144005

04 Dec 2025

Distributions:-

1. HQ CE Western Command, Chandimandir
2. Builders Association of India, G-1/G-20 Commerce Centre, 7th Floor Tardeo Bombay –400 034
3. MES Builders Association of India, 807, Sahyog, 58 Nehru Place, New Delhi-110 019
4. MES Builders Association of India, Chandigarh Branch, 706, Sector 8-D Chandigarh
5. MES Builders Association of India, C/O 13 Sadar Bazar Jalandhar Cantt.
6. MES Builders Association of India, Shivaji Nagar-1, Dhangu Road Pathankot-145001.
7. Zonal Chief Engineer _____
8. All CsWE under CE Jalandhar Zone _____
9. All GEs under CE Jalandhar Zone _____
10. Cantonment Board Jalandhar Cantt
11. General Post Office Jalandhar Cantt
12. State Bank of India Jalandhar Cantt
13. State Bank of India Jalandhar City.
14. Municipal Committee Jalandhar
15. SE, CPWD Jalandhar Cantt
16. Executive Engineer, CPWD, Jalandhar
17. Station Master, Railway Station Jalandhar Cantt

Internal:- E-2 (PIg), E-2 (Design), E-4 Section, E-6 section. Website Folder Computer E8 Sec - for uploading in MES website www.mes.gov.in

Contd/....

INTEGRITY PACT

To

HQ Chief Engineer Jalandhar Zone
Military Engineer Services
Jalandhar Cantt,
Jalandhar-144005 (Pb)

SUB-SUBMISSION OF TENDER FOR THE WORK FOR PROVN OF MD ACCN FOR 16 x OFFICER AT FEROZPUR MIL STN (TENDER ID : 2025_MES_742975_2)

Dear Sir,

I/We acknowledge that MES is committed to follow the principles thereof as enumerated in the Integrity Pact enclosed with the tender/bid document.

I/We agreed that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the Integrity Pact, which is an integral part of tender document, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Pact in letter and spirit and further agree that execution of the said Integrity Pact shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by MES. I/We acknowledge and accept the validity of the Integrity Pact, which shall be in line with para 15 of the enclosed Integrity Pact.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Pact, while submitting the tender/bid, MES shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duty authorized signatory of the Bidder)

Annexure-I (Contd..)**INTEGRITY PACT**

1. Whereas the President of India, represented by Chief Engineer Jalandhar Zone Jalandhar Cantt hereinafter referred to as Principal/ Owner and the first part, has floated the Tender (NIT No. **CEJZ/FZR- /2025-26**) and intends to award, under laid down organizational procedure, contract for **PROVN OF MD ACCN FOR 16 x OFFICER AT FEROZPUR MIL STN** hereinafter referred to as works/ Services and M/s _____ represented by, _____ (which terms unless expressly indicated by the contract, shall be deemed to include its successors and its assignees), here-in-after referred to as the Bidder/Contractor and the second part is willing to carry out the works/services.

2. Whereas the Bidders is a Proprietorship Concern/Partnership Firm/ Limited Liability Firm/ Private Limited Company/ Limited Company/ Joint Venture constituted in accordance with the relevant law in the matter and the Principal/ Owner is Chief Engineer Jalandhar Zone Jalandhar Cantt performing its functions on behalf of the President of India.

Objectives

3. Now, therefore, the Principal/ Owner and the Bidder agree to enter into this pre-contract agreement, referred to as **INTEGRITY PACT (IP)**, to avoid all forms of corruption by following a system that is fair, transparent and free from any influence/ prejudiced dealings prior to, during and subsequent to the conclusion of the contract to be entered into with a view to:-

3.1 Enabling the Principal/ Owner to get the desired works/ services at a competitive price in conformity with the defined specifications of the Services by avoiding high cost and the distortionary impact of corruption on public procurement.

3.2 Enabling Bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices and the Principal/ Owner will commit to prevent corruption, in any form, by their officials by following transparent procedures.

Commitments of the Principal/ Owner

4. The Principal/ Owner commit itself to the followings:-

4.1 The Principal/ Owner undertakes that, no official of the Principal/ Owner, connected directly or indirectly with the contract will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organisation or third party related to the contract; in exchange for an advantage; in the bidding process, bid evaluation, contracting or implementation process related to the Contract.

4.2 The Principal/ Owner will, during the pre-contract stage, treat all Bidders alike and will provide to all Bidders the same information and will not provide any such information to any particular Bidder which could afford an advantage to that particular Bidder in comparison to other Bidders.

4.3 All the officials of the Principal/ Owner will report to the appropriate Government office any attempted or completed breach(s) of the above commitments as well as any substantial suspicion of such a breach.

5. In case of any such preceding misconduct on the part of such official(s) is reported by the Bidder to the Principal/ Owner wilful and verifiable facts and the same is prima facie found to be correct by the Principal/ Owner, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the Principal/ Owner and such a person shall be debarred from further dealing related to the tender/ contract process. In such a case while an Inquiry is being conducted by the Principal/ Owner the tender process/ proceedings under the contract would not be stalled.

Commitments of Bidders

6. The Bidder commits himself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of his bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commits himself to the following:-

6.1 Bidder will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour any material or non-material benefit or other advantage, commission, fee, brokerage or inducement to any official of the Principal/ Owner, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the Contract.

Annexure-I (Contd..)**INTEGRITY PACT**

6.2 The Bidder further undertakes that he has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour any material or non-material benefits or other advantage, commission, fees, brokerage or inducement to any official of the Principal/ Owner or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other Contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other Contract with the Government.

6.3 The Bidder will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

6.4 The Bidder will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

6.5 The Bidder would not enter into conditional contract with any Agent(s), broker(s) or any other intermediaries wherein payment is made or penalty is levied, directly or indirectly, on success or failure of the award of the contract.

6.6. The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts. Complaint will be processed as per **Guidelines for Handling of Complaints** in vogue. In case the complaint is found to be vexatious, frivolous or malicious in nature, it would be construed as a violation of Integrity Pact.

7. Previous Transgression

7.1 The Bidder declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact with any other company in respect of any corrupt practices envisaged hereunder or with any Public Section Enterprise in India or any Government Department in India.

7.2 If the Bidder makes incorrect statement on this subject, Bidder can be disqualified from tender process or the contract and if already awarded, same can be terminated for such reason.

8. Company Code of Conduct

8.1 Bidders are advised to have a company code of conduct (clearly rejecting the use of bribes and other unethical behaviour) and a compliance program for the implementation of the code of conduct throughout the country.

9. Sanction for Violation

9.1 Any breach of the aforesaid provisions by the Bidder or any one employed by him or acting on his behalf (whether with or without the knowledge or the Bidder) or the commission of any offence by the Bidder or any one employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act 1988 or any other act enacted for the prevention of corruption shall entitle the Principal/ Owner to take all or any one of the following actions, wherever required:-

(i) Technical bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with the other Bidder(s) would continue.

(ii) Financial bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with the other Bidder(s) would continue.

(iii) The Earnest Money Deposit shall stand forfeited either fully or partially, as decided by the Principal/Owner, in case contract is not awarded to the Bidder and the Principal/Owner shall not be required to assign any reason therefor. For enlisted contractors an amount less than or equal to Earnest Money Deposit as decided by the Principal/Owner shall be deducted from any amount held with the Department/ any payment due.

(iv) To immediately cancel the contract, if already concluded/awarded without any compensation to the Bidder.

(v) To encash the Performance Security furnished by the Bidder.

(vi) To cancel all or any other Contract (s) with the Bidder.

(vii) To temporarily suspend or temporarily debar/ permanently debar the bidder as per the extant policy.

(viii) If adequate amount is not available in the present tender/contract, the deficient amount can be recovered from any outstanding payment due to the Bidder from the Principal/Owner in connection with any other contract for any other works/services.

Annexure-I (Contd..)**INTEGRITY PACT**

(ix) If the Bidder or any employee of the Bidder or any person acting on behalf of the Bidder, either directly or indirectly, is closely related to any of the officers of the Principal/Owner, or alternatively if any close relative of an officer of the Principal/Owner has financial interest/ stake in the Bidder's firm, the same shall be disclosed by the Bidder at the time of submission of tender. Any failure to disclose the interest involved shall entitle the Principal/Owner to debar the Bidder from the bid process or rescind the contract without payment of any compensation to the Bidder. The term 'close relative' for this purpose would mean spouse whether residing with the Government servant or not, but does not include a spouse separated from the Government servant by a decree or order of a competent Court; son or daughter or step son or step daughter and wholly dependent upon Government servant, but does not include a child or step child who is no longer in any way dependent upon the Government servant or of whose custody the Government servant has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Govt servant or to the Government servant's wife or husband and wholly dependent upon Government servant.

(x) The Bidder shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the Principal/ Owner and if he does so, the Principal/ Owner shall be entitled forthwith to cancel the contract and all other contracts with the Bidder.

9.2 The decision of the Principal/ Owner to the effect that a breach of the provisions of this Integrity Pact has been committed by the Bidder shall be final and binding on the Bidder. **However, the Bidder can approach the Independent External Monitor(s) (IEMs) appointed for the purposes of this Pact.**

10. **Independent External Monitors (IEMs)**

10.1 MoD has appointed the following Independent External Monitors for this pact in consultation with the Central Vigilance Commission :-

Srl No.	Name of IEM	e-mail id
1.	Shri Narayan Murthy Ganapathy, IFoS (Retd), IEM	gana_narayan@yahoo.com
2.	Shri Lalatendu Mohanti, IPS (Retd)	L.mohanti@gmail.com

10.2 Details of Nodal officer nominated by E-in-C's Branch are as follows :-

Name : Shri P K S Sengar Director (Contracts)
Postal Address : Room No 158,
Dte of Contract Management,
Engineer-in-Chief's Branch, Kashmir House,
Rajaji Marg, New Delhi - 110011

E Mail id : dircont1einc-mes@nic.in

Mob No. : 9131948501

Tele No (Office) : 011-23019154

10.3 In case of any complaint with regard to violation of Integrity Pact, either party can approach IEMs with copy to the Nodal Officer and the other party. If any such complaint from bidder is received by the Principal/Owner, the Principal/ Owner shall refer the complaint to the Independent External Monitors for their recommendations/ inquiry report.

10.4 If the IEMs need to peruse the relevant records of the Principal/ Owner and/or of the Bidder/ Contractor in connection with the complaint sent to them, the Principal/ Owner and/or the Bidder/ Contractor shall made arrangement for such perusal of records by the IEMs as demanded by them including unrestricted and unconditional access to the project documentation and minutes of meeting. If records/ documents of Sub-Contractor(s) are also required to be perused by the IEMs, the Bidder shall make arrangement for such perusal of records by the IEMs as demanded by them. IEMs are under obligation to treat the information and documents of the Principal/ Owner and Bidder/ Contractor/ Sub-Contractors with confidentiality.

10.5 The task of the IEMs, is to review independently and objectively, any complaint received with regard to violation Integrity Pact and offer recommendations or carry out inquiry as deemed fit. The IEMs are not subject to any instructions by the representatives of the parties and shall perform their functions neutrally and independently. The report of inquiry, if any, made by the IEMs shall be submitted to either of the following for a final and appropriate decision in the matter keeping in view the provision of this Pact:-

Annexure-I (Contd..)**INTEGRITY PACT**

- (a) Engineer-in-Chief in normal cases.
- (b) CVO (MES & BRO)/ MoD in cases involving vigilance angle.

11. Examination of Books of Accounts

In case of any allegation of violation of any provisions of this Integrity Pact or payment of commission, the Principal/ Owner or its agencies shall be entitled to examine the Books of Account of the Bidder and the Bidder shall provide necessary information of the relevant financial documents in English and shall extend all possible help for the purpose of such examination.

12. Law and Place of Jurisdiction

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the Principal/Owner.

13. Other Legal Actions

The actions stipulated in this Integrity pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

14. Signing of Integrity Pact on behalf of Bidder

- (a) Proprietorship Concern – The Integrity Pact must be signed by the proprietor or by an authorised signatory holding power of attorney signed by the proprietor.
- (b) Partnership firm – The Integrity Pact must be signed by all partners or by one or more partner holding power of attorney signed by all partners.
- (c) Limited Liability firm – The Integrity Pact must be signed by all partners or by one or more partner holding power of attorney signed by all partners.
- (d) Private Limited/ Limited Company – The Integrity Pact must be signed by a representative duly authorized by Board resolution.
- (e) Joint Venture – The Integrity Pact must be signed by all partners and members to Joint Venture or by one or more partner holding power of attorney signed by all partners and members to the Joint Venture.

15. Validity

15.1 The validity of this Integrity Pact shall be from date of its signing. It expires for the Contractor after the final payment under the contract has been made or till the continuation of Defect liability period, whichever is later and for all other bidders, till the Contract has been award.

15.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(Signature of Contractor)

AAD (Contracts)
for Accepting Officer

IN LIEU OF IAFW- 2159

TO BE USED IN CONJUNCTION WITH GENERAL CONDITIONS OF CONTRACTS

Tele Civil: 0181-2661600

Headquarters
Chief Engineer
Jalandhar Zone
Military Engineer Services
Pin-901209, C/O 56 APO

81090/ 70 /E8

08 Apr 2026

**LUMP SUM E-TENDER AND CONTRACT FOR WORKS REQUIRED IN THE EXECUTION
FOR PROVN OF MD ACCN FOR 16 x OFFICER AT FEROPUR MIL STN
(TENDER ID : 2025_MES_742975_2)**

1. Shri/ S'Shri _____
of _____ is/are hereby authorised to tender for the above
work. The bids i.e. Cover-1 & 2 shall be submitted/ uploaded on website "**eprocuremes.gov.in**" as per
the dates given in uploaded tender.

2. Any correspondence concerning this tender shall be addressed as indicated at the top of this
sheet, quoting the reference as given.

THE PRESIDENT OF INDIA DOES NOT BIND HIMSELF TO ACCEPT THE LOWEST OR ANY TENDER

(Signature of contractor)

Signature of the Officer
Uploading tender
Appointment: AAD (Contracts)

SCHEDULE 'A'**LIST OF WORKS AND PRICES****(A) NOTES (GENERAL) APPLICABLE TO ALL SECTIONS**

1. This BOQ (Schedule) is divided into various parts as detailed below: -

Part - I	-	Building Work	Lump Sum Amount to be quoted by the bidder in BOQ
Part - II	-	Site Clearance and Earth Works	- do -
Part - III	-	Internal electrification Works	- do -
Part - IV	-	Internal water supply Works	- do -
Part - V	-	Sewage disposal Works	- do -
Part - VI	-	Area Drainage Works	- do -
Part - VII	-	Compound Wall Fencing and Gate Works	- do -
Part - VIII	-	Road, Path and Culvert works	- do -
Part - IX	-	External Water Supply Works	- do -
Part - X	-	External Electrification Works	- do -
Part - XI	-	DG Set Works	- do -
Part - XII	-	Lift Works	- do -
Part - XIII	-	Fire Fighting, Fire Alarm & Detection System Works	- do -
Part - XIV	-	Lightning Protection Works	- do -
Part - XV	-	Rain Water Harvesting Works	- do -
Part - XVI	-	Solar water Heater Works	- do -
Part - XVII	-	Misc items of Works	To be quoted by the bidder in BOQ

2. This contract covers all works described in various Sections of schedule 'A', BOQ, General Summary, Special Conditions, particular Specifications and all as shown on drawings.
3. Description of building works and services given in various sections of Schedule 'A' are in brief. These are deemed to be amplified and read in conjunction with special condition, particular specifications, specification for material and workmanship and conditions and preambles in relevant trade sections of MES Standard Schedule of Rates Part-I (2009) & Part-II (2020) & Contract drawings (including notes thereon).
4. The entire work under this contract shall be completed within **548 days (Five Hundred forty-eight Days)** from date of handing over site as mentioned in work order No 1 to be placed by the GE.
5. Tentative distribution of various items of internal and external services is indicated on drawings and included in Schedule 'A' **Part-II to Part-XVI and BOQ (Part-XVII)**. These may be varied where necessary at the discretion of the Engineer-in-charge. The contractor shall not be entitled for any claim on account of such variation.
6. Layout of buildings indicated in the site plan is tentative. Final layout of buildings/ structures and relative infrastructure will be approved by GE. No adjustment in price shall be done on account of final layout within the site plan area.
7. Unless specified/ indicated otherwise, the items of works in various parts of schedule 'A' shall be deemed to include material and labour or supplying and fixing, jointing, connecting, testing etc. complete in all respect.
8. In case details in respect of items shown on main drawings are not given in the drawing referred to in the main drawings, then the same shall be followed from any other drawings listed in the list of drawings. Any drawings referred in the contract and/ or details of works shown on drawings but drawings in such case is/ are inadvertently not included in the list of drawings, the same shall also be deemed to form part of the contract.
9. Rates quoted against all items shall be deemed to include all taxes, **Goods & Services Tax (CGST, IGST & SGST)** on works contracts, levies, duties, Octroi, entry tax, labour welfare cess and shall also include all other local taxes as levied by the State Government, local bodies payable under respective statutes etc directly related to contract value, employees provident fund as EPF & MP Act 1952 and all taxes applicable to contracts. In this connection clause 26 of Special Conditions shall also be referred. No claim whatsoever shall be entertained by the department on account of any misunderstanding in this regard. Any other condition stipulated by the tenderer regarding any other taxes/ duties will not be considered and such tender shall be liable for rejection.

SCHEDULE 'A' (Contd...)

10. Tenderers to note that the pre-priced cost against Schedule 'A' **Part-I to XVI** are given as guidance only and their correctness is not guaranteed. Tenderers are required to work out their amount against respective part of Schedule 'A' based upon their own estimate/ pricing and quote the tender accordingly. No claim whatsoever on account of any inaccuracy in pre-pricing shall be admissible.
11. The testing instruments/ equipment's, material and labour required for testing shall be provided by the contractor without any extra cost to the government. If the test(s) result of any item(s) is/ are found unsatisfactory, such item(s) shall be removed from the site and replaced with proper item(s)/ material by the contractor without any extra cost to Govt.
12. Site for execution of work shall be available as soon as the work is awarded. In case it is not possible for the Deptt to make entire site available on the award of contract, the contractor will have to arrange his working programme accordingly. No claim whatsoever for not giving him the entire site on award of contract and for giving the site gradually will be admissible.
13. The rates inserted by MES or quoted by the contractor for items of works in various sections of Schedule 'A' shall be deemed to include 'Material and Labour' or 'Supplying and fixing', Jointing, commissioning and testing etc complete in all respects, unless mentioned specifically 'laying only', 'fixing only' or 'hanging only'.
14. Performance evaluation of the project will be carried out at certain intervals during currency and after completion of the work. Presentation for performance evaluation shall be arranged by the contractor inter-alia giving all salient features of the project including bottlenecks, if any at site. Type and frequency of evaluation at work site shall be as under:-
- (a) First evaluation: Within two months from the date of commencement of work indicated in work order No. 1.
- (b) Second/ Intermediate evaluation: Every six months from the date of commencement of work indicated in work order No. 1.
- (c) Evaluation one month prior to original/ extended date of completion.
- (d) Final evaluation: One month after actual date of completion.
15. Irrespective of whatsoever is specified elsewhere in the tender documents tests described in Appendix 'D' to the Particular Specification shall be got carried out by contractor at his own cost as under :-
- (a) **'A' Level Test** : One test of each material before incorporation in the work shall be carried out from Command Test Lab Chandigarh/IIT/NIT. In case source of any material is changed after conduct of earlier test, the material shall be again tested in Command Test Lab Chandigarh/IIT/NIT before incorporation in the work. Remaining tests shall be carried out in site laboratory as per frequency given in Appx 'D'.
- (b) **'B' and 'C' level Tests** : All tests as indicated in Appendix 'D' to PS here-in-after, shall be carried out in Command Test Lab Chandigarh/IIT/NIT and the contractor shall provide all facilities for testing of materials at at his own cost. The lump sum/ rates quoted by the contractor shall be deemed to be inclusive of these tests. The rates of various tests conducted in Command Test Laboratory are indicated in Appendix 'D' to PS here-in-after.
- Note:-** The cost of transportation and other expenditure shall be deemed to include quoted rates in the tender for testing of materials. For tests of 'B' and 'C' level, the contractor shall bear the actual charges of 'B' & 'C' level tests (to be done in labs other than CTL Chandigarh) irrespective of rates indicated in Appendix 'D' of particular specifications here-in-after. Wherever it is convenient to get 'B' level test done at approved test house/IIT/NIT, the same can be done at the cost of the contractor and no separate recoveries will be made by the Department for the same.
16. Blank
17. Irrespective of whether described or not, the following shall be deemed to have been inserted under column 3 of all schedules:-
- 'As applicable as per list of Drgs for all items of this Schedule'.
18. Irrespective of whether described or not, the following shall be deemed to have been inserted under column 7 of all schedules:-
- 'Refer **Srl Note No. 4 on Srl Page No. 19** for all items of this Schedule'.
19. Irrespective of whether described or not, the following shall be deemed to have been inserted under column 8 of all schedules:-
- 'Refer Schedule 'A' Notes, Special Condition (SC) & Particular Specification (PS) for all items of this Schedule'.

SCHEDULE 'A' (Contd...)

20. Makes of various items to be incorporated in the work have been specified in various documents viz. Schedule 'A', Particular Specifications, Appendix 'B-1' & Appendix 'B-2' to the particular specifications which may be at variance with each other. In case of such variance, makes of the items shall be preferred in following order:-
- (i) Make(s) specified in schedule 'A'.
 - (ii) Make(s) specified in Particular Specifications.
 - (iii) Makes specified in Appendix 'B-1', 'B-2' & 'B-3' to the particular specifications. Brands/ Makes/Manufacturer under Group I of Appendix 'B-1' shall be followed by the contractor. However, Group II can be incorporated if make is not available in Group I with minimum price adjustment and production on non-availability of certificate from manufacturer under Group I.
 - (iv) Makes to be followed as specified in Schedule 'A' and particular specification.
21. All the workers deployed by the contractor in connection with execution of work shall be enrolled as members of Provident Fund Organisation and should be given the Universal account Number (UAN). While clearing the bills of contractor, certificate be obtained by the GE from the contractor that all workers employed directly or indirectly by him are registered for EPF and due contributions have been credited into their accounts.
22. The Contractor shall meet the requirement of minimum T&P and Machinery etc as per **special condition Clause-22** during execution of the work and GE will ensure that minimum T&P and Machinery etc required as per subject provisions of the contract are held by the contractor during execution of work.
23. **Stage-wise Photographs**: Contractor shall maintain an album containing photos of each stage (stage wise) 02 photograph at different angle per stage per building and album shall be kept at site. On completion of work, same will be deposited in GE office. The cost of the same is deemed to be included in the quoted rate by contractor, failing which Rs. 50,000/- will be recovered from contractor's dues. In case of prohibited area for photograph no minus price adjustment shall be made.
24. Integrity Pact (IP), as per Annexure-I to Appx "A" to Notice Inviting Tender, is an integral part of contract and both parties are bound by its provision.
25. In case during execution of work, any deviation is required at site, the same shall not be executed/ implemented without prior written approval of the Accepting Officer. Rate and mode of measurement for the deviation involved also be finalised before approval. No payment shall be made in RAR/ final bill for the works carried out without appropriate approval.
26. In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.
27. In the event of a deviation order involving fixation of Special (Star) Rate, Draft Rate shall be prepared by GE (within a maximum period of 30 days) while initiating the proposal for deviation seeking approval of Accepting Officer and notified to contractor. While notifying the Draft Star Rate, contractor shall note that draft star rate is merely an estimated rate and firm rate shall be fixed based on actuals and receipt of supporting documents from contractor such as vouchers/literature of product/test certificates etc (as applicable) on completion of the work involving Star Rate. Any objection to the method of fixing Star Rate will be dealt as per Condition 7 of IAFW-2249.
28. Draft Star Rate shall be made based on market enquiry through telephonic enquiry/quotations/ email/rate lists/ internet based sources, materials & labour constants available in various civil Engg books and record available in respect of Star Rates approved in the past for similar items of work etc. Contractor may also assist GEs office in preparation of draft Star Rate.
29. The draft Star Rate shall be purely a draft rate and shall not be used for claiming final payment during execution of work.
30. After completion of the item of work involving Star Rate, contractor shall submit the vouchers/literature of product/test certificates (as applicable, decision of GE being final in case of any disagreement) for finalization of Star Rate. The Star Rate shall be technically checked by DCWE (C)/ Director (C) depending upon the financial effect & approved by competent authority within a period of one month from submission of the relevant documents by contractor as mentioned above.
31. The star rate as approved by competent authority after technical check by DCWE (C)/Director (C) depending upon the financial effect shall be referred as "the rate decided by GE" under Para 62(G) of IAFW-2249.
32. Contractor shall provide all preventive measures at site as per MHA guide lines and as directed by executives/users from time to time. Nothing shall be admissible on this account.

SCHEDULE 'A' (Contd...)**(B) NOTES APPLICABLE TO SCHEDULE 'A' PART-I**

1. The unit rate for work under Schedule 'A' Part-I shall be deemed to include for all relevant items of work all as specified and shown on drawings, notes thereon and/or specified in particular specifications complete for entire completion of works.
2. The unit rate of buildings of Schedule 'A' Part-I shall also be deemed to include the cost of the following items of works in addition to all works shown on drawings :-
 - (a) Preparatory works/Cuttings/leaving/ forming chases, holes etc, through/ in walls, floors and ceiling as required and making good to match with the adjoining surfaces required in connection with the work included in Schedule 'A' to Part-I. No adjustment shall however be made on the quoted price on this account while pricing of any deviation for items in respect of Schedule 'A' Part-I and also due to any variation in quantities indicated as 'PROVISIONAL' in the tender documents.
 - (b) Water proofing treatment for accessible/ non accessible roof as specified here-in-after shall be provided on roof slab of all buildings (having RCC roof) as catered in Sch 'A' Part-I.
 - (c) Pre-construction anti-termite treatment as specified to buildings at **Serial No 1 of Schedule 'A' Part-I**.
 - (d) All sanitary apparatus, appliances, accessories, toilet fittings, plumbing works and soil, waste, vent pipes, drain pipes etc (as shown in drawings) upto first manhole each independent stack (including 1st manhole) located at upto 1.8 metre from the outer edge of plinth protection complete. Pipe from gully trap to **1st manhole shall be all as shown on drawings and if not indicated then it shall be 110mm dia UPVC (SWR) conforming to IS 13592.**
 - (e) UPVC outlet pipes to drain out rain water from the building(s) wherever shown in the drawing shall be 200 mm bore pressure should not less than 4 kg/ sqm and shall be provided upto 3 metre from external face of wall. The pipes shall be of single length to prevent possible undermining of the foundations.
 - (f) Service tanks of capacity as shown on drawings including 20mm bore brass float valve with PVC ball and fixing arrangement (inlet & outlet connection), overflow and washout pipe including staging and arrangement for inlet & outlet connections as shown on drawing.
 - (g) Fan hooks including mild steel fan box all as specified.
 - (h) Seismic provision as shown in drawing No. CEJZ/STD-216/06, Sheet 1/8 to 8/8 for buildings in Seismic Zone-III.
 - (j) Number plates (with engraved numbers) including painting thereof as shown on drawing No. CEJZ/TD-48/11 Sheet 1/1.
 - (k) Plinth protection, chajjas, parapets, court yards, space frames, domes, paragolas steps, dwarf walls, platform, compound wall and/ or wicket gate/ steel door, porch, parking, ramp and sump wherever shown in the drawings connected with the building.
 - (l) Apron/ ramp/ platform and saucer drain, Toe wall etc connected with Buildings.
 - (m) Preparation of PSMBs of bldgs listed in Schedule 'A' Part-I along with completion drawings of each bldg (in recorded drawings) before completion of work by the contractor & submitted to **GE (West) Ferozpur**, failing which Rs. 50,000/- will be recovered from contractors dues.
 - (n) Blank
 - (o) Excavation and earth work in soft/loose soil shall be considered in lump sum quoted cost of item of schedule 'A' Part-I all as specified. The unit rate of bldgs of Sch 'A' Part-I shall be deemed to include surface dressing n.exc 15cm in soft/ loose soil of bldg area upto 3m from the plinth protection of the bldg and removing of soil exceeding 50m but n.exc 500m from outer perimeter of plinth protection, where any other type of excavation is not involved.
 - (p) Built in furniture items sundry and miscellaneous items shall be shown on drawings.
 - (q) Stainless steel & mild steel railings for staircase railings for staircase, balconies and other places all as specified and shown on drawings.
3. All drawings forming part of the contract shall be read as mutually explanatory to each other. Details shown in architectural drawings but not shown in structural drawings and vice versa shall also be deemed to be applicable for execution of work and the tenderers while quoting their lump sum shall include cost thereof.
4. In case details in respect of items shown on main drawings are not given in the drawing referred to in the main drawings, then the same shall be followed from any other drawings listed in the list of drawings. Any drawings referred in the contract and/ or details of works shown on drawings but drawings in such case is/are in-advertently not included in the list of drawings the same shall also be deemed to form part of the contract.

SCHEDULE 'A' (Contd...)

5. Rates quoted for a particular item and/ or lump sum quoted by the tenderer shall be deemed to include for any minor details/ items of work or constructions which are obviously and fairly intended and which may not have been included in these documents but which are essential for the execution and entire completion of the work. Decision of the Accepting Officer as to whether any minor details of work and/ or construction is obviously and fairly intended to be included in the contract or not shall be final, conclusive and binding. Some of the minor details/items which are deemed essential for execution and entire completion of work are detailed below for guidance:-
- (i) Reinforcement for any RCC member not indicated in the drawings but required due to codal requirement.
 - (ii) Dwarf wall in situations like verandah, passage, ramp etc not indicated in drawings.
 - (iii) Lintels over doors, windows, openings and electric meter box not shown in drawings.
 - (iv) In all the above and other similar cases, the details indicated elsewhere in the drawings which are similar or near similar to the missed-out items of work shall be followed. In the absence of any other similar or near similar details, minimum essential requirement for completion of the work from structural and utility point of view shall be deemed to be included in the lump sum quoted. In the event of any dispute, decision of the Accepting Officer shall be final, conclusive and binding.
6. Foundation details given in various drawings shall be followed and where foundation details are not indicated on the drawings, the same shall be followed from the typical foundation details drawings based on safe bearing capacity of soil indicated on structural drawings. Building under Schedule 'A' Part-I shall have the foundation for safe bearing capacity as specified/ shown on drawings. Variation in safe bearing capacity of soil if found at site and require redesigning of the foundation, the same shall be referred to Accepting Officer before execution at site. In case safe bearing capacity is not mentioned in drgs, matter shall be referred to AO for necessary clarification/ decision.
7. **Autoclaved Aerated Concrete Blocks (AAC Blocks) for the buildings listed in Schedule 'A' Part-I:-** Irrespective of whatever has been indicated in the drawings or elsewhere, AAC block work above plinth level to be provided and masonry below plinth level shall be built with Burnt Clay bricks as specified in PS in respective clauses.
8. Blank
9. **Schedule of Finishes**
- 9.1 Schedule of finishes unless otherwise shown on the Drg of Schedule of Finishes or specified elsewhere in the tender documents shall be provided as under and the quoted rate shall be deemed to be includes the same. In case of any deviation during execution, price adjustment shall be carried out accordingly: -
- (a) **External surfaces of walls:** - Two coats of water-based emulsion (Exterior Grade) water proof anti-fungal Asian paint (AP) Apex ultima or equivalent from other specified make with low VOC solvent content of 50 Gms per litre, over a coat of AP trucare exterior wall Primer shall be provided over two coats of sanded acrylic wall putty conforming to ASTM D6886 2018 on plastered surfaces.
 - (b) **Internal surfaces of walls/ ceiling:** - Two coats of water-based emulsion (Interior Grade) Asian paint (AP) Royale shyne luxury emulsion or equivalent from other specified make over a coat of primer (AP Royale wall base Primer) with low VOC solvent content of 50 Gms per litre shall be provided over two coats of sanded acrylic wall putty conforming to STMD6886 2018 on plastered surfaces.
 - (c) **Steel surfaces:** - Two coats of synthetic enamel paint over a coat of red oxide primer.
 - (d) **Wooden surfaces:** - Two coats of synthetic enamel paint over a coat of pink primer.
 - (e) **Flooring/ skirting:** - Vitrified tile flooring/ skirting as specified in Particular Specification.
10. In case any particular door/ window/ ventilator is not marked for the door opening on drg but the same is required from functional point of view in that case the same shall be provided from door details of other similar locations. Decision of GE in this regard shall be final and binding.
11. In the event of any discrepancy between inner dimensions and outer dimensions of buildings, the inner dimensions shall be maintained and outer dimensions of the buildings shall be deemed corrected accordingly without any extra cost to the Govt.
12. **STAGewise YARD STICK:** Stage-wise yard stick for the buildings/structures mentioned at Schedule 'A' Section-I has been made part of the tender as Annexure II and during currency of work payment to contractor will be made in accordance with this yard stick. No claim whatsoever of any nature will be entertained at later stage on this account.
- (C) NOTES APPLICABLE TO SCHEDULE 'A' PART-II TO PART-XVII AND BOQ)**
1. All quantities are 'PROVISIONAL'.

SCHEDULE 'A' (Contd...)

2. Special Condition in MES schedule and preambles in items given in MES Schedule (Part-II) under respective trades shall be applicable. If any provision in the description of items of Schedule 'A' and/ or in particulars specification is/ are at variance with the provision in special condition in MES Schedule Part-II and/ or preambles to MES Schedule items, the provision in Schedule 'A' and particular specifications shall take precedence thereon. However, condition 6A of IAFW- 2249 shall also be referred in this regard.
3. Wherever any damage is caused to the existing road for taking sewage line/ water supply lines across the road, the same shall be made good to match with the original surface by the contractor under his own arrangement and without extra cost to Govt.
4. In case details in respect of items shown on main drawings are not given in the drawing specifically referred to in these notes /clarifications to drawings or in the main drawings, the same shall be followed from any other drawings listed in the list of drawings. Any drawings referred in the contract and/ or details of works shown on drawings but drawings in such case is/ are in-advertently not included in the list of drawings, the same shall also be deemed to form part of the contract.
5. B/R & E/M services marked on site plan are tentative and may be changed as per requirement. The tenderer shall not be entitled for any extra on account of such variation.
6. Brick work shall be as specified.
7. On completion of work a schematic diagram showing internal services in each building shall be prepared by the contractor shall be submitted to the Garrison Engineer duly signed by both parties i.e. Contractor and Engineer-in-Charge without any extra cost to the Govt. Necessary certificate in this regard shall be attached along with final bill duly signed by the GE, failing which Rs. 50,000/- will be recovered from contractors dues.

(D) NOTE FOR ARBORICULTURE

1. The contractor shall furnish a guarantee bond on non-judicial stamp paper of appropriate value for well growth of the plants with remitting an amount of **Rs 50,000/- (Rupees Fifty Thousand Only)** towards security deposit in favour of GE in the form of fixed deposit receipt of National bank/Scheduled bank or retaining the sum from the bill for the period of two year from the certified date of completion of Phase-I. This guarantee will stands against maintenance / defects liability period as prescribed during the period. Any defects observed by AGE /GE during maintenance / defects liability period, it is obligatory on the contractor to attend rectification of the defects, if he fails to do so, the same will be got executed / completed through other agency/agencies and sum against security deposit will be utilized for the purpose. i.e. the disposal of the guarantee amount shall be at the discretion of Accepting officer. The balance amount shall be returned to contractor after the maintenance/ Defects Liability period.

(E) GRIHA 3 STAR RATING NOTES APPLICABLE TO SCHEDULE 'A' PART-I, ITEM NO 01 {16 MAJOR MD ACCN (G+4)}

1. The unit rate for work under Schedule 'A' Part-I ITEM NO 01 {16 MAJOR MD ACCN (G+4)} shall be deemed to include to comply with GRIHA 3 Star Rating. Some of the points as under will be ensured for ensuring GRIHA norms/certificates by the tenderers read in conjunction with addition of provision, if any mentioned in Particular specification. Non adherence to the GRIHA norms during construction and if GRIHA norms not achieved penalty shall be borne by the tenderer/contractor at risk and cost of the original work. No claim whatsoever of any nature will be entertained at later stage on this account. Feasibility report to adherence 3-star rating as per GRIHA norms as attached as Appendix 'G'.

1.1 GENERAL RESPONSIBILITIES:

- 1.1.1 **Green Building Compliance:** Ensure that all project components, design, materials, and construction practices align with GRIHA v.15 guidelines and follow GRIHA Manual of Good Construction Management Practices.
- 1.1.2 **Coordination with GRIHA Certified Professional (CP):** Appoint a GRIHA CP who has successfully managed at least one 4-Star rated project under GRIHA v.15. Proof of credentials must be submitted to the Engineer-in-Charge.
- 1.1.3 **Documentation and Reporting:** Provide comprehensive documentation, including calculations, drawings, and reports for all criteria mandated by GRIHA. Regular progress updates should be communicated to the project team and the GRIHA Secretariat. M/s The design factory help to contractor in preparation of documents & report for submission to GRIHA for project registration. All expenditure enquired for project registration bear by contractor.
- 1.1.4 **On-Site Monitoring:** Facilitate third-party audits and visits by GRIHA officials as part of the certification process.
- 1.1.5 **Compliance with Green Building Parameters:** Ensure that all design and construction practices meet the required green building parameters as outlined below.

1.2 CONTRACTOR'S SPECIFIC RESPONSIBILITIES

- 1.2.1 **Permissions and Approvals:** The contractor must obtain all necessary statutory approvals before commencing the project. These include sanctioned drawings, tree cutting permission letter, environmental clearance, Environmental Impact Assessment (EIA), AAI NOC, Traffic NOC, and GRIHA registration. All approvals must be in place to ensure compliance with regulatory requirements.

SCHEDULE 'A' (Contd...)

1.2.2 **Site Planning and Construction Management:** The following practices lie within the scope of the contractor, who is responsible for ensuring that these measures are implemented to meet the required compliances.

(a) **Site Barricading:** Implement continuous site barricading with a minimum height of 3 meters, can be in the form of permanent boundary wall, temporary walls made of galvanized iron sheets or fine net with adequate support to prevent from topping during strong winds. The barricading shall be solid throughout the boundary line with the meets the intent while ensuring feasibility for the project team, also ensure safety and minimize dust pollution across the entire site boundary.

(b) **Tree barricading:** The contractor must ensure that the existing mature trees preserved on-site are properly barricaded during construction to prevent damage. The barricades should be constructed using durable materials such as steel rods and green netting or safety tapes, rubble masonry or concrete blocks.

(c) **Wheel-Washing Facilities:** Provide wheel-washing facilities at all vehicular entry and exit points of the construction boundary to reduce soil and dust carryover. The facility is constructed as a slight depression filled with water so that the tyres of vehicles can be washed and construction muck from the site is not carried away along with tyres outside the site. The length of depression shall be equal to the perimeter of the tyre so that at least one tyre rotation is completed within it whereas width shall be equal to width of the vehicle and the bottom shall be impermeable.

(d) **Erosion and Sedimentation Control:** Implement effective erosion and sedimentation control measures, such as soil erosion channels shall run through the periphery of the site with gravel bed or of concrete and are connected to a sedimentation tank. A sedimentation tank is a temporary basin of any size which are constructed at the lowest level of the site in order to collect the sediment produced during the construction, to prevent site runoff and contamination of local water bodies.

(e) **Material Coverage:** Cover fine materials like sand and cement on-site using geotextile sheets or impervious fabric to prevent soil and air pollution.

(f) **Spill Prevention Plan:** Develop and implement a spill prevention plan to mitigate the impact of spills from hazardous materials, such as bitumen and diesel etc. For the storage of these materials the following spill prevention measures can be adopted:-

(i) Dedicated enclosed area should be provided to store all hazardous materials used on site. The materials should be placed on an impervious surface.

(iii) Channels should be constructed along the periphery to direct the toxic material in and impervious pit in case of any spill.

(iv) Spill prevention kit should be available near the storage area, and it should include gloves, absorbent materials and disposal bags.

(v) Proper equipment (Pumps, funnels) should be used to transfer fluids and such transfers should be performed only in designated areas.

(vi) Secondary containment (Drain Pan) should be provided to catch any spills while removing of changing fluids.

(g) **Construction Waste Management:** Segregate construction waste to ensure 100% diversion of non-hazardous waste from landfills by selling it to certified recyclers. Segregation during different construction phases shall include:-

(i) **Structural Waste:** Steel scrap, chemical drums, empty cement bags, shuttering waste, construction and brick debris, wooden scrap, etc.

(ii) **Finishing Waste:** Polythene packaging, thermocol, wooden waste, paper waste, plastic waste, cardboard boxes, etc.

(h) **Topsoil Preservation:** Excavate the top 0.2m of fertile topsoil before construction and stack it on-site in heights not exceeding 0.4m. Maintain the fertility of the topsoil during the construction phase through mulching and adequate coverage with geotextile sheets. Construction of temporary soil erosion channels around the periphery of soil storage area needs to be done to prevent the soil flowing along the run-off water. Utilize the preserved topsoil for landscaping purposes within the project post-construction. The contractor must provide a topsoil fertility test report from an ICAR accredited laboratory.

(j) **Material Staging Practices:** Adopt organized staging practices by properly storing construction materials in dedicated spaces to maintain site order and minimize wastage.

SCHEDULE 'A' (Contd...)

(k) **Diesel Generator Set Installation:** Install diesel generator sets used during the construction phase away from the construction zone with stack heights of at least 2 meters from the top of the generator and a cowl should be provided at the outlet of the pipe. Ensure they are positioned to face away from the site to minimize air and noise pollution.

1.2.3 UHI MITIGATING MEASURE:

(i) **SRI Coating:** Apply high Solar Reflectance Index (SRI) coating on the roof of the building to minimize heat absorption and reduce the urban heat island effect. If using:

- (a) SRI paint: ensure that the paint has an SRI value of more than 100.
- (b) Heat reflective tiles: ensure that the SRI value is not more than 0.5.

(ii) **Tree Plantation:** The contractor must plant four native species for every one tree cut on site. The trees must be of native species such as neem, ashoka, amalthas, jamun, guava, mango, amla, plumeria, gulmohar among others.

(iii) **Paved Areas:** Use grass pavers or similar permeable materials instead of hard paving or on ground car parking areas to mitigate heat gain and promote natural water infiltration.

1.2.4 WATER MANAGEMENT:

(i) **Construction Water Use:** Use STP treated water or captured rainwater for construction activities, including curing, ponding, and water sprinkling on fine aggregate (sand) and excavated earth. Adopt gunny bags and ponding methods for curing to reduce water wastage.

(ii) **Water Use Reduction:**

- (a) Monitor and prevent leaks and water wastage on-site.
- (b) Use additives to minimize fresh water requirements during construction.
- (c) Strategies that may be adopted to reduce curing water demand:-
 - (1) Ponding for curing of slab.
 - (2) Curing using hessian cloth.
 - (3) Curing using curing compound.

(iii) **Low-Flow Fixtures:** Use low-flow water fixtures to reduce fresh water demand. Fixtures should meet the minimum specifications: Dual Flush Water Closets (WCs) of 6/3lpf, Lavatory Faucets of 3-5lpm, Showers of 6lpm, and Kitchen Faucets of 4-6lpm. The contractor must provide technical specification sheets highlighting the flow rates of the selected fixtures.

(iv) **Landscape Irrigation:** Install efficient landscape irrigation systems, such as sprinkler systems for lawn areas and drip irrigation systems for trees and shrubs.

(v) **Water Metering:** Install digital meters in the following locations to ensure metering and regular monitoring of the project's water consumption:

- (a) At municipal supply line serving the project, (if any).
- (b) At borewell (if applicable) line serving the project.
- (c) At STP treated water line serving the project.
- (d) At captured rainwater line (if any).

1.2.5 ENERGY EFFICIENCY:

(i) **Energy-Efficient Lighting:** Ensure that all interior lighting installed in the project is energy-efficient (e.g., LED lighting), and all external lighting has a luminous efficacy of at least 75 lumens/watt.

(ii) **Automated Lighting Control:** The contractor must ensure that exterior lighting is connected to an astronomical timer control integrated into the feeder panel of the project to optimize energy use.

(iii) **High Performance Glazing:** The glass used in the project must be selected to achieve an effective SHGC (Solar Heat Gain Coefficient) not exceeding 0.44 and a VLT (Visible Light Transmittance) in the range of 40% to 60%.

(iv) **Energy-Efficient Building Materials:** Incorporate energy-efficient building envelope materials, such as AAC blocks for interior and exterior walls. Use over-deck roof insulation, such as 75mm XPS underdeck insulation or 75mm Brick Bat Coba, to enhance thermal performance.

(v) **Energy-Efficient Equipment:** Ensure that all equipment, such as fans, has a minimum BEE 3-star rating, and air conditioners installed in the project are at least 3-star inverter models. Additionally, motors must meet a minimum IE2 rating. These installations are to be carried out by the contractor.

SCHEDULE 'A' (Contd...)

In cases where such equipment falls under the tenant's scope, the contractor must issue a circular providing detailed specifications and compliance requirements to ensure adherence.

(vi) **Energy Monitoring:** Install digital energy meters at the building level to monitor energy consumption effectively. These meters should include devices to measure grid electricity usage and diesel generator (DG) set consumption of the building.

(vii) **Blank**

1.2.6 MATERIAL MANAGEMENT:

(i) **Low-Energy Interior Finishes:** Utilize low-energy materials for interior finishes, including flooring, false ceilings, internal partitions, paneling, in-built furniture, and internal door and window panels/frames. Select materials from the GRIHA product catalogue to ensure compliance. You can find the product catalogue here: <https://www.grihaindia.org/products-catalogue>.

(a) **Flooring Materials:** Use locally sourced stones such as granite and kota tiles or tiles with at least 5% recycled content.

(b) **False Ceilings:** Install false ceilings containing at least 5% recycled content.

(c) **Doors and Wood Products:** Use flush doors or composite wood for interior doors. Ensure composite wood products are free from urea-formaldehyde as a bonding resin.

(d) For all the materials above, the contractor must provide technical sheets for all selected materials, highlighting details such as the percentage of recycled content, locally sourced components, or other relevant low-energy parameters to ensure compliance with sustainability guidelines.

(ii) **Eco-Friendly Insulation and Systems:** Implement insulation and systems that avoid harmful chemicals:

(a) Use CFC- and HCFC-free insulation such as nitrile rubber insulation.

(b) Install HVAC equipment with CFC-free refrigerants like R410a.

(c) Incorporate halon-free fire suppression systems.

The contractor must provide technical sheets for all selected materials, highlighting the CFC and HCFC free properties.

(iii) **Low VOC Materials:** Use low VOC interior paints, adhesives, and sealants to enhance indoor air quality.

(a) Interior Paints: Flat paints (< 50 g/L VOC) and non-flat paints (< 150 g/L VOC).

(b) Adhesives: Wood adhesives (< 30 g/L VOC) and construction adhesives (< 70 g/L VOC).

(c) Sealants: Architectural sealants (< 250 g/L VOC).

Ensure that composite wood products used in interiors do not contain urea-formaldehyde as a bonding resin. Contractors must provide technical data sheets for the selected products, demonstrating VOC limits.

(iv) **Cement Selection:** Use Portland Pozzolana Cement (PPC) or Ordinary Portland Cement (OPC) with a minimum of 25% fly ash by weight in structural concrete, plaster, and masonry mortar. Ensure proper preparation, such as applying chicken mesh wire before cement plastering, to strengthen the bond between AAC blocks and plaster.

Contractors must provide design and batch mix reports for structural concrete and technical specification sheets for the cement used, clearly indicating the fly-ash percentage to ensure compliance.

1.2.7 CONSTRUCTION WORKER HEALTH, SAFETY, AND WELL-BEING:

(i) **Construction Worker Safety:**

(a) Provide personal protective equipment (PPE), such as helmets, safety harnesses, gloves, dust masks, earplugs and welding screens to ensure worker safety.

(b) Conduct regular safety training sessions to enhance awareness of potential hazards and safety protocols.

(c) Maintain first-aid kits, a dedicated medical room, and ambulances at the construction site for prompt medical assistance.

SCHEDULE 'A' (Contd...)

- (d) Set up a crèche facility for the children of construction workers, ensuring it is well-lit, ventilated, and located safely away from construction zones.
- (ii) **Signage:** Install adequate safety signage across the site in both English and local languages as per GRIHA guidelines.
- (iii) **Labour Hutments:** Provide temporary housing facilities with proper sanitation, potable water supply, waste management systems (dry and wet waste bins), electricity, fans, and separate common cooking areas for workers.

1.3 POST CONSTRUCTION MEASURES:

1.3.1 **Approvals:** Upon project completion, the contractor is responsible for securing all post-completion NOCs (No Objection Certificates), including Water NOC, Electric NOC, and Fire NOC, to finalize the necessary certifications and approvals for project handover.

1.3.2 **Waste Management Infrastructure:** Provide infrastructure such as multi-coloured dustbins (for dry and wet waste) or separate garbage chutes for wet and dry waste to building occupants to ensure the segregation of waste at source. The contractor is responsible for providing these bins.

1.3.3 **Centralized Waste Segregation Yard:** A dedicated, segregated and hygienic centralized waste segregation yard must be built on-site, properly covered from all sides to store different wastes before treatment /recycling. The yard should have sections to segregate plastic, glass, metal, paper, and organic waste. The contractor must secure contractual tie-ups with waste recyclers for safe recycling of recyclable materials like metal, paper, plastic, and glass.

1.3.4 **Service Staff Facilities:** Provide dedicated resting rooms and toilets for the service staff in the project.

1.3.5 **Environmental Awareness Display:** Display environmental awareness information in the project to spread awareness among the users. The contractor is responsible for providing a dedicated display board for this purpose.

1.3.6 **Indoor Environmental Monitoring:** Install CO₂, temperature, and relative humidity (RH) monitors in the ground floor common lobby area of the project.

1.3.7 Universal Accessibility:

- (i) Provide handicapped toilets with proper grab bars and a minimum door width of 1 meter, with the door opening outwards, in the common lobby area of the ground floor.
- (ii) Provide ramps with dual-level handrails (at 750mm and 900mm).
- (iii) Provide uniform floor levels.
- (iv) Ensure lifts are equipped with grab bars and braille buttons.
- (v) Provide handicapped parking provisions preferably located near the lift lobby.

1.3.8 **Noise Audit and Compliance:** The contractor must conduct a noise audit, ensuring that the indoor noise levels shall be within the acceptable limits ensuring compliance with the National Building Code (NBC) 2016. Key noise source on site like DG sets, should have sufficient acoustic insulation as per NBC 2016 norms. The noise audit shall be conducted at the following locations during both the day and night times and within the acceptable noise levels as seen below:

- (a) Ground, second and fourth floor lobbies - < 42dB
- (b) All habitable spaces - < 40dB

1.4 INNOVATION MEASURES:

1.4.1 **Electric Vehicle (EV) Charging:** Provide a minimum of 4 parking spaces designated for EV charging stations, ensuring infrastructure for future adoption of electric vehicles.

1.4.2 **Sustainable Furniture:** If furniture procurement falls under the scope of the contractor, they must ensure that all furniture used in the project interiors has an Environmental Product Declaration (EPD), such as products from Geeken and Godrej. If this is scope of the tenants, the contractor must provide guidance and advice to the tenants on selecting furniture with an EPD to ensure compliance.

1.4.3 **Sanitary Pipes:** Sanitary pipes used in the project, including PVC and UPVC, should be sourced from GRIHA enlisted manufacturers such as Astral and Birla HIL.

1.5 The contractor must maintain records of all construction materials, including lab reports, specification sheets, and purchase orders. Documents and logs need to be kept in order at site all the time:-

SCHEDULE 'A' (Contd...)

Lab Test Reports

- Compressive Strength Tests (Concrete)
- Tensile Strength Tests (Steel)
- Moisture Content Reports (Timber)
- Soil Testing Reports
- Air Quality Test (Construction area)
- Noice Test
- Batch mix reports

Material Procurement Documents

- Purchase Orders (POs)
- Invoices from Suppliers
- Delivery Receipts/Challans
- Material Requisition Forms
- Supplier Contracts or Agreements
- Purchase Agreements

Material Specifications

- Material Specification Sheets
- Manufacturer Data Sheets (MDS)
- Bill of Materials (BOM)
- Product Certificates
- Material Safety Data Sheets (MSDS)
- Warranty Documentation

Product catalogue for GRIHA compliance shall be find here: <https://www.grihaindia.org/products-catalogue>.

If any product which is not found in product catalogued of GRIHA site then product incorporate in project shall be of ISI marked or if no ISI marked product available in the market then of ASTM Standard and fulfill the bench mark mentioned in PS.

1.6 RESPONSIBILITY OF CONTRACTOR:

1.6.1 Contractor shall submit documents & reports to GRIHA Council for project registration. M/s The Design Factory will assist the contractor in preparation & submission of documents to GRIHA Counsel for project registration. All expenditure enquired for project registration bear by contractor.

1.6.2 GRIHA team will visit at site during various stages of project to verify for compliance in accordance with GRIHA norms the cost of visit, traveling expenditure, food and lodging of GRIHA team will be bear by contractor. M/s The Design Factory will organize the visit of GRIHA team and submit visit wise compliance report for three star rating. Contractor will rectify the observation raised by GRIHA team to achieve GRIHA three star rating of the project.

1.6.3 After completion of project contractor shall prepare drgs, documents & report based upon completed work at site for final certification to GRIHA. M/s The Design Factory will submit drgs, documents report prepared by contractor based upon completed work at site to GRIHA council for final certification. Contractor shall prepare drgs, documents & report in consultation with M/s The Design Factory any observation raised by M/s The Design Factory shall be rectify by contractor for GRIHA three-star rating.

(Signature of Contractor)

Dated: _____

AAD (Contracts)

For Accepting Officer

SCHEDULE 'A' PART-I
LIST OF ITEMS OF WORKS AND PRICES FOR BUILDING WORK

Srl No	Description of item of work	Drg No	Rate Unit	No of Units required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Construction of block of "16 MAJOR MD ACCN (G+4)" with GRIHA 3 Star rating including all fittings & fixtures etc complete all as specified and shown on drawings.		<u>121530000.00</u> Each Block	1.00	121530000.00		

Total amount of Sch 'A' Part-I carried over to BOQ under Srl item No. 2.01

121530000.00

(SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-II
LIST OF ITEMS OF WORK AND PRICES FOR SITE CLEARANCE & EARTH WORK

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Surface excavation in soft/ loose soil not exceeding 30cm and averaging 15cm deep and getting out including cleaning away bushes, shrubs, trees of girth n. exc. 30cm each (girth measured at 1 metre above ground) including removing rubbish upto a distance of 50m outside periphery of the area complete all as specified and directed.		<u>53.10</u> Square Metre	1716.00	91119.60		
2	Excavation in trenches in soft/ loose soil n.exc. 1.5m wide and n.exc. 1.50m in depth for foundation etc. or for shafts well cesspit, manholes, pier holes etc. n.exc. 10 sqm on plan complete all as specified and as directed.		<u>383.70</u> Cubic Metre	1282.85	492229.55		
3	Excavation in trenches in soft/ loose soil n.exc. 1.5m wide and depth exceeding 1.5m but n.exc. 3.00m for foundation etc. or for shafts well cesspit, manholes, pier holes etc. n.exc. 10 sqm on plan complete all as specified and as directed.		<u>542.40</u> Cubic Metre	148.08	80318.59		
4	Excavation over areas not exceeding 1.5m deep and getting out in soft/ loose soil complete all as specified.		<u>258.50</u> Cubic Metre	540.00	139590.00		
5	Forming embankments including raising (or lowering) earth, spreading in layers n exc. 30 cm thick; watering, ramming/rolling and finishing to required size, shape, etc., n exc. 1.5 m high from base complete all as specified. (Soil obtained from excavation after retuning filling to be used)		<u>168.10</u> Each	450.00	75645.00		
6	Earth work in excavation in any type of soil by mechanical means (Hydraulic excavator) over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm on plan) including getting out and disposal of excavated earth lead upto 50m and lift upto 1.5m all as directed.		<u>166.62</u> Cubic Metre	82.90	13812.80		
7	All as per item No. 6 above but depth exc. 1.50m and n.exc. 3.00m complete all as specified and directed.		<u>199.93</u> Cubic Metre	82.90	16574.20		
8	All as per item No. 6 above but depth exc. 3.00m and n.exc. 4.50m complete all as specified and directed.		<u>233.24</u> Cubic Metre	27.70	6460.75		
9	Returning, filling in soft / loose soil, including spreading, levelling, watering and well ramming in layers not exceeding 25cm thick complete all as specified and directed.		<u>139.10</u> Cubic Metre	888.67	123614.00		
10	Removal of excavated spoil to a distance n. exc. 50m and depositing where directed at a level n. exc. 1.5m above the starting point complete all as specified and directed.		<u>320.40</u> Cubic Metre	1143.49	366374.20		
11	Removal of excavated spoil to a distance exc. 250m but n.exc. 500m and depositing where directed at a level n.exc. 1.5m above the starting point complete all as specified and directed.		<u>582.60</u> Cubic Metre	377.30	219814.98		
Total amount of Sch 'A' Part-II carried over to BOQ under Srl item No. 2.02					<u>162553.65</u>		

SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-III
LIST OF ITEMS OF WORKS AND PRICES FOR INTERNAL ELECTRIFICATION WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supply and fixing modular metal flush box made out of GI sheet, thickness not less than 1.2mm with earthing terminal, 1/2 module complete all as specified and directed.		<u>179.10</u> Each	161.00	28835.10		
2	Supply and fixing modular metal flush box made out of GI sheet, thickness not less than 1.2mm with earthing terminal, 3 module complete all as specified and directed.		<u>179.80</u> Each	452.00	81269.60		
3	Supply and fixing modular metal flush box made out of GI sheet, thickness not less than 1.2mm with earthing terminal, 4 module complete all as specified and directed.		<u>213.40</u> Each	180.00	38412.00		
4	Supply and fixing modular metal flush box made out of GI sheet, thickness not less than 1.2mm with earthing terminal, 6 module complete all as specified and directed.		<u>284.10</u> Each	5.00	1420.50		
5	Supply and fixing modular white cover plate with frame, 1 module complete all as specified and directed.		<u>192.70</u> Each	61.00	11754.70		
6	Supply and fixing modular white cover plate with frame, 2 module complete all as specified and directed.		<u>195.80</u> Each	100.00	19580.00		
7	Supply and fixing modular white cover plate with frame, 3 module complete all as specified and directed.		<u>217.70</u> Each	452.00	98400.40		
8	Supply and fixing modular white cover plate with frame, 4 module complete all as specified and directed.		<u>247.10</u> Each	180.00	44478.00		
9	Supply and fixing modular white cover plate with frame, 6 module complete all as specified and directed.		<u>309.60</u> Each	5.00	1548.00		
10	Supply and fixing modular white cover plate with frame, 8 module complete all as specified and directed.		<u>381.40</u> Each	100.00	38140.00		
11	Supply and fixing modular white cover plate with frame, 12 module complete all as specified and directed.		<u>340.00</u> Each	18.00	6120.00		
12	Supply and Fixing Modular switch 6 Amp 1 way 1 module size complete all as specified and directed		<u>260.50</u> Each	1338.00	348549.00		
13	Supply and Fixing Modular switch 16 Amp 1 way with indicator 1 module size complete all as specified and directed.		<u>343.70</u> Each	99.00	34026.30		
14	Supply and Fixing Modular switch 6 Amp 2 way 1 module size complete all as specified and directed.		<u>307.30</u> Each	20.00	6146.00		
15	Supply and Fixing Modular socket shuttered 6 Amp 2/3 pin combined 2 module size complete all as specified and directed.		<u>340.54</u> Each	400.00	136216.00		
16	Supply and Fixing Modular socket 16Amp multipurpose type 2 module size complete all as specified and directed.		<u>528.40</u> Each	99.00	52311.60		
17	Supply and Fixing Modular Fan regulator step type 120 watts 2 Module size complete all as specified and directed.		<u>1017.95</u> Each	117.00	119100.15		
18	Supply and Fixing Ceiling rose, surface bakelite 3 terminal, 240 volts, 5 Amps with back plate of 3 mm thick bakelite, laminated hylem sheet of appropriate size complete all as specified.		<u>65.70</u> Each	602.00	39551.40		
19	Supply and Fixing Modular bell switch, 6 Amps, 01 module complete all as specified and as directed		<u>307.30</u> Each	48.00	14750.40		
20	Supply and Fixing single phase Buzzer 'DING DONG' AC 230 volts single pole fixed over and including pressed steel sunk box of size 175x100mm duly covered with 3mm thick backelite sheet complete all as specified and as directed.		<u>430.40</u> Each	32.00	13772.80		
21	Supply and Fixing single phase call bell AC 230 volts single pole fixed over and including pressed steel sunk box of size 175x100mm duly covered with 3mm thick backelite sheet complete all as specified and as directed.		<u>357.00</u> Each	16.00	5712.00		

SCHEDULE 'A' PART-III (Contd....)

1	2	3	4	5	6	7	8
22	Supply and Fixing lamp holder, PVC / polycarbonate type insulated body with back plate suitable for batten / angle fittings complete all as specified and directed.		<u>166.50</u> Each	49.00		8158.50	
23	Blank						
24	Supply and Fixing sheet metal enclosure for DB's (Double door type) when MCB's to be used, single pole and neutral, 8 ways with 200 ampere rated bus bar, 240 volts fixed sunk / flush to the wall with IP-43 and IK-09 protection complete all as specified and directed. Note: MCB shall be measured and paid for separately.		<u>1912.70</u> Each	43.00		82246.10	
25	Supply & Fixing MCB single pole, 240 volts, 6 to 32 Ampere, rupturing capacity 10 KA, 'B' curve type complete all as specified and directed.		<u>284.20</u> Each	426.00		121069.20	
26	Supply and Fixing MCB SPN, 240 volts, 6 to 32 Ampere, rupturing capacity 10 KA, 'C' curve type complete all as specified and directed.		<u>851.20</u> Each	42.00		35750.40	
27	Supply and Fixing horizontal type TPN DB's 4 Way, Double door type, 415V, IP43, suitable size and length of CRCA steel sheet, dust protection duly powder painted including factory fitted suitable size copper bus bar, 01 No of MCB TPN as incomer and 12 Nos SP as outgoing with neutral link, earth bar, din bar for mounting MCB and blanking plate a complete all as specified and directed. Note: MCB shall be measured and paid for separately		<u>2542.70</u> Each	16.00		40683.20	
28	Supply & Fixing MCB TP, 415 volts, 25 to 63 Ampere, rupturing capacity 10 KA, 'B' curve type complete all as specified and directed.		<u>1697.60</u> Each	16.00		27161.60	
29	Supply and Fixing MCCB 100 Amps 4 Pole 415 Volts, 3 phase 50 Hz AC with fix thermal release and 16 KA breaking capacity with adjustable magnetic setting including lugs/thimbles and nut bolt washers etc making incoming and outgoing connections complete all as specified and directed.		<u>4328.70</u> Each	4.00		17314.80	
30	Supply and laying Rigid non-metallic PVC conduit ISI MARKED 20mm dia concealed with inclusive of all tees, bends, elbows, reducers, bell mouth tube ends and fixing accessories such as couplers, lock nuts, saddles, pipe hooks etc. complete all as specified and directed.		<u>75.20</u> Running metre	160.00		12032.00	
31	M&L for sub main wiring with 1100 volt grade two single core FRLS Wire PVC insulated and unsheathed cable with stranded copper conductor 6 sqmm drawn into and including electrical grade PVC conduit not less than 25 mm dia with IS 9537 (Part-III) 1983 mark, or relevant ISI mark with all accessories fixed concealed including chase cutting in brick/ stone masonry for fixing conduit and making good the disturbed surfaces of wall as per existing including 6 sqmm multi - stranded copper conductor as earth wire in green colour complete all as specified and directed. NOTE Two runs of 6 sqmm PVC FRLS multi stranded copper cable wire and One run of 6 sqmm PVC FRLS multi stranded copper cable earth wire and One run PVC conduit of suitable size ISI mark will be measured as one unit length.		<u>259.20</u> Running metre	240.00		62208.00	
32	M&L for sub main wiring with 1100 volt grade two single core FRLS Wire PVC insulated and unsheathed cable with stranded copper conductor 4 sqmm drawn into and including electrical grade suitable size PVC conduit with IS 9537 (Part-III) 1983 mark, or relevant ISI mark with all accessories fixed concealed including chase cutting in brick/ stone masonry for fixing conduit and making good the disturbed surfaces of wall as per existing including 4 sqmm multi - stranded copper conductor as earth wire in green colour complete all as specified and directed. NOTE Two runs of 4 sqmm PVC FRLS multi stranded copper cable wire and One run of 4 sqmm PVC FRLS multi stranded copper cable earth wire and One run PVC conduit of suitable size ISI mark will be measured as one unit length.		<u>215.00</u> Running metre	1100.00		236500.00	

SCHEDULE 'A' PART-III (Contd....)

1	2	3	4	5	6	7	8
33	M&L for sub main wiring with 1100 volt grade four single core FRLS Wire PVC insulated and unsheathed cable with stranded copper conductor 6 sqmm drawn into and including electrical grade suitable size PVC conduit with IS 9537 (Part-III) 1983 mark, or relevant ISI mark with all accessories fixed concealed including chase cutting in brick/ stone masonry for fixing conduit and making good the disturbed surfaces of wall as per existing including 6 sqmm multi - stranded copper conductor as earth wire in green colour complete all as specified and directed. NOTE: Four runs of 6 sqmm PVC FRLS multi stranded copper cable wire and One run of 6 sqmm PVC FRLS multi stranded copper cable earth wire and One run PVC conduit of suitable size ISI mark will be measured as one unit length.		<u>392.66</u> Running metre	130.00			51045.80
34	S&F energy saving new generation 1X10Watt LED built up, 6000K bulkhead luminaires with opal diffuser light fitting complete including connecting up with three core flexible copper conductor cable of suitable size.		<u>1389.85</u> Each	74.00			102848.90
35	Supply and fixing ceiling fans 1200 mm Sweep, 26 W, 350 RPM, 220 cub mtr/ min Air delivery, BLDC technology, five star rated complete eith fan blade , down rods and other connected accessories, without remote and compatible with electronic fan regulator including 3 core insulated copper wire multistranded complete all as specified & directed.		<u>2649.47</u> Each	117.00			309987.99
36	Supply and fixing PVC Exhaust fans 250mm sweep, 35watt, 1200 RPM, 860 cub mtr / hour air delivery with high quality engineering plastic complete with louvers shutter, voltage 230volt 50 HZ copper winding, single phase, including circular hole shall be provide in the wall to suit the size of the frame which shall be fixed to wall with nut bolt and washer etc. The hole shall be neatly plastered to the original finish of the wall and connected with and including three core 1.5 sq mm, PVC insulated but unsheathed FRLS cable with multistranded copper conductors from ceiling rose to fan complete all as specified and directed.		<u>1606.52</u> Each	64.00			102817.28
37	Supply and fixing Heavy duty, Exhaust fans 300 mm sweep, 40watt, 1400 RPM, 1060 cub mtr / hour air delivery with special designed metal blade, powder coated long lasting finish, sturdy steel bird guard with louvers and frame including circular hole shall be provide in the wall to suit the size of the frame which shall be fixed by means of rag bolts embedded in the wall. The hole shall be neatly plastered to the original finish of the wall and connected with and including three core 1.5 sq mm, PVC insulated but unsheathed FRLS cable with multistranded copper conductors from ceiling rose to fan complete all as specified and directed.		<u>3548.59</u> Each	35.00			124200.65
38	Earthing complete with galvanized steel earth plate electrode 600x600x6mm thick, burried directly in ground (earth pit not less than 2.25 m deep below ground level) with top edge of earth plate not less than 1.5m below normal ground level connected with galvanized iron earth strip 32 x 6 mm by means of bolts, nuts, check nuts and washers of galvanized iron or steel complete with 40mm dia GI medium grade protection pipe, 20mm dia GI medium grade watering pipe with funnel including charcoal, dust, salt, PCC M-15 type B1 in pit with angle iron (25x25x3)mm frame work with precast RCC 1:2:4 type B-1 cover reinforced with 8mm dia TMT bars @ 150mm C/C both ways and 12mm dia MS fabricated handle, test point etc. in and including light grade GI protection pipe 40mm bore up to 5 mtr length for drawing in earth lead wire, all as shown in electric plate No. 3 of SSR Part-I complete with necessary earth work in any type of soil, removal to a distance not exc. 50m, testing on completion complete all as specified and directed.		<u>7572.90</u> Each	8.00			60583.20
39	Supply and fixing Alum strip 25x3.15mm buried directly in ground or fixed to walls complete all as specified and directed.		<u>125.10</u> Running metre	50.00			6255.00

SCHEDULE 'A' PART-III (Contd....)

1	2	3	4	5	6	7	8
40	Material and Labour earthing complete with galvanised earth plate electrode 60cmx60cmx6mm thick buried directly in ground not less than 2.25mtr deep below normal ground level with top edge of the plate not less than 1.5mtr below normal ground level connected to galvanised earth lead 4 mm dia by means of bolts, nut check nuts and washers of galvanised iron or steel, earth electrode covered all around on all sides with 150 mm thick alternate layers of charcoal and salt, earth lead protection pipe 15mm bore GI medium grade watering pipe 20mm bore GI medium grade all as shown in electrical plate No 3 connected to main switch distribution board complete and testing on completion all as specified and directed by Engr-in-Charge. Note : The unit rate shall also includes for earth work, type of soil, pit in PCC 1:3:6 type C1 funnel with watering pipe from earth test point upto equipment to be earthed, RCC 1:2:4 type B1 cover for earth chamber, 50mm thick with 8mm dia for steel 150mm C/C both ways and 6mm dia MS round bars at handles of cover slab all as specified.		<u>6688.40</u> Each	8.00	53507.20		
41	Supply and fixing earth continuity conductor or main earthing lead fixed to wall on batten or recess or chases or buried in ground or drawn in conduit/pipe or fixed situation for loop earthing etc. as required 4mm dia galvanised iron or steel wire complete all as specified and directed.		<u>60.20</u> Each	50.00	3010.00		
42	S&F BEE 5 star rated storage electric water heater (Geyser), flexible mounting of capacity 25 lts, single phase, 240 volts, AC, white colour, 50z, as per IS-2082:1993 having 2 KW incoloy glass coated heating element with ABS shock proof and rust proof body, SS tank with glass coating from inside suitable for 8 bar pressure, class-I, Vertical type, complete with high precision & externally adjustable capillary thermostat for temp regulation, backup safety overheating capillary thermal cut out at 95°C, temperature display/control knob, PUF insulation water proof technology with FRLS grade electric cable of suitable size ISI marked with ISI marked plug top 240V, 16 Amps with Magnesium anode, standing loss shall not exceed 0.562 KW/14 hrs. including 4 in 1 multifunction valve etc., including provn of suitable holding clamp, MS bolts, grouted to wall and connecting up including 3 core sheathed multi-stranded flexible copper conductor cable connected and provn of water connections with new PVC steel braided inlet/outlet connection pipe 15mm dia, 450mm long with two numbers union, NRV of suitable size, check/end nuts with washers, 15mm dia 100mm long nipples (02 Nos) for hot water and cold water connections and making good to the disturbed surface in cement mortar as required and testing complete all as directed. NOTE: Cost of flexible copper cable of 3 core, PVC steel braided inletoutlet pipe of 15mm dia, 450mm long with brass union, NRV. check/end nuts, nipples, MS bolts, etc., and minor parts, if any, other than those are not specified in the schedule and required for smooth functioning of geyser will be deemed to be included in the quoted rate.		<u>10029.54</u> Each	32.00	320945.28		
43	Supply and Fixing metal enclosure (plug & socket type DB) complete including single pole and neutral enclosure with two pin, earth plug and socket complete with one SP MCB B Curve type of capacity 20 Amp, 10 KA all as specified and directed.		<u>1689.70</u> Each	96.00	162211.20		
44	Supply and Fixing MCB TPN, 415 volts, 25 to 63 Ampere, rupturing capacity 10 KA, 'B' curve type complete all as specified and directed.		<u>2360.74</u> Each	16.00	37771.84		
Total amount of Sch 'A' Part-III carried over to BOQ under Srl item No. 2.03						<u>3118402.09</u>	

SIGNATURE OF CONTRACTOR)
DATED: _____AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-IV
LIST OF ITEMS OF WORKS AND PRICES FOR INTERNAL WATER SUPPLY WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Supplying and laying of 25 mm outer dia CPVC pipes SDR 11 & Plain CPVC SDR 11 fittings to walls/ceiling or laying in floors or in chases including all pipe fittings and cutting chases as required complete all as specified and directed.		<u>353.40</u> Running Metre	283.20	100082.88		
2	Supplying and laying of 32 mm outer dia CPVC pipes SDR 11 & Plain CPVC SDR 11 fittings to walls/ceiling or laying in floors or in chases including all pipe fittings and cutting chases as required complete all as specified and directed.		<u>496.80</u> Running Metre	416.80	207066.24		
3	Supplying and laying of 25 mm bore of UPVC pipes of pressure rating 10kgf/cm2 fixed complete to walls, ceiling or in floors etc., or in chases including all pipe fittings and cutting chases as required complete all as specified and directed.		<u>140.31</u> Running Metre	552.46	77515.66		
4	Supplying and laying of 32 mm outer dia UPVC pipes of pressure rating 10kgf/cm2 fixed complete to walls, ceiling or in floors etc., or in chases including all pipe fittings and cutting chases as required complete all as specified and directed.		<u>186.22</u> Running Metre	471.20	87746.86		
5	Supply and fixing steel water tubing medium grade galvanized pipe 50mm dia with all fitting fixed to walls, under floors and on ceiling surface or in chases including cutting chases as required complete all as specified and as directed.		<u>433.00</u> Running Metre	96.00	41568.00		
6	Supply and fixing steel water tubing medium grade galvanized pipe 80mm dia with all fitting fixed to walls, under floors and on ceiling surface or in chases including cutting chases as required complete all as specified and as directed.		<u>771.00</u> Running Metre	30.90	23823.90		
7	Supply and fixing stop cock, fancy type, chromium plated with long shank and cup (concealed type) with capstan head, screwed down, high pressure with screwed both ends for 15mm bore iron pipe or union complete all as specified and directed.		<u>720.14</u> Each	16.00	11522.24		
8	Supply and fixing angle stop valve cast copper alloy, CP, fancy type, screwed down, high pressure with crutch or butter fly handle; screwed both ends for 15mm bore iron pipe or union complete all as specified and directed.		<u>682.03</u> Each	247.00	168461.41		
9	Supply and fixing Brass CP mixer for mixing hot & cold water screwed down for iron pipe and fixed 15mm bore of pipe complete all as specified.		<u>1743.41</u> Each	48.00	83683.68		
10	Supply and fixing shower rose of cast copper alloy chromium plated 125mm dia ISI marked with swivel joint for fixing to 15mm bore GI pipe or union complete all as specified.		<u>409.25</u> Each	64.00	26192.00		
11	Supply and fixing PVC connection 15mm size with PTMT nuts of length 450mm complete all as specified and directed.		<u>150.00</u> Each	201.00	30150.00		
12	Supplying and fixing 32 mm CPVC Ball valve with screwed both ends pipe and fixed all as specified and directed		<u>679.40</u> Each	16.00	10870.40		
13	Supply and fixing Lagging to CPVC pipes used in internal water supply or plumbing all round with, 25mm thick bonded mineral wool preformed 'SNAP ON' pipe sections of density 144 Kg/cum conforming to IS 9842 on pipe 15mm internal dia complete all as specified.		<u>80.20</u> Running Metre	552.46	44307.29		

Total amount of Sch 'A' Part-IV carried over to BOQ under Srl item No. 2.04

912990.57

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-V
LIST OF ITEMS OF WORKS AND PRICES FOR SEWAGE DISPOSAL WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Material and labour for cement concrete (1:4:8) type D-2 using graded stone aggregate as in foundation, filling and mass concrete complete all as specified.		<u>5483.10</u> Cubic Metre	5.88	32240.63		
2	Material and labour brick work with sub class 'B' bricks, old size straight or curved on plan exceeding 6.00 metre mean radius, built in cement mortar (1:4) including corbelling and arches where shown on drawings complete all as specified and directed.		<u>5370.50</u> Cubic Metre	26.76	143714.58		
3	Material and labour for rendering 15mm thick in cement mortar (1:3) mixed with water proofing compound @ 3% by weight of cement contents on fair face of brick wall or surface finished even and smooth without using extra cement complete all as specified and directed. (WPC shall be measured and paid separately).		<u>304.24</u> Square Metre	142.06	43220.33		
4	Supply only water proofing compound conforming to IS-2645 complete all as specified and directed.		46.10 Kilogram	39.71	1830.63		
5	Material and labour for mild steel work as in rungs, handles and similar articles conforming to Fe-290 Gde- E-165 complete all as specified and directed.		<u>181.08</u> Kilogram	245.29	44417.11		
6	Material and labour for cement concrete (1:3:6) type C-2 using 40mm graded stone aggregate as in concrete bed to 200mm bore drain pipes including packing under and haunching against the sides of pipes after they are laid and tested complete all as specified and directed.		<u>647.79</u> Running Metre	250.00	161947.50		
7	Supply, laying and jointing 200mm bore RCC pipes class NP3 complete with collars laid in trenches and testing complete all as specified and directed.		<u>460.00</u> Running Metre	250.00	115000.00		
8	Material and labour for cast iron work grade FG 150, unmachined, in brackets, gully traps, gratings, railing, frames, manhole covers, fire and soot doors, dampers, stop valve boxes, gate stops, parts of ranges, balusters and similar articles exc 5kg of size (610x610mm) complete all as specified and directed.		<u>147.68</u> Kilogram	614.71	90780.37		
9	Material and labour for cutting into existing manhole for connecting new drain 100-300mm bore and making good to pipe and rendering, cutting out existing benching and forming branch (1/2 or 3/4 section) in plain cement concrete (1:2:4) type B-1 using 20mm graded crushed stone aggregate smooth finished and reforming benching as required complete all as specified and directed.		<u>1120.00</u> Each Pipe	2.00	2240.00		
10	Material and labour for cement concrete 1:2:4 type B-1 (20mm graded aggregate) Cement concrete in surface channels and drains including use & waste of formwork, if any, complete all as specified and directed.		<u>6611.70</u> Cubic Metre	1.76	11636.59		
11	Extra for forming fair finished drain or channel 30cm inner girth in cement concrete using extra cement including forms, moulds, stopped ends etc. complete all as specified and directed.		<u>43.35</u> Running Metre	16.47	713.97		

Total amount of Sch 'A' Part-V carried over to BOQ under Srl item No. 2.05

647741.73

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-VI
LIST OF ITEMS OF WORKS AND PRICES FOR AREA DRAINAGE WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Material and labour for PCC (1:4:8) type D-2 using 40mm graded crushed stone aggregate as in foundations, filling and mass concrete etc. complete all as specified and directed		<u>5483.10</u> Cubic Metre	30.60	167782.86		
2	Material and labour for brick work with sub class 'B' old size bricks, straight or curved on plan to any radius as in half brick thick wall built in cement mortar (1:6) complete all as specified and directed.		<u>652.59</u> Square Metre	384.00	250594.56		
3	Material and labour for brick flooring with old size sub class 'B' bricks, laid on edge, bedded and jointed in cement mortar (1:6) and pointed in cement mortar (1:3) complete all as specified and directed.		<u>699.60</u> Square Metre	138.00	96544.80		
4	Material and labour for cement concrete 1:2:4 type B-1 (20mm graded aggregate) Cement concrete in surface channels and drains including use & waste of formwork, if any, complete all as specified and directed.		<u>6611.70</u> Cubic Metre	6.75	44628.98		

Total amount of Sch 'A' Part-VI carried over to BOQ under Srl item No. 2.06

559551.20

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-VII
LIST OF ITEMS OF WORKS AND PRICES FOR COMPOUND WALL FENCING AND GATE WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Material and labour for PCC (1:4:8) type D-2 using 40mm graded crushed stone aggregate as in foundation, filling and mass concrete etc. complete all as specified and directed.		<u>5483.10</u> Cubic Metre	12.78	70074.02		
2	Use and waste of formwork to sides of concrete foundations, footings, bases of columns, raft and raft beams, sides and soffits (if any) of foundation and plinth beams; and similar work; vertical or to batter for rough finished surface of concrete complete all as specified and directed.		<u>316.72</u> Square Metre	120.32	38107.75		
3	Material and labour for RCC M-25 (Design mix) as in foundations including rafts, footings, foundation beams, plinth beams, bases for columns, basement slabs, under reamed piles and mass concrete complete all as specified and directed.		<u>7640.60</u> Cubic Metre	34.85	266274.91		
4	Use and waste of formwork to sides of pillars, posts, struts, piers, columns and stanchions for rough finished surface of concrete complete all as specified and directed.		<u>598.08</u> Square Metre	137.45	82206.10		
5	Material and labour RCC M-25 (Design mix) as in columns, pillars, piers, posts and struts complete all as specified and directed.		<u>8650.20</u> Cubic Metre	9.37	81052.37		
6	Use and waste of formwork to sides and soffits of floor or roof beams, beam haunchings, girders, bressummers, lintels, cantilevers, shelves including sup- ports, overhangs, etc. also splays between floors and beams, etc. complete all as specified and directed.		<u>462.80</u> Square Metre	63.88	29563.66		
7	Material and labour RCC M-25 (Design mix) as in Beams, cantilevers, bressummers, lintels over 1.5m span complete all as specified and directed.		<u>8144.20</u> Cubic Metre	9.58	78021.44		
8	Material and labour for mild steel TMT bars 10mm dia and over, cut to length, bent to shape required, including cranking, bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9mm dia or securing with clips complete all as specified and directed.		<u>82.60</u> Kilogram	3832.65	316576.89		
9	All as per Srl item No 8 above but 5mm dia and over upto and including 10mm dia in stirrups, spacers and binders complete all as specified and directed.		<u>85.18</u> Kilogram	2628.22	223871.78		
10	Material and labour brick work with sub class 'B' bricks, old size straight or curved on plan exceeding 6.00 metre mean radius, built in cement mortar (1:6) including corbelling and arches where shown on drawings complete all as specified and directed.		<u>4875.00</u> Cubic Metre	45.54	222007.50		
11	Supply, laying and jointing 75mm PVC (SWR) pipes single socketed, in any length with rubber ring joints, fixed to walls, laid in trenches or in weep holes complete all as specified and directed.		<u>160.00</u> Running Metre	14.70	2352.00		
12	M&L for rendering 15mm thick on fair surfaces of brick work or concrete surfaces, surfaces finished even and fair without using extra cement, in cement mortar (1:4) complete all as specified and directed.		<u>263.12</u> Square Metre	287.00	75515.44		
13	M&L for rendering 15mm thick on other than fair surfaces of brick work or concrete surfaces, surfaces finished even and fair without using extra cement, in cement mortar (1:4) complete all as specified and directed.		<u>303.87</u> Square Metre	271.58	82525.01		
14	Material and labour preparation of newly plastered surfaces on walls and apply two coats, of cement base paint by mechanically spray machine gun on wall complete all as specified and directed.		<u>70.50</u> Square Metre	558.58	39379.89		

SCHEDULE 'A' PART-VII (contd...)

1	2	3	4	5	6	7	8
15	Material and labour for posts and struts in fencing including cutting tops to shape as directed, drilling holes, notching for wire, etc.; flat iron fillets (for securing wire mesh etc.) including all necessary drilling, bolting or riveting, etc., and similar work conforming to Fe-290 Gde E-165 complete all as specified and directed.		<u>103.18</u> Kilogram	241.57		24925.19	
16	Material and labour for galvanized 2 strand steel barbed wire 2.24mm dia barbed with 2mm dia barbs at 75mm spacing and straining and fixing to any type of standard rails, straining bolts including securing or tying at crossing with and provision of galvanized mild steel wire, staples or steel pins etc. complete all as specified (each line wire to be measured).		<u>1342.01</u> Per 100 Running Metre	5.60		7515.26	
17	Material and labour for preparation of new steel surface of any description over 10cm width or girth not otherwise described and applying two coats of synthetic enamel paint over one coat of red oxide primer complete all as specified and directed.		<u>141.30</u> Square Metre	11.25		1589.63	
18	Demolition of brick work or stone/ boulder masonry, built in cement mortar including all quoins, arches, pillars, etc. but excluding ashlar facing, dressed stone work and precast concrete articles complete all as specified.		<u>1641.94</u> Cubic Metre	28.98		47583.42	

Total amount of Sch 'A' Part-VII carried over to BOQ under Srl item No. 2.07

1689142.26

SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-VIII
LIST OF WORKS AND PRICES FOR ROAD, PATH & CULVERT WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

ROAD WORK

1	Rolling and consolidating formation surfaces in cutting with power roller exceeding 8 Tonne and not exceeding 12 Tonne complete all as specified.		<u>26.00</u> X Square Metre	180.00	4680.00		
2	Material and labour for Soling or sub base with broken boulders or quarried stone, interstices filled, surface formed and rolled and consolidated to required gradient and camber with power roller exc. 8 tonne & n. exc. 12 tonne for 150 mm thick compacted thickness complete all as specified.		<u>2633.70</u> X Square Metre	180.00	474066.00		
3	Material and labour for 150mm thick two layers each of 75mm thick layer (compacted thickness) water bound macadam with coarse aggregate (Granite, trap or basalt) of grading-3 (50mm to 20mm size) blinded with stone screening type 'A' spread, rolled with 8 to 12 tonne power road roller, hollows made to form true surface and consolidated to required gradient and camber complete all as specified and directed.		<u>4782.20</u> X Square Metre	180.00	860796.00		
4	Material and labour for preparing surfaces of water bound macadam surfaces by brushing with wire brushes for removing caked mud etc. sweeping with brooms and finally fanning the cleaned surface with gunny bags to remove all loose dirt etc. and applying evenly a priming/tack coat with paving bitumen (VG-10) @ 8 kg per 10 Sqm of road surface complete all as specified.		<u>773.30</u> X Square Metre	180.00	139194.00		
5	M&L for Premix bituminous, macadam laid/rolled and compacted to required gradient and camber (consolidated thickness 50mm or less) with 4% binder content (using paving bitumen VG-30) by weight of total mix, using coarse aggregate grading 2 (upto 20mm size) rolled and compacted with 10 tonne to 12 tonne power road roller to required camber and gradient complete all as specified and directed.		<u>8915.70</u> Cubic Metre	117.00	1043136.90		
6	Material and labour for laying rolling consolidating bituminous premix asphaltic semi dense concrete 30mm consolidated thickness with 5.5% binder content (Vg-30) by weight of total mix, mixed in hot mix plant, laid with mechanical paver, rolled and compacted to required camber and gradient complete and rolling to uniform smooth surface with 8 to 12 ton power road roller complete all as specified. Note:- Design mix shall be required to be conducted in Govt. Engineering College or Govt. Approval test house and the actual charges as levied by these test house/ laboratory shall be paid by the contractor without any extra cost to department. The design mix shall be got approved from CWE before execution of work.		<u>2871.37</u> X Square Metre	180.00	516846.60		
7	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete all as specified and directed.		<u>8514.90</u> Cubic Metre	81.00	689706.90		
8	Material and labour preparation of newly concrete surfaces of road side kerb stone/plastered surfaces and apply two coats, of plastic emulsion paint complete all as specified and directed.		<u>118.30</u> Square Metre	210.00	24843.00		

SCHEDULE 'A' PART-VIII (Contd....)

1	2	3	4	5	6	7	8
PATH WORK							
9	Material and labour for 100mm thick cement concrete (1:4:8) type D-2 using 40mm graded stone aggregate as in sub base of floors/ hard standing complete all as specified and directed.		<u>533.00</u> Square Metre	1020.00		543660.00	
10	Material and labour for 25mm thick sand filling under floors or in foundations including watering and consolidation as specified complete all as specified and directed.		<u>1974.30</u> Cubic Metre	25.50		50344.65	
11	Material and labour for machine pressed precast concrete interlocking paver block (Gey colour) of any shape and size 60mm thick, M-35 grade with grey cement and pigment confirming to IS 15658-2006 laid dry over sand cushion complete all as specified and directed. (Note ; - Sand cushioning shall be measured and paid seperately)		<u>741.60</u> Square Metre	690.00		511704.00	
12	Material and labour for machine pressed precast concrete interlocking paver block (coloured) of any shape and size 60mm thick, M-35 grade with grey cement and pigment confirming to IS 15658-2006 laid dry over sand cushion complete all as specified and directed. (Note ; - Sand cushioning shall be measured and paid seperately)		<u>774.40</u> Square Metre	330.00		255552.00	
13	Material and labour for hard core of gauge n. exc. 63mm, deposited, spread and levelled in layers n. exc. 15cm thick, watered and rammed to a true surface complete all as specified.		<u>2070.80</u> Cubic Metre	102.00		211221.60	
HUME PIPE CULVERTS							
14	Material and labour for PCC (1:4:8) type D-2 using graded stone aggregate as in foundation, filling and mass concrete complete all as specified and directed.		<u>5483.10</u> Cubic Metre	4.45		24399.80	
15	Ditto all per item No 10 here-in-before but except sand		<u>106.00</u> Cubic Metre	3.31		350.86	
16	Material and labour brick work with sub class 'B' bricks, old size straight or curved on plan exceeding 6.00 metre mean radius, built in cement mortar (1:6) including corbelling and arches where shown on drawings complete all as specified and directed.		<u>4875.00</u> Cubic Metre	8.06		39292.50	
17	M&L for rendering 15mm thick on fair surfaces of brick work or concrete surfaces, surfaces finished even and fair without using extra cement, in cement mortar (1:4) complete all as specified and directed.		<u>263.12</u> Square Metre	12.80		3367.94	
18	M&L for rendering 15mm thick on other than fair surfaces of brick work or concrete surfaces, surfaces finished even and fair without using extra cement, in cement mortar (1:4) complete all as specified and directed.		<u>303.87</u> Square Metre	12.21		3710.25	
19	Material and labour preparation of newly plastered surfaces on walls and apply two coats, of cement base paint by mechanically spray machine gun on wall complete all as specified and directed.		<u>70.50</u> Square Metre	25.01		1763.21	
20	Material and labour for 300mm dia reinforced concrete pipe class NP-2 laid & jointed complete with collars complete all as specified and directed.		<u>645.00</u> Running Metre	21.00		13545.00	
Total amount of Sch 'A' Part-VIII carried over to BOQ under Srl item No. 2.08						5412181.20	

SIGNATURE OF CONTRACTOR)
DATED: _____AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-IX
LIST OF ITEMS OF WORK AND PRICES FOR EXTERNAL WATER SUPPLY WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	S&F GI tubing 25mm bore of tube, medium grade, galvanised, with all fitting such as Tee, elbows, bend, reducer, unions etc and fixed complete to walls and ceilings or laid in floors complete all as specified and directed.		<u>196.00</u> Running Metre	150.00	29400.00		
2	Supply, install, testing and commissioning cast iron sluice valve PN 1.6, 100 mm bore, conforming to IS 14846/ 2000 with brass spindle and iron wheel head flanged including jointed material such as nuts/bolts washers and rubber gasket etc complete all as specified and directed.		<u>11400.00</u> Each	1.00	11400.00		
3	Supply, install, testing and commissioning cast iron sluice valve PN 1.6, 80 mm bore, conforming to IS 14846/ 2000 with brass spindle and iron wheel head flanged including jointed material such as nuts/bolts washers and rubber gasket etc complete all as specified and directed.		<u>9500.00</u> Each	1.00	9500.00		
4	Supply & fix gun metal gate valve heavy duty with iron wheel head screwed at both ends for 25mm bore iron pipes complete all as specified and as directed.		<u>587.24</u> Each	4.00	2348.96		
5	M&L for DI specials, upto 150mm bore ISI marked such as bends, Taper, Tee pieces (single & double branch) any type and angle/radius and straight connecting pieces but all ends flanged complete all as specified and directed.		<u>180.00</u> Kilogram	150.00	27000.00		

Total amount of Sch 'A' Part-IX carried over to BOQ under Srl item No. 2.09

79648.96

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-X
LIST OF ITEMS OF WORK AND PRICES FOR EXTERNAL ELECTRIFICATION WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Material and labour brick protection layer for cables laid in trenches using sub-class 'B' bricks laid dry width wise across the line of cable (perpendicular to the direction of cable) complete all as specified and directed.		<u>5551.88</u> Per 1000 Nos	11.69	64901.48		
2	Supply & laying un-reinforced pre-cast concrete cable cover, class HV, type I, flat, size 300mm x 180mm x 40mm laid flat in trenches over the cable with the length of cable cover perpendicular to the direction of cable length, adjacent/abutting each other complete all as specified and directed.		<u>57.40</u> Each	1445.00	82943.00		
3	Material and labour for sand cushioning with a layer of sand 8mm thick before laying of cable & 15cm thick after laying of cable in trenches complete all as specified and directed. Note :- Punned down thickness of 18cm shall be measured for payment.		<u>1974.30</u> Cubic Metre	129.20	255079.56		
4	M&L PCC 1:4:8 type D2 using 40mm graded crushed stone aggregate as in foundation for pole/stay assembly foundation etc including use and waste of necessary form work and fair finish to exposed surface without using extra cement complete all as specified.		<u>5483.10</u> Cubic Metre	0.11	603.14		
5	Material & Labour for PCC (1:3:6) type C-2 using 40mm graded stone aggregate as in foundation for pole/stay assembly/feeder pillar/LT panel etc. including use and waste of necessary form work and fair finish to exposed surface without using extra cement complete all as specified.		<u>5862.00</u> Cubic Metre	1.19	6975.78		
6	Material & Labour for PCC (1:2:4) type B-1 using 20mm graded stone aggregate as in copings for pole/stay assembly/feeder pillar/LT panel etc. including use and waste of necessary form work and fair finish to exposed surface without using extra cement complete all as specified.		<u>9259.40</u> Cubic Metre	0.30	2777.82		
7	Supply and fixing steel tubular swaged poles complete with cast iron base plate, finial taper plug, bolts, nuts and screws as specified type 410 SP-55 (11 meters long) including painting of poles with two coats of aluminium paint complete all as specified and directed. Note:- Earth work, PCC for foundation and coping shall be measured and paid for separately.		<u>18443.78</u> Each	2.00	36887.56		
8	Supplying and fixing switch air break gang operated switch with polymer insulators outdoor type HT 11 KV triple poles 200 Amps with fixed contacts of phosphorus bronze and moving contacts of copper with mechanically operating from ground level; vertical mounted complete with HT insulator on steel frame, operating rod made out of 25mm bore GI pipe heavy grade worked from ground level with handle and locking arrangement with 15 polymer insulators having DO assembly and drop out fuses of 12.5 Amp complete all as specified and directed. Note: Clamps/ cross arms shall be measured and paid for separately.		<u>13694.88</u> Each	1.00	13694.88		
9	Material and labour for anti-climbing device; spikes type fabricated out of M.S. bars (round, square and flat) including nuts, bolts, washers and welding in two halves made to shape to suit the cross section of the pole complete all as specified and directed.		<u>12242.60</u> Set of three	0.25	3060.65		

SCHEDULE 'A' PART-X (Contd....)

1	2	3	4	5	6	7	8
10	Supply and fix danger notice plate for HT of 25cm x 20cm x 1.6mm thick mild steel sheet vitreous enameled white with letters, figures and conventional skull and bones and written as 'DANGER' in signal red colour and including provision and fixed with MS clamps made out of MS flat 25mm x 3mm including nuts & bolts and painting with 2 coats of aluminium paint over a coat of red oxide primer complete all as specified. Note:- Words shall be written in three languages viz.-Punjabi, Hindi and English.		<u>223.80</u> Each	2.00		447.60	
11	Material and labour MS cross arms, bracing, supports, clamps, anti-climbing device and back plates fabricated from structural steel section including nuts, bolts, washers with required mechanical working/ process i.e. cutting, welding, bending, cold or hot, drilling holes for bolts in any shape or size including 2 coats of aluminium paint over one coat of red oxide complete all as specified and directed. Note: Unexposed surface shall be given one coat of primer only.		<u>11931.40</u> Quintal	1.50		17897.10	
12	Supply and fix lightening arrester expulsion type complete with all fittings, transmission class, discharge capacity 10 KA rupturing capacity suitable for 11 KV, HT overhead line complete including nuts, bolts, clamps, brackets etc. and connecting with GI earth wire complete all as specified and directed.		<u>10694.90</u> Set of three	1.00		10694.90	
13	Supplying, laying, jointing and testing XLPE insulated, screened, PVC bedded, galvanised steel strip or wire armoured, electric power cables (heavy duty) with stranded aluminium conductor, 11000 volts grade, (Earthed system) cross sectional area 95 sqmm 3 core conforming to IS: 7098-1985 laid in trenches, in floor, in duct, through pipes or along the pole complete all as specified and directed. Note:- (i) Excavation, earthwork, sand cushioning, PCC protection cover, GI pipe & protection clamps shall be measured and paid for separately.		<u>1067.97</u> Running Metre	300.00		320391.00	
14	Supply and fix cable jointing kit for 11 KV grade (earthed system) cable for outdoor termination, heat shrink type joint complete with jointing material and accessories suitable for 3 core XLPE, armoured, aluminium conductor cable of size 95sqmm complete all as specified and directed.		<u>6150.70</u> Each	4.00		24602.80	
15	Material and labour for earthing complete with GI or steel earth plate electrode 60cm x 60cm x 6mm thick buried directly in ground vertically in a pit not less than 2.25 meter below ground level with top edge of earth plate at a depth not less than 1.5 meter below level covered on all sides with alternative layers of charcoal dust and common salt 15cm thick connected to galvanised earth lead Galvanised Iron strip 32 x 6mm by means of bolts, nuts, check nuts and washers of galvanised Iron or steel with protection pipe earth wire protected by galvanized steel pipe light grade 40mm bore from top of the earth plate electrode upto test point and watering pipe 20mm bore, GI medium grade with funnel and wire mesh all as shown in electrical plate No. 3 of SSR Part-1 and connected to earthing test point all as specified or indicated and testing on completion, including PCC earth pit (1:3:6) type C-2 RCC covered with CI cover hinged with frame including excavation and earth work complete all as specified. Note: If result is not satisfactory then contractor will do 2nd earthing on his own cost.		<u>7572.90</u> Each	10.00		75729.00	

SCHEDULE 'A' PART-X (Contd....)

1	2	3	4	5	6	7	8
16	Material & labour for earthing complete with GI or steel earth plate electrode 60cm x 60cm x 6mm thick buried directly in ground vertically in a pit not less than 2.25 meter below ground level with top edge of earth plate at a depth not less than 1.5 meter below level covered on all sides with alternative layers of charcoal dust and common salt 15cm thick connected to galvanised earth lead GI wire 4mm dia by means of bolts, nuts, check nuts and washers of Galvanised Iron or steel with protection pipe earth wire protected by galvanized steel pipe light grade 15mm bore from top of the earth plate electrode upto test point and watering pipe 20mm bore, GI medium grade with funnel and wire mesh all as shown in electrical plate No 3 of SSR Part-1 and connected to earthing test point all as specified or indicated and testing on completion, including PCC earth pit (1:3:6) type C-2 RCC covered with CI cover hinged with frame including excavation and earth work complete all as specified. Note: If result is not satisfactory then contractor will do 2nd earthing on his own cost.		<u>6688.40</u> Each	2.00		13376.80	
17	M&L for GI strip 32mm x 6mm buried directly in ground or otherwise above ground level or fixed to walls complete all as specified and directed.		<u>213.00</u> Running Metre	15.00		3195.00	
18	Supply, install, testing and commissioning of AC 3 phase 50 HZ as per IS : 1180 Part I 2014 with latest amdt and BEE certified (Level -3) of capacity 160 kVA capacity transformer step down, outdoor type 11000/433 volts (at no load) copper wound, oil immersed, ONAN cooled with external cooling tubes/Fins, core type, delta connected on primary (HV) side and star connected on secondary (LV) side in accordance with vector symbol DYN-11 (vector group-4) with neutral brought on secondary (LV) side & having tapplings in equal steps of 2.5 % from (+) 7.5% to (-) 7.5% on primary side by means of hand operated off load tap changing gear, so as to change/correct L.T voltage on secondary side including provision of all necessary / standard fittings and first fill of Oil, mainly comprising of following : (a) One cable box on primary H.V side with brass/gun metal bushing rods complete with nuts and washers) cable gland suitable for reception of outgoing armoured cable. (b) One cable box on secondary (LV) side consisting of 4 Nos porcelain bushings cable gland suitable for reception of two nos outgoing armoured cable. (c) Oil conservator with filter type, drain valve and oil level gauge. (d) Transparent Dehydrating breather with first fill of dry silica gel . (e) Explosion vents with diaphragm. (f) Temperature guage on tank cover having range 0-200 degree centigrade (g) Rating plate with terminal markings. (h) Two earthing terminals on tank/tank cover to facilitate fixing of 32 x 6 m earth strip. (i) Oil drain and filter valves. (j) Oil filler hole with cap/plug complete. (k) Lifting lugs. (l) Air relief valve plug. (m) Four solid cast steel detachable rollers. (n) First fill of fresh oil conforming to relevant IS and tested upto 60 kV dielectric strength. (o) Extra bushing for neutral outside the L.T cable box for providing independent earthing for neutral. (p) 2 Nos danger boards 250 x 200 mm size made out of 1.6 mm thick M.S. plate, vitreous enameled white, with letters, figures of voltage and conventional skull and bones in signal red colour, one at H.T side and other on L.T side. (q) Any other fittings / accessories so as to confirm the whole transformer to IS-1180 Part - 1		<u>864486.67</u> Each	1.00		864486.67	
19	Supplying, laying, jointing and testing LT cable XLPE insulated, PVC sheathed, galvanised steel strip or wire armoured, electric power cables (heavy duty) with multistranded aluminium conductor, 1100 volts earthed, grade of size 240 sqmm 3.5 core laid in trenches, in floor, in duct, through pipes or along the pole complete all as specified.		<u>1168.69</u> Running Metre	30.00		35060.70	

SCHEDULE 'A' PART-X (Contd....)

1	2	3	4	5	6	7	8
20	All as per description of Srl item No 19 above but size 185 sqmm 3.5 core complete all as specified and directed.		<u>937.13</u> Running Metre	95.00		89027.35	
21	All as per description of Srl item No 19 above but size 50 sqmm 3.5 core complete all as specified and directed.		<u>337.52</u> Running Metre	162.00		54678.24	
22	All as per description of Srl item No 19 above but size 25 sqmm 4 core complete all as specified and directed.		<u>249.04</u> Running Metre	100.00		24904.00	
23	All as per description of Srl item No 19 above but size 16 sqmm 4 core complete all as specified and directed.		<u>193.50</u> Running Metre	60.00		11610.00	
24	All as per description of Srl item No 19 above but size 10 sqmm 4 core complete all as specified and directed.		<u>174.68</u> Running Metre	990.00		172933.20	
<p>Note for item No. 13 & 19 to 24:- Sand cushioning and brick covers shall be measured and paid under respective item of this Schedule.</p>							
<p>Total amount of Sch 'A' Part-X carried over to BOQ under Srl item No. 2.10</p>						<p>2185958.23</p>	

SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XI
LIST OF ITEMS OF WORKS AND PRICES FOR DG SET WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

1	Material and labour for earthing complete with GI or steel earth plate electrode 60cm x 60cm x 6mm thick buried directly in ground vertically in a pit not less than 2.25 meter below ground level with top edge of earth plate at a depth not less than 1.5 meter below level covered on all sides with alternative layers of charcoal dust and common salt 15cm thick connected to galvanised earth lead Galvanised Iron strip 32mm x 6mm by means of bolts, nuts, check nuts and washers of galvanised iron or steel protected by galvanised steel pipe medium grade 40mm bore from top of the earth plate electrode upto test point and watering pipe 20mm bore, GI medium grade with funnel and wire mesh all as shown in electrical plate No 3 of SSR Part-1 and connected to earthing test point all as specified or indicated and testing on completion, including PCC earth pit (1:3:6) type C-2 RCC covered with CI cover hinged with frame including excavation and earth work complete all as specified. Note: If result is not satisfactory then contractor will do 2nd earthing on his own cost.		<u>7572.90</u> Each Set	6.00	45437.40		
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Total amount of Sch 'A' Part-XI carried over to BOQ under Srl item No. 2.11

45437.40

SIGNATURE OF CONTRACTOR)

DATED: _____

AAD (CONTRACTS)

FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XII
LIST OF ITEMS OF WORKS AND PRICES FOR LIFT WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Material and labour for earthing complete with GI or steel earth plate electrode 60cm x 60cm x 6mm thick buried directly in ground vertically in a pit not less than 2.25 meter below ground level with top edge of earth plate at a depth not less than 1.5 meter below level covered on all sides with alternative layers of charcoal dust and common salt 15cm thick connected to galvanised earth lead Galvanised Iron strip 32mm x 6mm by means of bolts, nuts, check nuts and washers of galvanised iron or steel protected by galvanised steel pipe medium grade 40mm bore from top of the earth plate electrode upto test point and watering pipe 20mm bore, GI medium grade with funnel and wire mesh all as shown in electrical plate No 3 of SSR Part-1 and connected to earthing test point all as specified or indicated and testing on completion, including PCC earth pit (1:3:6) type C-2 RCC covered with CI cover hinged with frame including excavation and earth work complete all as specified. Note: If result is not satisfactory then contractor will do 2nd earthing on his own cost.		<u>7572.90</u> Each Set	4.00	30291.60		
2	Material and labour GI strip 32mm x 6mm earth continuity conductor or main earthing lead fixed to wall on batten or recess or chases or buried in ground or drawn in conduit/pipe or fixed to poles or any other indicated situation for loop earthing etc.all as specified and directed.		<u>230.80</u> Running Metre	30.00	6924.00		
Total amount of Sch 'A' Part-XII carried over to BOQ under Srl item No. 2.12					<u><u>37215.60</u></u>		

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XIII**LIST OF ITEMS OF WORKS AND PRICES FOR FIRE FIGHTING, FIRE ALARM & DETECTION SYSTEM WORKS**

Srl No	Description of item of work	Drg No	Rate Unit	Qty	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: (i) The complete scope of work related to fire fighting and fire detection cum alarm system shall be got executed through any specialized agency dealing with planning, designing and execution of fire hydrant and fire alarm system and having minimum experience of five years in the field and approved from state/central government fire department. The contractor in construction with specialist agency shall submit a schematic plan of fire hydrant and fire detection cum alarm system including necessary power and control wiring diagram, fire alarm panel etc complete and obtain approval of GE before procurement and execution of work. All such fitting, fixtures and accessories of fire hydrant and fire detection cum alarm system shall be deemed to be within the scope of the special whether mentioned or not specifically mentioned in BOP but essentially required for final completion and testing/commissioning of fire hydrant and fire alarm system.

(ii) Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

FIRE FIGHTING WORKS

1	Supply and laying and welding M.S.(ERW) pipes 100mm bore, conforming to I.S. 1239 (Heavy grade) in trenches/on wall/roof/surface complete with fittings/ flanges including anticorrosive treatment, (wrapping of two layers of 2 mm thick multi-layer anticorrosive polymeric mix tape applied over a coat of primer) and testing complete all as specified and directed.		<u>903.00</u> Running Metre	60.00	54180.00		
2	All as Per Srl item No 1 here-in-before but of 80mm dia complete all as specified. Note for item No.1 & 2: - Pipe line to be laid underground buried in soil shall have protection against corrosion by means of coating and wrapping as per para 27.3.7.2 of SSR Part- I and above ground pipes shall be coated with one coat of red oxide primer and two coat of synthetic enamel of fire red colour as per para 27.3.12.5 of SSR Part-I.		<u>662.00</u> Running Metre	15.00	9930.00		
3	Supply, installation, testing and commissioning air vessel tank 200 mm dia with dished top, made of minimum 6 mm thick MS pipe/ plate complete with 20 mm dia, brass air valve (Ball Valve) 20 mm dia stop valve, pressure gauge with brass stop cock, nipple, tees, elbows and all accessories and adequate capacity as required as per IS 15301 (2003) of fire fighting pumps code of practice (CED22 : fire fighting) all as specified and directed.		<u>24636.00</u> Each	1.00	24636.00		
4	Supply and fix fire hydrant landing valve type A (single head outlet) gunmetal of 80 mm dia landing valve with 63 mm dia female outlet complete and 80 mm inlet with rubber blank cap and chain as per IS 5290-1983, suitable for brigade hose of 63 mm with couplings (for internal hydrant at Ground floor to 4rd floor and roof) complete all as specified and directed.		<u>6227.00</u> Each	7.00	43589.00		
5	Supply, fixing, testing and commissioning of wall mounting swinging type First aid fire hose reel with drum, hanging bracket, 30 mtr long and 20mm dia high pressure hose reel as per IS 444 with gunmetal shut off nozzle having 5mm dia orifice.The hose reel shall be conforming to IS 884-1985.Rate shall including for 25 mm dia MS pipe connection from riser to hose reel sockets, nipples, elbows and ball valve (25mm dia). Drum shall be fixed on adjoining wall through anchor fasteners/cement concrete book or MS stand as per site requirement and the rate for fixing/hanging items in the rates quoted(for internal hydrant and one each an either side of stage) complete all as specified and directed.		<u>7751.00</u> Each	5.00	38755.00		
6	Supply, fixing, testing and commissioning of 63 mm dia 15 mtr long Controlled perclating rubberised fabric hose conforming to IS 8423 (type 'A') incl gun metal/SS male and female instantaneous coupling, bound and rivetted to hose pipe with 1.5 mm dia copper wire complete in all respects, hose BSI marked, conforming to IS 636 type II and complete male female coupling conforming to IS 903 complete all as specified and directed.		<u>4652.00</u> Each	14.00	65128.00		
7	Supply, fixing, testing and commissioning of Gun metal, short type, instantaneous pattern Branch pipe to suit fire hose delivery coupling of 63 mm size complete with GM/SS nozzle of 20 mm nominal size conforming to IS 8090 complete all as specified and directed.		<u>3048.00</u> Each	14.00	42672.00		

SCHEDULE 'A' PART-XIII (Contd....)

1	2	3	4	5	6	7	8
8	M&L for weather proof standard hose cabinet outdoor/ indoor type of 800mm height x 600mm width x 250mm depth, suitable for accommodating yard hydrants and hose pipes made of 18gauge M.S. sheet having central opening door frame made of 16gauge MS Sheet and 4 mm thick glass including necessary locking arrangement, painting fire red outside and brilliant white inside complete all as specified and directed.		<u>3359.00</u> Each	7		23513.00	
9	Supply, fixing, testing and commissioning of Terrace pumps (Booster Pump) for 440 V, 3 Phase, 50 Hz conforming to IS-12469 :1988 With CI Casing bronze impeller and stainless steel shaft mounted on heavy duty bearings suitable for 440 volts, 3 phase, 50 Hz, 30 m head, 900 LPM discharge complete all as specified and directed. Note:- Cost of RCC/PCC foundation required for base frame including mounting arrangement shall be deemed to be included in quoted rate.		<u>67400.00</u> Each	2		134800.00	
10	Supply, fixing, testing and commissioning of C.I. Butterfly valves of 100mm bore with Body: IS:210, PN-1.6, conforming to IS:13095 complete all as specified and directed.		<u>8012.00</u> Each	6		48072.00	
11	All as Per Srl item No 10 here-in-before but of 80mm bore complete all as specified.		<u>5431.00</u> Each	2		10862.00	
12	Supply, fixing, testing and commissioning of strainer Y type conforming to IS of size 100 mm dia with matching Flanges, Nut, bolts, washer & Gaskets complete all as specified and directed.		<u>7895.00</u> Each	2		15790.00	
13	Supply, fixing, testing and commissioning of Gun metal fire brigade in let connection for connecting to external fire hydrant ring main consisting of Two nos 63 mm dia instantaneous type male coupling with built in check valve complete with NRV and 6 inch inlet flange with matching flanges, gaskets, stud bolts etc complete in all respects as directed.		<u>4349.00</u> Each	2		8698.00	
14	M&L for pressure gauge 4" dial 0-21 Kgs rating complete all as specified and directed.		<u>1564.00</u> Each	2		3128.00	
15	Supply, installation, testing and commissioning pressure switch adequate pressure with upper & lower limits for pump as required as IS-15301 (2003) of firefighting pumps code of practice (CED22: firefighting) all as specified and directed.		<u>4802.00</u> Each	2		9604.00	
16	Supply and fixing fire hydrant stand post 80 mm dia/ GI MS both ends flanged height 1.5 m with provision of single outlet confirming to IS:908 complete all as specified.		<u>21642.00</u> Each	2		43284.00	
17	Supply and laying pipe galvanised "medium class" including fittings of size 40 mm dia for drain of Water complete in all respects as directed.		<u>396.50</u> Running Metre	50		19825.00	
<u>FIRE ALARM & DETECTION SYSTEM WORKS</u>							
18	Supply, installation, testing and commissioning of siren Electronic type horizontal single stage continuous normal operation for atleast 50 minutes with sound level 65 DB to 120 DB measured at 1.5 Mtr with sound output variation of + 5 DB, 500 mtrs range all as specified and directed.		<u>2659.00</u> Each	1		2659.00	
19	Supply and laying pipe galvanised "medium class" including fittings of size 25 mm dia for drain of Water complete in all respects as directed.		<u>184.60</u> Running Metre	10		1846.00	
20	Supply and fix 25mm dia Gun-metal, globe or gate valves, with iron wheel head, screwed both ends for iron pipe and fixed complete all as specified and directed.		<u>587.24</u> Each	7		4110.68	
Total amount of Sch 'A' Part-XIII carried over to BOQ under Srl item No. 3.13						<u>605081.68</u>	

SIGNATURE OF CONTRACTOR)
DATED: _____AAD (Contracts)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XIV
LIST OF ITEMS OF WORKS AND PRICES FOR LIGHTNING PROTECTION WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Material and labour single pointed air termination aluminium rod, 12mm dia and 300mm long fixed to GI pipe including PCC block of size 250mm x 250mm x 300mm in PCC (1:2:4) type B-1 using graded stone aggregate complete all as specified and directed		<u>278.90</u> Each	20.00	5578.00		
2	Material and labour test point terminal block made of gun metal or phosphorus bronze of size 75mm x 75mm x 25mm drilled and screwed including 3 Nos 8mm dia 25mm long hexagonal head screw complete all as specified and directed.		<u>689.70</u> Each	4.00	2758.80		
3	Material and labour aluminium strip 25mm x 3.15mm complete with DMC/ epoxy insulators, saddles, screws for fixing loop conductor etc. complete all as specified and directed.		<u>125.10</u> Running Metre	431.00	53918.10		
4	Material and labour GI strip 32mm x 6mm buried directly in ground in earth pit or otherwise above ground level all as specified and directed.		<u>213.00</u> Running Metre	150.00	31950.00		
5	Material and labour for earthing complete with GI or steel earth plate electrode 60cm x 60cm x 6mm thick buried directly in ground vertically in a pit not less than 2.25 meter below ground level with top edge of earth plate at a depth not less than 1.5 meter below level covered on all sides with alternative layers of charcoal dust and common salt 15cm thick connected to galvanised earth lead Galvanised Iron strip 32mm x 6mm by means of bolts, nuts, check nuts and washers of galvanised iron or steel protected by galvanised steel pipe medium grade 40mm bore from top of the earth plate electrode upto test point and watering pipe 20mm bore, GI medium grade with funnel and wire mesh all as shown in electrical plate No 3 of SSR Part-1 and connected to earthing test point all as specified or indicated and testing on completion, including PCC earth pit (1:3:6) type C-2 RCC covered with CI cover hinged with frame including excavation and earth work complete all as specified. Note: If result is not satisfactory then contractor will do 2nd earthing on his own cost.		<u>7572.90</u> Each Set	4.00	30291.60		

Total amount of Sch 'A' Part-XIV carried over to BOQ under Srl item No. 2.14

124496.50

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XV
LIST OF ITEMS OF WORKS AND PRICES FOR RAIN WATER HARVESTING WORKS

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note: Excavation/ earthwork required shall be measured and paid for under Schedule 'A' Part-II, if specifically not mentioned in the item.

1	Material and labour for cement concrete (1:4:8) type D-2 using grade stone aggregate as in foundation, filling and mass concrete complete all as specified and directed.		<u>5483.10</u> Cubic Metre	5.60	30705.36		
2	Use and waste of formwork to sides of concrete foundations, footings, bases of columns, raft and raft beams, sides and soffits (if any) of foundation and plinth beams; and similar work; vertical or to batter for rough finished surface of concrete complete all as specified and directed.		<u>316.72</u> Square Metre	13.20	4180.70		
3	Material and labour for RCC M-25 (Design mix) as in foundations including rafts, footings, foundation beams, plinth beams, bases for columns, basement slabs, under reamed piles and mass concrete complete all as specified and directed.		<u>7640.60</u> Cubic Metre	13.20	100855.92		
4	Use and waste of formwork to faces of walls, retaining walls, abutments, parapets and staircase railings and similar work including attached pilasters, buttresses etc; vertical or to batter for fair finished surface of concrete complete all as specified and directed.		<u>573.94</u> Square Metre	153.30	87985.00		
5	Material and labour RCC M-30 (Design mix) as in walls, retaining walls, basement walls, ballast walls and the like; any thickness above top of footings including attached pilasters and buttresses complete all as specified and directed.		<u>8028.60</u> Cubic Metre	18.20	146120.52		
6	Use and waste of formwork to sides and soffits of floor or roof beams, beam haunchings, girders, bressummers, lintels, cantilevers, shelves including sup- ports, overhangs, etc. also splays between floors and beams, etc. complete all as specified and directed.		<u>462.80</u> Square Metre	10.50	4859.40		
7	Material and labour RCC M-25 (Design mix) as in Beams, cantilevers, bressummers, lintels over 1.5m span complete all as specified and directed.		<u>8144.20</u> Cubic Metre	1.40	11401.88		
8	Material and labour for mild steel TMT bars 10mm dia and over, cut to length, bent to shape required, including cranking, bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9mm dia or securing with clips complete all as specified and directed.		<u>82.60</u> Kilogram	1658.10	136959.06		
9	All as per Srl item No 8 above but size 6mm to 8mm dia complete all as specified and directed.		<u>84.55</u> Kilogram	917.70	77591.54		
10	All as per Srl item No 8 above but 5mm dia and over upto and including 10mm dia in stirrups, spacers and binders complete all as specified and directed.		<u>85.18</u> Kilogram	75.40	6422.57		
11	M&L for rendering 10mm thick on fair surfaces of brick work or concrete surfaces, surfaces finished even and fair without using extra cement, in cement mortar (1:4) complete all as specified and directed.		<u>204.80</u> Square Metre	16.50	3379.20		
12	S&F framed work such as grills, gratings, etc. with ends of bars shouldered and/ or riveted, or forged into spikes; framed guard bars; barred iron doors; ladders; framed balusters; walk ways; railings; framework of water tanks and similar work conforming to Fe.290.Gde-E-165 complete all as specified and directed.		<u>164.86</u> Kilogram	1167.00	192391.62		
13	Material and labour for applying two coats of synthetic enamel paint over one coat of red oxide zinc chromate on steel surface over 10cm width or girth not otherwise described including preparation of surface complete all as specified and directed.		<u>141.30</u> Square Metre	29.30	4140.09		

SCHEDULE 'A' PART-XV (Contd....)

1	2	3	4	5	6	7	8
14	Material and labour for 300mm dia bore holes in normal available strata upto 50 metre depth complete all as specified.		<u>13989.90</u> Each	1.00			13989.90
15	S&F PVC pipe 150mm dia class 'A' including all necessary fittings complete all as specified.		<u>249.29</u> Cubic Metre	50.00			12464.50
16	S&F gravel packing as in filter media of size 12.5mm size all around PVC pipe in pit complete all as specified.		<u>1665.60</u> Cubic Metre	12.00			19987.20
17	S&F gravel packing as in filter media of size 3 to 5mm size all around PVC pipe in pit complete all as specified.		<u>1665.60</u> Cubic Metre	12.00			19987.20
18	Material and labour for sand filling under floors or in paving or in foundations including watering and consolidation complete all as specified. Note:- Punned down thickness shall be measured for payment.		<u>1974.30</u> Cubic Metre	12.00			23691.60

Total amount of Sch 'A' Part-XV carried over to BOQ under Srl item No. 2.15

897113.26

SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XVI
LIST OF ITEMS OF WORKS AND PRICES FOR SOLAR WATER HEATER WORK

Srl No	Description of item of work	Drg No	Rate (Rs)	No of Units Required	Amount (Rs)	Period of completion of indl item after date of handing over of site	Remarks
1	2	3	4	5	6	7	8

Note :- (i) Hot water pipe with aluminium cladding for solar water heater are catered in internal water supply schedule of B&R.

(ii) For Backup storage for solar water heater tapping from terrace tank through GI pipe line, Connection for pipe line will be measured and paid separately under item Srl NO 2. of this Sch.

1	Supply, installation, commissioning and testing at roof top of building (G+4) "Solar hot water (Heat exchanger type) system" (flat plate collectors) ISI marked based on indirect transfer of heat of capacity 400 Ltrs per day (at Temp 60°C to 80°C) confirming to IS 12933-2003 Part-I having insulation of rock wool/mineral wool 50mm thickness bottom and 25mm thickness on with toughened tempered glass of 4mm thick and cladding with aluminium sheet 26 SWG complete with copper riser tubes, copper heater tubes, copper sheet and absorber with 40x40x6mm enameled coated MS angle Iron structure with accessories fasteners etc duly grouted in PCC 1:2:4 type B-1 (30cmx30cmx30cm block) with hot water storage tank of capacity 400 ltrs with inner shell fabricated from stainless steel 1mm thick in cylindrical shape and outer cover fabricated from aluminium sheet 1mm thick (having insulation of rock wool) mineral wool 100mm thick & cladding with aluminium 26SWG with necessary make up tank of stainless steel 01 No float valve 15 mm dia of brass to maintain water in collectors and heat exchanger necessary piping between collectors and hot water tank, fixed over on MS angle iron 50x50x6mm including nuts, bolts, grouted in PCC 1:2:4 type B-1 blocks (30cmx30cmx30cm) & two coats of painting over a coat of red oxide with temperature gauge (100°C) brass gate wall in hot & cold water pipes complete all as specified and as directed.		<u>124382.00</u> Each Job	4.00	497528.00		
2	Supply and laying galvanized GI pipes medium grade 20 mm dia ISI marked with necessary fittings such as Tee, elbows, bend, reducer, unions etc fixed on walls, floors or on roof complete all as specified and directed. similar work; vertical or to batter for rough finished surface of concrete complete all as specified and directed.		<u>169.00</u> Running Metre	60.00	10140.00		
3	Supply and fix gun-metal, globe or gate valves, with iron wheel head, screwed both ends ISI marked suitable for 20 mm dia iron pipe complete all as specified and directed.		<u>540.11</u> Each	4.00	2160.44		
4	Earthing complete with galvanized steel earth plate electrode 600x600x6mm thick, buried directly in ground (earth pit not less than 2.25 m deep below ground level) with top edge of earth plate not less than 1.5m below normal ground level connected with earth strip 25x4 mm by means of bolts, nuts, check nuts and washers of galvanized iron or steel complete with 40mm dia GI medium grade protection pipe, 20mm dia GI medium grade watering pipe with funnel including charcoal, dust, salt, PCC M-15 type B1 in pit with angle iron (25x25x3)mm frame work with precast RCC 1:2:4 type B-1 cover reinforced with 8mm dia TMT bars @ 150mm C/C both ways and 12mm dia MS fabricated handle, test point etc. in and including light grade GI protection pipe 40mm bore up to 5 mtr length for drawing in earth lead wire, all as shown in electric plate No. 3 of SSR Part-I complete with necessary earth work in any type of soil, removal to a distance not exc. 50m, testing on completion complete all as specified and directed.		<u>7164.70</u> Each Set	4.00	28658.80		
5	S&F earth continuity conductor or main earthing lead fixed to wall or batten or recess or buried in ground or drawn in conduit / pipe or fixed to wall of size 25x3 mm aluminium strip complete all as specified and directed.		<u>122.10</u> Running Metre	40.00	4884.00		

Total amount of Sch 'A' Part-XVI carried over to BOQ under Srl item No. 2.16

543371.24

SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (CONTRACTS)
 FOR ACCEPTING OFFICER

SCHEDULE 'A' PART-XVII

LIST OF ITEMS OF WORKS AND PRICES FOR MISC. ITEMS OF WORKS

REFER BOQ UPLOADED

(SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (Contracts)
For Accepting Officer

SCHEDULE OF CREDIT
FOR OLD MATERIAL

Notes: -

(a)	The rate at which contractor shall afford credit to Govt. for materials/ items obtained from dismantling/demolition or taking down has been inserted under column 5 as assessed by Department.				
(b)	The quantity of materials indicated in column 4 is provisional depending upon the quantity of corresponding demolition or taking down items of Schedule 'A'. The actually executed quantities of these items of Schedule 'A' shall be considered for credit.				
(c)	Contractor shall be deemed to have visited the site before quoting rates and ascertain the actual position/ quality of the materials/items for which he shall afford the credit as given below. Irrespective of the fact whether he has visited the site or not.				
(d)	Contractor shall be responsible for removal of all material / items from the site of work for which credit has been afforded and also debris from the site premises without any extra cost to the Govt.				
(e)	No rebate on schedule of credit shall be accepted. However contractor can offer more credit.				
Ser No.	Description of items	Unit	Qty	Rate assessed by the Deptt (Rs.)	Amount (Rs.)
1	2	3	4	5	6
1.	Old unserviceable brick bats	Cum	28.98	450.00	13041.00
Total amount of Schedule of credit					13041.00

(SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'B'

LIST OF MATERIALS TO BE ISSUED TO THE CONTRACTOR
(REFER CONDITION 10 OF 1AFW-2249)

Srl No	Particulars	Unit	Rate at which materials etc. will be issued to Contractor (Rate in Rs)	Place of issue by name	Remarks
1	2	3	4	5	6

----- **NIL** -----

SCHEDULE 'C'

LIST OF TOOLS AND PLANTS (OTHER THAN TRANSPORT) WHICH WILL BE PROVIDED TO THE CONTRACTOR (REFER CONDITION 15,34 & 35 OF IAFW -2249)

Ser No	Quantity	Particulars	Details of MES Crew supplied	Hire charged per unit per working day	Stand by charges per unit per day	Place of issue	Remarks.
1	2	3	4	5	6	7	8

----- **NIL** -----

SCHEDULE 'D'

TRANSPORT TO BE HIRED TO THE CONTRACTOR
(SEE CONDITION 16 & 35 OF IAFW-2249)

Ser No	Quantity	Particulars	Rate per unit per working day (Rs)	Place of issue (by name)	Remarks
1	2	3	4	5	6

----- **NIL** -----

(SIGNATURE OF CONTRACTOR)
 DATED: _____

AAD (Contracts)
 For Accepting Officer

TENDER
TO THE PRESIDENT OF INDIA

Having examined and perused the following: -

1. Specifications signed by SSW/ AAD (Contracts)
2. Drawings detailed in the list of drawings.
3. Schedule `A', `B', `C' and `D' attached hereto.
4. MES Standard Schedule of Rates (SSR) Part-I (Specifications) 2009 and MES Standard schedule of Rates (SSR) Part- II (Rates) -2020 together with errata/amendments as follows: -
 - (a) MES Standard schedule of Rates (SSR) Part-I (Specifications) 2009:
Errata: - Nil; Amendments: - 1 to 3.
 - (b) MES Standard schedule of Rates (SSR) Part- II (Rates) -2020:
Errata: - Nil; Amendments 1 to 122
5. GENERAL CONDITIONS OF CONTRACTS (IAFW-2249 1989 Print) together with amendments **1 to 49** and errata **1 to 20**.
6. WATER UNDER CONDITION 31 OF IAFW-2249: GENERAL CONDITIONS OF CONTRACTS.
***Water will not be supplied by MES.**
7. Should this tender be accepted, I/We ** agree: -
 - *(a) That the sum of `_____ (Rupees_____ only) forwarded as earnest money shall either be retained as part of security deposit or refunded by the Government in receipt of the appropriate amount as security deposit all as per condition 22 of IAFW-2249.
 - (b) To execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in items of Schedule `A' and to carry out such deviations as may be ordered under condition 7 of IAFW 2249 upto a maximum of **10% (TEN PERCENT)** and further agree to refer all disputes as required by condition 70 of IAFW-2249 to the Sole Arbitrator of a serving officer having degree in Engineering or equivalent or having passed final/ direct final examination of sub division-II of Institution of Surveyors (India) recognized by the Govt. of India to be appointed by the Engineer-in-Chief or in his absence the officer officiating as Engineer-in-Chief or Director General of works if specifically authorised in writing by Engineer-in-Chief, Army Headquarters, New Delhi whose decision shall be final, conclusive and binding.

* *Delete where not applicable.*
** *Delete whichever is not applicable.*

GENERAL SUMMARY (Contd.....)

IN LIEU OF IAFW-2159 (REVISED)

Total amount brought forward from Serial Page No. Rs. _____

Lump sum of Rs. _____ (Rupees _____
_____)

Signature in the capacity of duly
authorized to sign tender for and on behalf of (in
block capitals)

Witness Postal Address

Address Telegraphic Address

..... Telephone No

ACCEPTANCE

..... Alterations have been made in these tender documents and as evidence that these alterations
were made before execution of the Contract Agreement; the contractor and
..... have initialed these. The said officer(s) is/
are hereby authorized to sign and initial on my behalf the documents forming part of the Contract.

The above tender is/ was accepted by me on behalf of the President of India for the contract sum of
Rs. (Rupees
.....only)
on the day of2026

Signature dated this day of2026

APPOINTMENT: ACCEPTING OFFICER
CHIEF ENGINEER, MILITARY ENGINEER SERVICES
OF JALANDHAR ZONE, JALANDHAR CANTT- 144005
(FOR AND ON BEHALF THE PRESIDENT OF INDIA)

SPECIAL CONDITIONS**1. GENERAL**

The following Special Conditions shall be read in conjunction with the General Conditions of Contracts, IAFW-2249 and IAFW-2159 including errata/ amendments thereto. If any provision in these special conditions is at variance with that of the aforesaid documents, the former shall be deemed to take precedence there over.

2. INSPECTION OF SITE BY CONTRACTOR & RESPONSIBILITY TO ASCERTAIN HIS OWN INFORMATION

(a) The tenderers are advised to contact the Garrison Engineer for the purpose of inspection of site(s) and relevant documents other than those sent herewith, who will give reasonable facilities for this purpose. The tenderers shall also make themselves familiar with working conditions, accessibility of site(s), availability of materials and other cogent conditions, which may affect the entire completion of work under this contract.

(b) The tenderers shall be deemed to have inspected the site(s) and made themselves familiar with the working conditions, whether they actually inspect the site (s) or not.

3. EMPLOYMENT OF PERSONEL, SECURITY AND PASSES

3.1 Refer Condition 25 of IAFW-2249. The contractor shall employ only Indian Nationals as his representatives, servants and workmen after verifying their antecedents and loyalty. He shall ensure that no person of doubtful antecedents and nationality is, in any way, associated with work. If for reasons of technical collaboration or other consideration, the employment of any foreign national(s) is unavoidable, the contractor shall furnish full particulars to this effect to the Accepting Officer at the time of submission of his tender. As a proof that the contractor has employed only Indian Nationals he shall render a certificate to GE within one month from the date of acceptance of tender to this effect. In case the GE desires, contractor will have the police verification done of the personnel employed by him.

3.2 The GE shall have full powers and without giving any reasons to order the contractor immediately to cease to employ, in connection with his contract, any agent, servant or employee whose continued employment is, in his opinion undesirable. The contractor shall not be allowed any compensation on this account.

3.3 Contractor's attention is drawn to condition 25 of IAFW-2249 in this connection.

4. CONDITIONS FOR WORKING: ALL WORKS LIE IN UNRESTRICTED AREA

(a) The contractor, his agents, servants, workmen and vehicles may pass through the unit lines in which case the Engineer-in-Charge shall, at his discretion, has the right to issue passes, control their admission to the site of work or any part thereof. The contractor shall on demand by the Engineer-in-Charge submit a list of personnel, etc. concerned and other information called for by the Engineer-in-Charge and shall satisfy the Engineer-in-Charge as to the bonafides of such people. Passes shall be returned at any time on demand by the Engineer-in-Charge and in any case on completion of work.

(b) The contractor and his work people shall observe all the rules promulgated from time to time by the authority controlling the area where the work is to be carried out e.g. prohibition of smoking, keeping to specified routes, etc. Any person found violating the security rules laid down by the authority, shall be immediately expelled from the area without assigning any reasons whatsoever and the contractor shall have no claim on this account. Nothing shall be admissible for any man-hours lost on this account.

5. MINIMUM WAGES PAYABLE

5.1 Refer Condition 58 of IAFW-2249. The contractor shall not pay wages lower than minimum wages for labour as fixed by the Govt. of India/ State Govt./ Union Territory, whichever is higher.

5.2 Contractor's attention is also drawn amongst other things to the explanation to the Schedule of minimum wages referred to above.

5.3 The fair wage referred to in condition 58 of IAFW-2249 will be deemed to be the same as the minimum wages payable as referred to above as upto date from time to time.

5.4 Schedule of minimum wages are not enclosed alongwith tender documents. However contractor shall be deemed to have verified the minimum fair wages payable as on the last due date of receipt of tender.

5.5 The contractor shall have no claim whatsoever, if on account of local factors and or regulations, he is required to pay the wages in excess of minimum wages as described above during the execution of work.

5.6 Contractor shall follow compliance as per Specific Conditions of Contract - GRIHA RATING SYSTEM, Section 7: Construction Worker Health, Safety, and Well-being, when providing labour hutment and safety provisions.

SPECIAL CONDITION (Contd..../-)**6. FACILITY TO CONTRACTORS (QUARRIES ON DEFENCE LAND)**

Reference Condition 14 of General Conditions of Contracts (IAFW-2249). No quarries on Defence land are available.

7. LAND FOR TEMPORARY WORKSHOPS, STORES ETC. (REFERENCE CONDITION 24 OF GENERAL CONDITIONS OF CONTRACTS (IAFW-2249))

(a) The contractor shall be permitted to store his materials including erection of temporary sheds for stores and workshops with chowkidar at the area decided by the GE in consultation with the user. The contractor shall pay licence fee of Rupee one per year or part thereof in respect of each and every separate area of land allotted to him.

(b) The Contractor shall be not be permitted to erect his labour camp and the like on the Defence land. He shall make his own arrangement for this purpose outside the Defence land.

8. WATER:

8.1 Water will not be supplied by the MES. The tenderers are advised to visit the site of works to ascertain availability of water from civil sources or from nearby natural sources outside ministry of defence land. The contractor shall be allowed, if he so desires, to install hand pumps, tube wells at site of work at places as approved by Engineer-in-Charge and nothing shall be charged from the contractor. The contractor shall remove the hand pumps, tube wells as and when asked to do so by Engineer-in-Charge/ GE after plugging the base holes. and in any case on completion of the work and before issue of completion certificate, unless GE desires that these hand pumps, tube wells be left in position and the contractor agrees to do so without claiming cost thereof from department. No compensation whatsoever shall be admissible to the contractor, if he is required to remove the pump(s) tube well before completion of work. Use of water from such sources shall only be permitted, if found after testing, potable and fit for use in the work. The water from such sources shall be got tested by the contractor from laboratory approved by the GE, who shall after satisfying himself permit the contractor to use the water from such sources. Testing charges shall be borne by the contractor.

9. CO-ORDINATION WITH OTHER AGENCIES

The contractor shall permit free access and afford normal facilities and usual conveniences to other agencies or departmental workmen to carryout connected works of services under separate arrangements. The contractor will not be allowed any extra payment on this account.

10. **ELECTRIC SUPPLY:** Electric supply will be provided by the MES.

Conditions for providing electric supply by the MES:

In case the contractor desires to buy electricity from the MES. The contractor will be charged for the electric energy consumed for execution of works at the following rates: -

(a) At Rs. 11.92 per unit for lighting

(b) At Rs. 11.92 per unit for power.

10.1 Electric supply required for the works up to max **05 KVA** shall be made available by the MES at the incoming terminal of the main switch marked on the site plan. The exact location of the electric point, if not marked will be shown by the GE. The main switch and KWh meters to register the electric energy supplied shall be provided and installed by the MES. The contractor shall provide all necessary cables, fittings etc. from the main switch in order to ensure a proper and suitable supply of electricity for execution of work

10.2 The MES do not guarantee continuity of supply and no compensation whatsoever shall be allowed for supply becoming intermittent or for breakdown in the system.

10.3 GE or his representative shall be free to inspect all the power consuming devices or any electric lines provided by the contractor. Any devices or electric lines provided by the contractor, which are not to the satisfaction of the GE, shall be disconnected from the supply, if so directed by him.

11. NET WORK ANALYSIS

11.1 The time and progress chart to be prepared as per condition 11 of General Conditions of Contracts (IAFW-2249) shall consist of detailed network analysis and a time schedule using Project Management Software like MS Projects/ Primavera. The critical path network will be drawn jointly by the GE and the contractor soon after acceptance of tender. The time scheduling of the activities will be done by the contractor so as to finish the work within the stipulated time. On completion of the time schedule a firm calendar date Schedule will be prepared and submitted by the contractor to the GE who will approve it after due scrutiny. The schedule will be submitted in four copies within two weeks from the date of handing over the site.

11.2 During the currency of the work, the contractor is expected to adhere to the time schedule and this adherence will be part of his performance under the contract. During the execution of the work, the contractor is expected to participate in the reviews and updating of the network undertaken by the GE. These reviews may be undertaken at the discretion of the GE, either as a periodical appraisal measure or when the quantum of work ordered on the contractor is substantially changed through

SPECIAL CONDITION (Contd..../-)

deviation orders or amendments. Any revision of the time schedule as a result of the review will be submitted by the contractor to the GE within a week for his approval after due scrutiny.

- 11.3 The contractor will adhere to the revised time schedule thereafter. In case of contractor disagreeing with revised schedule, the same will be referred to the Accepting Officer, whose decision shall be final, conclusive and binding. GE's approval to the revised schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time. Extension of time shall be considered and decided by the appropriate authority mentioned in condition 11 of IAFW-2249 and separately regulated.
- 11.4 Contractor shall mobilize and employ sufficient resources to achieve the detailed schedule within the broad framework of the accepted method of working and safety.
- 11.5 No additional payment will be made to contractor for any multiple shift work or other intensive methods contemplated by him in his schedule, even though the time schedule is approved by the department.

12. MATERIALS AND SAMPLES

- 12.1 Refer condition 10 of IAFW-2249.
- 12.2 The materials and articles, which have been specified from certain makers/manufactures, shall be of makes/manufacturers as specified. If the manufacturer specified in tender documents makes both ISI marked and conforming to ISI, the materials/articles shall be provided only of ISI marked.
- 12.3 The materials and articles, which have not been specified in tender documents by makes/manufactures shall be as under: -
- (i) If ISI marked materials are being manufactured the same shall be ISI marked. For list of ISI marked manufactures refer website of BIS i.e www.bis.org.in.
- (ii) If ISI marked materials are not being manufactured the same shall be confirming to IS specifications.
- 12.4 Materials of local origin shall be as specified and conforming to samples kept in GE's office. The tenderer is advised to inspect sample of materials, which are displayed in the office of GE, before submitting his tender. The tenderer shall be deemed to have inspected the samples and satisfied himself as to the nature and quality of materials, he is required to incorporate in the work irrespective of whether he has actually inspected them or not.
- 12.5 The contractor shall not procure materials and articles unless the samples are first got approved by GE.

13. TESTING OF MATERIALS:-

- A LEVELS TESTS FOR WORKS COSTING 100 LAKHS AND ABOVE:-** The contractor shall set up site laboratory for testing of materials (except Sch 'B' materials) for 'A' level tests as listed in Appendix 'D' to PS II here in after. The contractor shall arrange all equipment/ machines for the tests specified in Appendix 'D' to PS II here in after as 'A' level tests at his own cost with prior approval of CE. This cost shall be included in the lump-sum costs quoted by the contractor. The contractor shall employ a competent technical representative as approved by the GE for the purpose of testing and all such tests shall be carried out in the presence of Engineer-in-charge. The successful tests result thereof shall be recorded and signed jointly by the contractor and the Engineer-in-charge. Charges for these tests i.e. 'A' level tests carried out in site laboratory of the contractor shall not be recovered. In case, the contractor has not set up the site laboratory and the test are carried out in zonal or any other laboratory setup/ approved by GE, the recovery shall be made at rates applicable i.e. as given in Appendix 'D' to Particular Specifications Section-II here-in-after.
- 13.2 **'A' LEVEL TESTS FOR WORKS COSTING UPTO 100 LAKHS:-** The contractor may set up site laboratory at his option for works costing upto 100 lakhs. The other stipulations will be same as specified in preceding para 13.1. However in case the contractor has not set up the site laboratory and tests are carried out in zonal or any other laboratory approved/ setup by the GE, the recovery shall be made at rates applicable i.e as given in Appendix 'D' to PS-II here in after.
- 13.3 The recoveries on account of testing charges wherever applicable shall be effected from the running account payments due to the contractor payable after completion of the respective tests or whenever the test is due whichever is earlier.
14. **PRE-CONSTRUCTION ANTI TERMITE TREATMENT:** Please refer clause 3 of Particular Specifications Section-II. The contractor's particular attention is invited to "Guarantee" and "Security Deposit" provision
15. Blank
16. **PERIOD FOR KEEPING THE OFFER OF TENDER OPEN**

The tender shall remain open for acceptance for a period of **60 (Sixty)** days from the bid submission end date commencing from the date next to bid submission end date.

SPECIAL CONDITION (Contd..../-)

17. **ADVANCE ON ACCOUNT AGAINST MATERIALS WHICH DOES NOT LOSE IDENTITY (APPLICABLE ONLY FOR CONTRACTS EXCEEDING RS 50 LAKHS)**
- 17.1 **Condition 64 Of IAFW-2249 Advances On Account:** - Add the following in continuation of para 8 "Provided further, the contractor may be paid advance on account of the full value of the under mentioned materials only, brought on the site, on his furnishing guarantee Bond(s) from a Schedule Bank for the amount of retention money which should otherwise be recoverable from him under the contract:-
- (a) Factory made steel windows.
 - (b) Iron Mongery.
 - (c) Electrical Cables/ wires/ fittings/ fixture.
 - (d) All other non-perishable materials as decided by GE.
- 17.2 Bank Guarantee bonds shall be executed for a period on the form appended as Annexure- I to these special conditions. The contractor shall further arrange to extend the period of Guarantee Bond(s) if and when necessary as directed by the Accepting Officer on a format appended as Annexure-II to these special conditions or shall furnish fresh guarantee bond(s) of similar value in lieu. It will be noted that advance on account to the full value of materials brought on the site is permissible only in respect of fittings and fixtures and other manufactured items which do not lose their identity. Materials like bricks, aggregate, pre-cast concrete and similar items shall not be taken in the list.
- 17.3 **Procedure for Acceptance of Bank Guarantee Bond(s) in Lieu of security deposit / retention money**
- (a) Bank guarantee bonds will be sent by the manager of the banks under registered post to the Accepting Officer of the contract under the covering letter has been endorsed to their superior office.
 - (b) A Guarantee Bond received as mentioned above may be accepted by the competent authority if found otherwise in order. The office receiving the bond from the bank will acknowledge the same to the Bank concerned and enclose a certificate or a Photostat copy of the Bond for their record. A copy of this letter alongwith a copy of the bond will also be endorsed to the superior office of the bank as aforesaid for their information and record. Both the above communications to the banks shall be sent under registered post.
 - (c) The above instructions will also be applicable to extension of validity to Bank Guarantee Bonds.
18. **BLANK**
19. **OFFICIAL SECRETS ACT**
Contractor shall be bound by the Official Secrets Act-1923.
20. **SECURITY OF CLASSIFIED DOCUMENTS**
Contractor's special attention is drawn to conditions 2-A and 3 of General Conditions of Contracts (IAFW-2249). The contractor shall not communicate any classified information regarding works either to sub - contractors or others without prior approval of the Engineer-in-Charge. The contractor shall also not make copies of the design/ drawings and other documents furnished to him in respect of works, and shall return all documents on completion of the works or earlier on determination of the Contract. The contractor shall along-with the final bill, attach a receipt of his having returned the classified documents as per condition 3 of General Conditions of Contracts (IAFW-2249).
21. **RECORD OF MATERIALS AND PURCHASE VOUCHERS**
- 21.1 The quantity of materials such as cement, steel, paints, water proofing compound, chemicals for anti-termite treatment and the like, as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in the works), shall be recorded in measurement books and signed by the contractor and the Engineer-in-Charge as a check to ensure that the required quantity has been brought to site for incorporation in the work.
- 21.2 Materials brought to site shall be stored as directed by the Engineer-in-Charge and those already recorded in measurement book shall be suitably marked for identification.
- 21.3 Contractor shall produce vouchers/ invoices from the manufacturers and/ or their authorized agents for the full quantity of the following materials, as applicable as a pre-requisite before submitting claims for payment for advances on account of the work done and/or materials collected in accordance with Condition 64 of General Conditions of Contracts -IAFW-2249:-
- (a) Water proofing compound.
 - (b) Chemicals for anti-termite treatment.
 - (c) Paints, distempers and cement base paint and like.
 - (d) Cast/DI iron pipes and fittings.
 - (e) Sanitary fittings.

SPECIAL CONDITION (Contd..../-)

- (f) Steel windows/ ventilators/ Aluminium doors/ Windows.
- (g) Factory made door shutters/ PVC frames/ PVC doors.
- (h) Floor/ Wall tiles.
- (i) Iron Mongery
- (j) Tarfelt/ bituminous products/ admixtures/ plasticizers/ APP membrane.
- (k) Salt glazed stone ware pipes
- (l) Electrical and Water Supply fittings/ fixtures where names of manufacturers/ brands are specified or approved.
- (m) Cables/ wires.
- (n) Cement.
- (o) Steel/ structural steel.
- (p) HDPE water tanks.
- (q) GI sheets.
- (r) CI sluice valves, GI pipes, butterfly valves, XLPE cables, air break switch, pre-stressed concrete poles, transformers, fire alarm/ sierenes, MCB's, flame proof light fittings, MS casing pipes, low carbon galvanised strainers, submersible cables, submersible pump sets, DI pipes & fittings, LT panels, MCCB's, voltmeters, ammeters, change over switches, DG set with accessories/ fittings, LT feeder pillar boxes, automatic power factor control panels, aviation obstruction lights, EOT cranes, ISMB/ ISMC and all other materials as applicable as per CA.

21.4 The contractor shall on demand produce to the GE; original receipted vouchers/ invoices in respect of the supplies. The vouchers/ invoices shall be defaced and stamped by Engineer-in-Charge indicating contract number, name of work, under his dated signature. The contractor shall ensure that the materials are brought to site, in original sealed containers/ packing, bearing manufacturer's marking except in the case of the requirement of material(s) being less than smallest packing.

21.5 The vouchers/ invoice will clearly indicate the contract number and IS No., specific alternative to which the material conforms in case of various alternative in IS.

22. **CONTRACTOR'S TOOLS & PLANTS AND MACHINERY**

22.1 **LIST OF MINIMUM TOOLS & PLANTS AND MACHINERY REQUIRED TO BE DEPLOYED AT SITE BY THE CONTRACTOR**

Ser No	Description	Quantity	Remarks
(a)	Vibrators (needle type and plate type)	6 Nos	
(b)	Tower/ builder's hoist	1 No	
(c)	Steel shuttering with spans, props etc.	2000 Sqm	
(d)	Trucks/ Tippers	1 No	
(e)	DG Sets 5/10 KVA	1 No	
(f)	Total Stations	1 No	
(g)	Concrete cube testing machine (Hydraulically operated)	1 No	
(h)	Concrete Pumps	2 Nos	
(i)	Fully automatic concrete batching plant	01 No	
(j)	Concrete mobile weigh batchers	2 Nos	
(k)	Transit Mixer	02 Nos	
(l)	Cranes	1 No	
(m)	Excavators (Power Shovels/ draglines)	1 No	
(n)	Bull dozers	1 No	
(o)	Road Rollers	1 No	
(p)	Drilling machines	1 No	
(q)	Steel/ Aluminum ladders 1.5m. to 8m.	4 Nos	
(r)	Chase cutting machines	2 Nos	
(s)	Torque wrench for nuts/ bolts/ screws	2 Nos	
(t)	Primary and secondary injection equipment	2 Nos	
(u)	Dielectric strength testing equipment	2 Nos	
(v)	Magnetic dial indicator for alignment	2 Nos	
(w)	Conduit die set	2 Nos	
(x)	Pipe vice	2 Nos	
(y)	Bench vice	2 Nos	
(z)	LT Meggar 500 volts	2 Nos	
(aa)	HT Meggar 5000 volts	2 Nos	
(bb)	Tong tester	2 Nos	
(cc)	Hydraulically operated & hand operated crimping machines	2 Nos	

SPECIAL CONDITION (Contd..../-)

(dd)	Earth tester	2 Nos	
(ee)	Portable drilling machines	2 Nos	
(ff)	Overhead conductor pullar	2 Nos	
(gg)	Test bench for light fittings	2 Nos	
(hh)	Cable fault location meggar	2 Nos	
(ii)	Oil testing set	2 Nos	
(jj)	Multi-meter	2 Nos	

22.2 The contractor shall be required to deploy minimum Tools & Plants and Machinery for smooth progress of the work as per time and progress chart (CPM). In case additional Tools & Plants and Machinery over and above as given in **Clause 22.1 here-in-before** is required, the same shall be deployed by the contractor without any extra cost to the Govt. These items can either be in owned or hired by the contractor. The contractor will be at liberty to remove these items from site after obtaining written approval of GE as per condition 34 of IAFW-2249.

22.3 No claim or compensation for idling charges of any of the tools & plants and machinery etc as given in **Para-22.1 here-in-before** shall be payable to the contractor. The contract quoted lump sum is deemed to include the cost of the tools & plants and machinery etc as given in **clause 22.1 here-in-before** and nothing extra shall be payable on this account for any reason whatsoever.

22.4 **DAILY RETURNS TOOLS & PLANTS, MACHINERY AND TRANSPORT DEPLOYED AT SITE**

(a) The contractor shall furnish to the Engineer-in-Charge every morning distribution return of his plants/equipments on the site of work stating the following particulars:-

- (i) Particulars of plants/ equipments, their make, manufacturers Model No if any, Registration No if any, capacity, year of manufacture and year of purchase etc.
- (ii) Total No (Quantity) on site of work.
- (iii) Location, indicating No., (quantity) at each location on the site of work.
- (iv) Purchase value on the date of purchase. For the purpose of this condition, plant/ equipment, vehicle No., i.e. of trucks and lorries but neither the workman's tools or any manually operated tools/equipment shall be given. Engineer-in-Charge shall record the particulars supplied by the contractor in the works diary and send the return to the GE for record in his office.

(b) **Loss Or Damages on account of Enemy Action**

If as a result of enemy action, the Contractor suffers any loss or damage, the Government shall reimburse to the Contractor such loss or damage to the extent and in the manner hereinafter provided:-

- (i) The loss suffered by him on account of any damage or destruction of his plant/ equipment (as defined in special condition (a) above) or materials or any part or parts thereof. (The amount of loss assessed by the Accepting Officer of the Contract or the CWE in case of contracts accepted by GE, on this account shall be final and binding).
- (ii) The compensation paid by him under any law for the time being in force to any workman employed by him for any injury caused to him or to the workman's legal successors for loss of the workman's life.
- (iii) Payment of compensation for loss or damage to any work or part of work carried out (The amount of compensation shall be determined in accordance with condition 48 of General Conditions of Contracts IAFW-2249).
- (iv) No reimbursement shall be made nor shall any compensation be payable under the above provision unless the contractor had taken air defence precautions ordered in writing by the GE/ OC concerned or in the absence of such orders, reasonable precautions. No reimbursement shall be payable nor shall any compensation be payable for any plant/ equipment or materials not lying on site of work at the time of enemy action.

(c) The contractor must ensure that all Tools & Plants, Machinery and Transport deployed at site are entered in the Work's Diary and signed by Engineer-in Charge and contractor.

23. **PERFORMANCE SECURITY DEPOSIT**

23.1 Refer Conditions 19 of IAFW-2249. The contractor has to deposit performance security for this contract as per condition 19 of IAFW-2249 as notified by the Accepting Officer.

23.2 Performance security by the successful contractor. shall be given in the form of Bank Guarantee Bonds or Govt Securities or FDR in terms of Condition-19.1 of IAFW-2249. No other form of performance security will be accepted.

SPECIAL CONDITION (Contd..../-)

23.3 The full amount of Performance security for the contract shall be given by contractor in any one of the forms stipulated in Clause- 23.2 here-in-before. Mix of performance security for the contracts shall not be allowed.

23.4 Performance security will be released in accordance with Condition-68 of IAFW-2249.

24. **CLEANING DOWN (Refer Condition 49 of IAFW-2249, General Conditions of Contracts)**

The contractor shall clean all floors, walls, remove cement/ lime/ paint marks/ drops, etc., clean the joinery, glass panes etc., touch up all paint work and carryout all other necessary items of work in connection therewith and leave the whole premises clean and tidy to the entire satisfaction of Engineer-in-Charge before handing over the items/works. No extra payment shall be admissible to the contractor for this operation.

25. **WATCH/LIGHTING**

The Contractor shall at his own cost take all possible precautions to ensure safety of life and property by providing necessary fencing, barrier, light, watchmen etc., during the progress of work and as directed by the Engineer-in-Charge.

26. **RE-IMBURSEMENT/ REFUND ON VARIATION IN "TAXES DIRECTLY RELATED TO CONTRACT VALUE:-**

(a) Rates quoted against all items shall be deemed to include all taxes, **Goods & Services Tax** (CGST, IGST & SGST) on works contracts, levies, duties, Octroi, entry tax, labour welfare cess and shall also include all other local taxes as levied by the State Government, local bodies payable under respective statutes etc directly related to contract value, employees provident fund as EPF & MP Act 1952 and all taxes applicable to contracts. No reimbursement/ refund for variation in rates of taxes, duties, royalties, octroi & other levies and/ or imposition/abolition of any new/ existing taxes, duties, royalties, octroi & other levies shall be made except as provided in sub para (b) here-in-below.

(b) (i) The taxes which are levied by Govt. at certain percentage rates of Contract Sum/ Amount shall be termed as "taxes directly related to Contract value" such as **Goods & Services Tax** (CGST, IGST & SGST) as applicable, Turnover Tax, Labour Welfare Cess/Tax and like but excluding Income Tax. The tendered rates shall be deemed to be inclusive of all "taxes directly related to Contract value" with existing percentage rates as prevailing on bid submission end date. Any increase in percentage rates of "taxes directly related to Contract value" with reference to prevailing rates on bid submission end date shall be reimbursed to the Contractor and any decrease in percentage rates of "taxes directly related to Contract value" with reference to prevailing rates on bid submission end date shall be refunded by the Contractor to the Govt./ deducted by the Govt from any payments due to the Contractor. Similarly imposition of any new "taxes directly related to Contract value" after the bid submission end date shall be reimbursed to the Contractor and abolition of any "taxes directly related to Contract value" prevailing on bid submission end date shall be refunded by the Contractor to the Govt./ deducted by the Govt. from the payments due to the Contractor.

(ii) The Contractor shall, within a reasonable time of his becoming aware of variation in percentage rates and/or imposition of any further "taxes directly related to Contract value", give written notice thereof to the GE stating that the same is given pursuant to this Special Condition, together with all information relating there to which he may be in a position to supply. Contractor shall submit the other documentary proof/ information as the GE may require.

(iii) The Contractor shall, for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly authorized representative of Govt, and shall further, at the request of the GE furnish, verified in such a manner as the GE may require, any documents so kept and such other information as the GE may require.

(iv) Reimbursement for increase in percentage rates/imposition of "taxes directly related to Contract value" shall be made only if the Contractor necessarily & properly pays additional "taxes directly related to Contract value" to the Govt, without getting the same adjusted against any other tax liability or without getting the same refunded from the concerned Govt Authority and submits documentary proof for the same as the GE may require.

26A. **DEFECT LIABILITY PERIOD:** Refer Condition-46 of IAFW-2249 (General Condition of Contracts). Defect liability period shall be Twenty four calendar months after the works have been handed over to Government.

27. **CONCILIATION UNDER ARBITRATION AND CONCILIATION ACT-1996 AS AMENDED BY ARBITRATION AND CONCILIATION (AMENDMENT) ACT 2015**

27.1 **SCOPE OF CONCILIATION**

SPECIAL CONDITION (Contd..../-)

The scope of conciliation shall be restricted to the following types of disputes with financial limits as indicated therein:-

- 27.1.1 Disputes relating to levy of compensation for delay in completion-actual amount of compensation.
- 27.1.2 Disputes relating to technical examination of works.
- 27.1.3 Disputes relating to interpretation of the provisions of the contract with reference to their application to parties.
- 27.1.4 Disputes relating to non-return of Schedule 'B' stores over issued to contractor.
- 27.1.5 Any other dispute having fair chances of being resolved by conciliation and considered fit to be referred to conciliation by the parties.
- 27.1.6 For Clause 27.1.2 to 27.1.5 each as stated above the financial limit shall be Rupees two lakhs or one percent of the contract amount whichever less is.

27.2 COMMENCEMENT OF CONCILIATION PROCEEDINGS

- 27.2.1 The party initiating conciliation shall send to the other party a written invitation to conciliate, briefly identifying the subject of the dispute.
- 27.2.2 Conciliation proceedings shall commence when the other party accepts in writing the invitation to conciliate.
- 27.2.3 If the other party rejects the invitation, there will be no conciliation proceedings. If the party initiating conciliation does not receive a reply within 30 days from the date on which he sends or within such other periods of time as specified in the invitation, he may elect to treat this as a rejection of the invitation to conciliate and if he so elects, he shall inform in writing the other party accordingly.

27.3 **NUMBER OF CONCILIATORS** : There shall be a Sole conciliator.

27.4 **APPOINTMENT OF CONCILIATOR** : All disputes brought out in clause 27.1.1 to 27.1.5 above shall be referred to the sole Conciliator viz Serving Officer not below the rank of Superintending Engineer/ Superintending Engineer (QS&C) having degree in Engineering or equivalent or having passed final/ direct final examination of Sub division-II of Institution of Surveyors (India) to be appointed by the Engineer-in-Chief, Army Headquarter, New Delhi or in his absence the Officer officiating as Engineer-in-Chief or Director General of works specifically delegated by the Engineer-in-Chief in writing.

27.5 **STATUS AND EFFECT OF SETTLEMENT AGREEMENT** : The settlement agreement signed by the parties as a result of conciliation proceedings shall have the same status and effect as it is an arbitral award on agreed terms.

28 **Blank.**

29 **Blank.**

30. **CURING AND STRIKING OFF FORM WORK** :The following specifications with regard to curing and striking off formwork will be adopted in case of various type of cement issued:-

A	Curing period for structural RCC/PCC Work/Plastering/ pointing/brick work etc for ordinary Portland cement.	:	As per IS 456 of 2000
B	Form work (Striking period) for ordinary Portland cement	:	As per IS 456 - 2000.
C	REMOVAL OF PROPS TO SLABS		
	(a) Spanning up to 4.5 metre	:	9 days
	(b) Spanning over 4.5 metre	:	16 days
	(c) Spanning over 6 metre	:	23 days
D	REMOVAL OF PROPS TO BEAMS AND ARCHES		
	Spanning up to 6 metre	:	16 days
	Spanning over 6 metre	:	23 days

31. **QUALIFIED TRADESMEN (APPLICABLE FOR WORKS COSTING RUPEES ONE CRORE OR MORE)**

In compliance with the Condition 26 of IAFW-2249 (General Conditions of Contracts), the contractor shall employ skilled/semi skilled tradesmen who are qualified and possessing certificate in particular trade from Industrial Training Institute (ITI)/National Institute of Construction Management and Research (NICMAR)/ National Academy of Construction (NAC) Hyderabad/ Construction Industry Development Council (CIDC)/Similar reputed and recognized institutes by State/Central Government to execute the works of their respective trade. The number of such qualified tradesmen shall not be less than 25% of total skilled/semi skilled tradesmen required in each trade. The contractor shall submit the list of such tradesmen alongwith requisite certificates to Garrison Engineer for verification and approval. Notwithstanding the approval of such tradesmen by GE, if the tradesmen are found to have inadequate skill to execute the work of their trades,

SPECIAL CONDITION (Contd..../-)

leading to un-satisfactory workmanship, the contractor shall remove such tradesmen within a week after written notice to this effect by the GE and shall engage other qualified tradesmen after prior approval of GE. GE's decision whether a particular tradesman possesses requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

31A EMPLOYMENT OF ENGINEER FOR SUPERVISION OF WORKS

31A.1 The contractor shall employ following qualified engineers at his own expenses to supervisor the work and to received instruction from the Engineer-in-Charge :-

(a) **One (01) Graduate Engineers** from a Govt. recognized institution with minimum experience of Four (04) years.

And

Two (02) Diploma Engineers from Govt. recognized institution with minimum experience of Six (06) years.

Note : The requirement as per Condition-25 of IAFW-2249 shall be strictly followed except the number of engineers as given here-in-before.

32. LABOUR REGULATION AND ABOLITION ACT

Contract labour (Regulation and Abolition) Act 1970 is applicable to MES contracts. Rates quoted by the contractor shall be deemed to take into account the cost etc, required to comply with the provisions contained in the said act and the rules framed under the said act.

33. OUT OF POCKET EXPENSES

No out of pocket expenses incurred by the tenderer in submitting this tender will be reimbursed whether his tender is accepted or not.

34. DAMAGE TO EXISTING STRUCTURES, ROADS AND DRAINS ETC

Any damage to the existing structure/and existing roads etc during the execution of work shall be made good by the contractor at his own expense. Rectification/replacement, making good and touching up etc. shall be carried out, conforming to the materials and workmanship originally provided and to the satisfaction of the Engineer-in-Charge. In case of any dispute on this account, the matter shall be referred to the GE whose decision shall be final, binding and conclusive.

35. CONDITIONS OF CONTRACT AND EXECUTION OF WORK

The material and workmanship shall satisfy the job specifications contained in latest relevant Indian Standard Codes as applicable as on the date of issue of tender by the accepting Officer where the job specifications stipulate requirement in addition to those contained in the Indian standard Codes of practice, these additional requirements shall also be satisfied by the contractor.

36. INDEMNITY BOND FOR PAYMENT OF LABOUR, WORKMEN EMPLOYED ON WORKS OR OTHER MONEYS OF TENDER PAYMENTS

The contractor shall execute indemnity bond with the GE for enforcement of various enactments like wages Act 1936, Minimum wages Act 1948, employees liability Act 1938 workmen's compensation Act 1923 or any other Act or enactment's related to indirectly and directly labour employed on works and rules framed there under from time to time for the time being enforce. In case of non compliance of any of the enactment's by the contractor, the GE shall be empowered to exercise the powers vested in him as the principal employer and the amount so not paid to the labour/workman to be deducted from the sum become due under this Contract or from other Contracts in terms of condition 67 of IAFW-2249, General Condition of Contracts.

37. HANDING OVER SITES

Site for execution of work will be available as soon as the work is awarded. In case it is not possible to make the entire site available on the award of work the contractor will have to arrange his working programme accordingly. No claim whatsoever, for not giving entire site on award of work and for giving site gradually, will be tenable.

38. APPROACHES

The Contractor shall make arrangements for and provide at his own cost all temporary approaches, if required to the site(s), after obtaining approval in writing of the GE to the layout of such approaches.

39. LOCATION OF BUILDINGS AND WORKS

There may be some changes in location/sitting of building shown in site (Layout) plan(s) to suit local conditions and/or departmental requirements. The contractor shall have no claim whatsoever consequent to such changes in the location/ sitting of works.

40. OUTPUT OF ROAD ROLLER (REFER CONDITION 15 OF IAFW - 2249)

40.1 Where road roller(s) is/ are hired by the Department to contractors a logbook for each shall be maintained by the Department for recording hours of working of the road roller. In case, however, when the contractor procures road rollers from sources other than the Department a log book for

SPECIAL CONDITION (Contd..../-)

each road roller shall be maintained by him for recording hours of working of the road roller. Entries in the log book shall be signed by the Contractor or his authorised representative and by the Engineer-in-Charge.

- 40.2 To ensure proper consolidation, roller must work for at least the number of days assessed, on the basis of output given here-in-after. If the roller has not worked for the number of days so assessed, recovery shall be effected from the contractor for the number of days falling short of the days assessed on the basis of output stipulated. The recovery shall be affected where road roller is hired by the contractor only from sources other than the Department at a rate of Rs. 1800/- per working day of 8 hours.
- 40.3 The above provision shall not, however, absolve the contractor of his responsibility of properly consolidating surfaces as required under the provisions of the contract.
- 40.4 Output of Road Roller per day of Eight hours.

(i)	Consolidation of formation Surfaces/ sub-grade.	:	1850 Sqm
(ii)	Consolidation of stone soling 23cm thick (spread thickness) with 8 to 10 tonne roller.	:	518 Sqm
(iii)	Consolidation of stone soling 15cm thick (spread thickness) with 8 to 10 tonne roller.	:	800 Sqm
(iv)	Consolidation of water-bound macadam (stone metal) 11 cm spread thickness including spreading and consolidation with binding material	:	248 Sqm
(v)	Consolidation of water-bound macadam (stone metal) 7.5cm consolidated thickness including spreading and consolidation with binding material	:	372 Sqm
(vi)	Consolidation of Mix Seal or premixed carpet including seal coat 20 mm thick	:	744 Sqm
(vii)	Consolidation of Mix Seal or premixed carpet including seal coat 25mm thick.	:	600 Sqm
(viii)	Consolidation of Mix Seal or premixed carpet including seal coat 30mm thick.	:	500 Sqm
(ix)	Consolidation of single coat surface dressing	:	774 Sqm
(x)	Ditto two coat surface dressing	:	558 Sqm
(xi)	Consolidation of semi dense/dense asphaltic bituminous concrete, consolidated thickness 4cm.	:	372 Sqm

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43. **Bank Guarantee Bond (BGB)**

- 43.1 The contractor may submitted bank guarantee bond (BGB) in lieu of retention money in terms of Condition- 64 of IAFW 2249 as per format given in Annexure-I. The BGB shall be submitted upto original date of **completion of work** as applicable. In case date of completion is extended in terms of Condition- 11 of IAFW-2249, the contractor will be required to extend the BGB upto extended date of completion as per format given in Annexure-II. Contractor will be required to further extend the BGB upto payment of final bill on account of retention money for amount of Rs 1.5 lakhs or 1% of contract amount as executed whichever is more in case amount available in the final bill is not sufficient. For details provision given in Condition-64 of IAFW- 2249 shall be referred.
- 43.2 The contractor may submit bank guarantee bond (BGB) in lieu of performance security in terms of Condition- 19 of IAFW 2249 as per format given in Annexure-III. The BGB shall be submitted upto and including the scheduled date of expiry of defects liability period of two years. In case date of completion is extended in terms of Condition- 11 of IAFW-2249, the contractor will be required to extend the BGB upto two years after extended date of completion as per format given in Annexure-IV. The BGB shall be extended before the date of expiry of validity. If the contractor fails to do so, the BGB will be en-cashed before expiry. The BGB will be released as stipulated in Condition-68 of IAFW- 2249 provided that no recovery is outstanding against the contractor.
- 43.3 The BGB shall be issued by Nationalized/Scheduled Indian Bank but its confirmation will be done by the Accepting Officer only from the Head office of the Bank.

44. **REIMBURSEMENT/REFUND ON VARIATION IN PRICES FOR SCH 'A' PART-I TO XVI & BOQ(PHASE-I ONLY)**

Refer condition 63 of the General Conditions of Contracts (IAFW-2249)/ Re-imbusement/Refund on variation of Prices. The condition 63 of General Conditions of Contract shall be deemed to be modified to the extend mentioned hereinafter.

- 44.1 Increase or decrease in prices of Cement, Steel and other materials shall be adjusted on the basis stipulated hereinafter irrespective of the actual variation in prices (to the contractor).

SPECIAL CONDITION (Contd..../-)

44.2 (a) **Cement:** The cement cost component for the contract as a whole shall be taken as Kc% of value of works executed under the contract. Accordingly value/cost of cement consumed in the work as well as that laying at site for which reimbursement/refund is applicable shall be:-

$$V_{MC} = \frac{(K_C \times V_g)}{100} + V_C$$

Variation in prices of cement shall be worked out by applying the following formula:

$$EM_C = (V_{MC2} - V_{MC1}) \times \frac{(C_1 - C_0)}{C_0}$$

EM_C = Variation in prices of cement to be adjusted.

K_C = Constant representing the percentage cost of Cement as compared to the value of work under the contract as a whole. The value of K_C for this work shall be **7.00 (Seven Only)**.

V_g = Amount of work done priced at contract rates up to for the last date of the period of reckoning excluding amount payable to the contractor towards items on star rate and PC Sum.

V_C = Cost of all cement lying at site for incorporation in the work excluding cement issued under Schedule 'B' and excluding cement brought and paid or payable to contractor under Price Cost Sum and /or Star Rate(s).

C₁ = Wholesale Price Index for Cement (Base Year 2011-12=100) published by Economic Adviser to the Government of India as on the date of commencement of the period of reckoning. In case the original contract period is extended under condition 11 of General Conditions of Contracts (IAFW-2249), the Price Index as applicable on the date of commencement of the last period of reckoning before the original completion date (s) (phase wise except where phasing has been done only for sample quarter/block) shall only be applicable during the extended period. If phasing has been done for only sample quarter/sample block, the price index as applicable on the date of commencement of the last reckoning period before the original completion date of the project as a whole shall only be applicable during the extended period.

C₀ = Wholesale Price Index of cement (OPC) (Base Year 2011-12=100), published by Economic Adviser to the Government of India as on the last date of bid submission. Generally Indices are published at the end of month. Hence Wholesale Price Index as published at the end of prevailing month in which the date falls, shall be applicable as on the last due date of Bid submission. In case of tenders for specialist works made in two parts viz "T" and "Q", C₀ shall be as on date of opening of "Q" Bid.

VM_{C2} = Amount of cement up to the last date of the period of reckoning for which variation is adjustable as worked out as per formula for V_{MC}.

V_{MC1} = As per V_{MC2} but as on date of immediate preceding period of reckoning.

(b) **Steel** : The steel cost component for the contract as a whole shall be taken as Ks% of the value of works executed under the contract. Accordingly value/cost of steel consumed in the work as well as that laying at site for which reimbursement/ refund is applicable shall be

$$V_{MS} = \frac{(K_S \times V_g)}{100} + V_S$$

Variation in prices of steel shall be worked out by applying the following formula:-

$$EM_S = (V_{MS2} - V_{MS1}) \times \frac{(S_1 - S_0)}{S_0}$$

EM_S = Variation in prices of steel to be adjusted.

K_S = Constant representing the percentage cost of steel as compared to the total value of work under the contract as a whole. The value of K_S for this work shall be **19.00 (Nineteen only)**.

V_g = Amount of work done priced at contract rates up to for the last date of the period of reckoning excluding amount payable to the contractor towards items on star rate and PC Sum

V_S = Cost of all steel lying at site for incorporation in the work excluding steel issued under Schedule 'B' and excluding steel brought and paid or payable to contractor under Prime Cost Sum and /or Star Rate(s).

S₁ = Wholesale Price Index for Mild Steel (Long Products) (Base Year 2011-12=100) published by Economic Adviser to the Government of India as on the date of commencement of the period of reckoning. In case the original contract period is extended under condition 11 of General Conditions of Contracts (IAFW-2249), the Price Index as applicable on the date of commencement of the last period of reckoning before the original completion date (s) (phase wise except where phasing has been done only for sample quarter/block) shall only be applicable during the extended period. If phasing has been done for only sample quarter /sample block, the price index as applicable on the date of commencement of the last reckoning period before the original completion date of the project as a whole shall only be applicable during the extended period.

S₀ = Wholesale Price Index of Mild Steel (Long Products) (Base Year 2011-12=100), published by Economic Adviser to the Government of India as on the last date of bid submission. Generally

SPECIAL CONDITION (Contd..../-)

Indices are published at the end of month. Hence Wholesale Price Index as published at the end of prevailing month in which the date falls, shall be applicable as on the last due date of Bid submission. In case of tenders for specialist works made in two parts viz "T" and "Q", S₀ shall be as on date of opening of "Q" Bid.

V_{MS2} = Amount of steel up to the last date of the period of reckoning for which variation is adjustable as worked out as per formula for V_{MS}.

V_{MS1}= As per V_{MS2} but as on date of immediate preceding period of reckoning.

(c) Other materials (except Cement & Steel): The material cost component except cement & steel for the contract as a whole shall be taken as K_{OM}% of the value of works executed under the contract. Accordingly value/cost of other material (except cement and steel) consumed in the work as well as that laying at site for which reimbursement is applicable shall be:

$$V_M = \left(\frac{K_{OM} \times V_g}{100} \right) + (V_{OM} \cdot V_B)$$

Variation in prices of material (except cement & steel) shall be worked out by applying the following formula:-

$$EM = (V_{M2} - V_{M1}) \times \frac{(W_1 - W_0)}{W_0}$$

E_M= Variation in prices of material to be adjusted except cement and steel.

K_{OM}= Constant representing the percentage cost of other material except cement and steel as compared to the total value of work under the contract as a whole. The value of K_{OM} for this work shall **34.00 (Thirty four only)**.

V_g= Gross value of work done at contract rates upto the last date of period of reckoning excluding amount payable to the contractor towards items on Star Rate and PC sum.

V_{OM}= Value of all materials (except cement & steel) lying at site for incorporation in the work including materials (except cement and steel) issued under schedule 'B' and including materials (except cement and steel) brought and paid or payable to contractor under Prime Cost Sum and/or Star Rate (s).

V_B= Value of all materials (out of V_g and V_{OM} (except cement and steel) issued under schedule 'B' plus value of all materials (except cement and steel) brought and paid for payable to contractor under Prime Cost Sum and/or Star Rate(s).

W₁= Wholesale Price Index for All Commodities (Base Year 2011-12=100) published by Economic Adviser to the Government of India as on the date of commencement of the period of reckoning. In case the original contract period is extended under condition 11 of General Conditions of Contracts (IAFW-2249), the Price Index as applicable on the date of commencement of the last period of reckoning before the original completion date (s) (phase wise except where phasing has been done only for sample quarter/block) shall only be applicable during the extended period. If phasing has been done for only sample quarter/sample block, the price index as applicable on the date of commencement of the last reckoning period before the original completion date of the project as a whole shall only be applicable during the extended period.

W₀= Wholesale Price Index of All Commodities (Base Year 2011-12=100), published by Economic Adviser to the Government of India as on the last date of bid submission. Generally Indices are published at the end of month. Hence Wholesale Price Index as published at the end of prevailing month in which the date falls, shall be applicable as on the last due date of Bid submission.

V_{M2}= Value of material (except cement & steel) upto the last date of the period of reckoning for which price variation is adjustable as worked out as per formula for V_M.

V_{M1}= -do- but as on date of immediate preceding period of reckoning.

Note:- No adjustment, whatsoever, due to variation in prices of materials on account of coming into force of any fresh law or statutory rule or order as provided in Condition 63 of IAFW-2249 or otherwise than provided in this condition shall be made.

- 44.3 No adjustment in prices shall be made for any work done with materials brought at site after the original date of completion of the work as mentioned in work order No 01 under contract except as contemplated under definition of C₁, S₁ and W₁ hereinbefore.
- 44.4 Periodicity of working out the escalation on account of variation in prices will be three months. The last calculation shall however be done for the value of work at contract rates and materials lying at site for incorporation in the work as on date of completion or extension thereof as mentioned in Note 42.2 above. Valuation of RARs is to be timed in such a manner that relevant date required for quarterly calculation under this condition is available from RARs. In case on these dates no RAR is preferred by the contractor, dummy RAR would be prepared & shall be kept on record duly technically checked and audited. Amount payable relevant to work done and materials collected in quarter will be worked out after firm whole sale price indices for the relevant quarter are available.

SPECIAL CONDITION (Contd..../-)

Once the amount adjustable for any quarter is worked out, the same shall be adjusted as and alongwith advance on account payment in the subsequent RAR (s).

- 44.5 Any dispute arising out of interpretation or application of this Special Condition shall be referred to the Accepting Officer whose decision shall be final and binding.
- 44.6 For purpose of calculating of retention money, liquidated damages, GST on works contract, deduction of income tax at source and recovery of water charges (in case of unmetered supply) the value of contract as revised by the above price variation will be taken into account.
- 44.7 In cases, where value of $V_{M2}-V_{M1}$ works out to minus on account of higher utilisation of schedule 'B' stores (i.e value of Sch B Stores under contract as a whole is higher than K_{OM} value) and the reimbursement on account of variation in prices of materials (except Cement & Steel) works out to be negative in spite of the Wholesale Price Index for All Commodities published by Economic Adviser to Government of India going up from WO, reimbursement on account of variation in prices of materials shall be treated as "NIL".

45. **REIMBURSEMENT/ REFUND ON VARIATION IN WAGES OF LABOUR (REFER CONDITION 63 OF IAFW-2249)**

- 45.1 Increase or decrease in prices consequent on variation in wages of labour, shall be adjusted on the basis stipulated hereinafter, irrespective of the actual variation in price wages of labour to the contractor.

45.2 **LABOUR**

The labour component for the work under the Contract as a whole shall be taken as K_L % of the value of the work executed under the contract. Variation in the labour wages shall be worked out by applying the following: -

$$E_L = \frac{(K_L \times Vg_1)}{100} \times \frac{(L_1 - L_0)}{L_0}$$

Where

E_L : Variation in wages of labour reimbursement to be made to the contractor or refund to be made by the contractor.

K_L : Constant representing the percentage cost of labour element as compared to total value of work under the contract as a whole. The value of K_L for the work shall be **21 (Twenty One Only)**.

Vg_1 : Gross value of work done at contract rates during the period of reckoning less value of work paid or payable to the contractor based on actual cost (e.g. star rate (s), work executed under prime cost sum etc. during the period of reckoning.

L_1 : Minimum wage in rupees of unskilled adult male mazdoor as fixed under any law, statutory rule or order as on the date of commencement of the period of reckoning.

L_0 : As for L_1 but the minimum wage in rupees of an unskilled adult male mazdoor as on the last due date for receipt of tender.

- 45.2.1 The contractor shall within reasonable time of his becoming aware of any alteration to the payment of wages of labour consequent on fixation of minimum wages under any law, statutory rule or order, give written notice thereof, to the GE stating that the same is given pursuant to this Special Conditions together with all information relating thereto which he may be in a position to supply.
- 45.2.2 Irrespective of the variation in minimum wages for any category of labour, for the purpose of adjustment under this Special Condition, the variation in minimum wages fixed under any law, statutory rule or order for an unskilled adult male mazdoor, if any, shall only form the basis.
- 45.2.3 Periodicity of working out the variation in wages of labour will be three months commencing from the last due date for receipt of tender. The last adjustment for variation in wages of labour shall however, be done for the period upto the date of completion or extended date of completion. Valuation of price adjustment due to increase/decrease in minimum wages under any law, statutory rule or order for the purpose of making reimbursement/refund in RAR's, will be timed in such manner that relevant date required for quarterly calculation under this Special Condition is available from the RAR's. The first price adjustment in respect of variation in wages of labour will be worked out for the relevant quarter during which alteration to the wages of labour took place. For implementing this provision, the period of reckoning in such quarter will have to be divided into two periods i.e. the first period up to the RAR payable immediately after the date of variation and the other up to the end of the quarter. Value of L_1 at the beginning of the other period shall be the altered wage. If there are more than one change in wages in a quarter there will be more than two periods of reckoning on similar basis. Amount payable relevant to work done for any quarter will be worked out after the minimum wages of an unskilled adult male mazdoor as fixed under any law, statutory rule or order for the relevant quarter is available. Once the amount adjustable for any quarter is worked out, the same shall be adjusted in subsequent RAR's as 'advance on account' adjustment alongwith adjustment for 'Material and Fuel'.

SPECIAL CONDITION (Contd..../-)

- 45.2.4 No adjustment in prices shall be made for any work done after the due date of completion or extension of time granted under Condition 11 of IAFW-2249 (whichever is later) for the work under the Contract.
- 45.2.5 No adjustment, whatsoever, due to variation in wages of labour on account of coming into force of any fresh law or statutory rule or order as provided in Condition 63 of IAFW-2249 or otherwise, than provided in this Special Condition shall be made.
- 45.2.6 Any dispute arising out of interpretation or application of this Special Condition shall be referred to the Accepting Officer whose decision shall be final and binding.
- 45.2.7. For purpose of calculating of retention money, liquidated damages, Goods and Service Tax (GST) on works contract, deduction of income tax and labour welfare cess at source and recovery of water charges (in case of unmetered supply) the value of contract as revised by the above price variation will be taken into account.
46. **Conciliation under Arbitration and Conciliation Act-1996 as amended by the Arbitration and Conciliation (Amendment) Act 2015**
- 46.1 **Dispute resolution board (DRB) applicable for works costing more than 10 Crore Refer Condition 71 of IAFW-2249 General Conditions of Contract:-**
- 46.1.1 During execution of the works or after completion or after determination/cancellation/termination of the contract all disputes between the parties to contract arising out of the contract (except those for which decision of Accepting Officer or any other officer (CWE and/or GE) is expressed to be final and binding), including any disagreement by either party with any action, inaction, opinion, instruction, certificate or valuation by the Accepting Officer or his nominee, the matter in dispute shall, in the first place be referred to the Dispute Resolution Board (DRB). In case of disagreement with the decision of such DRB, any party may invoke arbitration clause.
- 46.1.2 The Constitution of the DRB shall be a three member body as under :-
- (i) **Chairman** : Joint DG (Contracts) of Chief Engineer, Western Command Chandimandir, Where Jt DG (C) is not posted in the Command, any other Chief Engineer/ Brig level Offr posted in CE Comd shall be nominated by the Comd CE at his sole discretion.
- (ii) **Member 1** : } Col/Director rank officers of Command CE or of any other Zonal CE to be nominated by the CE Western Command, Chandimandir
- (iii) **Member 2** : }
- 46.1.3 The name of chairman and members shall be notified by the Accepting officer within one month of the date of acceptance of contract.
- 46.1.4 Once the DRB is constituted the members and chairman shall disclose in writing their neutrality and impartiality about any personal interest in the work.
- 46.1.5 The dispute shall be referred to the chairman of the DRB by the concerned party after giving notice to the other party for invoking of this clause.
- 46.1.6 The DRB shall decide the dispute in accordance with the terms of the contract, principle or natural justice, equity and fair play.
- 46.1.7 The DRB may fix oral hearing at a place, date and time as decided by the Chairman.
- 46.1.8 The requisite administrative support to the DRB shall be provided by the Accepting Officer.
- 46.1.9 All the contract documents pertaining to the case shall be provided by the Accepting Officer for reference by the DRB.
- 46.1.10 DRB shall give its decision on the disputes within three months of notice from any party invoking the DRB clause. This period can be extended by one month with the consent of the parties.
- 46.1.11 All the decisions given by the DRB shall be by majority and such decisions shall be communicated in writing by Chairman to the parties.
- 46.1.12 If the decision of the DRB is not to the satisfaction of either party or if the DRB fails to give decision within the laid down time either party shall indicate his reservations on the decision to accepting Officer within 30 days of such decision and to refer that dispute for arbitration within the provisions of Condition 70 of IAFW-2249 General Conditions of Contract.
- 46.1.13 It shall be mandatory for the party invoking arbitration on any particular dispute to have first exhausted the remedy provided under the DRB clause for that particular dispute.
- 46.1.14 The mandate of the DRB shall terminate on completion of one year from the date of completion/ determination/ cancellation/ termination of the contract.
- 46.1.15 If any member or Chairman of the DRB is unable to function due to any reason whatsoever, or he resigns his appointment, Chief Engineer, Western Command Chandimandir as the case may be, shall fill the vacancy so caused within 15 days of happening of such vacancy.

SPECIAL CONDITION (Contd..../-)

- 46.1.16 Any dispute referred to the DRB and having been decided by the DRB and not objected to by either party within 30 days shall attain finality and shall not be referable to arbitration.
- 46.1.17 Accepting Officer shall ensure implementation of the decisions of the DRB which attain finality, i.e. except those which are objected by him or by contractor within 30 days as per Para 27.A.12 above.
- 46.1.18 Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent Arbitration and/ or litigation.
- 46.1.19 DRB Chairman/ members shall not, in any case, be liable to be called as witness or to produce any evidence in any Arbitration or departmental proceedings of any kind.
- 46.1.20 During execution of work the disputes may be referred to the DRB as per the requirement of each party after having exhausted the decision-making process provided in the contracts. In case of completion of work or after determination/ cancellation/ termination of the contract all the disputes including payment/ nonpayment/ delay in final bill shall be simultaneously referred to the DRB within six months of completion/ determination/ cancellation/termination of the contract.
- 46.1.21 The department case before the DRB shall be presented by Accepting Officer himself and/ or Dir (Contract) of CE Zone assisted by CWE and his DCWE (Contracts), GE and his AGE (Contracts) and any other officer and legal counsel nominated by Accepting Officer. The contractor may present his case by himself and/ or by his nominated reps & authorized legal/ technical counsel.
- 47. THIRD PARTY TECHNICAL INSPECTION (TPTI)**
- 47.1 Third party technical inspection of the work shall be assigned to a group of professors of NITs/ IITs/ Govt. Engg Colleges/ Central Building Research Institutes/ CRR/ Govt. accredited Laboratories and CVC approved Institutions by the Department. The competent Engineer Authority (CEA)/ Accepting Officer will engage the Services of consultant as "TPTI" for Third Party Technical Inspection by entering into a contract agreement and/ or MOU. The expenditure involved shall be incurred through project contingency as per provision laid down in DWP 2020 by the department.
- 47.2 The work shall be subject to inspection by a Third Party Technical Inspection (TPTI) team on behalf of the Accepting Officer. The defects and other observation raised by this team shall be deemed to be raised by the Accepting Officer. Follow up action, its monitoring and certificate of rectification of defect as well as resolution of observation shall be taken up by GE / AGE (I) concerned.
- 47.3 Contractor shall be accountable to the following actions in connection with this inspection:-
- (a) To facilitate testing of materials/ products as asked for by the team.
 - (b) To perform necessary tests as are required to ensure that the items of work meet the contract specification. In case sufficient proof of quality in the form of test certificate or any other reliable record is already available, the same shall be produced to the team.
 - (c) However, the team may order for additional/ independent tests for the materials/ products. The number of such independent tests/ additional tests shall be maximum 10% for materials/ products and 30% for concrete products calculated based on frequency of such tests as laid down in contract/ quality assurance manual of MES/ Indian Standards. Alternatively, such percentages of tests shall be out of total required number of tests on all materials/ products as per frequency of such tests.
 - (d) In case, additional tests are required to be performed (over and above the total number of tests required as per the frequency stipulated as mentioned above), contractor shall bear the cost of testing only if the material/ product fails in the test. However, contractor shall bear the cost of material, transportation and other incidental expenses irrespective of the test results. Further in case of material/ product failing in testing, all rectification and remedial measures shall be taken by the contractor to the entire satisfaction of the GE/ AGE (I).
 - (e) The frequency of visits/ inspection by the team shall be once in three months. Prior to inspection, contractor shall take all pre-requisite action and keep the site, site lab and other record/ details available for inspection.
 - (f) For the purpose of tests and inspection, contractor shall refer the Quality Assurance Manual of MES as kept in the office of GE.
- 47.4 In case defects or observations noticed during any visit/ inspection are not rectified or resolved prior to next visits/ inspections, a penalty of Rs. 10,000 will be levied and contractor will rectify the defect before next inspection/ visit.
- 47.5 In case defects or observations (including those of minor nature) are not rectified/ resolved after two subsequent site visits or in case defects/ observations are serious in nature, contractor will be subject to such action as considered appropriate under the conditions of contract as well as enlistment rules, apart from his liability to rectify the defects. In case such observations are not rectifiable and department considers the affected items of work as technically acceptable, work will be devalued and there will be no claim of contractor on this account.
- 47.6 All cost and charges towards the aforesaid issues under condition 47.3 above shall be deemed to be included in the quoted rate/ amount of the contractor and nothing extra shall be payable except for those provided in Para 47.3 (d) above.

(SIGNATURE OF CONTRACTOR)
DATED: _____

AAD (Contracts)
For Accepting Officer

SPECIAL CONDITION (Contd..../-)

Annexure-I

BANK GUARANTEE BOND (IN LIEU OF RETENTION MONEY)
(TO BE USED BY APPROVED SCHEDULED BANK)

Place of Execution Name of State.....

Stamp Paper For Rs.....

1. # In case of retention money:

“In consideration of the President of India (hereinafter called ‘the Government’) having agreed not to retain Rs_____ (Rupees_____ only) out of the reserve or the retention money as provided under the terms and conditions of contract Agreement No _____ (hereinafter called “the said Agreement “) made between the President of India and Shri/s’ Shri @ _____ from the claims of the said Contractor (s) in respect of the work done by the said Contractor(s) for the due fulfilment by the said Contractor (s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs_____ (Rupees_____ only) we, _____ Bank* (hereinafter referred to as ‘the Bank’), do hereby undertake to pay the Government, an amount, not exceeding Rs_____ (Rupees_____ only), against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor(s) of any of the terms of conditions contained in the said Agreement.

In case of reserve of the material brought on site by contractor:

“In consideration of the President of India (hereinafter called “ the Government”) having agreed not to retain Rs_____ (Rupees_____ only) out of the reserve of (*)% (.....percent) of the value of certain items of materials brought on the site as provided under the terms and conditions of Contract Agreement No _____ (hereinafter called “the said Agreement “) made between the President of India and Shri/s’ Shri @ _____ from the claims of the said Contractor (s) for the due fulfilment by the said Contractor (s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs_____ (Rupees_____ only) we, _____ Bank* (hereinafter referred to as “the Bank”), do hereby undertake to pay the Government, an amount, not exceeding Rs_____ (Rupees_____ only), against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor(s) of any of the terms of conditions contained in the said Agreement.

2. We, _____ Bank* do at the request of the said Contractor(s) hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from the Government, stating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reasons of the said contractor(s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by and the liability of the Bank, under this guarantee and we..... Bank*. Do hereby undertake to pay the Government the amount demanded notwithstanding any dispute or dispute or disputes raised by the said contractor (s) on any ground whatsoever and notwithstanding any proceeding pending in any court or tribunal relating to the said Agreement or this Guarantee, the liability of the Bank under this Guarantee being absolute and unconditional. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs..... (Rupees..... only).

3. We 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 to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till (Office/ 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. Unless a demand or claim under the Guarantee is made on us in writing on or beforewe shall be discharged from all liability under this Guarantee thereafter.

4. We Bank*, further agree with the Government, that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder or to vary any of the forms and conditions of the said agreement or to extended the 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 Government 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 reasons of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said contractor(s) by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

5. We Bank*, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Government in writing and that our liability under this Guarantee shall not be impaired or extinguished on account of any change in the Constitution of the said Contractor(s).”

SPECIAL CONDITION (Contd..../-)

6. Notwithstanding what is state here in above our liability under this Guarantee is restricted to Rs _____(Rupees _____only) and shall be valid upto_____. Unless a demand/claim is made to us in writing on or before that date we shall be discharge from all liabilities under this Guarantee.

Dated the day of20.....
For..... Bank*

Manager
Branch Code,
Personal Code Seal of Bank

The above guarantee is accepted by the Presiding of India.

Signature _____ Dated _____
For and on behalf of the President of India.

Name of Designation

*In the case of Banks, other than the Nationalised Banks the word 'Ltd' will be added after the work 'Bank' where the asterisk mark is indicated.

@ For Proprietorship concern

Shri _____ Son of _____ resident of _____ carrying on business under the name and styles of _____ at _____ (hereinafter called 'the said Contractor' which expression shall unless the context required otherwise include his herirs, executors, administrators and legal representatives)

@ For Partnership concerns

- (i) Shri _____ Son of _____ resident of _____ and
- (ii) Shri _____ Son of _____ resident of _____, carring on business in co-partnership under the name of style of _____ at _____ hereinafter collectively called the said Contractor's which expression shall unless the context requires otherwise include each of them and their respective heirs. executors, administrators and legal representatives.

@ For companies

_____ Ltd an existing Company within the meaning of the Companies Act 1956 and having its registered office at _____ in the State of _____ (hereinafter called 'the said Contractor ' which expression shall unless the context requires otherwise include their successors and assigns).

* * To be accepted by the Accepting Officer of the Contract and the blank space in para3, line 5, shall be filled to indicate the said "Accepting Officer".

Annexure-II

FORMAT FOR EXTENSION OF BANK GUARANTEE STAMP PAPER

To,
.....
.....

Extension of validity date our Bank Guarantee Bond No.....(In lieu of security Deposit/ retention money) date for CA NO.....Contractor

We.....extend the validity period of above mentioned Bank Guarantee Bond which was due to expire on upto

All other terms and Conditions of the Bond shall remain unchanged.

This will form part of the Original Bank Guarantee.

Manager

The above Guarantee Bond is accepted by the President of India.

(Rank)

For and on behalf of the President of India

Dated:

SPECIAL CONDITION (Contd..../-)

Annexure-III

BANK GUARANTEE BOND (IN LIEU OF PERFORMACE SECURITY DEPOSIT)
(TO BE USED BY APPROVED SCHEDULED BANK)

Place of Execution Name of State.....

Stamp Paper For Rs.....

1. # In case of Performance Security deposit:

“In consideration of the President of India (hereinafter called ‘the Government’) having agreed to exempt (here-in-after called ‘the said contractor(s)’) from the demand, under the terms and conditions of an Agreement dated..... made between..... and for (hereinafter called “the said Agreement”) of performance security deposit for the due fulfilment by the said Contractor(s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs..... (Rupeesonly), We ,..... Bank Ltd. (hereinafter referred to as “the Bank”) do hereby undertake to pay to the Government an amount not exceeding Rs.....against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We,_____ Bank* do at the request of the said Contractor(s) hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from the Government, stating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reasons of the said contractor(s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by and the liability of the Bank, under this guarantee and we..... Bank*. Do hereby undertake to pay the Government the amount demanded notwithstanding any dispute or dispute or disputes raised by the said contractor (s) on any ground whatsoever and notwithstanding any proceeding pending in any court or tribunal relating to the said Agreement or this Guarantee, the liability of the Bank under this Guarantee being absolute and unconditional. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs..... (Rupees..... only).

3. We 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 to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till (Office/ 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. Unless a demand or claim under the Guarantee is made on us in writing on or before..... we shall be discharged from all liability under this Guarantee thereafter.

4. We Bank*, further agree with the Government, that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder or to vary any of the forms and conditions of the said agreement or to extended the 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 Government 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 reasons of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said contractor(s) by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

5. We Bank*, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Government in writing and that our liability under this Guarantee shall not be impaired or extinguished on account of any change in the Constitution of the said Contractor(s).”

6. Notwithstanding what is state here in above our liability under this Guarantee is restricted to Rs _____(Rupees_____ only) and shall be valid upto_____. Unless a demand/claim is made to us in writing on or before that date we shall be discharge from all liabilities under this Guarantee.

Dated the day of20.....

For..... Bank*

The above guarantee is accepted by the Presiding of India.

Signature_____ Dated_____

For and on behalf of the President of India.

Name of Designation

* * _____

SPECIAL CONDITION (Contd..../-)

*In the case of Banks, other than the Nationalised Banks the word 'Ltd' will be added after the work 'Bank' where the asterisk mark is indicated.

@ For Proprietorship concern

Shri _____ Son of _____ resident of _____ carrying on business under the name and styles of _____ at _____ (hereinafter called 'the said Contractor' which expression shall unless the context required otherwise include his herirs, executors, administrators and legal representatives)

@ For Partnership concerns

- (i) Shri _____ Son of _____ resident of _____ and
- (ii) Shri _____ Son of _____ resident of _____, carring on business in co-partnership under the name of style of _____ at _____ hereinafter collectively called the said Contractor's which expression shall unless the context requires otherwise include each of them and their respective heirs. executors, administrators and legal representatives.

@ For companies

_____ Ltd an existing Company within the meaning of the Companies Act 1956 and having its registered office at _____ in the State of _____ (hereinafter called 'the said Contractor ' which expression shall unless the context requires otherwise include their successors and assigns).

** To be accepted by the Accepting Officer of the Contract and the blank space in para3, line 5, shall be filled to indicate the said "Accepting Officer".

Annexure-IV

FORMAT FOR EXTENSION OF BANK GUARANTEE STAMP PAPER

To,

.....
.....

Extension of validity date our Bank Guarantee Bond No..... (In lieu of Performance security Deposit) date for CA No.....Contractor

We.....extend the validity period of above mentioned Bank Guarantee Bond which was due to expire on upto

All other terms and Conditions of the Bond shall remain unchanged.

This will form part of the Original Bank Guarantee.

Manager

.....

The above Guarantee Bond is accepted by the President of India.

(Rank)

.....

For and on behalf of the President of India

Dated:

PARTICULAR SPECIFICATIONS**1. GENERAL**

- 1.1 (a) Work under this contract shall be carried out in accordance with schedule 'A', particular specification, drawings, general specifications and other provisions in MES Standard Schedule of Rates here-in-after called as MES Schedule read in conjunction with each other. In case of variation in specification and make given in various parts of tender documents, the order of precedence to be followed as under:-
- (i) Schedule 'A'.
 - (ii) Particular specification.
 - (iii) Appendix 'B' Particular Specification.
 - (iv) Drawings.
 - (v) IS (Appendix-A).
- (b) Terms "General specifications" referred to here-in-after as well as referred to in IAFW-2249 (General conditions of Contracts) shall mean the specifications contained in the MES Schedule (Part-I).
- (c) General rules, specifications, special conditions and preambles in the MES Schedule shall be deemed to be applicable to the work under this contract unless specifically stated otherwise in these documents in which case the provision in these documents shall take precedence over the aforesaid provision in the MES Schedule. The terms "as specified" wherever appears in tender documents and drawings relates to relevant particular specifications and in its absence general specifications.
- (d) Where specifications for any item of work are not given in MES Schedule or in these particular specifications, specifications as given in relevant Indian Standard (IS with all upto date amendments at the date of receipt of tender) or code of practice shall be followed.
- (e) Any drawing which is mentioned or further referred on the drawings forming part of the tender and tender documents itself but not specifically mentioned in the list of drawings shall be deemed to be forming part of the tender. The tenderers shall refer such drawings/details in the office of Accepting Officer/ concerned CWE/GE.
- 1.2 Reference to some Paragraphs of MES Schedule has been made in these particular specifications but other Paragraphs and provisions as applicable are also to be followed.
- 1.3 Where specifications/ provisions given in these particular specifications are at variance with the provisions/ specifications given in MES Schedule, specifications/ provision given in these particular specifications shall be followed.

2. EXCAVATIONS AND EARTH WORK

- 2.1 **Preparatory works:** - Before setting out the building and commencing the construction, the contractor shall carry out the preparatory works, such as removal of grass, vegetation etc. trimming/surface dressing of the area as directed by Engineer-in-charge. The 'Area' referred to implies, the entire area occupied by the building including hardstanding/ ramp/ apron, platform, steps, plinth protection, shaft and the like and upto a width of 3 metre beyond outer edge of plinth protection. The cost of such work as may be necessary shall be deemed to be included in the contractor's quoted lump-sum/item rates. Layout of buildings shall be carried out by total survey station.
- 2.2 **Excavation General**
- (a) Excavation and earthwork under this contract shall be considered as excavation in soft/ loose soil as detailed in MES Schedule (Part-I).
- (b) Unit rates for building in Schedule 'A' Part-I shall include for excavation and earthwork in soft/ loose soil. Any deviation involving excavation and earthwork will be priced on the basis of soft/ loose soil.
- (c) Boulder and stone obtained from excavation shall be sorted out and neatly stacked as directed by Engineer-in-charge without extra cost to the Govt. These shall be taken over by the Engineer-in-charge.
- (d) In case timbering to excavation is required and specifically ordered by the GE in writing, it shall be paid as deviation. Timbering/ planking shall be carried out as per para 3.24 of MES Schedule (Part-I).
- (e) Since the water table of the area is high and water may be met at any depth during excavation work due to variable water table during rainy season etc. as such bailing/ pumping out of water where required shall be carried out as described in clause 3.17 of MES Schedule (Part-I). The cost of such work as may be necessary shall be deemed to be included in the contractor's lump sum. No additional payment as stipulated in para 3.17 of MES Schedule (Part-I) will be admissible. In the event of deviation, no price adjustment shall be made for cost of bailing/ pumping out etc.

PARTICULAR SPECIFICATIONS

(f) All rubbish obtained from site clearance and all spoil obtained from surface dressing shall be removed, outside MOD land.

(g) Contractor shall ensure all safety measures in construction as per para 1.16 of MES Schedule (Part-I).

2.3 Filling in trenches, plinth and under floors etc.

2.3.1 Filling excavated earth in foundation trench, plinth and under floors shall be carried out as per para 3.19.1 to 3.19.3.1 of MES Schedule (Part-I). Earth obtained from excavation and not approved for filling or surplus to the requirement shall be removed to a distance not exceeding 100 meter from the outer periphery of buildings, spread and leveled.

2.3.2 Surplus soil obtained from excavation under Schedule 'A' Part-I and other sections as approved for filling shall be used for filling in trenches, plinth and under floors etc. Cost of the transportation and other operations will be deemed to be included in unit rate of Schedule 'A' Part-I.

2.3.3 All filling of earth will be spread in layers not exceeding 25cm thick (each layer) watered and well rammed. Thickness of filling shown in drawing is after consolidation.

2.3.4 The filling in plinth and under floors of garages, repair bays & the like structures shall be compacted by mechanical means to achieve 95% of the standard Procter density for each layer.

2.4 Earth filling

2.4.1 Surplus earth obtained from excavation of foundations of buildings and other structures as approved by Engineer-in-Charge shall be used for filling. Cost of the transportation and other operations will be deemed to be included in unit rate of respective items of Schedule 'A' Part-I.

2.4.2 For workmanship and other specification refer clause 3.22, 3.22.1 to 3.22.12 of MES Schedule (Part-I). The filled earth shall be spread in layers, rolled and compacted to achieve 95% of the standard proctor density (at optimum moisture contents) for each layer.

2.5 Standard proctor density and optimum moisture content will be determined for each source of soil as per IS-2720 in the approved lab at site as mentioned herein below:-

(i) IN LAB:- OMC and standard Proctor Density tests on soil for filling in traverse as per IS-2720 Part 7 & 8.

(ii) AT SITE:- Moisture tests and density tests of compacted soil at site of work as per IS-2720 Part 2 and 28/29.

Tolerance of $\pm 1\%$ will be permitted at site of work provided 95% of proctor density is achieved. In confined places and near the RCC works, rolling with $\frac{1}{2}$ Tonne roller will be permitted.

2.6 Additional earth required for filling in trenches, plinth and under floors shall be brought by the contractor from outside MoD land, the earth for filling shall be free from organic matter, peat, foreign perishable material, dry grass, garbage, stone boulders. and shall be got approved from the Engineer-in-Charge before filling. The cost of the same shall be deemed to be included in the unit rate of buildings of Sch 'A' Part-I.

2.7 METHOD OF MEASUREMENTS FOR EXCAVATION AND EATH WORK

Before starting the work, block levels of the area shall be taken by total station jointly by the contractor and Engineer-in-Charge at intervals decided by GE. From these levels the Engineer in Charge shall draw cross sections and longitudinal sections. These sections shall also indicate the required finished levels. The drawings containing the above sections and level books shall be signed by the Engineer in Charge and contractor. After completion levelling works of levels, levels shall again be taken to ensure required finished levels are adhered to.

(a) The area of cutting and /or filling in each cross section shall be separately computed by Simpson's rule as described here in after. The volume {cubic contents} of cutting and/or filling shall be separately computed by prismoidal formula all as described here in after. For computing area of cross section the interval between two ordinates shall be as described by the Engineer-in-charge to suit the site conditions but in no case it will exceed 3 metre.

(b) Computation of areas (Simpson's Rule) Simpson's rule given below shall apply for the computation of areas where the total number of ordinates is odd and the ordinates are spaced at equal interval.

$$A=d/3 [(h_1 + h_n) + 2 (h_3 + h_5 + \dots) + 4 (h_2 + h_4 \dots)]$$

where

A – Area of the cross section in Square metre.

d – Common distance between successive ordinates in metres.

h 1 – Height of the first ordinate in metres.

h_n – Height of the last ordinate in metres.

(h₃ + h₅+...) – Sum of the heights of odd ordinates in metres in between h₁ and h_n.

PARTICULAR SPECIFICATIONS

($h_2 + h_4 + \dots$) – sum of the heights of even ordinates in metres in between h_1 and h_n .

(c) In case of odd number of divisions (i.e. where the number of ordinates is even), the area of end division shall be computed as per the formula given below and added to the area of the other divisions computed by Simpson's Rule. Similarly where the distance between any two parallel ordinates is different, then the area between these ordinates shall be computed by the formula given below and added to the rest of the area computed by the Simpson's Rule.

$$A_x = d/2 [(h_x + (h_{x+1}))]$$

Where

A_x = Area to be computed between any two ordinates in square metres.

$h_x, (h_{x+1})$ are heights of two ordinates respectively.

- 2.8 **Hard core:** Hard core shall be of quartzite stones/ boulders (broken to gauge) not exceeding 63mm. Hard core shall be deposited, spread and leveled in layers n. exc. 15 cm thick and watered and well rammed to a true surface and compacted. The thickness of the hard core specified or as indicated in the drawings is the thickness after consolidation and where not specifically mentioned, it shall be 150mm consolidated thickness.
3. **ANTI-TERMITE TREATMENT: PRE-CONSTRUCTION SOIL TREATMENT IN FOUNDATION AND GROUND FLOORS.**
- 3.1 Pre-construction anti-termite chemical treatment which includes bottom and sides of foundation trenches/ pits filling/ trenches/ pits and below floors, junction of wall and floors, external perimeter of building (s) and surrounding of conduits/ pipes of all buildings, as per **Note (B) 2 (c) on Sri Page No. 22** shall be carried out all as specified in clause 3.26 of MES Schedule (Part-I). Extent of this treatment shall be restricted upto and including external perimeter of bldg including loading/ platforms with ramps and steps.
- 3.2 Anti-termite treatment shall be got done through approved specialized agency, holding valid license as per clause 13 of **Insecticides Act 1968**. Persons employed to do the anti-termite treatment shall be qualified as per rule 10 of the rules promulgated under the insecticides rule 1971. The specialized agency may be any one from list available as per Appendix 'B' to these particular specifications, which is located and active in the area with prior approval of CWE. GE/ CWE should during their inspection of the work, specifically examine the anti-termite treatment. A copy of IS 6313 (Part-II) should be available at site with every Engineer-in-Charge who gets anti-termite treatment works executed.
- 3.3 Anti-termite treatment in the work shall be carried out by using Chloropyriphos (20% EC)/ imidacloprid 30:50 SC conforming to IS 16131. The rates quoted by the contractor are deemed to cater for use of Chloropyriphos (20% EC)/ imidacloprid 30:50 SC only. For the purpose of deviation however the rates given in MES Schedule (Part-I) shall only be applicable.
- 3.4 The chemical for use in anti-termite treatment shall bear ISI certification mark.
- 3.5 Chemical should be brought in original sealed container and should be purchased from approved manufacturer or their authorised agents/ dealers only. The chemical shall be recorded in the measurement book duly signed by the Engineer-in-Charge and contractor before permitted to be used.
- 3.6 Tests may be carried out in a recognized laboratory or test house at the discretion of the GE, of the chemical brought by the agency executing the work with regard to composition of chemical and to satisfy that spurious materials are not being used. The cost of test shall be born by the Contractor.
- 3.7 Chemicals shall be stored carefully at site. Seals of containers should be broken only in the presence of the Engineer-in-Charge (EIC). Empty containers should be got removed off the site promptly. If on any particular day the contents of one full container could not be used in the work, the container should be got sealed at the end of the day in the presence of the EIC and opened when required, also in the presence of the EIC.
- 3.8 The Engineer-in-Charge (EIC) should ensure that paid vouchers are produced by the agency executing the work, for the full quantity of the chemical required and brought to site and a record of such vouchers should be kept by the EIC.
- 3.9 The EIC should work out the total requirements of chemicals required for the work as per specifications and ensure that full quantity is brought to site and used in the work. For the purpose, entries should be made in the Measurement Book (not for payment/ not to be abstracted) indicating the brand name, quantity brought, etc and signed by EIC as well as representative of the agency executing the work.
- 3.10 **Guarantee:** The defects liability period of anti-termite treatment shall be 10 years and the contractor shall be responsible to keep the entire buildings free from termite infestation for a period of 10 years from the certified date of completion. The contractor may obtain a similar guarantee from the specialized firm engaged by him for the purpose.

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- 3.11 **Security deposit:** Security deposit to be held from the contractor against the guarantee period for anti-termite treatment shall be calculated as per scales laid down by the MES for calculating individual security deposit as applicable on the date of receipt of tender on the amount of anti-termite treatment priced at contract rates for the buildings for which treatment is to be done and the amount shall be withheld from the contractor's final bill. Alternatively, the contractor may give a separate fixed deposit receipt/ BGB in lieu of the sum to be retained as security to GE valid for 10 years for this amount. The security deposit shall be refunded to him after the period of ten years from the certified date of completion by the GE, provided always that the contractor shall first have been paid the final bill and have rendered a No-demand certificate (IAFW-451). Condition 10, 46 & 68 of the General Conditions of Contracts (IAFW-2249) shall be deemed to be amended to the extent mentioned above.
- 3.12 Should the GE any time during construction or reconstruction or prior to the expiry of defects liability period of ten years after the anti-termite treatment has been completed as per contract, finds that the buildings have been infected with termites, the contractor shall, on demand in writing by the GE specifying the buildings (s) complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith undertake to carry out such treatment as may be necessary to render the said building(s) free from termite infestation at his own expenses for a period of ten years from certified date of completion and in the event of his failing to do so within a period to be specified by the GE in his aforesaid demand, the GE may undertake such treatment at the risk and expense in all respects of the contractor. The liability of the contractor under this condition shall not extend beyond the period of ten years from the certified date of completion unless the GE had previously given notice to the contractor.
- 3.13 The contractor shall provide a plaster plate of requisite size in situation as decided by the Engineer-in-charge on the wall of the each of the building. The plate shall be 10mm thick in cement mortar (1:4) to indicate the contract agreement number, name of the contractor, the date of completion of work and the probable date of expiry of 10 years guarantee for anti-termite treatment by engraving and painting (black). The cost of plaster plates, engraving and painting etc is deemed to be included in the unit rates of the buildings.

4. CEMENT

- 4.1 **Type of cement:** The details of various types and grade of cement are enumerated below:-
- (i) Ordinary Portland cement, grade 43(IS: 8112-1989).
 - (ii) Portland Pozzolana Cement, IS-1489 (Part-I) subject to certain conditions given in clause 4.2.4 here-in-after.
- 4.2 **Procurement of cement:** Cement shall be procured from the main producers/ manufacturers of the cement as specified in appendix 'B' to these particular specifications.
- 4.2.1 The particulars of the manufacturer of cement alongwith the date of manufacture shall be produced by the contractor for every lot of cement separately. The cement so brought shall be fresh and in no case older than 60 days from the date of manufacturing. The documents in support of the purchases of cement such as purchase voucher shall be verified by the site staff and GE. Before placing the order for supply of cement by the contractor, he shall obtain written approval from the GE regarding name of manufacturer, quantity of cement etc. Cement shall be procured for minimum requirement of one month and not exceeding the requirement of the same for more than two months at a time. The cement shall be consumed in the work within three months after receipt but for structural member, the cement shall not be older than 2 months from the date of manufacture. Cement shall conform to the requirements of Indian Standard Specification and each bag of cement shall bear relevant ISI mark. Weight of each consignment shall be verified by the GE and recorded.
- 4.2.2 The cement shall be procured by the contractor preferably in paper polythelene bags. Average weight of each bag shall not be less than 50 Kg. The average weight shall be tested by taking the weight of 50 Kg bags selected at random by GE per lot. In case the weight found is less than 50 Kg, whole lot shall be rejected. In case weight is more than 50 Kg it shall be deemed to contain 50 Kg only and nothing extra shall be admissible to contractor on account of extra cement used in the work.
- 4.2.3 Purchase vouchers as mentioned here-in-before shall bear machine number from the manufacturers.
- 4.2.4 **Use of Portland Pozzolana Cement (PPC)**
- While using PPC, the following requirement shall be met with:-
- (a) PPC shall meet the strength criteria of 43 grade Ordinary Portland Cement (OPC) as laid down in IS-8112-1989.
 - (b) Minimum period before striking the form work given in clause 11.3.1 of IS 456:2000 and (MES Schedule (Part-I) vide clause 4.11.6.3 shall be 14 days.
 - (c) Extra curing shall be carried out as required.

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- (d) PPC shall not be used for over head Reservoirs, underground sumps, prestigious buildings (to be decided by GE), buildings with span more than 10 metre and locations where RMC is to be used as specified here in after. In such cases only OPC shall be used.
- (e) Mixing of OPC and PPC shall not be allowed in a work and separate record shall be maintained showing location and types of cement used.
- (f) While procuring PPC, the following requirements are to be ensured and certificate to that effect shall be obtained by Contractor for each batch from the manufacturer:-
- (i) The quality of fly ash is strictly as per IS 1489 (Latest Edition).
 - (ii) Fly ash is inter-ground with clinker and not mixed with clinker.
 - (iii) Dry fly ash is transported in closed containers and stored in silos. Only pneumatic pumping shall be used.
 - (iv) Fly ash shall be procured from thermal plants using high temperature combustion above 1000°C.
 - (v) Ensure strict compliance of clause 4.1.3 and clause 9.2 of IS-1489 (Part-I)-1999 by getting fly ash and cement tested at National Council of Cement and Building materials, Ballabgarh, Haryana, PIN-121004 or any other laboratories as mentioned in clause 4.3.4 here-in-after.
- (g) Both OPC and PPC shall not be permitted for use in the same building.
- (h) Use Portland Pozzolana Cement (PPC) or Ordinary Portland Cement (OPC) with a minimum of 25% fly ash by weight in structural concrete.
- (j) Contractors must provide design and batch mix reports for structural concrete and technical specification sheets for the cement used, clearly indicating the fly-ash percentage to ensure compliance.

4.3 Testing of Cement:

- 4.3.1 The manufacturer is required to carry out inspection and testing of cement in accordance with relevant BIS provisions. The contractor shall submit the manufacturer's test certificate in original alongwith test sheets giving the results of each physical test as applicable in accordance with relevant IS provision and the chemical composition of cement or authenticated copy thereof, duly signed by the manufacturer with each consignment, as per the following IS provisions:-
- (a) Method of sampling for hydraulic cement as per IS-3535-1986.
 - (b) Method of physical test for hydraulic cements as per IS-4031.
 - (c) Method of chemical analysis of hydraulic cement as per IS-4032-1985.
- 4.3.2 The test certificate and test sheet shall be furnished with each lot of cement procured. The Engineer-in-Charge shall record these details in Cement Acceptance Register to be maintained by him, after due verification, which will be signed by JE (Civil), Engineer-in-Charge, Garrison Engineer and Contractor as per Appx 'E' here-in-after.
- 4.3.3 The contractor shall however, organize setting time, fineness, soundness and compressive strength test of cement through designated laboratory on samples collected from each lot brought at site before incorporation in work. The contractor will be allowed to use the cement only after satisfactory compressive strength of seven days. To meet this requirement contractor is required to keep minimum 10 days stock before any new lot is brought at site which can be used in the work. The contractor shall be required to remove the cement not meeting the requirement from site within 24 hours. Seven days strength test will be relied upon to accept the lot of cement to commence the work. 28 days compressive strength test will be the final criteria to accept/reject the lot.
- 4.3.4 The GE shall also organize independent physical testing as per the tests mentioned in the 'CEMENT SUPPLY/ ACCEPTANCE FORM' of random samples of cement drawn from various lots. The random samples of cement to be tested shall be drawn as per Quality Assurance Manual. The testing shall be carried out from NABL laboratories as National Test House/ SEMT Wing CME Pune/ Regional Research Laboratories IITs/ The Laboratories approved by the Chief Engineer Jalandhar Zone Jalandhar Cantt or MES Zonal Laboratories, Govt. Engg Colleges and National Institutes of technology as per the relevant BIS and shall be recorded in the respective portion of Appendix "E". The decision as to where the testing of cement is to be done shall be taken by GE. In case the cement is not of requisite standard despite manufacturer's test certificate, the contractor shall remove the total consignment from the site at his own cost after written rejection order of the consignment by the GE.
- 4.3.5 The random samples as per relevant IS shall be selected by GE before carrying out testing. The record of such samples selected by the GE for testing shall be properly maintained in the 'Cement Testing Register' giving cross reference to relevant consignment of cement and quantity received etc.
- 4.3.6 Cost of transportation of samples to the approved laboratory/test house and all testing charges including cost of sample shall be borne by the contractor.

PARTICULAR SPECIFICATIONS

4.3.7 Notwithstanding the submission of purchase vouchers/test certificates, following tests shall be mandatory to be carried out as per IS-4031:-

- (a) Initial and final setting time.
- (b) Soundness test.
- (c) Compressive strength test at 3 days, 7 days & 28 days as specified in the relevant para of the Indian Standard.
- (d) Consistency test
- (e) Fineness.

Other tests need not to be carried out for cement procured with BIS certification mark unless specifically asked by GE or Accepting Officer and the contractor shall not have any claim on this account.

4.3.8 The cement shall conform to chemical requirements and physical requirements as specified in the respective clauses of the Indian Standard. The tests carried out as per provisions of IS codes specified here-in-before, shall be the criteria for acceptance of cement by Engineer-in-Charge. If samples from a lot/ lots are not within the acceptable limits of Indian Standard, the lot/lots shall be rejected without any claims or compensation to the contractor for the lot/lots purchased. The contractor shall replace the lot/ lots with the fresh one which shall be tested again for acceptance.

4.3.9 The cost of all tests carried out on cement before acceptance for incorporation in the work shall be borne by the contractor whether the results are acceptable or not. No claim or compensation shall be entertained on this account and clause of IAFW-2249 deemed to be amended accordingly. Any cement lot/lots on being tested found not to be conforming to relevant clauses of Indian Standard shall not be paid as material at site.

4.4 Storage of cement

4.4.1 Refer clause 4.3.1 of MES Schedule (Part-I) for storage and precaution in storage of cement. The cement shall be stored over dry platform at least 20cm high from floor in such a manner as to prevent deterioration due to moisture or intrusion of foreign matters. The stacking of cement shall be at least 20cm high from floors and 20cm away from walls of store rooms. Stacking of cement shall not be more than 10 bags high. Joint inspection of storage of cement shall be carried out by Engineer-in-charge and contractor once in a day. The cement fully set or partially set shall not be used in the work and shall be removed by the Contractor immediately without any extra cost.

4.4.2 Tested and untested cement shall be segregated and stored separately with distinct identification.

4.4.3 The cement godown shall be provided with two locks on each door. The key of one lock of each door shall remain with the Engineer-in-charge or his representative and that of other lock with the contractor or his authorised agent at site of work so that cement is removed from the godown only according to the daily requirement with the knowledge of both the parties. During the period of storage, if any cement bag(s) found to be in damaged condition due to whatsoever reason, the same shall be removed from the cement godown on written order of the GE and suitable replacement for the cement bag(s) as removed shall be made and no claim whatsoever shall be admissible on this account.

4.5 Documentation

4.5.1 The Contractor shall submit original purchase vouchers from the manufacturer for the total quantity of cement supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the GE alongwith the relevant documents before acceptance. The original Vouchers and the Test Certificate shall be defaced by the Engineer-in-charge, signed by contractor and kept on record in the office of GE duly authenticated and with cross reference to the consignment number/control number recorded in the cement acceptance register clearly mentioning 'Batch No.' and 'Date of manufacture'. The cement acceptance register will be signed by JE (Civil), Engineer-in-charge, GE and the contractor. The Accepting Officer may order a Board of Officers for random check of cement and verification of connected documents.

4.5.2 The entire quantity of all cement shall suitably be recorded in the measurement Book (Not to be abstracted) for record purpose before incorporation in the work and shall be signed by the Engineer-in-charge and the contractor.

4.5.3 In addition to the cement Acceptance Register, the cement consumption register shall be maintained as given below:-

(a) The contractor shall maintain a pucca bound register with serially numbered pages with all pages initialed by Engineer-in-Charge against numbering showing quantities of cement received, used in work and balance at the end of each day. The form of record shall be as approved by Engineer-in-Charge. The register shall be signed daily by representatives of MES and the contractor in token of verification of its correctness and will be checked by Engineer-in-Charge, at least once a week and on the days cement is brought by the contractor.

(b) The register shall be kept at site in safe custody of the contractor's representative during the progress of the work and shall on demand be produced for verification to the inspecting officer(s).

PARTICULAR SPECIFICATIONS

(c) On completion of the work the contractor shall deposit the cement register with the Engineer-in-Charge for record.

4.6.1 Schedule and Supply

4.6.2 Schedule of supply of cement shall be finalised by contractor with the GE and shall be incorporated in CPM chart so that supply of cement is monitored in a way to avoid any delay in completion of the work. The supply shall be regulated in such a way that cement is consumed in work within three months of its manufacture.

4.6.2 The complete requirement of cement will be worked out before making any RAR payment. Procurement of cement by the contractor shall be completed sufficiently in advance of the date of completion. The contractor will forfeit his right to demand extension of time if the supply of cement got delayed due to his failure in placing order in time to the manufacturer.

4.7 **General:** The payment shall only be allowed after production of original purchase vouchers, certified copies of test certificates from manufacturer for each consignment and results of testing carried out in laboratory on receipt of cement (7 days compressive test) are found satisfactory after testing as specified here-in-before. Payment for cement shall be made as material lying at site as per condition 64 of IAFW-2249. Rate of cement given in MES Schedule shall be applicable for cement irrespective of type and grade of cement specified for use in the work.

4.8 **Curing:-** Curing shall be carried out all as specified in relevant clauses of MES Schedule (Part-I) and relevant IS for all the works where the cement is to be used for brick masonry, reinforced or plain cement concrete, lime concrete, plastering, pointing etc.

4.9 Curing compound coating for RCC surfaces:-

4.9.1 ASTM C 1315 Type 2, class A gives out Standard Specification for "Liquid Membrane-Forming Compounds having special properties for Curing and Sealing Concrete".

4.9.2 Following specification shall be adopted for curing of all RC surfaces for new constructions:

SI No	Protection	Specification
i	Criteria Required	Ready to use Curing compound FOSROC Concure 1315 (White) or equivalent make of CHRYSO, STP, MBCC shall be applied as soon as practically possible after removal of shuttering, and whilst the concrete surface is still damp
ii	Surface preparation	If any traces of laitance, grout runs or loose material found in the concrete surface, it shall be removed by using steel wire brush.
iii	First coat application	FOSROC Concure 1315 (White) or equivalent make of CHRYSO, STP, MBCC should be applied uniformly by brush, roller, or spray with no overlap of applications. A single coat of FOSROC Concure 1315 (White) applied at a uniform rate of 5 m ² per litre / as per manufacturer's instructions for make of CHRYSO, STP, MBCC.
iv	Second coat	FOSROC Concure 1315 (White) should be applied at coverage of 10-15m ² per litre / as per manufacturer's application instructions for make of CHRYSO, STP, MBCC. plastering and painting can be applied directly over this coat.

4.9.3 Execution to be done with authorized trained/skilled applicator of manufacturer as per the technical guidelines laid by manufacturer. Necessary care for protection of curing compound coats shall be taken as per technical literature of the product.

4.9.4 Equivalent products are as under:

FOSROC	CHRYSO	STP	MBCC
Cocure 1315	CGRYSO cure AC	Shaliculture Acrelate WB10	MasterKure 181

4.10 Admixture and curing compound; Use additives and curing compounds to minimize fresh water requirements during constructions.

5. CEMENT CONCRETE

5.1 Materials

5.1.1 **Cement:** Refer clause 4 here-in-before.

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- 5.1.2 **WATER**: Water shall comply with the requirement of clause 4.9 of MES Schedule (Part-I) and as per IS: 456-2000. Irrespective of water being supplied by department or brought under the own arrangement of contractor, it shall be tested to confirm its suitability for construction purposes. The record of testing obtained shall be carefully preserved. The testing charges including cost of material and transportation charges shall be borne by the contractor.
- 5.1.3 **Water proofing compound powder/ liquid**: Water proofing compound shall be added as per manufacturer's instructions where waterproof plaster/ concrete have been indicated to be provided. However, for pricing deviations the quantity of water proofing compound shall be 3% by weight of cement.
- 5.1.4 Blank.
- 5.1.5 Coarse and fine aggregate for cement concrete (PCC and RCC): Refer para 4.4.1 to 4.4.7, of MES Schedule (Part-I). Fine aggregate shall be sand obtained from the sources given here-in-after.
- 5.1.6 Coarse and fine aggregate for lime concrete: Coarse aggregate shall be broken bricks as per paras 4.5, 4.5.1, 4.5.2 of MES Schedule (Part-I). Fine aggregate shall be natural sand as for cement concrete.
- 5.1.6.1 Coarse aggregate for plain and reinforced cement concrete shall be crushed stone. Grading of coarse aggregate unless otherwise specified shall be as follow:-
- | | | | |
|-------|---|---|---------------|
| (i) | For all plain & reinforced cement concrete thickness upto 25mm. | - | 12.5mm graded |
| (ii) | For all reinforced cement concrete over 25mm thickness. | - | 20mm graded |
| (iii) | For plain cement concrete over 25mm thick upto 75mm thick. | - | 20mm graded |
| (iv) | -ditto- but 75mm thickness and over. | - | 40mm graded |
- 5.1.6.2 Grading of coarse aggregate for plain and reinforced concrete i.e. crushed stone aggregate shall be as per Para 4.4.7.1 of MES Schedule (Part-I). Grading of broken brick aggregates for lime concrete shall be as per Para 4.5.3 of MES Schedule (Part-I).
- 5.1.6.3 Grading of fine aggregate (sand) shall be as per para 4.4.7.2 of MES Schedule (Part-I) for grading Zone-III.
- 5.2 **Mix of cement concrete**: Refer para 4.11.1, 4.11.2, 4.11.2.1 to 4.11.2.4 of MES Schedule (Part-I).
- (a) **Plain concrete**: Unless otherwise specified elsewhere or shown in drawings mix of concrete in various situations shall be as under: -
- | | | | |
|-------|--|---|-------------------|
| (i) | In foundation for brick walls, dwarf walls, toe walls, steps, ramps and lean concrete under column/portals footings. | - | 1:5:10 (Type E-2) |
| (ii) | PCC benching at junction of slab/ parapet walls/ fascia, PCC filling around concealed rain water pipes, drains, PCC block for fixing hold fasts, cills, blocks for bolts, straps, plinth protection and similar locations. | - | 1:3:6 (Type C-1) |
| (iii) | Cement concrete in situations other than covered by (i) & (ii) above. | - | 1:2:4 (Type B-1) |
- (b) **Reinforced concrete**: Against Schedule 'A' Part-I Item No 01, unless otherwise superior/ higher grade of concrete shown in structural drawings and specifically specified, the RCC work shall be M-30 (Design Mix). If in any drawing M-15/ M-20 or other lower grade of concrete has been shown against RCC work, the same shall be amended to M-25 (Design Mix) with reinforcement and size of members remaining same without any price adjustment. (For reinforcement also refer Clause 10.2. here-in-after). For other parts of Schedule 'A', the mix of RCC shall be as indicated against respective items. However, for Overhead reservoir/water storage tank/UG Sump (including staging and foundation) design mix M-30 concrete shall be used irrespective of whatsoever shown on drawings.
- 5.3 **Form Work**: Refer Paras 4.11.6.1 to 4.11.6.5 of MES Schedule (Part-I). Irrespective of type of formwork mentioned elsewhere or indicated in the drawings, formwork shall be of steel only. Steel formwork (both verticals props and surfaces) shall be properly designed. However, for deviation if any, rates in MES Standard Schedule of Rates, for timber formwork (Rough finished surfaces) shall only be applicable.
- 5.4 **Important requirement of reinforced cement concrete and plain cement concrete**: The contractor shall provide all facilities such as material and labour, tools/equipment for moulding, casting and conveyance of test cubes to Command Test Laboratory, Chandigarh. In case the facility is not available in Command Test Laboratory, Chandigarh for testing, contractor shall provide all facilities for testing in National Institute of Technology/IIT/ any other Govt laboratories as approved by HQ Chief Engineer Jalandhar Zone Jalandhar Cantt. Charges of testing including materials & conveyance shall be borne by the contractor and his quoted lump sum shall be deemed to include for the same.

PARTICULAR SPECIFICATIONS**5.5. DESIGN MIX CONCRETE**

- 5.5.1 Where concrete is specified by grade that is M-25, M-30 & M-35 etc., the same shall be of design mix all as per IS-456-2000, IS-10262-1982, SP-23 (S&T) 1982 and as specified here-in-after.
- 5.5.2 Design mix of concrete shall be got done by the Contractor as per IS-10262 from Command Test laboratory Chandigarh/IIT/NIT. Charges of testing including cost of materials & conveyance thereto, shall be borne by the contractor and his quoted lump sum shall be deemed to include for the same. The mix design calculation for trial and approved design mix shall be kept on record for future record.
- 5.5.3 The optimum mix to achieve the Target Mean Strength shall be determined in the laboratory condition. The concrete shall conform to the following specifications: -

Srl No	Specifications Required	Grade of Concrete		
		M-25	M-30	M-35
(a)	Maximum free water cement ratio	0.50	0.45	0.45
(b)	28 days Target Mean Strength (N/mm ²)	31.60	38.25	43.25
(c)	Minimum Cement Content in kg per cum of concrete.	As per IS	As per IS	As per IS
(d)	Degree of Quality Control	Good	Good	Good
(e)	Type of Exposure	Moderate	Severe	Moderate

- 5.5.4 **Batching:** In proportioning concrete, the quantity of both cement and aggregate shall be determined by mass and all in accordance with clause 10.2 and sub clauses thereon of IS:456-2000 as applicable.
- 5.5.5 **Weighing & mixing:** For mixing of all cement concrete, contractor shall install one or more computerized batch mix plant (s) at site. The capacity of these plants shall be to full fill day to day requirement of mixing concrete. The contractor is required to use quality concrete produced by the batch mixing plant, complete quality assurance and control shall be maintained by the contractor in accordance to latest IS code and best modern Engineering practice. The record of quality assurance shall be submitted to the GE and shall be kept on record. Mixed concrete will be carried by the transit mixer which will also be arranged by the contractor at his own expenses.
- Refer Special condition 10 of SC. MES shall supply electricity on payment through electric metre from the points as shown in the site plan. Arrangement for electricity from this point to run the above batch mixing plant(s) and other equipment's shall be provided by the contractor under his own arrangement. In case of any failure of electric supply by MES, contractor shall arrange other alternative arrangement without additional cost to the Deptt. Further no extension of time shall be granted to the contractor for any brake down of electric supply. However small Concrete shall be carried to site of work quantity of concrete may be hand mixed with prior written permission of GE.
- 5.5.6 **Trial Mixes:** The actual mix proportion will be arrived at by means of number of trial mixes by changing the water cement ratio, proportions of fine and coarse aggregate, fineness moduli of aggregate by changing their grading and proportions etc. Attempt shall be made to make the mix design as economical as possible. The mix design shall be carried out again whenever there is change in the source of material of coarse/ fine aggregate or cement.
- 5.5.7 **Sampling:** The sampling procedure and the frequency of sampling shall be as per clause 15 of IS: 456-2000.
- 5.5.8 **Test Specimens:** All test specimens shall be 150mm cubes. For each sample, nine cubes shall be casted, out of which, three cubes shall be tested for 7 days, three for 28 days compressive strength and three cubes shall be preserved at site for inspection as and when required. The specimens shall be tested as described in IS: 516-1959.
- 5.5.9 **Test strength of sample:** Refer clause 15.4 of IS: 456-2000.
- 5.5.10 **Accepting criteria:** The acceptance criteria of the test result shall be as laid down in clause 16 of IS: 456-2000.
- 5.5.11 **Workability:** The workability of the concrete for different location shall be conforming to para 7.1 of IS-456-2000.
- 5.5.12 **Compaction of concrete:** Refer to para 4.11.11 of MES Schedule (Part-I). Consolidation/ compaction of all RCC work such as footings, columns, beams, slabs, walls, bands, lintels, chajjas, shelves etc and the flooring (exceeding 75mm thickness) shall be carried out with approved mechanical needle and plate vibrator of appropriate size. Where however the same is not feasible, manual compaction shall be carried out after obtaining permission from Engineer-in-Charge.
- 5.5.13 **Packing and transportation of samples:** Refer clause 13 of IS: 456-2000. The contractor shall bear the cost of materials, packing and transportation of the samples required to be tested from site of work to the laboratory where it is to be tested.

PARTICULAR SPECIFICATIONS

5.5.14 Following documents shall be maintained at site:-

- (a) Test reports and manufacturer's certificate for material.
- (b) Concrete mix design details.
- (c) Pour cards for site organization and clearance for concrete placement.
- (d) Record of site inspection of workmanship, and field test.
- (e) Non confirmation reports, change orders.
- (f) Quality control charts and Statistical analysis.
- (g) Statistical analysis.

5.5.15 RCC other than design mix shall be all as per relevant IS code and MES Schedule.

5.6 Finishing to Exposed Surfaces of Concrete: Refer to para 4.11.14, 4.11.15 and 4.11.16 of MES Schedule (Part-I).

5.6.1 Exposed soffits of RCC floors/ RCC slabs, soffits and sides of slab/beam, parapet and stair case, soffits and sides of shelves, RCC fascia, RCC parapet, chajjas and cantilevers etc which are not continuous with the adjoining plastered surfaces will be finished in accordance to para 4.11.16.2(a) of MES Schedule (Part-I) after removal of form work.

5.6.2 Exposed surfaces of columns, beams, lintels, bands and similar items which are continuous with plastered surfaces of walls shall be plastered as that for adjoining walls plastering.

5.6.3 Exposed surfaces of RCC columns, lintels beams bands etc. and similar items not covered under clause 5.6.1 & 5.6.2 above shall be finished in accordance to para 4.11.16.2(a) of MES Schedule (Part-I) after removal of form work.

5.6.4 Exposed surfaces of concrete shall be roughened with wire brushes and hacked out closely for making key for plaster before the application as described.

5.6.5 If thickness of plaster where specified, is required to be increased in excess to achieve fair and even surfaces, it shall be provided by the contractor without any extra cost to Government.

5.7 Concrete cover to reinforcement: Refer clause 26.4 of IS: 456-2000, unless otherwise shown on drawings.

5.7.1 **Cover Blocks for RCC works:-** Cover blocks for RCC slabs, beams and columns shall be factory made cover made of Fibre reinforced concrete of strength not less than 50 Mpa.

5.8 **Damp proof course:** Damp proof course shall be 40mm thick PCC (1:2:4) type B-0 using 12.5mm graded crushed stone aggregates mixed with water proofing compound as per manufacturer's instructions and shall be provided on full width of all walls including door opening. DPC shall however not be provided over dwarf walls, compound wall and PCC/ RCC plinth beams. A coat of 85/25 bitumen @ 1.70 Kg per Sq metre shall be laid over PCC.

5.9 Provisions contained in clause 5.22.1 of MES Schedule (Part-I) shall not be applicable unless specially required due to site condition to make up levels etc. for which no price adjustment shall be made. Bed blocks shall rest over bearing plaster as specified here-in-after.

5.10 All RCC beam, lintel/ bands resting on masonry work which are independent (i.e. not continuous), shall be provided with PCC bed blocks cast in PCC (1:2:4) type B-1. Bed block shall be twice the width of beams/ lintels/ bands in length, covering the entire thickness of wall and thickness 150mm, if not indicated or shown on drawings otherwise. Lintels/ bands running over the masonry work (i.e. which are continuous) shall not be provided with bed blocks.

5.11 **Throating/ weathering:** Throating to projection of RCC/ PCC beyond external faces of the wall where shown on drawing and where RCC chajjas are not provided with down ward fascia shall be formed in concrete while casting by planting fillet/ bar of 12 mm dia. in the form work and finished smooth.

5.12 **Pre-cast concrete Articles:** Cement concrete shelves, bed blocks/ plates, covers slabs, fins and jalli and the like shall be pre-cast and shall be set in cement mortar (1:3). Deviation involving these items shall be done on the basis of appropriate rates in SSR for cast-in-situ work.

5.13 **RCC chajjas with fins**

5.13.1 RCC chajjas shall be provided as per details shown on drawings. Where fins are indicated with RCC chajjas the thickness of the finished fins including thickness of plaster on both sides shall be 50mm unless otherwise shown on drawings. Coving or any other extra plaster (over external plaster) over chajja not to be provided.

5.13.2 The designated area i.e. over chajja and over the wall above chajja for a height 900mm and upto 600mm on either side of chajja width shall be moist by sprinkling water. Apply FOSROC Brushbond Roofguard minimum 3-layers or equivalent product of Asian Paints/ M/s MC Bruchemine / CIPY / SIKA / PIDILITE Dr Fixit / Thermax / STP / Berger as per manufacturer's instructions.

5.14 **WINDOW CILL:-** Irrespective of whatever shown in drawings, the window cill shall have 18 to 20mm thick machine cut and mirror polished Granite slab with width equal to wall thickness and overhang of 15-20mm beyond plaster line. The front edge shall be chamfered/ rounded and bottom

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surface shall be fair machine finish. The granite shall be bedded over a cement mortar of mix 1:4. The granite cills shall be fixed securely into the masonry or RCC with a minimum embedment of 25mm on each side. All cills must be properly aligned levelled. Exposed surfaces shall be protected from staining or damage during construction using protective film/tape. The Granite shall be of approved quality, uniform in colour and texture, sound hard dense, durable and free from cracks, flows, soft view or other defects.

5.15 Bearing of RCC structural members

5.15.1 Bearing of all roof/ floor slabs on load bearing masonry wall shall comprise of 20mm thick bearing plaster in cement mortar (1:3) finished even and smooth with one coat of white wash applied and two layers of laminated water proofing building paper type-I conforming to IS-1308 weighing not less than 100g/ sqm each layer, laid over it. However, in case floor/ roof slab rests on RCC beams/ bands this provision does not apply.

5.15.2 The bearing of lintels shall comprise of a full brick with vertical joints in brickwork staggered.

5.16 No treatment shall be provided under bearing of RCC bands.

5.17 RCC Shelves/ Platforms

5.17.1 The finished thickness of RCC shelves and RCC platforms, if not indicated in drawings, shall be 60mm.

5.17.2 The number of tiers of RCC shelves shall be all as shown in the drawing. For locations where number of tiers is not shown/indicated, the RCC shelves shall be single tier.

5.17.3 The edge of RCC shelves/RCC platforms shall be bull nosed to a radius of 5mm except where stone/tile topping is to be provided over RCC shelves/platforms.

5.17.4 10mm thick cement plaster in cement mortar (1:3) shall be provided on top where no finish over the RCC shelves has been indicated on the drawings.

5.18 **Concrete padding**: Where the required height of walls, opening is not obtained with adequate size of bricks the same shall be obtained by providing PCC (1:3:6) type C-1 concrete padding.

5.19 Lime Concrete

5.19.1 Lime shall be factory made hydrated lime powder conforming to IS-712.

5.19.2 Lime concrete filling shall be with lime mortar (1:2) mix using 40mm well burnt brick aggregates.

5.20 Ready mix concrete (RMC)

5.20.1 All reinforced cement concrete work shall be ready mix concrete (RMC) from approved manufacturers. RMC shall conform to the requirements as per IS-4925 (amended upto date) and IS 456-2000.

5.20.2 RMC shall be procured by the contractor from any RMC as approved by CWE as per IS-4925 (amended upto date) having fully automatic computerized batching plant of capacity over 20-30 Cum/hr with tested and calibrated water meter, control panel and provision for computer generated batch report all as per IS-4925. RMC plant shall be approved by CWE after verification of the plant and various plant lab.

5.20.3 The relevant details of Design Mix Concrete and minimum cement content for different grade as specified earlier shall be applicable alongwith the following specific details for ready mix concrete.

5.20.4 Initial mix design from RMC shall be submitted by the contractor in quadruplicate with complete data adopted for mix design along with test results of all materials and concrete. Initial mix design should take into account the aspects such as loss of workability and strength during transportation, till placement of concrete. Any change shall be only with prior approval of GE after necessary revision in design mix.

5.20.5 Specification for all materials/ ingredients, etc given here-in-before shall hold good for RMC also.

5.20.6 Admixtures/plasticizers not more than 1% of weight of cement at no extra cost to the department may be used conforming to IS 9103-1999 (Revised) and shall be from any one of the following firms:-

- (a) MC Bauchemic (India) Pvt Ltd
- (b) Fosroc Chemical (India) Ltd
- (c) STP speciality Chemicals Ltd
- (d) CICO Technologies Ltd.
- (e) Fairmate Chemicals Pvt Ltd.

5.20.7 The contractor shall ensure that all facilities are made available at the site of RMC plant for the departmental officials to inspect the materials incorporated, test carried out for all materials, concrete etc. Copies of all tests carried out for materials used/concrete shall also be made available to the Department.

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- 5.20.8 Concrete shall be transported in concrete transit agitators conforming to IS-5892.
- 5.20.9 Concrete shall be delivered and placed by pumping using BOOMER. Decision of GE as to whether RMC can be placed by pumping or not shall be final and binding. The tenderer will have no extra claim on this account.
- 5.20.10 Pump and pumping arrangement shall be inspected and approved by CWE, while approving the RMC plant.
- 5.20.11 No water/admixture shall be allowed after initial mixing of concrete at the plant. The use of PPC/ Fly ash/ mineral based admixture in RMC shall not be permitted.
- 5.20.12 Slump test shall be carried out at site by the department in the presence of contractor. The concrete shall be placed in position within the designed initial setting time and at the end of initial setting time the remaining concrete shall be rejected.
- 5.20.13 **Transportation of Concrete:** The concrete shall be discharged from the truck mixer within two hrs of the time of loading. Time of loading shall start from adding the mixing water to the dry mix of cement and aggregate or of adding the cement to wet aggregate whichever is applicable.
- 5.20.14 Contractor should plan his arrangement in such a manner so as to enable a full load of concrete to be discharged within 30 minutes of arrival on site.
- 5.20.15 In addition to the tests carried out for RMC at the plant site, sampling and testing of concrete shall be carried out at the site before delivery as per IS- 456-2000 by the department along with the representative of the contractor. However, the cost of testing shall be borne by the contractor. The concrete, which does not meet the requirement of acceptance criteria as per IS-456-2000 shall be rejected and the contractor shall make good the same at his cost.
- 5.20.16 Following information will be added on site:-
- Time of arrival on site.
 - Time when discharge was completed.
 - Any water/ admixture added by the supplier to meet the specified workability.
 - Any extra water/ admixture added at the request of the purchaser of the concrete, or his representative, and his signature.
 - Pouring location
 - Signature of the purchaser or his representative confirming discharge of the load.
- 5.20.17 **RECORDS** Record shall be maintained by the contractor to provide confirmation of the quality and quantity of cement procured. The Records shall be retained for the purposes of these requirements for a period of atleast One Year. This will also be made as part of agreement between contractor and deptt. They shall cover the following aspects:-
- Production and delivery :
 - Batching instructions,
 - Batching records,
 - Delivery tickets, and
 - Equipment calibration and plant maintenance.
 - Materials and production control :
 - Concrete production and materials purchase, usage and stocks, and
 - Certificates or test results for materials.
 - Production quality control : Control test results
- 5.21 The contractor may install RMC plant having capacity 20 to 30 cum/ hour fulfilling all the requirements as specified in clause 5.20 here-in-before or else contractor shall use RMC from the manufacturers as approved by CWE as per clause 5.20.2 here-in-before.
6. **Brickwork**
- 6.1. Refer para 5.6.1 to 5.6.9 of MES Schedule (Part-I). The bricks shall have minimum compressive strength of 75 Kg/Sqcm and shall be burnt clay bricks which are locally best available as per sample kept in GE office and water absorption of bricks shall not exceed 20% (Twenty Percent). Sampling and testing of bricks shall be carried out as per IS-5454 (1998). Brick and brick tiles shall be old size brick and old size tiles as mentioned in Para 5.6.3 MES Schedule (Part-I). Thickness of brick tiles shall be 40 mm.
- 6.2 In case of deviation the brick work shall be priced at appropriate rate for sub class 'B' bricks as given in MES SSR irrespective of the fact that bricks of minimum compressive strength of 75 kg per sqcm shall be/have been used in the work.
- 6.3 The bricks shall be soaked in water before incorporation as mentioned in Clause 5.22 of MES Schedule (Part-I).

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- 6.4 **Cement:** Refer clause 4 here-in-before.
- 6.5 **Sand:** Refer Para 5.4, 5.4.1 and 5.4.2 of MES Schedule (Part-I).
- 6.6 Unless otherwise specified here-in-after and/or shown on drawings, brickwork in various situations shall be built in cement mortar as under: -

(i)	Brick work in half brick thick and under, brick work in independent pillars and reinforced brick work.	-	Cement mortar (1:4)
(ii)	Brick work in all other situations including foundation.	-	Cement mortar (1:6)

- 6.6.1 Half brick thick wall shall be reinforced with two No 8mm dia TMT bars horizontally at every fourth course starting from floor level and anchored in walls/column at junction. The anchorage length provided shall be not less than 100mm.
- 6.6.2 In framed structures RCC band shall be provided all as per details shown in Drgs and if not shown/mentioned on Drgs then RCC bands of size width equal to full width of wall and depth 100mm with four Nos 8mm dia high yield strength deformed TMT bars as longitudinal reinforcement and 8mm dia TMT bars links, stirrups/ spacers at 150mm centre to centre shall be provided at lintel or opening level throughout the length of walls. Panel walls shall be bonded with RCC column with cement mortar (1:3).
- 6.7 Width of concrete lintels, beams, cills, columns and the like coming in conjunction with bricks walls/ pillars shall be kept to the actual width of brick work of that place unless off sets have been specifically shown in which case the width as shown on drawings shall be maintained.
- 6.8 Centre line dimension of rooms, verandahs, etc shown in drawings shall be maintained. Internal and overall dimension, if at variance from whatever shown in drawings, shall be deemed to have been amended accordingly as shown on drawings.
- 6.9 Mortar bed joints shall be such that four course of brickwork and three joints taken consecutively shall measure 3cm to 4cm in addition to the combined height of bricks themselves. The provision regarding above made in para 5.27 of MES Schedule (Part-I) shall be deemed to be modified accordingly and no price adjustment shall be done on this account.
- 6.9 **EFFLORESCENCE TREATMENT TO ALL EXTERNAL WALLS:** - Following treatment shall be provided to external walls from plinth protection to bottom of window cill level:-
 (i) Clean the surface to remove loose particulars or any efflorescence on bricks.
 (ii) Application of Silane Siloxane based water repellent coating FOSROC NITOCOTE SN 522 (or equivalent of SIKA/Berger/ Asian Paints/Pidilite Dr Fixit) by evenly spraying or brushing (coverage approx. 7 Sqm per Ltr of NITOCOTE SN 522).
- 6.9.1 **Masonry in walls:** Fly ash Bricks shall not be used above lintel level. Instead, PCC block/AAC blocks or Burnt clay bricks to be used to avoid cracking in walls.
- 6.9.2 **Cracks prevention at joints of RCC & brickwork internally:** 145 GSM fibre glass mesh with 5x5mm or 4x4mm mesh size should be provided under plaster at the joints for 100-125 mm on either side of joints.
- 6.9.3 **Junction between brick wall and RCC column:** Flat iron 40 x 3mm or 8mm dia bars (02 No's) 40cm long dowel bar shall be provided at every fourth course of brickwork at the junction between brick wall and RCC columns.
- 6.10. **AAC (AUTOCLAVED AERATED CONCRETE) BLOCK MASONARY**
- 6.10.1 **GENERAL:** - AAC (Autoclaved Aerated Concrete) blocks are light weight concrete blocks made by introducing air or other gas into the cement or lime slurry resulting it lighter than the cement concrete blocks. All external wall & internal wall shall be provided with AAC Blocks.
- 6.10.2 **DIMENSION:** - Nominal dimension of Full Size AAC Blocks
 For 230mm thick wall: 600mm x 230mm x 200mm (LxBxH)
 For 150mm thick wall: 600mm x 150mm x 200mm (LxBxH)
- 6.10.3 **PHYSICAL REQUIREMENTS OF AAC BLOCKS:** - AAC Blocks shall be as per IS 2185 (Part-III), AAC blocks used for the masonry work should be sound, free from cracks or other defects which interfere with proper placing of block units, impair strength or performance of the construction. The important requirements are listed below.
 (a) **Block density:** The minimum density should be 651-750 kg/cum (Grade-I).
 (b) **Compressive strength:** The minimum Compressive strength, being the average of twelve units when determined as described in IS 6441(Part-V) should not be less than 5 N/sqmm.

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6.10.4 DESIGN CONSIDERATIONS; -

(a) Autoclaved Aerated Concrete (AAC) blocks shall not be used in foundations and for masonry below damp-proof course.

(b) Construction of AAC block masonry shall be as per IS: 6041.

(c) **Wall thickness**: The wall thickness shall be designed in accordance with the provisions of IS: 1905 to meet the strength and stability. The minimum thickness of non-load bearing wall shall be 100mm and 200mm for internal and external walls respectively. For load bearing wall it should not be less than 150mm and 200mm for internal and external walls respectively.

(d) The maximum horizontal and vertical dimension of wall should be in accordance to IS: 1905. It is not recommended to have long span AAC block wall without RC/ stiffeners.

(e) Crack prevention: Various measures for the crack prevention as under will be provided as per clause 4.6.2 to 4.6.6 of IS 6041: 1985.

(i) Nominal Bond beams shall be provided with two Nos 8mm #Fe-500 bars, width equal to wall thickness spaced every 1200mm along the height will be provided as per IS 6041.

(ii) Ensure the levelling bed of 15mm is used to ensure perfect level across all the blocks in the first course and there on.

(iii) Structural Bond beams to be provided as structural members at floor level, at the top of the door openings (serves as lintel) and below the cill of the opening. The grade for the bond beam in this case should not be lower than M-30 and the reinforcement should be two Nos 12mm# bars as described in clause 4.7.2 of IS 6041: 1985 unless specified otherwise in the drawings.

(iv) RC bond beams as shown Fig-1 of IS 6041-1985 to be provided at sill level.

(v) AAC Blocks shall be stored in such a way so as to avoid any contact with moisture on site (refer clause 5.1 of IS 6041:1985).

(vi) AAC Blocks will not be wetted before or during the laying in the walls; in case the climatic condition so required, the top and the sides of the blocks may be slightly moistened (Refer IS 6041 - 1985 clause 6.1).

(vii) Vertical reinforcement 12mm Fe-500 bar @ 450 mm c/c will be provided when gap between two columns exceeds 3 meters.

(f) **AVOIDANCE OF HEAVY LOADS**: Heavy loads due to heavy fittings like huge commode to 100mm AAC wall shall not be provided.

(g) LAYING:

(i) The construction should be made by the trained mason only. AAC blocks should be laid carefully to avoid damage and cracks in the wall.

(ii) The foundation/beam needs to be chipped off with uneven cement deposits and dust cleaned with water.

(iii) Each blocks needs to be made wet with a sponge on all sides of mortar contact surface and place them one by one and press it firmly to have proper bond without any level difference and fill joints between the blocks by same mortar (Blocks should not be soaked).

(iv) AAC Block Masonry shall be provided with polymer modified ready mix cement mortar. The mortar thickness shall be 6 mm (Refer IS 6041-1985 clause 7.1). First course of masonry should be laid carefully. Checking should be done after laying 3 to 4 blocks in the masonry.

(v) The proper construction workmanship should be followed as described in IS 6041: 1985.

(vi) True masonry bond should be provided between the intersecting walls as stated in clause 10.1 of IS 6041:1985.

(vii) When full depth of blocks course is not available, the gap shall be filled with PCC M-10 (nominal mix) using 20mm graded aggregate.

(viii) Manufacturing of blocks is carried out as per the provision in the IS.2185(Part-3) 1984. AAC Blocks shall be set and joined in Polymer modified ready mix cement mortar for 100mm, 150mm & 200mm thick wall. As per the exposure conditions, external plastering is applied with different thicknesses (refer clause 12.1.3-12.1.6 of IS 6041: 1985)

(ix) **Filling of holes**: Any hole left in the AAC block masonry work for the purpose of centering/scaffolding shall be filled up with cement concrete M-10 (using 20mm graded aggregate) and mixed with WPC as per Manufacturer's instructions.

(h) PROVISION FOR DOOR AND WINDOW: -

(i) Door and window frames are attached to the masonry by flooring nails of size 200mm which are spaced not more than 400mm and the first nail should not be farther than 200mm from

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a corner. Vertical reinforced concrete studs are provided to attach the frame to the masonry (refer clause 8 of IS-6041: 1985).

- (ii) Lintel bond beam shall also be provided on top of the door openings in the internal as well as external wall where lintel beam has not been provided in the drawings.

(j) **TESTS** :- The tests, bulk density, compressive strength, moisture content and thermal conductivity should be conducted with same specimen. Tests to be carried out as per policy to determine various physical properties of AAC are listed below;-

- (i) **Block Density**: Unit weight or density of the AAC block should be determined in the manner described in the IS 6441 (Part I) -1972.
- (ii) **Compressive strength**: Compressive strength test should be carried out as per the provision in IS 6441 (Part-V): 1972.
- (iii) **Thermal conductivity**: Thermal conductivity test of AAC blocks should be conducted in accordance with IS 3346:1980. The result should confirm the values as in Table 1 of IS 2185 (Part-III): 1984.
- (iv) **Drying shrinkage**: Drying shrinkage test on AAC blocks is performed as per the provision in the code IS 6441 (Part II): 1972.

(k) **CODES TO BE FOLLOWED:**

- (i) IS-2185 (Part-3): 1984-Specification for concrete masonry units (Autoclaved Aerated Concrete).
- (ii) IS-6041 Part-I to Part-IX- Methods of test for AAC products
- (iii) IS 6041 - Best practice for construction of AAC block masonry.
- (iv) IS 1661 - Best practice for application of cement and cement-lime plaster.
- (v) IS 1905: 1987 Code of practice for structural use of unreinforced masonry

MAKES: SIPOREX (ECOLITE), BIRLA AEROCON, HIL Ltd Hyderabad, Xtralite ULTRATECH, Godrej Constructions, Ambuja Cements Ltd or any make approved by CWE.

7. **ROOFING**

7.1 **NEW RCC ROOF**

7.1.1 RCC roof shall be provided all as shown on drawings and as specified hereinafter and in MES Schedule (Part-I). RCC roof slabs shall be casted to slopes as indicated in drawings. Where different slopes are indicated for same location, slopes as indicated in structural drawings shall be

7.1.2 After RCC slab is cured and fully set, ponding shall be done over RCC slab by filling water, which shall be kept there for one week (in case of roof slope upto 1:20).

Note:- (i) Raw concrete surface SHALL NOT be treated with cement plaster when concrete is green.

(ii) No coving shall be provided after the RCC slab is cured & fully set at junction of roof and parapet.

(iii) No ponding test to be carried out if roof slope is more than 1:20.

7.1.3 In case the slightest indication of seepage/leakage is noticed, the same shall be rectified by injection grouting to seal all cracks or application of Polymer modified mortar FOSROC Nitobond SBR or equivalent of M/s MC Bauchemie/CIPY/ SIKA/ Pidilite Dr Fixit/ Asian paints/ Thermax/ STP/ Berger admixed with Integral WPC or cementitious crystalline waterproofing compound in the affected area to seal all cracks and micro cracks if any, and this shall be done by contractor at his own cost.

7.1.3.1 Roof surface shall be rechecked for water tightness by Ponding Test (in case of roof slope upto 1:20) and this stage shall be passed by GE.

Injection grouting: - At places of dripping, injection grouting to be done using cement slurry admixed with FOSROC Cebex 100 an expansive grout additive admixed at 225gms/bag of cement or equivalent of M/s MC Bauchemie/ CIPY/ SIKA/ Pedilite Dr Fixit/ Asian Paint/ Thermax/ STP/ Berger. The fixing and spacing of nozzles and the injection pressure shall be as per manufacturer's instructions.

Cementitious crystalline waterproofing treatment: - To be done at places of dampness. Providing and applying crystalline slurry of hydrophilic in nature for water proofing treatment to RCC roof slabs, prepared by mixing integral crystalline slurry with water in ratio as per manufacturer's instructions and applying the same with the help of synthetic fibre brush on horizontal/sloping surfaces as required. Number of coats shall be required at site and applied as per manufacturer's instructions. Make: FOSROC-Brushbond TGP system and equivalent of M/s MC Bauchemie/ CIPY/ SIKA/ Pidilite Dr Fixit/ Asian paints/ Thermax/ STP/ Berger.

Note:- Cementitious crystalline water proofing compound reacts with moisture in cracks and micro cracks to form crystals and thus result in sealing of cracks and micro-cracks of concrete.

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7.2 **WPT FOR NON-ACCESSIBLE ROOF:** Apply Polyurethane waterproofing coating on prepared concrete surface of roof slab & up to 300mm of parapets and crumple joint including junction of roof and parapet. This stage shall be passed by the GE. Roof surface shall be left without any further treatment.

Method: Cleaning the surface and applying two coats FOSROC Brushbond Roof Guard Premium (minimum 0.8mm dft) over a priming coat of Nitoproof WB Primer or equivalent product of Asian paints, M/s MC Bauchemie/ CIPY/ SIKA/ Pidilite Dr Fixit/ Thermax/ STP/ Berger applied as per manufacturer's instructions.

7.3 **WPT FOR ACCESSIBLE ROOF:** Apply Polyurethane waterproofing coating on prepared concrete surface of roof slab & up to 300mm of parapets and crumple joint including junction of roof and parapet. This stage shall be passed by the GE.

Method: Surface preparation of the substrate.

(a) Coving applying at wall slab junction using FOSROC NITOBAND TPE or equivalent with the liquid apply water proofing membrane applied in such a way that the NITOBAND TPE is sandwich between layers of the waterproofing coats.

(b) Applying NITOPROOF WB primer or equivalent on the prepared substrate.

(c) Applying two coats of NITOPROOF 650 PU or equivalent water proofing membrane.

(d) Applying 80mm average thick thermal insulation layer of NITOFoam 45 or equivalent PU form, density ~ 40 kg/cum, thermal conductivity ≤ 0.023 w/m-k, applied monolithically and top surface sloped to achieve 1:40 slope over the cured waterproofing membrane, in multiple layers.

(e) Applying two coats of NITOPROOF 630 PU or equivalent waterproofing membrane over the PUF insulation layer as a sealer coat.

(f) Applying Geotextile (150-200 gms) laid continuously with 150 mm over laps acting as a mechanical protection and separator layer.

(g) Applying 25 mm thick M-20(Nominal Mix) grade protection screed including saw cutting of 3m x4m panels within 24 hours of concrete placement and filling the groove with expanded polythene backer rod keeping the top appx 10mm depth open and sealing the groove on the top after 28 days of concrete placement with PU sealant and making angle fillet of 100mmx100mm using M-20 grade concrete at corner compacting, curing for 7days complete

(h) Applying NITOLITE MPA or equivalent a high performance, polymer modified tile adhesive conforming to IS 15477: 2019, type 4.

(j) providing and laying roof tiling with 8mm thick 300mmx300mm ENDURA-JOHNSON (or equivalent) cool roof tiles, white colour, having solar reflectance index (SRI) ≥ 78 and min 5% recycled content, confirming to ASTM E 1980, EN673 AND EN 411.

(k) Tiles shall be laid with 3mm spacing pointed with NITO TILE grout or equivalent as specified.

7.3.1 **SPECIFICATION:** Nonwoven geotextile fabric (vapour separation & protection layer) provide and lay nonwoven geotextile fabric, made from polyester filament or polypropylene fiber, needle-punched and thermally bonded, with the following minimum properties:

Mass per unit area: 150-200 G/M²

Thickness: ≥ 1.2 mm (ASTM D5199)

Grab tensile strength: ≥ 325 n (ASTM D4632)

Puncture resistance (CBR): ≥ 950 n (ASTM D6241)

Elongation at break: $\geq 50\%$

Water flow rate @ 5 cm head: ≥ 90 l/m/s (ASTM D4491) apparent opening size (AOS): ≤ 90 microns (ASTM D4751)

Uv resistance: $\geq 70\%$ retained strength after 500 hours (ASTM D4355)

The geotextile shall be laid continuously over the PU foam insulation layer, with minimum 150 mm overlaps, and joints sealed using Butyl tape or heat bonding. it shall act as a mechanical protection layer, separation barrier, and drainage interface between insulation and overlying waterproofing or screed layers. (Suggested Manufacturer's: - OCEAN GLOBAL GEOSYNTHETIC, SUPREME GEOTECH, KHATOR TECHNICAL TEXTILES LTD.)

7.3.2 Equivalent products mean equivalent products from FOSROC / ASIAN PAINTS / MC BAUCHEMIE / CIPY / SIKA / PIDILITE DR. FIXIT / THERMAX / STP / BERGER all work shall be completed as per manufacturer's specifications and under the direction of the Engineer-In-Charge. Comparison chart of waterproofing treatment products given in Appendix 'H'.

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7.4 **WPT IN BALCONY**:- Apply Polyurethane waterproofing coating on prepared concrete surface of roof slab & up to 300mm of parapets. This stage shall be passed by the GE.

Method: Cleaning the surface and applying FOSROC Brushbond Roof Guard Premium (minimum 0.8mm dft) over a priming coat of Nitoproof WB Primer or equivalent product of Asian paints, M/s MC Bauchemie/ CIPY/ SIKA/ Pidilite Dr Fixit/ Thermax/ STP/ Berger applied as per manufacturer's instructions.

7.4.1 Further, provide a polypropylene/ polyester, nonwoven geotextile fabric of 150 gsm. Followed by cement screed 15mm in CM (1:4) in slope over that 7-8mm thick non-skid colour tiles are laid. While laying tiles, care should be taken to see that joints between tiles are kept minimum and joints are thoroughly filled with FOSROC Nitotile grout polymer based joint mortar or equivalent products of Asian paints/ M/s MC Bauchemie/ CIPY/ SIKA/ Pidilite Dr Fixit/ Thermax/ STP/ Berger applied as per manufacturer's instructions.

7.5 Outer wall of lift well below plinth beam: Applying two coats of FOSROC brushbond aqua protect (of total WFT 1000 micron) or equivalent over a coat of primer as per manufacturer's instructions.

7.6 The work shall be carried out as per manufacturer's specification and application methodology. Execution to be done with authorized trained/skilled applicator of manufacturer as per the technical guideline laid by manufacturer. Company back guarantee to be given by contractor after completion of Water Proofing work before payment. A triparty MoU between contractor, company and applicator shall be submitted before commencement of WPT work.

7.7 **WATER PROOFING TREATMENT OF UG & OVERHEAD RCC TANKS**:-

7.7.1 IS: 6494 and IS: 3370 provide guidance in methods to be adopted for construction of water-tight underground structures and provisions relating to waterproofing including other provisions relating to construction technique, quantity of material, etc which are important for overall waterproofing. Concrete should be watertight in itself and waterproofing methods should be looked upon as additional safety devices only.

7.7.2 The following water proofing treatment to joints of wall and base slab of tank shall be carried out to prevent leakage of water from inside to outside & seepage from outside to inside the tank and any deterioration of the reinforcement: -

i) **Cleaning**: Sand blast and water wash internal and external side of walls and base of the tank with high pressure water jet to remove loose concrete so that the surface is free from frost, surface laitance and contamination free from loose aggregate or other sharp protrusions with smooth finish for application of waterproof priming coating.

ii) **Strip sealing of joints**: Chisel hammer V-groove for a depth of 25-35 mm all the cold construction joints [both vertical and horizontal including the kicker joints and also remove skin of concrete (slurry of higher lift of concrete on lower lift) upto 3 mm to expose cold joints clearly] to a minimum width of 100 mm, 50 mm above and below the joint; for clear identification of construction joint line of wall casted in lifts (which is not in a straight line). This happens to be the main source of all the seepages in tank if there is no honey combing in concrete due to improper compaction. Fill the V-groove with polymer modified mortar using FOSROC Nitobond BR or equivalent over compatible epoxy priming coat as per manufacturer's instructions.

i) **Water test**: After completing water proofing of joints, water ponding test to be carried out by filling water in tank.

ii) **Grouting**: If at all leaking points or damp points arise, it should be marked from outside & inside the tank for pressure grouting. Open the joints near the area of seepage/leakage again to locate exact point of seepage/leakage. The seepage points to be drilled to a depth of nearly half the thickness of wall, fix a PVC nozzle at 45° angle with FOSROC Renderoc plug and cure, If area of seepage is large, fix multiple PVC nozzles for grouting as required. Strip seal the balance opened joint with FOSROC Nitobond SBR and cure. Pressure grout with Nitofill WS 60 (PU Foam) to arrest the leakages and followed by injecting Nitofill UR 63 (Epoxy Resin) to permanently seal the leakage.

iii) **Crack Treatment**: All visible cracks on RCC shall be chased to a 5 mm x 5 mm groove and filled using FOSROC Nitoseal PU40 or equivalent.

iv) **Water test to be repeated**: After completing grouting and crack treatment, water ponding test to be again carried out.

v) **Case-1: Water proofing treatment (WPT) for Non-potable water tanks** :Applying two coats of FOSROC Brushbond Aquaprotect (of total WFT 1000 micron) or equivalent over a coat of primer as per manufacturer's instructions for complete internal sides of tank.

Case-2: Water proofing treatment (WPT) for Potable water tanks: Applying two coats of food grade epoxy coating of FOSROC Nitocote EP 405 (of total DFT 200 micron)

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or equivalent over a coat of primer as per manufacturer's instructions for complete internal sides of tank.

viii) **Water test post WPT**: The water ponding test to be conducted after 48 hours of the final waterproofing membrane application. Any leakages shall be treated with PU Injection grouting.

Equivalent makes of: FOSROC/ BASF/ MASTER BUILDER/ ASIAN PAINTS/ SIKA/ PIDILITE DR FIXIT to be used. Comparison chart of waterproofing treatment products given in Appendix 'H'.

7.8 **GUARANTEE PERIOD FOR ROOF TREATMENT/ WATER PROOFING TREATMENT** ;The work shall be carried out as per manufactures specification and application methodology Execution to be done with authorized trained skilled applicator of manufacturer as per the technical guideline laid by manufacturer. Company back guarantee to be given by contractor after completion of Water Proofing work before payment A triparty MoU between contractor, company and applicator shall be submitted before commencement of WPT work.

- (i) The contractors shall be responsible for keeping the buildings leak proof/ water proof for a period of Ten years from the certified date of completion of work.
- (ii) The contractor shall furnish guarantee in favour of the Garrison Engineer for the effectiveness of the water-proofing treatment during the guarantee period. If the work is executed through a Sub Contract, the guarantee furnished by the Sub Contractor should be in favour of the Garrison Engineer and not in favour of the main Contractor.
- (iii) An appropriate sum, equal to the amount of security deposit calculated as per scales laid down for individual securities deposit on the amount of water proofing treatment at the contract rates under the contract, shall be retained out of the final bill amount as Security Deposit for the water-proofing work, and it shall be released to the Contractor only after the expiry of the guarantee period. The facility of furnishing fixed deposit receipt/ BGB in lieu of the sum to be retained as security may be accepted.
- (iv) Should the GE at any time during the construction or prior to expiry of the said guarantee period of Ten years find that the building(s) are leaking, the contractor, on demand in writing from the GE will forthwith undertake to carry out such treatment which may be necessary to tender the water proofing/ leak proofing of the building (s) at his own cost/expense till expiry of the guarantee period.
- (v) In the event of contractor's failure to comply with the GE's directions within the stipulated period. The work shall be carried out at the risk & cost of the contractor.
- (vi) The contractor shall provide a plaster tablet of requisite size in situation as decided by the Engineer-in-charge on wall of each of the building. The tablet shall be 8mm thick in ready mix cement-based plaster to indicate the contract agreement number, name of contractor, date of completion of work and date of expiry of ten years guarantee for water proofing treatment to RCC roof. The indication will be engraved pattern and painted with enameled paint. The cost of plaster plates, engraving and paint etc is deemed to be included in the unit rates of the bldg(s).

7.9 **RAIN WATER PIPES & FITTINGS**

7.9.1 Refer clause 11.20, 11.20.5 to 11.20.6 of MES Schedule (Part-I). Rain water pipes shall be unplasticized polyvinyl chloride (UPVC) pipes confirming to IS-13592, type 'A'. Unless otherwise indicated in the drawings, rain water pipes shall be of 200 mm bore. Pipes shall be ISI marked and shall have following marking:-

- (a) Manufacturer's name or trade mark.
- (b) Nominal outside dia
- (c) Type 'A'
- (d) Batch number.

7.9.2 Fixing & jointing of pipe shall be as specified in clause 11.20.4 of MES Schedule (Part-I). Fittings for pipes shall be of same make & having minimum wall thickness of 3.2mm. Pipes and fittings shall be fixed to wall all as shown in drawing No. CEJZ/TD-115/2025 sheet 1/1.

7.9.3 Where rain water pipes from higher level are letting out over lower terrace and as well at ground floor, splash stones shall be provided under RWP splash stone shall be of size 750 x 450 x 75mm in PCC (1:3:6) type C-1.

7.9.4 Grating at the inlet of the pipe shall be of cast iron slotted type or dome type weighing not less than 1 kg each as approved by GE.

8. **JOINERY**

8.1 **Seasoning and moisture contents**: Refer Para 7.6 and 7.7 of MES Schedule (Part-I). Moisture contents shall be as specified for Zone-I. Use low VOC adhesives to enhance indoor air quality.

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The VOC levels of the adhesives shall not exceed the following levels: Wood adhesives (< 30 g/L VOC) and construction adhesives (< 70 g/L VOC).

- 8.2 **Species of timber:** Unless otherwise specified, timber to be used in various situations where timber work is shown on drawings shall be of following species: -
- | | |
|--|--|
| (a) Timber frame for wooden doors, vents & windows | : 1 st Class Hard Wood Shisham. |
| (b) Brackets for curtain rods cleats and stoppers of doors | : 1 st Class Hard Wood Shisham |
| (c) All other works unless otherwise specified | : 1 st Class Hard Wood Shisham |
- 8.3 Tolerance in the dimension shown on drawings for the wrought faces of carpenter's work, joinery etc. shall be permissible as specified in MES Schedule (Part-I). No tolerance on factory made shutter's thickness would be admissible.
- 8.4 Unless otherwise specified here-in-after, all woodwork shall be wrought except surface of timber in contact with or buried in brick work/concrete/plaster.
- 8.5 Counter sunk holes for bolts and the like on wrought faces shall be plugged with tightly fitted plugs and planed/finished to match with surrounding surfaces.
- 8.6 Use of nails in joinery and other timber built in items is prohibited. Wood screws of appropriate sizes shall be used.
- 8.7 **Pre-laminated Particle board:** - Pre-laminated particle board where ever shown on drawings shall be of exterior grade pre-laminated one side (exposed side) with decorative choice lamination and other side balancing white lamination. Where both the surfaces are exposed, particle board shall be with both sides decorative choice lamination.
- 8.8 **Veneered particle board:** - Veneered particle board where ever shown on drawings shall be of commercial type and as per clause 12.14 of MES Schedule (Part-I).
- 8.9 **Laminated sheets:** Laminated sheets where shown on drawings, shall be plastic laminated sheets of 1 to 1.5mm thick natural teak finish.
- 8.7 **uPVC DOOR AND FRAME:** - uPVC door & frame shall be factory made white colour Two track two panels sliding glazed door made of (big series) frame 67 x 50 mm & sash 46 x 82 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of door above 2.00 sqm upto 5.00 sqm) comprising of uPVC multi-chambered frame, with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension uPVC, extruded glazing beads, uPVC extruded interlock and uPVC extruded line sash adaptor (if required), EPDM gasket, wool pile, zinc alloy (white powder coated) handle with key on one side of extreme panels along with zinc plated mild steel multi point locking having transmission gear with keeps, zinc alloy (white powder coated) crescent lock (if required), stainless steel (SS 304 grade) body with adjustable double nylon rollers (weight bearing capacity to be 120 kg), G.I. fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mired cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, complete all as specified and directed by Engineer-in-Charge. (Glass or wire mesh shall be paid separately).

Note: For uPVC frame and sash extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable. Variation in profile dimension in higher side shall be accepted but no extra payment on this account shall be made.

- 8.8 **Flush door shutters**
- 8.8.1 Flush door shutters shall be as per para 8.25 of MES Schedule (Part-I). Flush door shutters shall be solid core type with block board core conforming to IS-2202 Part-I. Battens for core shall be of 2nd class hard wood kiln seasoned glued each other and bonded with phenol formaldehyde synthetic resin BWR grade. Flush door shutters shall be non decorative (Commercial type). Rebate shall be made in double leaf shutters by providing rebating of teak wood 12mm thick at meeting style. Shutters shall be 35mm thick with vision/ without vision glazed as shown on drgs.
- 8.9 **Block Board Shutter**
- 8.9.1 Block board shutters shall be interior grade commercial type having commercial face veneers on both faces confirming to IS-1659. The block board shutters shall be bonded with BWR type adhesive. Thickness of the shutters shall be as shown on drgs.
- 8.9.2 Edging shall be 6mm thick of 1st class hard wood (Shisham) bonded with fevicol or movicol and nailed with head less nails to the shutters at 20cm centre to centre. However in double leaf shutters the edging in the meeting edge shall be 12mm thick instead of 6mm thick and rebates shall be made in the meeting edge.
- 8.9.3 Wooden surface embedded/ in contact with concrete/ brick work/ plaster etc. shall be clean sawn. All other surface of woodwork shall be wrought.

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- 8.10 If thickness is not specified/ shown on drawings, shutters of cabinet, officers cup board and loft shall be 18/19mm thick one side decorative exterior grade PF bonded flat pressed 3 layered melamine faced pre-laminated wood based particle board BWR type with 6mm thick teak wood lipping, all round as per IS-3087 fixed with piano type hinges.
- 8.11 **Anti-termite preservative treatment to wood work before painting:** All natural timber surfaces except those in ply/ particle board and in factory made paneled/ glazed shutters which shall be internally treated in factory, shall be treated with two coats of any of the approved chemical such as modified hot and cold with copper chrome arsenic or with acid cupric chromate composition with minimum quantity of chemical impregnated per cubic metre of timber not less than 4 Kg as per IS-401 or ASCU etc. as directed by GE for protection against termite. The quantity and application of chemicals shall be as per manufacturer's instruction. Cost of anti-termite treatment to woodwork is deemed to be included in the cost of building work under Schedule 'A'. Woodwork shall be painted or polished as specified after second coat of anti-termite chemical has completely dried.
- 8.12 Rates given in MES Schedule (Part-II) for factory made shutters, particle board and plywood are deemed to include for the treatment of anti-termite of the timber.
- 8.13 Unless otherwise shown on drawings, pelmet boxes and shelves in cupboards/ cabinets shall be 19mm thick veneered one side decorative and other side commercial type finish exterior grade phenol formaldehyde bonded flat pressed 3 layered malamine faced pre-laminated wood based particle board BWR type with 6mm thick teak wood lipping all around as per IS-3087.
- 8.14 Thickness of plywood, where not shown on drawings/ specified elsewhere shall be 4mm thick, 3 ply. The finish/ type of plywood, where not shown on drawings/ specified elsewhere shall be with commercial facing veneered on both sides BWR quality.
- 8.15 For pricing deviation, the rates of joinery as given in MES Schedule (Part-I) shall apply to glazed/ gauged type of joinery including for factory made shutters of appropriate type of timber sizes, as shown on drawings. However the rate of factory made panelled shutters in MES Schedule (Part-I) for two panels shall be applicable for two or more panels.
- 8.16 **Pre-laminated Particle board:** - Pre-laminated particle board where ever shown on drawings shall be of exterior grade pre-laminated one side (exposed side) with decorative choice lamination and other side balancing white lamination. Where both the surfaces are exposed, particle board shall be with both sides decorative choice lamination.
- 8.17 **Veneered particle board:** - Veneered particle board where ever shown on drawings shall be of commercial type and as per clause 12.14 of MES Schedule (Part-I).
- 8.18 **Laminated sheets:** Laminated sheets where shown on drawings, shall be plastic laminated sheets of 1 to 1.5mm thick natural teak finish.
- 8.19 **WPC (WOOD POLYMER COMPOSITE) DOOR FRAME:** Unless otherwise shown on drawings, frame for WPC door shall be Factory made single extruded WPC (Wood Polymer Composite) solid door/ window/ Ceosetory windows & other Frames/ Chowkhat of size 45 x 70 mm comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/ wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/ cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm², modulus of elasticity 900 N/mm² and resistance to spread of flame of Class A category with property of being termite/borer proof, water/ moisture proof and fire retardant and fixed in position with MS hold fast/ lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-in-Charge.
- Note:-** For WPC solid door/window frames, **minus 5mm** tolerance in dimension i.e. depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.
- 8.20 **WPC (WOOD POLYMER COMPOSITE) DOOR SHUTTER :** Factory made single extruded WPC (Wood Polymer Composite) solid plain flush door shutter of 30mm size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm², modulus of elasticity 850 N/mm² and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In-Charge. WPC doors shall be of make given in appendix 'B' to these particular specifications as approved by GE.
- 8.21 **FIBER GLASS REINFORCED PLASTIC (FRP) DOOR FRAMES:** - Fiber Glass Reinforced plastic (FRP) Door Frames of cross section 90 mm x 45 mm having single rebate of 32 mm x 15 mm to receive shutter of 30 mm thickness. The laminate shall be moulded with fire resistant grade unsaturated polyester resin and chopped mat. Door frame laminate shall be 2mm thick and shall be

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filled with suitable wooden block in all the three legs. The frame shall be covered with fiber glass from all sides. M.S. stay shall be provided at the bottom to steady the frame, complete as specified by the manufacturer and as per directions of Engineer-in-charge.

- 8.22 **FIBER GLASS REINFORCED PLASTIC (FRP) DOOR SHUTTER**: - 30 mm thick Glass Fibre Reinforced Plastic (FRP) panelled door shutter of required colour and approved brand and manufacture, made with fire - retardant grade unsaturated polyester resin, moulded to 3 mm thick FRP laminate for forming hollow rails and styles, with wooden frame and suitable blocks of seasoned wood inside at required places for fixing of fittings, cast monolithically with 5 mm thick FRP laminate for panels conforming to IS: 14856, including fixing to frames, complete as specified by the manufacturer and as per directions of Engineer- in-charge. FRP frame & doors shall be of make given in appendix 'B' to these particular specifications as approved by GE.
- 9 **BUILDER'S HARDWARE**
- 9.1 Unless otherwise shown/indicated in drawings, the type of the following items of builder's hardware shall be as indicated against them:-
- (a) Ball catch spring shall be of brass.
 - (b) Magic eye shall be of aluminium.
 - (c) Handles for built in cupboards/wardrobes/wooden almirah etc shall be of aluminium alloy fabricated.
- 9.1.1 Irrespective of what is shown in drawings, aluminium anodised hardware shall be provided for MD Offrs Accommodation and to all aluminum doors and windows. Remaining buildings shall be provided with mild steel stove enamelled fittings.
- 9.2 Type of other articles of builder's hardware shall be all as shown in the drawings/ specified elsewhere. At locations where the type is not indicated in the drawings/ specified elsewhere, these builders hardware articles shall be of mild steel stove enameled black Japan.
- 9.3 Size of builder's hardware articles, if not shown in the drawings/ specified elsewhere shall be as directed by GE.
- 9.4 **Butt Hinges**: Irrespective of what is shown in drawings, 04(four) butt hinges on each leaf shall be provided in door shutter except bathroom & WC door shutters. These shall be mild steel medium weight, cold rolled, pin hinges need not be zinc coated. Butt hinges for cleats shall be 50mm.
- 9.5 **Aldrop sliding door bolts**: The sliding bolts shall be provided with 6 No of bolts & nuts. Aluminium aldrop sliding bolt shall be of aluminium alloy extruded section and shall be ISI marked. Dia of bolt shall be 16mm.
- 9.6 **Helical Door Spring**: Refer clause 9.7.8 of MES Schedule (Part-I). It shall be 150mm long of mild steel stove enameled.
- 9.7 **Hydraulic Door Closer**: Refer clause 9.16 of MES Schedule (Part-I). It shall be of designation 3 with anodized aluminium alloy body suitable for doors weighing 61 to 80 Kg, as indicated. Closers shall be universal type suitable for both anti clock wise and clock wise door, without any change in parts of the closer.
- 9.8 **Floor Door Stoppers**: Refer clause 9.15 of MES Schedule (Part-I). The same shall be aluminium alloy body and tongue with hard drawn steel spring. The overall length of cover plate shall be 140mm.
- 9.9 **Handles**: Mild steel handles to door shutters shall be pressed oval type and aluminium handles to door shutters shall be of aluminium alloy fabricated type and shall be ISI marked.
- 9.10 **Hasp and Staples**: Hasp and staples shall be of safety type.
- 9.11 **Continuous (Piano) Hinges**: Continuous (Piano) hinges of mild steel shall be galvanized with oxidized finish. Thickness of the flap shall be to suit the thickness of the style.
- 9.12 **Ball Catch Springs**: Ball catch springs shall be of brass and polished bright all as specified in clause 9.14 of MES Schedule (Part-I).
- 9.13 **Door Springs Rat Tail Type**: All wire gauge shutters shall be provided with door spring rat tail type made of mild steel all as specified in clause 9.7.8 MES Schedule (Part-I).
- 9.14 **Towel Rail**: Unless otherwise shown on drawings towel rail shall be of stainless steel tubular of 'D' shape with flanged ends for fixing. It shall be of 19mm dia and 60cm length in case where the length is not mentioned.
- 9.15 **Towel Ring**: This shall be standard stainless steel towel ring.
- 9.16 **Tie Hanger**: Tie hanger 'D' shaped 300mm long of aluminium-anodized tubular 15mm dia shall be provided as shown on drawings.
- 9.17 **Magic Eye**: Magic eye shall be provided to the entrance doors only of officer quarters at appropriate height. Magic eye shall be of aluminium as directed by the GE and shall be fixed with cadmium plated screws.

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- 9.18 **Aluminium Sheet Lining:** Where wooden doors are specifically indicated to be provided in Bath, WC and toilet; 22 gauge aluminium sheet shall be provided to full width upto top of bottom rail on both sides of these wooden doors. Aluminium sheet shall be in single piece without joint and shall be fixed with cadmium plated steel screws at 20cm centre to centre.
- 9.19 **Tower bolts:** Refer clause 9.3 of MES Schedule (Part-I). Mild steel tower bolts shall comply with IS-204 (Part-I) and aluminum tower bolts shall comply with IS-204 (Part-II). Barrel and skeleton tower bolts shall have knob integral with bolts. The dia of bolts shall be 10mm for upto size 125mm and 12 mm for 150mm & above.
- 9.20 **Mortice lock:** Refer clause 9.2.2 of MES Schedule (Part-I). Where shown in drgs, in all aluminum doors, mortice lock of size as indicated in drgs shall be provided. Mortice locks shall conform to IS-2209 and shall be of brass.

10 **STEEL AND IRON WORK**

10.1 **GENERAL**

All steel including structural steel, steel sheets etc for entire completion of work shall be procured by the contractor at his own cost.

10.2 **MATERIALS:**

Size type and Gde of steel shall be as shown on drawing (s) However, if Gde and type of steel are not shown on drawing (s) the same shall be TMT bars Gde Fe-500/ Fe-500d/ Fe-550/ Fe-550d for reinforcement and MS Gde E-250 Fe-410 W (Quality 'A') for structural purposes. Various types of steel are given as under:-

- (i) **Reinforcement Steel:** - High strength deformed steel bars produced by thermo mechanical treatment process of Gde Fe-500/ Fe-500d/ Fe-550/ Fe-550d and meeting all other requirements of IS-1786.
- (ii) **Structural Steel:** -
 - (a) Specification of structural steel as given in clause 10.4 of MES Schedule (Part-I) shall be applicable. Standard quality Gde E-250 Fe-410 W (Quality 'A') conforming to IS-2062 for all types of steel structures including these subject to dynamic loading shall be used.
 - (b) Ordinary quality steel E-165 Gde Fe-290 conforming to IS-1977-1975 for all non structural use viz, doors, windows, guard bars, grills, steel gates, hand railing, fencing posts etc.
- (iii) Galvanised steel sheets (plain and corrugated) shall be conforming to IS-277 of 1985 with medium coating of zinc, nominal 120 g/sqm.
- (iv) Fabric reinforcement for concrete shall be conforming to IS-1566 of 1982.

10.2.1 **PROCUREMENT**

- 10.2.1.1 TMT steel bars irrespective of size shall be procured from main/ primary producer(s) i.e. SAIL/ RINL/ TISCO/ and as per Appx 'B-1' as mentioned here-in-after.
- 10.2.1.2 All structural steel shall be procured from main/ primary producer(s) i.e. SAIL/ RINL/ TISCO and as per Appx 'B-1' as mentioned here-in-after.

Note: - Steel section for railings, gates, fencing, guard bar, steel chowkhats and holdfasts etc, which do not constitute structural members, can be procured from main producers/secondary producers/BIS marked manufacturers or their authorized dealers at the option of contractor without any minus price adjustment. These should also conform to IS-1732 for general engineering purpose. However, tests will not be insisted upon for such steel sections.
- 10.2.1.3 The galvanized iron sheets & fabric reinforcement for concrete shall be ISI marked & shall be procured from main producers.
- 10.2.1.4 Main producers of steel and the approved secondary producers/manufacturers are specified in Appendix 'B' to these particular specifications.
- 10.2.1.5 Reinforcement shall be fabricated, placed in position all as shown on drawings and specified in clause 10.17 to 10.22 of MES Schedule (Part-I) without application of heat.
- 10.2.1.6 All laps and crossings shall be tied with mild steel wire (annealed) of size not less than 0.9mm dia and the cost thereof deemed included in the quoted amount of the contractor.
- 10.2.1.7 For the purpose of calculating the lump sum and making adjustment arising out of deviations involving reinforcement bars, the length of each bar for laps shall be taken as 10 (Ten) metre.
- 10.2.1.8 All finished steel shall be well and clearly rolled to the dimensions, section and weights specified. The finished material shall be reasonably free from cracks, surface flaws laminations, rough, jagged and imperfect edges and other harmful defects and shall be finished in a workman-like manner.

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10.2.1.9 Tolerance on size and weight of reinforcement bars shall not be more than specified in clause 10.17.4 & 10.17.5 of MES Schedule (Part-I).

10.2.1.10 Steel shall be procured from the storage depots of the manufacturers and not from their authorized agents/ dealers.

10.2.2 TESTING OF STEEL

The manufacturer is to carry out inspection and testing of steel in accordance with relevant BIS provisions. The contractor shall submit the manufacturer's Test Certificate in original along with the test sheet giving the result of each mechanical test as applicable and the chemical composition of the steel or authenticated copy thereof duly signed by the manufacturer with each consignment. The site staff and GE shall verify the original documents in support of the purchase of steel. The Engineer-in-Charge shall record these details in a steel acceptance register, as given at Appendix 'F' after due verification and send a certified true copy of test sheet to GE for his records. The GE/CWE shall also organize independent testing of random samples of steel drawn from various lots from National Test House, SEMT wing, CME, Regional Research Labs, Govt. approved Lab, Zonal Labs etc for Normal, Mass, Tensile, Bend & Re bend test of steel as per the following minimum frequency:-

<u>STEEL FOR CONCRETE REINFORCEMENT</u>	QUALITY
1. Bars size less than 10mm	1 Sample; (3 Specimen) for each test for every 25 tonne or part thereof.
2. Bar size 10mm to 16mm	1 Sample (3 Specimen) for each test for every 35 tonnes or part thereof.
3. Bars size over 16 mm	1 Sample (3 Specimen) for each test for every 45 tonnes or part thereof.
<u>STRUCTURAL STEEL</u>	
4. Tensile test	1 Test for every 25 tonne of steel or part thereof
5. Bending test	1 Test for every 10 tonne of steel or part thereof

Note:-

(i) Various tests, acceptance criteria, tolerance, etc. shall be as per Appendix 'F' and relevant BIS codes.

(ii) Independent testing of steel by the GE shall be optional at the discretion of the GE in case of procurement of steel from main producers and testing charges shall be borne in accordance with condition 10A of IAFW 2249 i.e. testing charges shall be borne by the Deptt if the test results are found in order otherwise these shall be borne by the contractor.

(iii) Independent testing of steel by the GE shall be mandatory in case of procurement of steel from secondary producers and testing charges shall be borne by the contractor irrespective of the outcome of test results.

(iv) In both the cases at sub para (ii) and (iii) above, the contractor at his cost shall provide all facilities required for the testing.

(v) Cost of materials used in testing including its transportation shall be borne by the contractor and no extra claim what so ever shall be admissible irrespective of test results. Minimum numbers of tests shall be as mentioned here in before. Wherever same is not indicated, it shall be decided by GE.

(vi) For various tests, acceptance criteria, tolerance etc refer appendix 'F' and relevant BIS codes.

(vii) Sample from each lot shall be tested for quality and elongation. The elongation shall not be less than 18%.

10.2.3 DOCUMENTATION

Steel Acceptance Register and measurement Book for steel (for record purposes and as "not to be abstracted") shall be maintained by the Engineer-in-Charge. The contractor shall submit original machine numbered purchase vouchers from the main manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the GE alongwith the relevant documents before acceptance. The original purchase vouchers and the test certificates shall be defaced by the Engineer-in-Charge and kept on record in the office of the GE duly authenticated and with cross-reference to the control number recorded in the steel acceptance register. The steel acceptance register shall be signed by JE (Civil), Engineer-in-Charge, GE and contractor. The entire quantity of all steel items shall also

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be suitably recorded in the Measurement Book for record purposes as “not to be abstracted” before incorporation in the work and shall be signed by the Engineer-in-Charge and the contractor.

10.2.4 STEEL IN COILS ETC

Any bar of any diameter for reinforcement may be procured in round; bundles or coils and the cost of straightening the same shall be borne by the contractor. When bars are procured in bundles, the length of each bundle shall be worked out on the basis of unit weight pre determined by the GE by getting suitable length (not less than 3 metre) out of each consignment(s) received, getting it straightened, length measured and weighed in presence of contractor's accredited representative. The said length(s) and the weight (s) shall be recorded from which unit weight (Weight per unit length) shall be calculated. The length of bars worked out on the basis of unit weight determined as above shall form the basis for the purpose of calculating quantity of steel used/to be used in work and making payment of materials lying at site. However, if the unit weight works out more than the unit weight given in SSR then unit weight given in SSR shall be followed for computing weight of steel for the purpose of making payment of steel lying at site.

10.2.5 STORAGE

- 10.2.5.1 Steel of different sizes shall be stacked separately for each classification of steel. Separate area shall be earmarked. Steel shall be marked with distinct painting marks for easy identification.
- 10.2.5.2 All steel shall be stored at least 15cm above ground level Steel shall be stored in a manner so as to prevent distortion and corrosion. Any section that has deteriorated or corroded or if considered defective by Engineer-in-Charge shall not be used in the work and shall be removed by the contractor from the site of work without any extra cost. It shall be the responsibility of the contractor to make sure that all possible arrangements are made for the safe custody of the steel. In case of any loss of steel, contractor shall only be responsible and the loss shall be made good without any delay and no claim shall be admissible on this account.

SCHEDULING OF SUPPLY

- 10.2.6 Schedule of supply of steel shall be finalised by the contractor with GE and shall be incorporated in CPM chart as that supply of steel is monitored in a way to avoid any delay in the completion of work.
- 10.2.6.1 The complete requirement of steel of various sizes shall be worked out before making any RAR payment and procurement of steel by the contractor shall be completed sufficiently in advance of the date of completion.
- 10.2.6.2 **Payment of steel:** The payment of steel shall only be allowed after production of original purchase vouchers, test certificates by the contractor for each consignment of steel and results of testing if carried out by the department are found satisfactory after testing as specified here-in-before.
- 10.6.3 Samples for each type of windows/ vents with complete fittings shall be produced for approval of the GE. Manufacturer's certificate to the effect that their product conform to IS specification shall be produced by the contractor at the time of submitting samples for approval before procurement of bulk quantity of the materials for incorporation in the work. Samples shall be retained in the sample room of the GE until completion of the work. However, the contractor shall produce manufacturer's certificate for entire quantity as specified above.
- 10.6.4 Steel windows/ vents shall be procured from any of the manufacturers specified in appendix 'B' to these particular specifications.
- 10.6.5 Steel windows/ vents shall be obtained from the firm of which the samples have been approved by the GE.
- 10.7 **MS grills/ guard bars:** MS grills/guard bars shall be provided at locations and as per details shown in drawings including the amendment sheet thereto. Where nothing is shown on drawings, guard bars type 'F' shall be provided to all windows and ventilators.
- 10.7.1 All MS grills/ guard bars (including frame work) shall be painted with two coats of synthetic enamel paint over a coat of red oxide primer.
- 10.8 **Wire cloth:** Refer clause 9.25 of MES Schedule (Part-I) and conforming to IS-1568, wire cloth shall be galvanized mild steel having 0.56mm as nominal dia of wire and average width of aperture as 1.18 mm. Wire cloth in wire gauged shutters of steel windows shall be fixed with fillets all as shown on drawings.
- 10.8A **Stainless Steel wire cloth:** Refer clause 9.25.3 of MES Schedule (Part-I) and shall be stainless steel having 0.36mm as nominal dia of wire and average width of aperture as 1.40 mm. Wire cloth in wire gauged shutters of door/windows shall be fixed with fillets all as shown on drawings.
- 10.9 **Steel doors:** Steel doors shall be all as shown in the drawings. The steel sheets for the steel doors shall be MS 1.00mm thick unless otherwise indicated on the drawings. These shall be factory fabricated and spray painted with two coats of synthetic enamel paint over a coat of primer (factory painted).

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- 10.10 **Rolling Shutter**: Rolling shutter shall be made of 1.25mm thick MS sheet and provided in situations where shown in drawing(s) including top box as specified in clause 10.23 of MES Schedule (Part-I). Other members like curtain, lock plate, guide channel, bracket plate shall be all as specified in clause 10.23.1 to 10.23.11 of MES Schedule (Part-I). Rolling shutter shall be push & pull type where the area of each shutter is upto 10 Sqm and shall be fitted with three ball bearings. Rolling shutter shall be gear operated type with bevel gear box where area of each shutter is exceeding 10 Sqm and shall be fitted with four ball bearings. The rolling shutter shall be painted with two coats of synthetic enamel paint over a coat of primer.
- 10.11 **Collapsible door/gate**: - Collapsible door/gate shall be provided in situation where shown in drawings complete as specified in clause 10.24 and 10.24.1 to 10.24.5 of MES Schedule (Part-I).
- 10.12 **Aluminium Doors, Windows & fixed glazing**
- 10.12.1 Aluminium doors, Windows & fixed glazing shall be provided to the openings as per drawings.
- 10.12.2 Unless otherwise indicated aluminium sections shall be extruded heavy duty anodised powder coated of any colour (thickness of powder coating not less than 50 micron). Thickness of aluminium section shall be 3mm.
- 10.12.3 Standard aluminium beading shall be provided all around the aluminium windows/doors for fixing glazing.
- 10.12.4 Irrespective of whatever shown on drawings or specified elsewhere, the glass panes for aluminium doors and windows shall be of 6mm thick clear float glass. Glazing shall be fixed to aluminium doors, windows etc. with aluminium beading and standard rubber beading/lining.
- 10.12.5 Each door shall be provided with one standard mortice lock of approved make.
- 10.12.6 The aluminium sections shall be procured from approved manufacturers.
- 10.12.7 Each leaf of doors shall be provided with one double action floor spring duly ISI marked.
- 10.12.8 Aluminium handles shall be provided as shown in drawings.
- 10.12.9 All aluminium windows shall be provided with aluminium grills as shown on drawings.
- 10.13 **Fan hook with boxes**: Wherever fan hooks/fan points have been shown, cast iron or MS boxes with hooks as per details shown on drawings shall be provided. Exposed faces shall be given two coats of white paint over a coat of red oxide primer. The cost of the CI or MS boxes with hooks shall be deemed to be included in the lump sum cost of buildings in Schedule 'A' Part-I.
- 10.14 **Expanded metal**: Expanded metal shall be provided as shown on drawings. The size of XPM where not shown on drawing shall be 20mm short way mesh by 50mm long way with nominal weight not less than 4.078 Kg/Sqm. However, where it is used for reinforcement as shown on drawings, it shall weigh exceeding 5 Kgs but not exceeding 8 Kgs per square metre. If used as partitions, the XPM shall be painted with two coats of aluminium paint over a coat of primer.
- 10.15 **Welded steel wire mesh**: Welded steel wire mesh shall be provided as shown on drawings. The size of Welded steel wire mesh where not shown on drawing shall be 20mm short way mesh by 50mm long way with nominal weight not less than 4.0 Kg/Sqm. Welded steel wire mesh shall be painted with two coats of aluminium paint over a coat of primer.
- 11 **FLOORING**
- 11.1 **General**
- 11.1.1 Floors of various types shall be provided as shown in schedule of finishes drawings for various buildings.
- 11.1.2 Floor shall be laid to levels or to falls as shown on drawings/directed by Engineer-in-Charge.
- 11.1.3 Floor finish shall be carried over through all openings, toe wall and dwarf walls.
- 11.1.4 Surface of PCC floors unless otherwise indicated in schedule of finishes shall be finished even and smooth using extra cement with steel trowels. Exposed edge of floors shall be finished to match with top surface finish. Top surface of ramp shall be finished chequered using extra cement.
- 11.1.5 The dividing line between the floors of different type wherever they so meet between adjoining room shall be determined on the basis of finish visible when the doors are closed and the applicable finish shall accordingly be provided. Exposed edge of floors shall be finished to match with top surface finish.
- 11.1.6 Cement concrete in sub base or sub base floor and wearing coat shall be laid separately and not monolithically. Sub base or sub floor shall be laid at a stretch without forming panels and no adjustment shall be made for form work on this account.
- 11.1.7 Graded coarse aggregate shall be crushed stone aggregate.
- 11.1.8 The size of marbles chips in the terrazzo tiles shall be up to 12mm. No black coloured chips shall be used in pre-cast terrazzo tiles.

PARTICULAR SPECIFICATIONS**11.1.9 Glass dividing strips**

(i) PCC floor topping shall be laid in bays/ panels not exceeding 1.2m x 1.2m or part thereof. Glass dividing strips shall be 4mm thick and of required width as per thickness of floor topping and shall be provided in all floors whether shown on drawing or not, except garages, aprons, sheds.

(ii) Bays shall be so formed that not more than 3 strips meet at one point i.e. only 'T' junction is formed.

(iii) Use of all temporary fillets/ side forms shall be dispensed with where glass dividing strips are used. No price adjustment will be made on account of non use of the temporary fillets/ side forms etc.

(iv) Where sunken floor is provided, plastic strips 2.5mm thick and 40mm deep shall be provided at the edge of sunken portion.

11.1.10 Where cast in situ terrazzo finish has been indicated in schedule of finishes drawing, terrazzo precast tiles flooring shall be provided as specified here in below.

11.1.11 Flooring indicated on drawings to be provided on RCC slab shall be laid after applying a coat of cement slurry at the rate of 2 Kg per square metre area.

11.1.12 Grinding and polishing of terrazzo shall be done by machine all as specified. In location where grinding and polishing cannot be done with machine, these shall be done by hand at the discretion of the Engineer-in-Charge. Wax polishing shall not be done to terrazzo floors of toilet WC's bath and kitchen etc.

11.1.13 In case of sunken floor the composition of flooring shall be provided over the lime concrete filling of mix (1:2).

11.1.14 Apron/ramp of all building shall have flooring shown in schedule of finishes and as specified here-in-after. However, where no specific type of flooring has been indicated, floors shall be as that of adjoining floor to which ramp is connected and shall have in addition, chequered finish except where stone sett flooring indicated/ specified.

11.2 TYPES AND COMPOSITION OF FLOORS:

11.2.1 The flooring for all buildings shall be provided as shown on drawings for Schedule of finishes and specified hereinafter.

11.2.2 **Flooring Materials:** Use locally sourced stones such as granite and kota tiles or tiles with at least 5% recycled content. Select materials from the GRIHA product catalogue to ensure compliance. Tenderer can find the product catalogue here: <https://www.grihaindia.org/products-catalogue>.

11.2.3 Base/ Sub base/ Sub floors for all types of floors shall be provided as per drawing for schedule of finishes and as specified below:-

<u>Situation</u>	<u>Composition</u>
(a) Ground floors	: Unless specifically indicated otherwise, base/ sub base/ sub floor shall consist of following:- PCC (1:5:10) type E-2 (using 40mm graded stone aggregate) over HDPE sheet of 1.5mm thick as indicated in drawings over rammed earth. In case thickness is not shown, it shall be 75mm thick (minimum). In case of garages/repair bays/Parking, thickness shall be 150mm thick.
(b) First floors	: Topping layer as specified here-in-after on RCC slabs after applying neat cement slurry @ 3 Kgs of cement per Sqm of RCC slab.
(c) Second & Third floors	: Topping layer as specified here-in-after on RCC slabs after applying neat cement slurry @ 3 Kgs of cement per Sqm of RCC slab.

11.2.4 Topping layer in different locations shall be provided over base/ sub base as indicated in Schedule of finishes and pattern as per drawing CEJZ/TD-116/2025 sheet 1/1 to the following specification:-

(A) CEMENT CONCRETE FLOORS (PCC FLOORING)

(a) PCC (1:2:4) type B-1 (using 20mm graded stone aggregate) shall be provided where PCC floors are indicated in drawings. Thickness of PCC floors shall be as indicated therein. If thickness is not shown, it shall be 50mm thick finished even and smooth using extra cement.

(B) NON-SKID CERAMIC TILES FLOORING

(a) The ceramic tiles shall be of size as given in the schedule of finishes drawings, If not mentioned then 7 to 8mm thick mat finish light coloured and printed pattern, non-skid of approved make. Ceramic tiles shall be jointless.

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- (b) Tiles shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match with colour of tiles.
- (c) The tiles shall be laid over a cement screed 20mm thick average in cement mortar (1:6). Ceramic tiles shall be jointless.
- (C) **PCC Pavement (inter-locking) tiles flooring:** Wherever shown in schedule of finishes, epoxy coated PCC pavement tiles shall be 80mm thick of M-40 (design mix.) inter-locking type; set in cement mortar (1:6) and laid over 30mm thick sand cushion over 100 thick PCC (1:4:8) type D2 over 1.5mm thick HDPE sheet over rammed earth. Tiles shall be of make Eurocon/ Duracrete as approved from GE.
- (D) **KOTA STONE FLOORING**
- (a) The size of Kota stone slab shall be 550 x 550mm, 15-16mm thick, machine cut. In case of steps/ stair case, Kota stone shall be in one piece upto 1.50 metre length.
- (b) Kota Stone slab shall be laid over 15mm thick screed for ground floor and 20mm thick for 1st floor & above in cement mortar (1:3), jointed and pointed with white Cement Mortar and pigment to match the colour of Kota stone and mirror polished.
- (E) **MARBLE FLOORING**
- (a) The size of marble slab shall be 500mm x 500mm, 18-20mm thick, machine cut and wax polished. Marble shall be Makrana doogri Adanga white Marble.
- (b) Marble slab shall be laid over 20mm thick screed in cement mortar (1:4), jointed and pointed with white Cement Mortar and pigment to match the colour of marble stone and polished as specified.
- (F) **PCC chequered tiles flooring:** The size of PCC chequered tiles shall be as indicated in Schedule of Finishes. In case the same is not indicated it shall be 300mm x 300mm x 25mm thick in PCC (1:2:4) type B-0 laid over 20mm thick screed in cement mortar (1:4), jointed and pointed with grey Cement Mortar as specified.
- (G) **Double charged Vitrified Tile Flooring**
- (a) The vitrified tiles shall be 9-10mm thick & of size as given in the Schedule of finishes drawings. Tiles shall be light coloured printed pattern as approved by GE.
- (b) Tiles shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match with colour of tiles.
- (c) The tiles shall be laid over a cement screed 20mm thick average in cement mortar (1:6) over sub-base or otherwise as given in Schedule of finishes drawing.
- (H) **Udaipur Green Marble:** Udaipur Green Marble shall be provided to steps (risers, treads) & skirting of stair case and shall be of same lot and single piece shall be provided to each step. Marble shall be of uniform colour and laid over 15mm thick screed in cement mortar (1:3) jointed and pointed with white cement and pigment to match the colour of marble stone and polished as specified.
- (J) **Machine Cut Machine polished Granite Stone Flooring/ Dado**
- (i) Granite stone slab in flooring/ dado shall be of selected quality, hard, sound dense & homogeneous in texture, free from defects & conforming to clause 13.12 of SSR Part-I. Thickness of slab shall be 18 to 20 mm. Granite stone slab shall be machine cut machine polished (exposed surfaces only) and shall be provided as per locations shown in drawings. Colour of slab shall be 'Ruby Red' with 'Black' colour in border. Granite stone slab in flooring shall be set, jointed & pointed in neat cement slurry & shall be laid over 20mm thick bedding in CM 1:4 over concrete sub-base/ RCC slab. Joints shall be thin & nearly indistinguishable. In case of dado Granite stone slab shall be fixed over 15mm thick cement mortar (1:3), jointed & pointed in grey cement. The exposed surface shall be machine polished.
- (ii) For platform Granite stone slab shall be in one piece of selected quality, hard, sound dense & homogeneous in texture, free from defects conforming to clause 13.13 of SSR part-I and thickness 18 to 20mm machine cut machine polished (exposed surfaces only) and shall be provided as per locations shown in drawings. Colour of slab shall be 'Ruby Red' or 'Black' as approved by GE. Slab shall be provided in a chase inside the wall at least 25mm deep and set, jointed & pointed in neat cement slurry to match with the colour of the slab. The edge exposed shall be bull nosed as directed by GE.
- (iii) For trades and risers in steps and stair case, granite, slab shall be in one piece of selected quality, hard, sound dense & homogeneous in texture, free from defects conforming to clause 13.13 of SSR part-I and thickness 18 to 20mm machine cut machine polished (exposed surfaces only). The trades shall be engraved with three grooves and edges of trades shall be round/ bull nosed.

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- 11.3.1 Skirting and dado shall be as shown in Sch of Finishes drawing for various buildings. Height of skirting and dado where not indicated in Sch of finishes shall generally be as under:-

(a)	Skirting in all location (except precast terrazzo tiles)	:	150mm
(b)	Dado in toilet with bath/bathroom, toilet without bath, WHB/Urinal, WC, Kitchen	:	Upto full wall height

- 11.3.2 Skirting/ dado shall be returned in jambs, cills and over shelves etc.
- 11.3.3 Wherever skirting is provided, it should be flush with the finished surface or plaster or POP punning of wall. Either chipping masonry suitable by mechanical means or fixing tiles/stone by epoxy tile adhesive.
- 11.3.4 **Cement Skirting/ Dado:** Cement Skirting/ dado shall be provided in locations and specifications as indicated on drawings. Where not indicated in the drawings, 5mm thick setting coat 150mm high in cement mortar (1:2) over 15mm thick screed in cement mortar (1:4).
- 11.3.5 **Glazed/ Ceramic tile dado/ Skirting:** 7 to 8mm thick glazed (ceramic tiles) coloured tiles of size 600x300mm shall be provided on walls over 10mm thick screed in cement mortar (1:4) at locations shown in drawing. Tiles shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match the colour of tiles. The size of tile shown in Schedule of Finishes if at variance shall be deemed to have been amended accordingly.
- 11.3.6 **Kota Stone skirting:** Kota stone skirting where shown in Schedule of Finishes shall be 15 to 16mm thick machine cut kota stone laid over 15mm cement mortar (1:3) screed on wall. It shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match the colour of Kota stone and mirror polished.
- 11.3.7 **Marble skirting:** Marble stone skirting where shown in Schedule of Finishes shall be 16 to 18mm thick machine cut, polished and laid over 15mm cement mortar (1:3) screed on wall. Colour of marble shall be green. Marble stone shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match the colour of marble stone.
- 11.3.8 **Acid proof tiles skirting/dado:** Where shown, acid proof tiles shall be of size 300 x 300mm, 8 to 9mm thick of approved manufacturers. Acid proof tiles shall be laid as per clause 5.48 of MES Schedule (Part-I) including bedding and jointing in chemical mortar as per manufacture instructions as indicated in Schedule of Finishes.
- 11.3.9 **Vitrified Tile Skirting / dado:** 10 mm thick vitrified tiles of coloured printed pattern as approved by GE and of size as given in schedule of finishes drawing shall be provided on walls over 10mm thick screed in cement mortar (1:3) at locations shown in drawing. Tiles shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match the colour of tiles.
- 11.4 Irrespective of whatsoever has been shown on drawings, treads & risers of brick steps and stair case steps shall have the same finish as that of adjoining floor topping. In case of PCC topping laid over treads of brick steps, it shall be 30mm thick PCC (1:2:4) type B-1 and of chequered finish bull nosed. Angle iron nosing where shown shall be provided to treads of steps of stair case and verandah steps all as per shown on drawings. The size of angle iron shall be 35 x 35 x 5mm if not indicated in drawings.
- 11.5 Where floor topping in garages/ repair bays is not shown in schedule of finishes, this shall be considered as 100mm thick PCC (1:2:4) type B-1 with surface finished fair and even without using extra cement laid over 150mm thick PCC (1:5:10) type E-2 over well rammed earth filling including expansion, dummy and construction joints as specified. Joints shall be filled with bituminous sealing compound grade 'A'.
- 11.6 **Plinth Protection:** Unless otherwise indicated, plinth protection where shown on drawings shall be 50mm thick PCC (1:3:6) type C-1 over 75mm thick (consolidated thickness) hard core of broken stone aggregate of not exceeding 63mm gauge over well rammed earth. Plinth protection shall be laid in (1:20) slope. The concrete shall be laid at a stretch not exceeding 3metre in length. Joint gap between adjoining slab, at corners and at junctions of walls shall not exceed 10mm in width and shall be sealed with mastic filling i.e. one part of bitumen 85/ 25 grade mixed with 3 part of sand. Top surface of concrete shall be finished even and smooth without using extra cement. Joints shall be provided at not more than 3 metre interval at corner and as junction of walls. The width of plinth protection shall be as shown on drawing for respective building/structure. Where width has not been indicated it shall be 75cm and toe of plinth protection shall be of size 50mm x 150mm.
- 11.7 **WATER PROOFING TREATMENT TO WET AREA**
- (a) Water proofing shall be provide in complete floor of all wet area (kitchen, bath, WC toilet) of all upper floors of bldgs, walls of all the balconies upto 1m height from FFL, internal face of all the cupboards abutting the external walls on all floor upto full height and floor slabs & local sunk in all kitchen, toilets & balconies on fistr floor & above. WP Treatment shall also be done up to lintel height on walls with internal water supply pipe in kitchen in all floors. WP Treatment shall be provided up to lintel height on all walls of bath, WC & toilets in all floors.

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- Floors:-**
- (i) Clean the RCC surface with wire brush and chisel out and mortar sticking to surface.
 - (ii) Apply FOSROC NITOPROOF 600 PF (min 0.8mm dft) over a priming coat of Nitoproof WB primer or equivalent of Asian paint/SIKA/Berger/Pidilite Dr fixit.
 - (iii) Provide HDPE 1.0mm sheet before laying of any floor finishes.
 - (iv) The top surface of the sunken RCC slab shall be laid with cross slope as indicated in drgs towards the spouts. The min thickness of the RCC slab shall be as specified in the drg.
 - (v) GI pipe 40mm dia medium grade be inserted at the end of lateral slope projecting at least 15cm beyond the outer most projected part of the building below the drain pipe up to two storey construction and 25cm beyond two storey const
 - (vi) All the joints of pipes and traps within the sunken portion shall be sealed properly by epoxy sealant.
 - (vii) All traps in sunken slabs to be enclosed with PCC (1:1½:3) minimum 15cm all around.
 - (viii) The sunken portion shall be filled with a layer of 75mm thick PCC (1:5:10) type E-2 using 40mm graded stone aggregate over brick aggregate layer after carrying out the required tests for CI pipes/ joints/ waterproofing treatment.

- Walls:-**
- (i) Clean the surface to remove loose particles.
 - (ii) Apply one coat of FOSROC NITOCOTE SN or equivalent of Asian paint/ SIKA/ Berger/ Pidilite Dr fixit by evenly spraying or brushing, before plastering/ tiling.

(b) **Guarantee for water proofing treatment:** - Refer clause 7.8 here-in-before.

11.7A **INVISIBLE GRILLS FOR BALCONIES:-** Unless otherwise indicated, invisible grills shall be provided for all balconies and Installation as per manufactures instructions. The cost of invisible grills shall be deemed to be included in the lump sum cost quoted by the contractor against Schedule 'A' Part-I. Specification are as under:-

- (a) 3mm dia of 316 marine grade SS cables with nylon Coating spaced at 50mm vertically and supported horizontally at 1000mm.
- (b) Aluminium channels of 3mm thick (min) for fixing at floor/ceiling.
- (c) Anchor Fasteners 75 mm (min).
- (d) SS 304 screws (Locking, self drill, stiffeners etc).

.12 **PLASTERING AND POINTING**

12.1 **General**

- 12.1.1 External finish shall be taken 15cm below the ground level except where plinth protection/ramp and the like is provided in which case it shall be taken up to the bottom of the plinth protection/ramp.
- 12.1.2 Plaster/ pointing, skirting/ dado shall be returned to in jambs reveals and soffits of lintels/ windows cills etc.
- 12.1.3 All internal plastered /rendered surfaces shall be trowelled even and smooth with steel trowels without using extra cement. All plastered /rendered surfaces shall be finished fair and even. Ensure proper preparation, such as applying chicken mesh wire before cement plastering, to strengthen the bond between AAC blocks and plaster.
- 12.1.4 Unless sand is specifically specified otherwise, sand for plastering shall be 50% fine sand and 50% coarse sand conforming to the samples approved by the GE except for sand faced plaster for which 100% coarse sand shall be used.
- 12.1.5 All corners, angles, junctions and risers shall be truly vertical or horizontal as the case may be and shall be carefully finished. Corners around jambs of opening and junction of walls shall be finished straight and square. 10mm wide groove at the junction of wall and RCC slabs internally and externally to entire thickness of wall plaster shall be provided. Also trowel groove of size 10mm x 6mm shall be provided at junction of wall and RCC columns or any other dissimilar materials e.g. wooden/steel chowkats etc.
- 12.1.6 Internal plaster wherever provided shall be above skirting/ dado. If skirting/ dado does not exist, then it shall be right from floor level.

12.2 **READYMIX CEMENT PLASTER:-** Irrespective of whatever has been indicated in the drawings or elsewhere in the tender documents, ready mixed cement-based plaster shall be carried out as specified here-in-after.

12.2.1 **INTERNAL PLASTER**

- (a) Cement plaster (internal) wherever indicated in drawings for walls shall comprise rendering of 8 mm thick ready mixed cement-based plaster finished even and smooth and including white cement-based putty on plaster surfaces (Makes: ACCOPlast of ACC, Readiplast of Ultra Tech, EasyPlast from Wall Plast, ENDURO PLAST from JSW Cement).

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(b) The plaster work on the concrete surfaces adjoining to wall shall be carried out as per specification for the wall plaster.

(c) Application of ready-mix plaster shall be done as per manufacturer's instructions.

12.2.2 EXTERNAL PLASTER

(a) Cement plaster (External) wherever indicated in drawings for walls shall comprise rendering of 15 mm thick ready mixed cement-based plaster on AAC block masonry in two coats (5 mm thick setting coat with WP compound/liquid as per manufacturer's instructions over 10 mm backing coat) finished fair and even. (Makes: ACCOPlast of ACC, Readiplast of Ultra Tech, EasyPlast from Wall Plast, ENDURO PLAST from JSW Cement), over GI chicken mesh made of 0.9mm thick GI wire 13mmx13mm holes fixed to wall with 40mm long galvanised nails and GI washers having 15mm dia.

(b) Application of ready-mix plaster shall be done as per manufacturer's instructions.

(c) 5mm thick ready-mix plaster in CM 1:4 finished even and smooth without using extra cement over RCC ceiling/soffits of slab/RCC beam/ Chajja/ facia/ Roof Projection and other exposed surfaces of RCC/PCC all as specified

Notes:

(i) Thickness of plaster shall mean the thickness at the protruded part.

(ii) Irrespective of whether indicated in drawing/ specified or not, mortar for external plaster shall be mixed with water proofing compound @ 3% by weight of cement or as per manufacturer's instructions whichever is higher. However, for the purpose of pricing the deviation, the quantity of water proofing compound shall be considered as 3% by weight of cement.

12.2.3 All exposed surfaces of beams columns, lintels, cills seismic bands and the like coming in conjunction with plastered surfaces shall be plastered in the same mortar as for adjoining wall and to the thickness required to bring them in the same plane as that of adjoining plaster.

12.2.4 The internal brick wall surfaces of cup boards and other built-in fixture shall be plastered with 8mm thick ready mixed cement-based plaster mixed with water proofing compound as per manufacturer's instructions.

12.2.5 Plaster groove at junction of wall/ beam/ column: The details given in drawing No CEJZ/STD-232/07 Sh 1/1 shall be followed.

12.3 Pointing: External surfaces wherever shown on drawing to be provided with pointing shall be faced with selected bricks. The pointing indicated on drawings shall be keyed pointing in cement and sand mortar (1:3) as specified in para 14.29.5.3 of MES Schedule (Part-I).

12.4 Sand faced plaster: Sand faced plaster where shown on drawings shall be provided over plastered surfaces (as specified for external plaster) all as per clause 14.21 of MES Schedule (Part-I). Plastered surfaces shall be kept rough to receive sand facing. Sand facing shall consist of one coat of cement and sand mortar (1:4), 5mm thick.

12.5 Grit finish: Grit finish where shown on drawings shall be provided all as per clause 14:23 (Dry Dash finish) of MES Schedule (Part-I) over a rough finish rendering coat of cement and sand mortar 1:3, 15mm thick.

13 WHITE/ COLOUR WASHING/ DISTEMPERING AND CEMENT BASE PAINT

13.1. Use low VOC interior paints, adhesives, and sealants to enhance indoor air quality. The Interior Paints shall not exceed the VOC (Volatile Organic Compounds) limit such as flat paints < 50 g/L VOC) and non-flat paints (< 150 g/L VOC).

13.2 White/colour wash: 3 coats of white wash or 2 coats of colour wash over a coat of white wash shall be provided on wall surfaces as indicated in drawings, all as specified in MES Schedule (Part-I). For white washing on ceiling adequate quantity of zinc oxide shall be added to lime wash for achieving white shade. Skirting and dado are not to be white/ colour washed.

13.3 Distemper in two coats over a coat of primer of clearcolle shall be provided as indicated on drawings all as specified in relevant clause of MES Schedule (Part-I) of make as given in Appendix 'B'.

13.4 Cement base paint: Where shown on drawings/schedule of finishes, external surfaces of walls shall be given two coats of cement base paint over a coat of primer in the manner as specified in relevant clause of MES Schedule (Part-I), of make as given in Appendix 'B'.

13.5 Oil emulsion distemper: Where indicated in schedule of finishes, two coats of oil emulsion distemper shall be applied on prepared surfaces over a coat of alkali resistance primer as specified in clause 15.14 of MES Schedule (Part-I).

13.6 Plastic emulsion paint: Where indicated in drawing(s), two coats of plastic emulsion paint over a coat of primer shall be applied on well prepared surfaces. Plastic emulsion paint shall conform to IS-5411 (Part-I)-1974 & (Part-II)-1972.

13.7 Wherever water based emulsion paint is indicated in internal wall & ceiling Schedule of finishes drawings, it shall be provided in two coats of water bases emulsion (Interior Grade) Asisn paint

Contd...

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(AP) Royale shyne luxury emulsion or equivalent over a coat of primer (AP Royale wall base Primer) low VOC solvent content of 50 Gms per litre shall be provided over two coats of sanded acrylic wall putty conforming to STMD6886 2018 on plastered surfaces.

- 13.8 Wherever water based emulsion paint is indicated in external wall Schedule of finishes drawings, it shall be provided in two coats of water bases emulsion (Exterior Grade) water proof anti-fungal Asisin paint (AP) Apex ultima or equivalent low VOC solvent content of 50 Gms per litre over a coat of AP trucare exterior wall Primer shall be provided over two coats of sanded acrylic wall putty conforming to ASTMD6886 2018 on plastered surfaces.
- 13.9 Before applying priming coat, under distemper, oil emulsion distemper and plastic emulsion paint, plastered surfaces shall be treated with chalk whitening.

14 PAINTING

- 14.1 All synthetic enamel paint, emulsion paint shall be of 1st quality manufactured by the standard firms of makes as per Appendix 'B'.
- 14.1.1 Use low VOC interior paints, adhesives, and sealants to enhance indoor air quality. The Interior Paints shall not exceed the VOC (Volatile Organic Compounds) limit such as flat paints < 50 g/L VOC) and non-flat paints (< 150 g/L VOC).
- 14.1.1 The contractor shall inform the GE within four weeks of the acceptance of the tender, the brand names of the manufacturers of paint proposed to be used in the works and submit sample thereof well in time and obtain prior written approval of the GE before their incorporation in the work.
- 14.1.2 The contractor shall when so required by GE produce certificate from the manufacturers or their representative to establish that the brands of paint purchased by the contractor from them satisfy the requirement of the relevant Indian Standard.
- 14.1.3 Paints for priming coat, under coat and finishing coat shall be of same manufacturer.
- 14.1.4 Tint of paint, if not mentioned in drawings/ Schedule of finishes, will be approved by the GE.
- 14.1.5 Where painting is indicated in schedule of finishes, it shall be done in 2 coats over one coat of appropriate primer unless otherwise specified here-in-after.

14.2 Workmanship

- 14.2.1 Irrespective of what is shown on the drawings or specified elsewhere, no treatment shall be given to reinforcement except the reinforcement to be used in overhead reservoir tank, galvanized steel work, aluminium work and PVC work, iron mongry, builders hardware and GI pipes etc. Steel reinforcement where found rusted shall, however, be given a coat of neat cement slurry.
- 14.2.2 All wood and wood based surfaces unless shown on drawings and specified elsewhere in the particular specification to be treated otherwise shall be prepared, knotted and given two coats (Under coat and finishing coat) of synthetic enamel paint over priming coat. However the bottom edges of door shutters need not be painted and shall be given a priming coat only. Laminated surfaces shall not be painted.
- 14.2.3 All surface of steel and iron work including exposed surfaces of pressed steel frames except reinforcement and galvanised surface or surfaces specified to be treated otherwise or specified to be left untreated shall be prepared and given two coats (under coat and finishing coat) of synthetic enamel paint over a priming coat. The primer shall be red oxide zinc chromate (ready mixed) conforming to IS-2074. Surface abutting with each other (Laps) shall have only priming coat before fixing.
- 14.2.4 All cast iron pipes and fittings other than those which are embedded in walls/ floors or underground shall be given two coats of black bituminous paint after erection in position. Where schedule of finishes shows black Japan/ black enamel paint on steel work, it shall be applied in two coats over a coat of primer.
- 14.2.5 Irrespective of what is indicated on drawings and specified elsewhere, finishing coat and under coat shall be with synthetic enamel paint of one brand only.

14.3 **French polishing:** French polish to wood work where ever shown on drawing shall be provided as per clause 17.7.4 of MES Schedule (Part-I).

14.4 **Aluminium paint:** - Where drawings show aluminium paint on surfaces of steel and iron work, the surfaces shall be prepared and given two coats of aluminium paint over a coat of primer (red oxide).

14.5 Tarring:

- 14.5.1 The backs of wooden and steel chowkats in contact with concrete/brick work/plaster etc and also wooden/ steel surfaces embedded in walls shall be given two coat of tar. Hold fast shall be given two coats of tar and sanded.
- 14.5.2 Unless otherwise specified in the particular specifications, portion of iron and steel members embedded in or in contact with brick work/ concrete and hold fasts/ lugs shall be treated with tar

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(One thick coat) and sanded before being built in. Surface of pressed steel frames and ends of steel windows in contact with PCC/ mastic filling shall also be tarred with two thick coats.

14.6 **Cement Slurry:** Portions of MS bolts, lugs, anchor bolts and anchoring other than anchor bolts etc embedded in concrete shall be treated with neat cement slurry.

15 **GLAZING TO DOORS/ WINDOWS AND VENTS (OTHER THAN ALUMINIUM DOORS AND WINDOWS)**

15.1.1 The glazing shall be done with selected quality sheet glass conforming to IS 2835 unless otherwise specified in particular specifications here-in-after. All sheet glass shall be of good quality, free from sleeks, bubbles, smokiness, air holes and other defects.

15.1.2 Unless specified or shown in drawings, otherwise all glazing except for toilets shall be 3mm thick glass panes upto 0.5 square metre each pane and 4mm thick for panes exceeding 0.5 sqm each pane.

15.1.3 Glass mentioned here-in-after shall be fixed to door/ windows/Ventilators/ CSWs/vents as shown in drawings. The provisions of glazing with beads shall be as specified in section 16 of MES Schedule (Part-I).

15.1.4 Pin head glass shall be 3mm thick and shall be provided in window, vents coming in lavatories, WC and in other locations indicated in drawings. Toilet glass shall be frosted.

15.1.5 The glass shall be fixed to wooden shutter with wooden beads shown on drawings and as specified in clause 16.9.2 of MES Schedule (Part-I).

15.1.6 The contractor shall produce voucher/certificates from suppliers/manufactures to the GE as proof that the putty conforms to IS-419.

15.1.7 The glass shall be fixed to steel windows/ventilator with glazing clip as specified in clause 16.10.1 of MES SSR 2009 (Part-I) unless otherwise specified.

16. **BUILT IN FURNITURE, SUNDRY AND MISCELLANEOUS ITEMS OF BUILDINGS COVERED UNDER SCHEDULE 'A' SECTION-I**

Cost of the following built-in furniture such as cup boards, letterbox and following sundry and miscellaneous items shall be deemed to be included in the lump sum quoted by the contractor for schedule 'A' Part-I.

16.1 **GENERAL:** All fittings and fixture shown on drawings shall be provided and their cost is deemed to be included in the lump sum cost of buildings in Schedule 'A' Part-I.

16.2 **SOAP NICHE:** Niches shall be provided in accordance with the details as shown in the drawings. These shall be finished with white glazed tiles same as specified here in before for dado.

16.3 **Telephone Niche:** This shall be provided all as shown in drawings. Wooden surfaces other than prefabricated, shall be painted with two coats of synthetic enamel paint over a coat of primer.

16.4 **Crumple Joints**

(a) Metal cradle shall be made to shape as shown in drawings. It shall be made of 0.63mm PGI sheet class 3.

(b) Bituminous joints filler/ bituminous compound shall conform to IS-1838 & shall be Grade 'A'.

(c) Unless otherwise shown on drawings, the gap width of crumple joint wherever shown on drawings shall be provided as under:-

(i) Single storey building	-	25mm
(ii) Double storey building	-	40mm
(iii) Tripple storey building	-	60mm
(iv) Four Storey building	-	80mm

The overall dimension of the building with increase in width of gap shall be amended accordingly.

16.5 **Blank**

16.6 **Draperly Rods:** Draperly rod shall be provided with SS finials of superior quality on both ends at locations all as mentioned in the relevant drawing. However, where no specific location has been specified, it shall be provided to all doors, windows and openings except in toilets, bath, WC, store, garage & repair bays as per typical drawings. Draperly rods shall be of high strength stainless steel rod, dia of rod as approved by GE. Bracket for fixing of draperly rods shall be of GI sheet 1.6mm thick powder coated of same finish as of draperly rods. In case the length of draperly rods exceeds 1.80m, an additional bracket at middle of span be provided to avoid sagging.

16.7 **Railing for staircase/ balconies/ terrace/ parapets:** Railing at various positions such as stair case, balconies, terraces and parapets shall be of mild steel or RCC as per details given in the drawings and shall be provided with specification given in succeeding paras.

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- 16.7.1 **Mild Steel railing for stair case/verandah/balconies**: Where shown on drgs, mild steel railing in stair case, verandas, and balconies and in other position shall be provided as per details given in the drgs. MS pipe for hand rail shall be of light grade ungalvanised pipe 50mm bore. In verandah/ balconies/ parapets, mortice holes shall be left in concrete/ masonry for fixing of balusters of railing and shall be grouted in cement mortar (1:2), finished to match adjoining surfaces welding of MS pipe with flat iron and other steel sections of railing shall be with running welding. All mild steel surfaces shall be painted with 2 coats of synthetic enamel paint over a coat of red oxide primer. The embedded portion in concrete/masonry shall be tarred before embedding.
- 16.7.2 **Stainless steel railing for stair case/ balconies/ lobby**: Where shown on drgs, stainless steel railing in stair case/balcony or in any other position shall be provided as per details given in drgs. Stainless steel sections for railing such as pipe, square bars & flats shall be jointed to each other as per manufacturer's instructions. Balusters of railing shall be grouted in cement mortar (1:2).
- 16.7.3 **RCC railing/ parapet**: RCC railing/ parapets where shown on drgs shall be provided with RCC M-25 (design mix) using 20mm graded stone aggregate. Reinforcement shall be provided all as shown in respective drg. All exposed surfaces of railing/ parapet shall be plastered with 5mm thick cement mortar (1:3) and plastered surface shall be finished to the specifications as that of adjoining wall surface or as per schedule of finish.
- 16.8 **Plate Rack**: Plate racks shall be provided as shown on drgs. The size of plate racks shall be 900 x 750 x 250mm. The thickness of stainless steel sheet shall be 1.00mm and grade of sheet shall be 304 AISI. The make of stainless steel plate rack shall be as given in Appendix 'B'.
- 16.9 **RCC jalli/ brick jalli**
- 16.9.1 RCC jalli shall be provided where shown on drgs. RCC jalli shall be pre-cast RCC (1 cement: 2 coarse sand: 1 stone aggregate of 6mm nominal size). The thickness of jalli shall be as shown in drgs and reinforced with 6mm mild steel bars and 3mm dia MS wire around the hollow space of jalli. Pre-cast jalli shall be set and jointed in cement mortar (1:3). Exposed surfaces of jalli shall be finished fare & even. Surface shall be finished to the specifications as that of adjoining wall surface or as per schedule of finish.
- 16.9.2 **Brick jalli**: Brick jalli shall be provided where shown on drgs. Type of brick jalli if not indicated on drg, shall be type 'C'. Bricks shall be set & jointed in cement mortar (1:3)
- 16.10 **Cooler Rest**: Cooler rest for desert cooler, wherever indicated on drawings, shall be provided as shown on typical drawings. Size of cooler rest shall be 750mm x 600mm, 450mm high. All mild steel members shall be jointed with running welding. All exposed mild steel surfaces shall be painted with two coats of synthetic enamel paint over a coat of red oxide primer.
- 16.11 **Brackets for T.V. Antenna**: Brackets for TV antenna shall be provided all as shown in drawings. However, TV antenna and antenna pipe are outside the scope of this contract.
- 16.12 **Kitchen cabinet**: Various type of kitchen cabinets where shown on drgs shall be provided as per details given therein. Frames for cabinets shall be of WPC. Cabinet shutters shall be of 19mm thick decorative WPC board. Shelves for cabinets shall be as shown on drg i.e either of 12mm thick decorative WPC board. All edges of particle board shall be provided with 6mm thick teak wood edging. All fittings & fixtures shall be provided as shown on drgs. All wooden surfaces except laminated surface shall be given two coats of synthetic enamel paint over a coat of primer.
- 16.13 **DRAWERS**:- Drawers shall be made of 19mm decorative WPC board fixed with SS telescopic ball bearing channel runner 400mm(min) full extension for side mounting channels. Make Hittich or Hafele with load capacity 50 Kgs.
- 16.14 **Cup board/ward robes** : Cupboard/ ward robes shall be provided with details shown in drgs & as specified here-in-below:-

(a)	Frame	-	MS angle Iron 25x25x4mm
(b)	Shutters	-	25 mm thick of Plain WPC moulded shutter with 6mm lipping allround.
(c)	Shelves	-	19 mm thick of Plain WPC moulded shutter with 6mm lipping.
(d)	Iron mongry & fittings	-	All iron mongries such as hasp & staple, butt hinges, holdfasts, handles and hanging rod with brackets shall be of aluminium anodised and shall be provided with chromium plated screws. All other fittings & fixing arrangement shall be as shown on drgs.
(e)	Finishes	-	All wooden surfaces except pre-laminated surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer after preparation of surfaces. All masonry/ plastered surface inside cupboard shall be given two coats of oil bound distemper.

- 16.15 **Prelaminated Particle board**:- Prelaminated Particle board of grade BWP where ever shown on drawings shall be of exterior grade pre-laminated one side with decorative choice lamination and other side balancing white lamination. Where both the surface are exposed, particle board shall be with both sides decorative choice lamination.

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- 16.16 **Veneered particle board**:- Veneered particle board where ever shown on drawings shall be of commercial type and as per clause 12.14 of MES Schedule (Part-I).
- 16.17 **Sink and draining board**:
- 16.17.1 Stainless steel sink and drainage board shall be provided at the locations and details as under:-
- (a) Sink with double drainage board, ELEGANT GLORY of NIRALI make (BIG) made of 1.00mm thick stainless steel sheet.
- (b) At all other locations where sink/kitchen sink (except ground sink) have been shown in the drawing, the same shall be of vitreous china (white) and as per drawing No. TD-132. Drainage boards, other than those covered above, shall be provided as per drawing No. TD-132.
- 16.17.2 All sinks shall be provided with PVC waste pipe 40mm dia.
- 16.17.3 **Ground sink**: Provide ground sink as shown on drawings. The specifications of ground sink shall be the same as that for the adjoining floors. Dado shall also be the same as that of adjoining walls.
- 16.18 **Planter**: Provide planter as shown on drawings. Brick work in half brick thick in cm (1:4) and plaster with 15mm thick cement plaster in CM(1:3).
- 16.19 Blank
- 16.20 **Water storage tanks (service tanks)**
- 16.20.1 The type and capacity of water storage tanks (service tanks) shall be as indicated in drawings. In case the type and/ or capacity of these tanks are not indicated in the drawings, the same shall be HDPE tank and 500 litres capacity respectively.
- 16.20.2 **HDPE/ PVC Service tank**: These shall be (ISI marked) of standard makes listed in Appendix 'B' of cylindrical vertical type rotational moulded (Conforming to IS-12701) with closed top. Following accessories shall be provided by the contractor to each tank, the cost of which shall be deemed to be included in the lump sum cost of the building:-
- (a) 25mm dia GI washout pipe 300mm long (medium grade) with GI plug.
- (b) 25mm dia overflow pipe upto a length to bring overflow water down to the finished roof level and then to the nearest sump on the roof, fitted with brass anti-mosquito rose coupling at the end.
- (c) Ball brass valve to match with inlet pipe with brass rod and polythene float ball fly nut fixed to tanks. Ball valve shall be high pressure type and rod shall be of brass all as conforming to IS-1703 and clause 18.19 of SSR Part-I. Floats shall be PVC heavy duty.
- (d) All inlet, outlet, overflow and washout pipes shall be fixed to tank as required and shown on drawing.
- (e) Irrespective of whatever drawing has been referred in main/structural drawings the HDPE service tanks shall be provided on the roof slabs all as shown on drawing No. CEJZ-STD- 270/09 sheet 1/1 and as specified hereunder:-
- (i) RCC slab type A-1 (M-25 design mix) of required thickness as shown on drawing.
- (ii) PCC bed plate/bed block shall be provided all as shown on drawing.
- (iii) Reinforcement all as shown on drawing.
- (iv) Flat iron in vertical and rings shall be as shown on the drawings and shall be painted as specified for steel work.
- (v) All brick work shall be built in cement mortar (1:4). Internal and external surfaces of wall shall be plastered in cement mortar (1:4), 10mm thick. Plastered surface shall be given two coats of cement base paint over a coat of primer after preparation of surface.
- 16.21 **RCC platform/ preparation shelf/ working table/ cooking platform/ service counter in kitchen**: RCC platform/ preparation shelves/working table /cooking platform/service counter in kitchen in various buildings shall be provided as per details given in the drgs. Top finish to these platforms/shelves shall be of 18-20mm thick polished black granite stone (machine cut) laid over 10mm thick screed base of cement mortar (1:3), jointed with gray cement slurry with pigment to match the shade of slab. Front edging of RCC slab shall also be provided with 16mm thick black granite stone. 20mm dia hole shall be provided in cooking platform for gas pipe line.
- 16.22 **Trough type WHB**: Trough type WHB shall be made of concrete M-25 (design mix) and finished with white glazed tiles of colour and printed pattern as approved on exposed surfaces and adjoining wall.
- 16.23 **Peg set of 3/6**: Peg set of 3/6 as shown on drgs shall be provided where shown on drgs. Peg set shall be aluminium anodised fixed on wooden plank of 1st class hard wood (teak) fixed to wall or door shutter. All wooden surfaces shall be French polished.

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- 16.24 **Mirror (Full size):** This shall be provided all as shown on drawing with the details as per the Mirror with shelf. Unless otherwise shown on drawing, size of mirror full size shall be considered as 600mm x 1200mm. Mirror of size 450mm x 600mm shall be provided where single wash hand basin is shown on drawings. Where 02 or more wash hand basins shown on same wall in the drawings, the mirror shall be of height 600mm and of full span between the outer edges of 1st & last wash hand basin on the same wall.
- 16.25 **Key Box:** Where shown key box shall be provided as per details given the drgs. All wood work shall be in 2nd class hard wood (hollock). Shutters for key box shall be of 25mm thick glazed shutter of 2nd class hard wood. Glass for glazing shall be 4 mm thick. Iron mongry & other fittings such as hinges, hasp & staple wooden knob & hooks for keys shall be as given in drgs. All wooden surfaces shall be painted with two coats of synthetic enamel paint over a coat of pink primer.
- 16.26 **Glazed built-in Book Case:**
- This shall be provided all as shown on drawing.
 - All timber surfaces, except particle board, exposed to view shall be French polished. Particle board shall be commercial veneered.
- 16.27 **Saucer Drain:-** Saucer drain shall be as shown on the drawings. Mix of concrete for saucer drain shall be as of PCC topping layer of adjoining hard standing/ apron.
- 16.28 15mm jet connection alongwith PVC pipe shall to be provided to each EWC/ Anglo Indian WC and the cost is deemed to be included in the lump sum quoted for the respective buildings.
- 16.29 **Switch Boxes & Meter Boxes:** Irrespective of what is shown on drgs, switch boxes & meter boxes of sizes as given in drgs shall be provided in all buildings as per details given. Switch/ meter boxes shall be fabricated out of 16 gauge mild steel sheet and fixed in wall nitch. Fittings & other items shall be as shown in the drgs. Meter box shall be provided with 4mm thick glass of size 250 x100mm glazing. Opening for inlet & outlet conduits shall be provided in the box. All steel surfaces shall be spray painted with two coats of synthetic paint over a coat of red oxide primer before fixing in the wall.
- 17 **SANITARY AND TOILET FITTINGS**
- 17.1 General: All the sanitary and toilet fittings and fixtures shall be of 1st quality.
- 17.2 Unless otherwise specified elsewhere, all sanitary appliances shall be vitreous china (white) first quality of approved make and shall conform to IS-2556 for General requirements and the specific requirements as mentioned in relevant clause of MES Schedule.
- 17.3 All waste pipes, except of sinks, and fitting upto floors/Nahani trap shall be galvanised steel tubing medium grade conforming to IS-1239 (Part-II).
- 17.4 Flush pipe and socket of flushing ream of WC shall be jointed with white and red led cement (White and red led in equal portion by weight) and linseed oil added to form paste.
- 17.5 'P' or 'S' trap shall be of cast iron and jointed to WC pan with cement joints as specified in clause 18.48.5 of MES Schedule.
- 17.6 PVC low level flushing cistern of 10 Ltrs dual discharge capacity shall be provided and shall be ISI marked and of specified make.
- 17.7 Use low-flow water fixtures to reduce fresh water demand. Fixtures should meet the minimum specifications: Dual Flush Water Closets (WCs) of 6/3lpm, Lavatory Faucets of 3-5lpm, Showers of 6lpm, and Kitchen Faucets of 4-6lpm. The contractor must provide technical specification sheets highlighting the flow rates of the selected fixtures.
- 17.8 The sizes given here-in-after are approximate sizes. The sizes of sanitary fittings to be provided shall be the nearest size as per manufacturers' catalogue as approved by the GE.
- 17.9 Where flushing cistern cannot be fixed in back wall due to window/ lintel as per sanitary plan, the same shall be fixed in the side wall with additional bend, the cost of which shall be deemed to be included in the lump sum cost of buildings given in Schedule 'A' section-I.
- 17.10 **WATER CLOSET (ORISSA PATTERN):** Unless otherwise shown on drawings Water closet (Orrisa pattern) shall conform to IS-2556 (Part-III) and shall be of pattern long pan, size 580mm x 440mm long, provided with 'P' or 'S' trap for ground floor and with long 'P' or 'S' trap for 1st floor and subsequent floor. Length of the arm of the trap will be sufficient to ensure that there is no other joint except the joint with WC and the joint outside the wall with soil waste pipe and also the following fittings :-
- PVC low level flushing cistern ISI marked 10 litres discharge capacity fixed over angle iron bracket/ with screws.
 - PVC flush pipe 40 mm dia as per clause 18.35 of MES Schedule (Part-I).
 - The pan shall be set in the cement concrete or lime concrete (1:2) at least 15cm around and finished just below the rim to receive the specified thickness of floor finish.

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- 17.10 **WASH HAND BASIN**: The Wash Hand Basin shall be of size 55cm x 40cm vitreous glazed Ivory (without pedestal). It shall be provided with 32mm dia CP waste fitting, 32mm dia CP bottle trap connected to 32mm dia medium grade GI waste pipe upto floor trap to be concealed in wall by cutting chase of suitable size. WHB to be supported on a pair of angle iron (40 x 40 x 6mm) brackets of suitable length, made to shape, painted white, embedded in walls in cement concrete (1:2:4) type B-1 of size 11.5cm x 11.5cm x 11.5cm. One 15mm bore ISI marked brass chromium plated fancy type pillar cock long neck to be provided to each wash hand basin. Where mixing valve is ordered to be provided in lieu of pillar cock, necessary deviation for omission of pillar cock shall be placed under respective item of Schedule 'A' Part-I. Where wash hand basin counter sunk type is shown in drawings, it shall be of oval shape type without pedestals and shall be of light colour.
- 17.11 **MIRROR**: Unless otherwise shown on drawings, one mirror shall be provided over each WHB. It shall be polished sheet glass of thickness 5.5mm. Size shall be all as shown on drg or 45 x 60cm where not indicated on drgs. It shall be provided with anodized aluminium angle frame of size 10mm x 10mm x 1.6mm with 6mm thick PVC sheet backing. Mirror shall be hung by key slots on steel screws fixed to wooden plugs embedded in walls or rawl plugs in case of prefabricated RCC wall components. Where wash hand basin countersunk type is shown in the drawings, it shall be of oval shape without pedestals and shall be of light colour.
- 17.12 **WASH DOWN WATER CLOSET (PEDESTAL PATTERN)**: Wash down water closet shall be of vitreous china white fixed with 'P' trap with pipe extension sufficiently long so that there is no joint within the external wall and with the following fittings:
- (a) PVC flush pipe 40mm dia and as per clause 18.35 of MES Schedule (part-I).
 - (b) PVC low level flushing cistern ISI marked 3/6 litre dual discharge capacity fixed over angle iron bracket/ with screws.
 - (c) Plastic seat and cover as per clause 18.36, 18.36.1 to 18.36.4 of MES Schedule (part-I).
 - (d) Fixing bolts.
 - (e) Chromium plated cast copper alloy jet spray with flexible LDPE pipe.
- 17.13 **Urinals**: Type of urinals shall be all as shown on drawings. In case not shown in the drawing, it shall be half stall type of vitreous China Ivory fitted with brass chromium plated spreader. Irrespective of whatsoever has been specified elsewhere in these particular specifications or shown in drawings, each urinal shall be provided with 15mm bore brass chromium plated half turn valve. Use low-flow water fixtures to reduce fresh water demand. Fixtures should meet the minimum specifications: Urinals of 2 lit of 4-6lpm. The contractor must provide technical specification sheets highlighting the flow rates of three per flush (l/f). The contractor must provide technical specification sheets highlighting the flow rates of the selected fixtures.
- 17.13.1 **Urinal Partitions**: Urinal partitions shall be of 20mm thick granite (table rubbed and polished) set in Cement Mortar 1:4 of size 0.45 metre X 0.90 metre
- 17.13.2 Waste pipe of urinals shall be extended upto floor trap. The waste pipe shall be HDPE 32mm bore complete.
- 17.13.3 **Toilet paper holder**: - Irrespective of whether indicated or not, one toilet paper holder vitreous china box type shall be provided with each wash down water closet (Pedestal pattern).
- 17.13.4 **GLASS TRAY**: Glass tray shall be provided on each WHB and shall consist of glass shelf placed on anodised aluminium angle frame fixed with brass CP screws to plugs in the wall. The size of glass shelf shall be 60 x 12cm and glass for shelf shall 5.5mm thick with edges round off.
- 17.14 **TOWEL RAIL**: Towel rails where shown on drgs shall be provided. It shall be of brass CP 20mm dia tubular rail 60cm long with end brackets. Wall thickness of towel rail shall be 1.6mm. It shall be fixed on wall with brass CP screws on PVC rawl plugs.
- 18 **PLUMBING**
- 18.1 **GENERAL**
- 18.1 Irrespective of whatever mentioned elsewhere/shown on drgs, plumbing work shall be carried out as under and as specified in clauses 18.13 to 18.27A of MES Schedule 2009(Part I) Specifications.
- 18.2. **PVC (SWR) PIPES AND FITTINGS**
- PVC (SWR) pipes and fittings shall be UPVC (SWR) and shall conform to IS 13592 as under:
- | | | |
|---|---|----------|
| For use in ventilation pipe work and rain water specification | : | Type 'A' |
| For use in soil and waste discharge systems | : | Type 'B' |
- 18.3 **SOIL/WASTE/VENT PIPE/FITTINGS/ACCESSORIES**: These shall be UPVC conforming to IS. All the pipes and fittings shall have ISI certification mark. Irrespective of what is shown on drawing size of soil pipe/waste pipe at different locations shall be as under:-

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(a)	WC to vertical stack	110mm dia
(b)	Nahani trap to floor trap/nahani trap to gully trap	110mm dia
(c)	Soil pipe in vertical stack and upto first manhole	110mm dia (separate pipe for each toilet).
(d)	Waste pipe in vertical stack and upto gully tarp	110mm dia
(e)	Vent pipe with PVC (SWR) slotted cowl	160mm dia
(f)	Waste pipe gully trap to first manhole	160mm dia

- 18.4 **JOINTING**: All pipes and fittings shall be jointed as specified in clause 18.52 of MES Schedule 2009 Part-I Specifications.
- 18.5 **FIXING OF PIPES TO WALLS**: Pipes and fittings shall be fixed to wall all as specified in Clause No 18.67.7A.1 of MES Schedule 2009 Part-I Specifications and as shown in drawing No. CEJZ/TD-115/2025 sheet 1/1.
- 18.5.1 Soil pipes in vertical stacks shall be extended above roof as vent pipe. Vent pipe shall be provided with slotted vent cowl on top with mosquito net. Vent pipe shall be extended above, such that top of vent cowl extended is 1200mm above RCC roof/sheet roof. Vent pipe shall be provided as specified above whether indicated on drawing or not.
- 18.5.2 **STACKING OF PIPES**: wherever possible, independent stack should be provided with floor trap/Nahani trap and interconnection of floor traps / Nahani traps should be avoided.
- 18.5.3 **TRAP FOR BATH AREA IN ALL MD ACCN**:- stainless (AISI304) concealed tile insert shower drain with cockroach trap (450x75mm) shall be provided as per TD Drg CEJZ/TD-116/2025 sheet 1/1.
- 18.6 **NAHANI/FLOOR TRAPS**: Nahani /floor traps shall be provided in situations as shown on drawings. These shall conform to IS. Floor traps shall be provided with CP steel grating. Nahani trap/floor traps shall be of UPVC.
- Note**: Where Nahani/floor traps of 22.5cms depth cannot be accommodated in sunken floor, a 300mmx300mm portion of the RCC slab or portion of size as indicated in drawings shall be sunken to the extent it accommodates the Nahani trap without any additional cost.
- 18.7 **SHORTER LENGTHS**: Except for WC connections, the contractor may use pipe pieces without sockets in shorter lengths (less than one pipe length) if approved by the GE and connect these to pipes fitting with double sockets/collars, including additional joints as specified above without extra cost to the Government.
- 18.8 **GULLY TRAPS**
- (a) Where shown gully traps shall be of UPVC complying with the requirements of IS.
- (b) Gully traps shall be square mouthed, 110mm size, type 'P' set in PCC (1:3:6) type C-2, block measuring 45cms square, thickness of bed concrete shall be 10cm. Jointing to drain pipe shall be done in cement solvent.
- (c) Cast iron perforated grating shall be 110mmx110mm bituminous coated and fixed as directed by the Engineer-in-Charge.
- (d) PCC (1:2:4) type B-1 Kerb and RCC cover slabs shall be provided all as directed by the Engineer-in-Charge.
- 18.9 **TESTING**: All soil waste and vent pipes shall be tested as specified in clauses 18.79.1 and 18.79.5 of MES Schedule 2009 Part-I Specifications. Record of testing shall be maintained separately for each building.
- Note**:- The work of plumbing as specified herein before and as shown on drawings shall be for the complete plumbing stacks of all the buildings under this contract in all respects. Nothing extra shall be payable if any additional items, other than those shown on drawings are required to complete the stack. The lump sum quoted for Schedule 'A' Part-I is deemed to include provision of waste pipe upto and including gully trap and soil pipe up to a distance of 2 metres from external face of wall but excluding first manhole. In case first manhole is located at distance other than 2 Metres, the length of pipe provided shall be adjusted through DO.
- 19 **INTERNAL ELECTRIFICATION**: Internal electrification shall be provided as given in Schedule 'A' & in BOQ.
- 19.1 **General**: Refer Para 19.2 of MES Schedule (Part-I).
- 19.2 No price adjustment in prices shall be made on account of change in location of fittings and accessories than that shown on drawings.
- 19.3 Material and workmanship of fittings and fixtures shall be all as given in MES Schedule (Part-I) and as specified in Schedule 'A'.

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- 19.4 Terminal points of light and power plugs (socket outlets) switches, regulators, fittings, etc. shall terminate in recessed mild steel boxes fixed flush to the wall, top covered with 3mm thick plastic laminated bakelite sheet instead of wooden blocks.
- 19.5 **Earthing**: Earthing shall be provided all as per Plate No. 3 of MES Schedule (Part-I) using plate electrode.
Note: PCC/ Masonry pit to be constructed shall be one metre away from the outer edge of the edge of the earth pit. Pit cover shall be of 50mm thickness RCC and of size suitable to fully cover the PCC pit opening.
- 19.6 **Testing**: On completion of the work the following test shall be carried out:-
(a) Insulation resistance test overall and sectional. This shall be carried out between each face and neutral and between phase and earth.
(b) Polarity test of switches shall be carried out to ascertain that each switch has been fixed on phase wire.
(c) **Earthing continuity test**: This test shall be carried out as per clause 19.146.3 on serial page No. 19-39 of MES Schedule (Part-I). The result shall not be more than one ohm.
(d) All test carried out shall be recorded in triplicate and signed both by the contractor and Engineer-in-charge and shall be kept on record.
- 19.7 **Records**: On completion of work following record in triplicate shall be prepared by the contractor, signed by contractor and Engineer-in-charge and handed over to Engineer-in-charge:-
(a) Wiring circuit diagram for each building.
(b) Insulation resistance test for each circuit and over all.
(c) Earth continuity test.
(d) Wiring test Sheet.
- 20 **INTERNAL WATER SUPPLY**: Internal water supply shall be provided as given in Schedule 'A' & in BOQ.
- 20.1 **General requirements**: Refer Para 18.40, 18.41 of MES Schedule (Part-I). General layout of water supply work is shown in drawing. The exact position of water supply line and fittings shall be as directed by Engineer-in-charge. All internal water supply pipe line shall concealed in internal surface.
- 20.2 **Excavation and preparation of trenches**: Refer specifications here-in-before and para 18.42 of MES Schedule (Part-I).
- 20.3 **Laying of GI pipe**: Refer para 18.50, 18.51 and 18.56 of MES Schedule (Part-I). Unions shall be provided at suitable places as directed by Engineer-in-charge so that long lengths of pipes are not disturbed during cleaning, changing/ repair etc. Uncovered threaded portion of pipes shall be painted with approved paint.
- 20.4 The contractor shall use proper bends/ Elbows/ Tees at turning/ corners etc. Bending of pipe is not permitted.
- 20.5 The contractor shall provide screwed plug to all open ends of pipes and fittings at the end of day work and at time when work is stopped.
- 20.6 Weight of chromium-plated adopter for connection of polyethylene pipe/ GI pipe shall be not less than 40 grams each.
- 20.7 **Bib taps and stop valve**: Refer para 18.14, 18.15 and 18.18 of MES Schedule (Part-I). The handles shall be crutch type. Handle and spindles may be cast brass, washers to be used for this purpose shall conform to para 18.18 of MES Schedule (Part-I).
- 20.8 **Testing**: Refer para 18.50.4 and 18.55 of MES Schedule (Part-I).
- 20.9 **Galvanized Iron pipes**: Galvanized iron pipes shall be medium grade complying with IS: 1239 (Part-I). GI fittings shall comply with IS-1239 (Part-II) butt welded or seamless. Fittings not covered by IS-1239 (Part-I to X) shall be of brands as approved by the GE. These fittings shall be galvanized.
- 20.10 **Ball Valve**: Refer clause 18.14 of MES Schedule (Part-I).
- 20.11 **PVC connections**: PVC pipes for PVC connection shall be heavy duty 45cm long with brass chromium plated coupling nuts on both ends.
- 20.12 **Pillar tap**: Refer clause 18.16, 18.16.2 &18.16.3 of MES Schedule (Part-I). Pillar taps shall be of brass chromium plated and shall confirm to IS-1795.
- 20.13 **Fancy pillar tap**: Refer clause 18.16, 18.16.2 &18.16.3 of MES Schedule (Part-I). They shall be of cast copper alloy & shall confirm to IS-8934.

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- 20.14 **Shower rose**: Refer clause 18.106.1 of MES Schedule (Part-I). Shower rose shall be chromium plated brass of diameter and inlet size specified in respective item of Schedule 'A'. Shower rose shall be Sivel joint type with shower arm of adequate length.
- 20.15 **Jet spray**: Refer clause 18.107 & 18.113 of MES Schedule (Part-I).
- 21 **SEWAGE DISPOSAL**: The work of sewage disposal shall be provided as described in Schedule 'A' & in BOQ and specified in these specifications.
- 21.1 **General**: Specification of various trades e.g. excavation earth work, concrete, brick work, steel and iron work, plastering and pointing etc., required for sewage disposal works shall be as already given here-in-before under respective trades with modifications, amplification, additions etc., as given here-in-after and/ or in Schedule 'A' and as directed by Engineer-in-charge.
- 21.2 Excavation in trenches for sewer shall be allowed to the extent of authorised width as specified in para 3.2.3 of MES Schedule (Part-I) or that actually excavated whichever is less and shall be measured and paid accordingly.
- 21.2.1 Beds of trenches shall be watered and well rammed and any depression thus formed shall be filled with approved earth to the required level and slopes as directed by Engineer-in-charge.
- 21.2.2 Refilling of trenches shall be done as specified in para 3.20 of MES Schedule (Part-I). Refilling of trenches on the top and around the pipes upto 45cm from the crown of the pipe or from top of the concrete encasing shall be done with selected approved earth only in layers not exceeding 25cm in thickness. The balance of the trenches may be filled up with mixture of earth and stone gravel/ boulders in layers not exceeding 25cm.
- 21.3 SGSW pipes and RCC pipes shall be laid and jointed as specified. Where indicated, these pipes shall be laid on PCC beds as mentioned laid to falls including packing under and haunching against the sides of the pipes after they are laid tested complete all as specified. Thickness and width of PCC beds, packing, haunching etc, shall be all as mentioned in MES Schedule (Part-I). Refer Para 18.28, 18.68 to 18.70 & 18.70.1 of MES Schedule (Part-I).
- 21.4 **Concrete**
- 21.4.1 Mix and grade of concrete shall be as specified in respective item of Schedule 'A' for sewage disposal. Thickness and width of PCC bedding, packing, surrounding and haunching for SGSW pipes and RCC pipes shall be all as mentioned in MES Schedule (Part-I).
- 21.5 **Brick Work**
- 21.5.1 (i) Refer para 5.6.1 to 5.6.9 of MES Schedule (Part-I). The bricks shall have minimum compressive strength of 75 Kg/Sqcm and shall be fly ash bricks which are locally best available as per sample kept in GE office and water absorption of bricks shall not exceed 20% (Twenty Percent). Sampling and testing of bricks shall be carried out as per IS-5454 (1998). Brick and brick tiles shall be old size brick and old size tiles as mentioned in Para 5.6.3 MES Schedule (Part-I). Thickness of brick tiles shall be 40 mm.
- (ii) In case of deviation the brick work shall be priced at appropriate rate for sub class 'B' bricks as given in MES SSR irrespective of the fact that bricks of minimum compressive strength of 75 kg per sqcm shall be/have been used in the work.
- (iii) The bricks shall be soaked in water before incorporation as mentioned in Clause 5.22 of MES Schedule (Part-I).
- 21.6 **Steel work**: MS steps as shown on drawings shall be provided in manholes exceeding 60cm depth.
- 21.7 **Plastering and pointing**
- 21.7.1 Internal surfaces of brick work and PCC shall have 15mm plaster in cement mortar (1:4) water proofed by adding approved water proofing compound. The quantity of water proofing compound shall be as per manufacturer's instructions or 3% by weight of cement whichever more. The plaster shall be finished even and smooth using steel trowel.
- 21.8 **Painting**
- 21.8.1 All steel and iron work such as hold fasts, steps shall be treated with 2 coats of coal tar/ Black paint conforming to IS-280 of 1961.
- 21.9. **Manhole covers and frame**
- 21.9.1 Manhole covers with frames shall be provided all as per details under relevant section of Sch 'A'.
- 21.10 **Testing**
- 21.10.1 Sewers shall be tested by water test as specified in para 18.79 of MES Schedule (Part-I).
- 21.10.2 Manholes shall be tested for water tightness as directed by Engineer-in-charge.
- 21.10.3 Record of testing shall be maintained as specified in para 18.79.5 of MES Schedule (Part-I).

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21.10.4 Cost of testing as specified above shall be deemed to have been included in the rates/amount quoted by the contractor and nothing extra shall be paid for carrying out test. If any pipe burst during testing the same shall be made good by replacement by the contractor without any extra cost to the Govt.

21.10.5 **Concrete Pipes:** Refer clause No 18.29 of MES Schedule (Part-I). Reinforced concrete pipes for drain and culverts shall be non-pressure type class NP-2 and shall conform to IS-458. Laying & jointing of concrete pipes shall be carried out as specified in clause 18.74 of MES Schedule (Part-I).

22 ROAD AND PATH WORKS

Road work shall be provided all as described in Sch 'A' and as per SSR. Any item for which specification is not given in Sch 'A', the same shall be followed from specifications given for the lump sum part in the beginning of the particular specifications, or if not there then from SSR.

22.1 EARTH WORK

Levels of existing ground at suitable intervals not exceeding 10 metre shall be taken jointly by MES representative and contractor representative and recorded in level book. Quantity of earthwork shall be worked from the levels taken at site and proposed formations/invert levels.

22.2 ROLLING OF FORMATION SURFACES

The formation surfaces coming in cutting shall be rolled to the required gradient and camber with power roller for roadwork and including sprinkling the surfaces with water as required. Where rolling with power roller/ animal/ hand roller is not feasible prior permission of the GE shall be obtained in writing for hand ramming. The lying of base course will commence only after the rammed earth formation is approved by the GE.

22.3 DRAINAGE OF EARTH FORMATION

At all times the formation surfaces shall be kept well drained by the contractor. The contractor shall provide such temporary open drain as may be necessary to prevent accumulation of water from rain or other sources.

22.4 HORIZONTAL CURVES, CAMBER AND SUPER ELEVATION

Horizontal curves and super elevation for roads shall be as ordered by the Engineer-in-charge. Camber of finished road surfaces shall be as under:-

- | | |
|--------------------------|-----------|
| (i) Bituminous Road | - 1 in 48 |
| (ii) Concrete Roads/Path | - 1 in 60 |

22.5 STONE SOLING

Stone soling shall be laid as specified in respective part of Schedule 'A' and as described in clause 20.A.2 of MES Schedule (Part-I). Surface shall be formed to required gradient and camber. Stone for soling shall be quartzite/ Basalt/ Trap.

22.6 WET MIX MACADAM(WMM)

(a) Aggregate for wet mix macadam shall be as specified in respective part of Schedule 'A' as specified in MES Schedule (Part-I) and conforming to the samples kept in GE's office and as approved by the GE before incorporation in work.

(b) Two layers each of 7.5cm thick (consolidated thickness) WMM, each layer shall be laid and consolidated separately of metal, spreading, rolling, and applying screening and watering as specified in clause 20.B.5 of MES Schedule (Part-I).

(c) The combined grading of aggregate for WMM shall be of grading classification 'A' as specified in clause 20.B.2.5.4 (a) of MES Schedule (Part-I).

22.7 PREMIX CARPET

(a) Stone chipping for the bitumen premix carpet shall be 10 to 12mm size crushed broken from boulder all as specified in MES Schedule (Part-I).

(b) Bitumen required for roadwork, tack coat, premix and seal coat shall be viscosity grade (VG-10) & (VG-30) bitumen as mentioned in BOQ.

(c) Premix carpet shall be laid over water bound macadam all as specified in clause 20.A.27 to 20.A.28 of MES Schedule (Part-I). Premixed sand seal coat shall be applied all as specified for dry area. Premix carpet shall be laid on the water bound macadam after the latter has completely dried up before allowing traffic on the road. Top surface of water bound macadam shall be properly cleaned before premix carpet is laid. Materials for bituminous carpet and sand seal coat shall be mixed in hot mixing plant/mini hot mixing plant.

22.8 Factory made precast PCC blocks top surface rounded (1:2:4) type B1 using 20mm graded stone aggregate of size 300 x 100 x 200mm as in edging of road shall be provided.

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- 22.9 **BITUMEN**: Bitumen for road work shall be of Viscosity Grade (VG-10/30) conforming to IS-73-2006. Bitumen shall be procured by the contractor from their own sources and arrangement at his own cost directly from the refinery of Hindustan Petroleum or Indian Oil Corporation or Bharat Petroleum or from their authorized outlets with sealed intact. Original purchase voucher of the manufacturer along with test certificate shall be produced by the contractor to the Engineer-in-Charge before commencement of work at site. The GE may also get carried out independent test of bitumen and the cost of testing shall be borne by the contractor.
- 22.10 **SEMI –DENSE ASPHALTIC CONCRETE/DENSE ASPHALTIC CONCRETE**
- 22.10.1 **Preparation of under laying Course**: - Ref para 20.B.4.1 of MES Schedule (Part-I).
- 22.10.2 **Application for Tack Coat**: - Ref para 20. B.4.2 of MES Schedule (Part-I).
- 22.10.3 **Job Mix formula**: - Ref para 20 B.4.3 of MES Schedule (Part-I). Job Mix formula (Design Mix) shall be got carried out from the Govt. Engineering College or Laboratory or any other Laboratory approved by MES, by the contractor under is own arrangements without any extra cost to the Govt. Design Mix shall be approved by the CWE.
- 22.10.4 **Preparation of Mix**: - Ref para 20 B.4.4 of MES Schedule (Part-I).
- 22.10.5 **Transporting of Mix**: - Ref para 20 B.4.5 of MES Schedule (Part-I).
- 22.10.6 **Spreading of Mix**: - Ref para 20 B.4.6 of MES Schedule (Part-I).
- 22.10.7 **Rolling and compaction**: - Ref para 20 B.4.7 of MES Schedule (Part-I).
- 22.10.8 **Quality Control**: - Ref para 20 B.4.9 of MES Schedule (Part-I).
- 22.10.9 **Control on laid thickness**: - Ref para 20 B.4.9 of MES Schedule (Part-I).
- 22.10.10 **Plant/ Machines to be used for Semi Dense Asphaltic concrete/ Asphaltic Concrete/ Bituminous Concrete**: - Ref para 20 B.4.11 of MES Schedule (Part-I).
- 22.11 **PRECAST INTERLOCKING PAVER BLOCKS**: Refer para 13.18 of MES Schedule (Part-1). Precast concrete interlocking paver blocks shall conform to IS-15658-2006. These blocks shall be machine ressed factory made of 80mm thickness of concrete M-40 grade with grey cement. Blocks shall be sound and free from cracks or other visual defects. Colour of paver blocks shall be as approved by GE. The paver blocks shall be laid over 35mm thick sand cushion layer and laying of blocks the joints shall be filled with fine sand.
- 22.12 **BITUMINOUS MACADAM (BM)**: Bituminous Macadam (BM) shall be laid as specified in respective part of Schedule 'A' and as described in clause 20.B.2.5.4 (b), 20.B.2.11 and 20.B.3 of MES Schedule (Part-I).
- 22.13 **USE OF PLASTIC WASTE IN BITUMINOUS WEARING COAT IN NEW CONSTRUCTION** : -
- (a) Use of plastic waste is in Bituminous wearing coat in new construction.
- (i) Guidelines for use of waste plastic has been published in IRC:SP:98- 2013 and shall be complied.
- (ii) Only Thermoplastic conforming to Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE, PET & Polyurethane) shall be used as per Table 2 of SP: 98-2013.
- (iii) Only Dry process to be used for mixing plastic as per Para 2 & 6 of SP 98-2013.
- (iv) Black coloured plastic waste & PVC should not be used.
- (v) Specification of waste plastic shall be as per Clause 4.4 of SP: 98-2013.
- (vi) Waste plastic @ 6 to 8% of weight of bitumen shall be used as per Clause 5.2 of SP: 98-2013.
- (vii) Construction and control shall be as per Clause 7 & 8 of SP: 98-2013.
23. **CHAIN LINK FENCING AND STEEL GATES**: - The work of compound wall security fencing and steel gates shall be provided all as described in Sch 'A' and as per SSR. Any item for which specification is not given in Sch 'A', the same shall be followed from specifications given for the lump sum part in the beginning of the particular specifications, or if not there then from SSR.
- 23.1 **Steel Gate**: These shall be provided all as shown on drawings and as specified below:-
- (a) Excavation & earth work in soft/loose soil.
- (b) PCC (1:4:8) type D-2 in lean concrete below foundation.
- (c) Brick work in cement mortar (1:4) with sub class 'B' bricks as specified here-in-before.
- (d) PCC in (1:2:4) type B-1 using 20mm graded crushed stone aggregate.
- (e) RCC work shall be of RCC M-25 (Design mix) using 20mm graded crushed stone aggregate.
- (f) RCC columns shall be provided with black Granite stone cladding (20mm thick) over bedding layer of 10mm thick plaster in cement mortar (1:4) extended down to 15cm below ground level and polishing (wax).
- (g) Steel work as shown on drawings.
- (h) All steel surfaces treated with two coats of synthetic enamel paint over a coat of primer.
- Note: - Light fittings shall be measured and paid separately.

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- 24 **AREA DRAINAGE WORKS:** The work of area drainage and rain water harvesting works shall be provided all as described in Sch 'A' and as per SSR. Any item for which specification is not given in Sch 'A', the same shall be followed from specifications given for the lump sum part in the beginning of the particular specifications, or if not there then from SSR.
- 25 **EXTERNAL WATER SUPPLY:** External water supply shall be provided as given in Sch 'A'.
- 25.1 **General:** All works shall conform to the best method of modern practice and shall be executed by the fully qualified plumber/ fitter etc. the evidence of their qualification shall be produced by the contractor on demand by GE.
- 25.2 **Scope of Work:** Work under this contract relates to external water supply as per details in Schedule 'A' and described in these particular specifications.
- 25.3 **Excavation and Earth Work**
- 25.3.1 Trenches for pipes shall be excavated to gradient as directed by Engineer-in-charge at site. Minimum earth cushion over the crown of the pipe shall be as directed by the Engineer-in-charge.
- 25.3.2 The excavation for pipe line in trenches shall be restricted to the authorised width as defined in MES SSR Part-II and these shall be measured accordingly. Nothing extra will however be paid to the contractor in addition to the authorised width for working space if required for laying water mains and pipes.
- 25.3.3 Any additional width/depth of excavation made, if any, for pipe fitting in excess of required width/depth, shall be made good by the contractor in concrete as directed by Engineer-in-charge without any extra cost to the Govt.
- 25.3.4 Care shall be taken to keep this trenches/excavation free from water during the work. All water which may accumulate from rains or other cause shall be bailed or plumped out or otherwise removed. The tendered rates shall be deemed to include for pumping and/or bailing out of water as necessary. No claims what-so-ever will be entertained on this account.
- 25.3.5 Bottom surface of the trenches for pipe shall be formed to level/falls all as directed by the Engineer-in-charge.
- 25.3.6 All excavated earth shall be deposited at least one metre away from the edge of trenches.
- 25.3.7 Excavated earth from trenches (as approved) shall be allowed for refilling and any surplus earth shall be removed to a distance not exceeding 50 metres, deposited, spread and leveled to the satisfaction of the Engineer-in-Charge.
- 25.3.8 All excavation (except rough excavation) shall be dug to the exact dimensions and profile as directed by Engineer-in-charge.
- 25.3.9 When excavations are required across the roads, half the width of road shall be dug at time and proper sign board, lights etc shall be displaced and watchmen posted to prevent accident as directed by Engineer-in-charge.
- 25.3.10 No joints shall be covered up with earth till the pipe line has been tested under pressure, but certain lengths of the pipe line may be covered up if specifically permitted in writing by Engineer-in-charge for the purpose of ensuring safety of persons and to allow the traffic etc.
- 25.3.11 Returning filling in trenches shall be carried out in layers not exceeding 25cm thick and well ramming without the addition of water.
- 25.3.12 Tenders rates for disposal of soil against respective item (s) of Schedule 'A' shall be deemed to cover the quantity of earth spread and leveled over the trenches to allow for settlement of earth returned, filling in trenches with time.
- 25.4 **Cement, Aggregate, Bricks:** These shall be as specified here-in-before.
- 25.5 **Samples of Material:** The contractor shall produce samples of materials and catalogue/literature of requirements and obtained in writing from GE/Engineer-in-charge before placing bulk order for the materials for incorporation in the work.
- 25.6 **Equipment**
- 25.6.1 All equipment and materials to be incorporated in this work shall be of standard quality conforming to appropriate Indian Standard specifications or where ISS have not been issued they shall be of the best quality to the entire satisfaction of GE.
- 25.6.2 All similar equipment and similar materials shall be the same make and origin.
- 25.7 **Galvanised Iron Pipes and fittings:** Galvanised and iron pipes shall be medium grade complying with IS: 1239 (Part-I). GI fittings shall comply with IS-1239 (Part-II) butt welded or seamless. Fittings not covered by IS-1979 (part-I to X) shall be of brands as approved by the GE. These fittings shall be galvanised.
- 25.8 **Laying, Jointing and Testing of GI Pipe**
- 25.8.1 All pipes shall be laid as per the layout approved by GE. In location where it is decided by the GE to lay the pipes alongwith the roads, the exact distance of the pipe in trenches from the center of road sides be decided by the GE.

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25.9 **Cast iron pipes and fittings**: All CI pipes and fittings shall be coated both externally and internally in manufacturer's workshop with a composition having tar or other suitable base all as specified in clause 18.2.4.6 of MES Schedule (Part-I). CI pipe and fittings shall be conforming to relevant IS.

25.10 **Gun Metal Globe Valve**: Gun metal globe valve shall be of size as mentioned in Sch 'A' and shall be IS marked.

25.11 **Laying, Jointing and Testing of Cast Iron Pipes**

25.11.1 All pipes shall be laid as per the layout approved by GE. In location where it is decided by the GE to lay the pipes alongwith the roads, the exact distance of the pipe in trenches from the centre of road sides be decided by the GE.

25.11.2 Cast iron fitting and special such as bends, tapers, tees, connecting pieces etc. shall be carefully and accurately aligned and jointed to pipe all as described in IS-3114.

25.11.3 Jointing material shall be of standard manufacturer's conforming to relevant IS standard. All joints after laying and jointing of pipes shall be tested for water tightness as per directions of the GE and all as specified in MES Schedule (Part-I) and record shall be maintained.

25.11.4 Jointing materials used between flanged joints of pipes shall be rubber of thickness 3.00mm. Rubber gasket shall be free from extractable substances. The rubber gasket shall comply with IS-5382. The samples of the same shall be got approved from the GE before procuring in bulk. Flanges where not specified shall be out of 12mm thick MS plate and shall be welded or screwed (at the option of contractor without any adjustment) on to the pipes as per IS requirements. Nuts, bolts and washers shall be of steel. The flanges shall be at right angle to the axis of the pipe or the fittings. The bolt holes shall be drilled with their axis perpendicular to the machine finished surface and burs removed.

25.11.5 The pipes and joints shall be absolutely water tight when tested. The pipes shall withstand the sweating or other defects of any kind. Testing of the pipe line shall be carried out after laying and jointed as specified in clause 18.48.7 of MES Schedule (Part-I).

25.11.6 All testing equipments and labour for testing shall be provided by the contractor without any extra cost to the Govt.

25.11.7 Date-wise giving reference to the main points between which each section has been tested shall be mentioned and signed by the contractor and Engineer-in-charge in register.

25.12 **Ductile Iron Pressure Pipes and fittings**: Refer clause No 18.94 of MES Schedule (Part-I). Ductile iron pressure pipes for water supply shall be spigot and sockets pipes class K-9 conforming to IS-8329-2000. DI fittings shall confirm to IS-9523-2000. DI pipes and fittings shall withstand the hydraulic test pressure after installation, without leakage, sweating or defects of any type as laid down in IS.

25.12.1 **Laying and Jointing of Pipes**: Refer clause 18.95, 18.95.1, 18.95.2 and 18.95.3 of MES Schedule (Part-I). Pipes shall be laid jointed and tested all as per IS-12288. Testing of DI pipes shall be carried out as specified in clause 18.95.4 of MES Schedule (Part-I).

25.13 **Valve pit**

25.13.1 Valve pit shall be of size as mentioned in respective item (s) of Schedule 'A' and as shown on drawings with following specifications :-

(a)	Excavation	-	Excavation shall be in loose/soft soil.
(b)	Foundation concrete	-	PCC (1:4:8) type D-2 using stone aggregate
(c)	PCC Top	-	PCC (1:2:4) type B-1 using stone aggregate
(d)	Brick Work	-	In cement and sand mortar (1:4)
(e)	Finishing	-	15mm thick in cement and sand mortar (1:4) finished fair without using extra cement (internally). Flush pointing in same mortar as the work proceeds (externally)
(f)	Steel and iron work	-	All as shown on drawings
(g)	Painting	-	MS cover angle iron frame and other steel work shall be given two coats of synthetic enamel paint over a coat of red oxide primer.
(h)	White washing	-	Three coats of white wash shall be carried out to internal plastered surface.

25.12 **Record Drawings**: After completion, the contractor shall submit 3 signed copies of the drawings of circuit diagram showing the layout plan of the equipment/pipes as actually laid at site.

26. Blank

27 **EXTERNAL ELECTRIFICATION WORKS**: External Electrification Works shall be provided as given in Schedule 'A'.

PARTICULAR SPECIFICATIONS**27.1 General**

- 27.1.1 All work shall strictly comply with the provision in the Indian Electricity Act and rules framed there under amended up to date) as applicable to this work. The work shall also comply with the provision contained in the latest edition on the relevant ISS/BSS issued up to the date of receipt of the tender irrespective of what is referred to in the particular specification.
- 27.1.2 All works shall conform to the best method of modern practice and shall be executed by the fully qualified electrician/lineman/wireman etc. he evidence of their qualification shall be produced by the contractor on deemed by GE.

27.2 Layout

- 27.2.1 The tentative layout is shown in the site layout plan.
- 27.2.2 The electric lines and cables shall be laid by route as actually directed by the Engineer-in-charge. The contractor shall measure on the ground the actual length alongwith the said route to work the exact requirement of electric lines and cables before placing orders for procurement of the same. The contractor is to ensure that materials/ equipment offered by him can be suitably placed in the space marked for the purpose.

27.3 Samples of Materials/ Equipment

- 27.3.1 All materials/ equipment incorporated in the work shall comply with relevant ISS. Samples of materials for which no IS Specification is issued and which are to be supplied by the contractor for incorporation in the work, shall be approved by the GE before incorporation in the work.
- 27.3.2 Materials offered for incorporation, shall be new and no reconditioned/used equipment/ materials will be accepted in the work.
- 27.3.3 All equipment, allied accessories and materials to be incorporated in this work shall be of the make(s) specifically mentioned or where the make(s) are not specifically mentioned then the same shall be of standard make and strictly comply with latest ISS.

27.4 Excavation and Earth work

- 27.4.1 Excavation for laying underground cables, foundation for poles/ struts/ stays etc shall be restricted to dimensions shown in the drawings and as directed by Engineer-in-Charge. The minimum depth of trenches shall be as laid down in Para 19.74.1 of MES Schedule (Part-I). In the case of excavation for poles, struts and stays, excavation in excess of the required depth shall be made good by the contractor in cement concrete (1:4:8) type D-2 without any extra cost to the Government.
- 27.4.2 All excavated earth shall be deposited atleast one metre clear of the edge of the trenches. When road has to be crossed, trench upto half the width of the roads shall be dug at a time and proper notices, sign boards and lights shall be displayed and watchman posted to prevent accident, without any extra cost to the Government.
- 27.4.3 Refilling of earth in trenches shall be done in 25cm layers with excavated soil approved by Engineer-in-Charge in a manner as to ensure the proper compactness and solidity. Each layer shall be well watered and rammed.
- 27.4.4 Soft/ loose soil, hard/dense soil and mud shall be classified as 'any type of soil'.
- 27.4.5 All surplus spoil shall be removed to a distance not exceeding 50 metres spread and levelled at the places as directed by Engineer-in-Charge.

27.5 Underground Cables HT & LT

- 27.5.1 The contractor shall produce original purchase vouchers and test certificates from the manufacturer for HT & LT cables, which shall be got verified by the GE before approval and incorporating in the work.
- 27.5.2 Laying and Jointing of Underground cables
- 27.5.3 The cables shall be laid and jointed strictly as specified in the MES Schedule (Part-I) and in accordance with instructions furnished by the manufacturer and latest IS specification and as specified herein in the particular specifications.
- 27.5.4 The sand for the purpose of cushioning should be fine sand.
- 27.5.5 The bricks for protection cover of the cable shall be sub class 'B' bricks. Bricks shall be laid across the cable length.
- 27.5.6 After the layer of brick covers is laid, the remaining trench will be filled with excavated earth all as specified in respective item of schedule 'A'.
- 27.5.7 The cable shall be snaked at all joints and junctions boxes. Snaking shall be done as directed by the Engineer-in-Charge. Extra length on account of snaking will also be payable under respective item of schedule 'A'. The quantity payable under Schedule 'A' item shall be the length of cable laid

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including the length in snaking and no price adjustment shall be made for variation in quantity of connected (allied) item like sand cushion/cover and brick layer protection cover.

27.5.7.1 Where the cable run vertically, they shall be firmly fixed with flat iron clamps as directed by the Engineer-in-Charge at one metre center to center along the supports.

27.5.7.2 Where cable is required to be fixed with wall, it shall be properly secured by means of clamps/saddles as specified by Engineer-in-Charge.

27.5.7.3 When more than one cable are laid in same trench, minimum spacing between cables shall be 25cm.

27.5.7.4 Jointing of cable shall be carried out by crimping method using proper crimping tools. Suitable glands at entry to existing cable shall be provided. Jointing of cable and fixing of compound shall be in accordance to relevant IS specifications and material shall be best quality of compound.

27.5.7.5 Joint boxes where required shall be epoxy type suitable for respective cable as specified in schedule 'A'. They shall be filled completely with ceiling compound and shall be tamped while doing so to insure that they are properly filled.

27.5.8 **Pipes**

27.5.8.1 GI pipes for laying cables and earth wire shall be light grade conforming to IS-1239.

27.5.8.2 Ends of pipes shall be properly sealed with wooden bush and bitumen compound after drawings the cable through pipes.

27.5.8.3 Where cables are to be fixed alongwith poles, these shall be drawn through pipes. The pipes shall be fixed to poles with suitable MS clamps and same shall be paid under appropriate item of Schedule 'A'.

27.5.9 **Testing during laying**: Cables shall be megger tested before jointing and after jointing is completed. The cables shall again be megger tested for the following:-

- (a) Continuity.
- (b) Insulation resistance to earth.
- (c) Insulation resistance between conductors.

27.5.10 **Testing after laying and jointing**

27.5.10.1 On the completion of laying and jointing of cables following tests shall be carried out:-

- (a) Insulation resistance test, sectional and overall.
- (b) Continuity test sectional and overall.
- (c) Full load test sectional and overall.
- (d) Earth test.

27.5.10.2 The result of all the above tests shall be recorded duly signed by the contractor and the Engineer-in-charge. If the test is unsatisfactory, the defective cable shall be replaced by the contractor at his own expense to the entire satisfaction of Engineer-in-charge. The contractor shall supply necessary apparatus, labour and instruments required for testing. However the Engr-in-charge is at liberty to use any other instrument he may wish to employ for the purpose.

27.6 **Prestressed concrete poles and struts**

27.6.1 Prestressed concrete poles and struts shall comply with the requirements of IS-1678. The contractor shall produce copy of the manufacturer's test certificate to the effect that the poles and struts comply with the requirements of IS-1678

27.6.2 Erection of poles shall be carried out in accordance with IS-5613 (Part-I, Section2). PCC in foundation for embedding the poles shall be as specified here-in-after and as shown on drawings.

27.6.3 The poles shall be erected with due care in such a manner that they are in true vertical position to the entire satisfaction of the Engineer-in-charge. These shall be erected exactly in a straight line except where line changes direction. Proper erection equipment such as derricks, cranes, sheet legs etc shall be used by the contractor in erection poles so that they are not improperly strained or damaged during erection and are firmly stayed till the foundation has properly set and secured.

27.6.4 All the poles shall be numbered as directed by the Engineer-in-charge with 3 inch high letters and figures at a height of 1.5 metres from the ground level in 30cm strips of black & white synthetic enamel paint. The cost of paint, painting and numbering shall be deemed to be included in rates quoted in Schedule 'A'.

27.7 **Stay Assembly**: While calculating the weight of stay wire, net effective length between thimbles shall be measured. The unit rate quoted shall be deemed to be inclusive of the cost of stay wire.

27.8 **ACSR Conductors**

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- 27.8.1 Every care shall be taken by the contractor to ensure that the conductors are not dragged over sharp object. Rope cradles wooden guards shall be used over such obstacle. They conductor which become kinked, smashed or otherwise damaged will be spliced at that point.
- 27.8.2 The splicing/jointing of ACSR shall not be located within 3 metres from the point of support of poles and they shall be aligned properly with conductors at the end of the splices/joints.
- 27.8.3 While calculating the weight of ACSR conductor, no extra allowances shall be made for jumpers etc at turning/shackle points. Sagging in the overhead lines shall however be calculated and added in accordance with the procedure given in IS-5613 (Part- I Section-I) of 1970.
- 27.9 Continuous Earth Wire: GI earth wire shall be paid by weight either calculated from tables or actual, in case of variation, lesser only will be paid. No extra allowances for sag and jointing shall be made while computing the weight of GI wire.
- 27.10 **Earthing**
- 27.10.1 Earthing shall be carried out to the specification as given in respective item of Schedule 'A' and shall conform to IS-3043.
- 27.10.2 The earth resistance of the whole system shall not be more than one ohm.
- 27.10.3 Each item of equipment as ordered by GE shall be connected to two sets of earth connections.
- 27.10.4 The contractor shall obtain approval of Engineer-in-charge to the earthing before commencement and it shall be executed in the presence of his respective. Excavation shall be passed by Engineer-in-charge before filling the charcoal dust. Filling and back filling of earth shall be done in 15cm layers well watered and rammed.
- 27.11 **Anti-climbing device**: Anti-climbing device shall be all as described in Schedule 'A' and as specified in Para 19.72.1 of MES Schedule (Part-I). Painting to steel surfaces shall be done with two coats of synthetic enamel paint over a coat of primer. Anti-climbing device shall be of approved quality and shall be fixed on poles as directed by Engineer-in-Charge.
- 27.12 **Testing**: The contractor shall produce manufacturer's original test certificates for the following:-
- (a) HT lightning arrestor.
 - (b) Air break switch gang operated.
 - (c) HT underground cable 11 KV.
 - (d) LT cable 1100 volts.
 - (e) Any other item (s) equipment (s) on plant as decided by GE.
- 27.13 **Record Drawings**: After completion, the contractor shall submit 3 signed copies of the drawing of circuit diagram showing the layout plan of the equipment/cables as actually laid at site.
- 27.14 Irrespective of whatever mentioned in Schedule 'A', all MCCB's with adjustable thermal and/ or magnetic release shall have overload thermal setting from 63% to 100%.
- 27.15 **TRANSFORMERS**: Three phase outdoor distribution transformers shall conform to IS 1180-Part 1- 2014 with latest amendment No 4 of Mar 2021 and 1180-Part 2- 1989 Specification for outdoor type three phases distribution transformers upto and including 250 KVA-11 KV. These transformers are oil immersed naturally cooled type. Preferred KVA ratings are 16, 25, 40, 63 and 200 KVA and their no load voltage ratios are 3300/ 433 V, 6600/ 433V and 11000/ 433V.
- 27.15.1 The oil of the transformer shall comply with the requirements of IS 335-1993 Specification for new insulating oil for transformers and switchgear.
- 27.15.2 **FITTINGS**: The transformer shall be provided with the following:
- (a) Two earthing terminals for body earthing and two additional for neutral brought out on a bushing.
 - (b) Oil level gauge indicating oil level minimum and maximum.
 - (c) Lifting lugs.
 - (d) Rating and terminal marking plates.
 - (e) Plain breathing device which would not permit ingress of rain water and insects.
 - (f) Drain-cum-sampling valve (3/4" nominal size thread) preferably steel with plug,
 - (g) Thermometer pocket (for transformers of rating above 25 KVA).
 - (h) Oil filling hole (1-1/4" Nominal size thread) with cover (for transformers without conservator).
- 27.15.3 The following fittings shall be provided as extra, if indicated. -
- (a) Dehydrating breather in lieu of plain breathing device.
 - (b) Filter valve (1-1/4" nominal size thread).

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- (c) Thermometer pocket (For transformers of rating 25 KVA and below).
 - (d) Draining-cum-sampling plug on transformers without conservators.
 - (e) Filling hole with cover on transformers without conservators.
- 27.15.4 Transformer complete with radiators, bushings, conservator and misc. accessories shall be thoroughly inspected and any damage noticed shall be reported to the Engineer-in-Charge, for erection of transformer the level of rails on foundation shall be checked and minor correction, if necessary shall be carried out. After the completion of erection, necessary stoppers shall be provided at the wheels. All loosely supplied fittings/accessories shall be cleaned and mounted on the transformers and connections made. The transformer oil supplied in drums by the manufacturers shall be tested for dielectric strength and other aspect in accordance with relevant IS and only approved oil on test shall be pumped into the tank through stream line filter, while filling the transformer with oil manufacturer's instructions shall be strictly followed. After filling and topping the transformer with all, samples shall be taken from the bottom and conservator and tested for dielectric strength. Fresh silica gel shall be filled in the breather. Completely assembled transformer shall be cleaned the touch up paint supplied by the manufacturer applied wherever necessary. All tank cover bolts shall be checked for proper tightness.
- 27.15.5 The transformer shall be inspected by the officer nominated by the Accepting Officer before dispatch of the transformer and allied equipments at the Factory Premises. The tenderer shall ensure that the following tests are conducted in factory premises in the presence of the nominated officer:-
- (a) Heat Run test/temperature rise test.
 - (b) Impulse test.
 - (c) All routine test.
 - (d) Magnetization current test.
- 27.51.6 All the above test shall be carried out as per relevant IS and test certificate shall be submitted on completion of the test to the testing officer as well as to the Garrison Engineer.
- 27.15.7 The transformer shall be subject to the following pre commissioning test before commissioning. The tests shall be carried out in the presence of senior Electrical Inspectors to be nominated by department before issue of completion certificate.
- (a) Insulation resistance test.
 - (b) Ratio test.
 - (c) Measurement of magnetizing current.
 - (d) Core balance test.
 - (e) Measurement of winding resistance
- 27.16 Indoor type naturally cooled oil immersed transformers shall conform to IS 2026 (Part I) 1977, Specification for power transformers. Preferred KVA ratings are 6.3, 10, 25, 40, 63, 100, 160, 250, 400, 630 & 1000 KVA.
- 27.17 **TESTING**
- 27.17.1 For testing of the dielectric strength of insulating oil in oil immersed equipment test samples of liquid shall be drawn from equipment after filling. In case oil is supplied in separate containers for filling or topping up at the site a test also shall be made with samples drawn from such oil container before the equipment filled.
- 27.17.2 Minimum acceptable values for each test will be indicated by the Engineer-in Charge. However, dielectric strength of oil should be above 60 KV (RMS) as per IS-335.
- 27.17.3 While measuring the dielectric strength of the oil in the transformers if tests indicate the presence of undue amount of moistures, the insulation oil shall be filtered by streamline filter. No extra charges shall be paid for filtration and the contractor shall arrange his own filtration machine oil testing kit and other accessories.
- 27.17.4 Insulation, resistance shall be measured from primary and secondary to ground and between primary and secondary.
- 27.17.5 **Pre-commission test for transformer shall be carried out by Senior Electrical Inspector/ Electrical Inspector.** Tenderers to note that all the necessary arrangements shall be made by the Contractor and cost thereof shall be borne by the contractor without any extra cost to the Govt.
- 27.18 **PROFORMA FOR TRANSFORMER TEST**

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27.18.1 Transformer rating

- (a) Insulation resistance test with megger.
- (b) Between primary to earth with 2500/5000 V megger.
- (c) Between secondary to earth with 1000 V megger.
- (d) Between primary & secondary with 2500/5000 V megger.
- (e) Dielectric strength of oil in the transformer (test voltage 40 KV for 1 minute for a gap to 2.5 gap).
- (f) Operation of the tap switch: - This should be off load tap changing unit to vary the voltage $\pm 7.5\%$ with steps of $\pm 2.5\%$.
- (g) Condition of silica gel crystals.
- (h) Earth resistance

27.18.2 **GUARANTEE**: The transformer shall be guaranteed for trouble free operation for a period of 24 months from the date of commissioning. Any defects discovered during this period shall be rectified free of cost by contractor.

28. **ANALOGUE ADDRESSABLE FIRE ALARM CONTROL PANEL (FACP) SPECIFICATION FOR ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM**

28.1 **ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM**

28.1.1 **SCOPE OF WORK**

28.1.1.1 The scope of work under this heading shall include designing supplying and installing of Analogue Addressable Fire Detection and Alarm System. The work under this system shall consist of furnishing all materials, equipment, appliances and labour necessary to install the complete Fire Detection and Alarm System, complete with Main Fire Alarm Control Panel, Sensors, Sounders, Strobes, Manual Call Stations, Relays etc. for interfacing with other systems.

28.1.1.2 It shall include laying of cabling duct, conduits and power supply etc., necessary for installation of the system with supply of sensors and devices as appropriate and as indicated in the Specification and Bill of Quantities. Any openings/chasing in the wall/ceiling required for the installation shall be made good in appropriate manner.

28.1.1.3 The Bidder shall also undertake to control and monitor the ventilation and other systems from the Fire Alarm Panel through the use of Addressable Output / Input Modules.

28.1.1.4 The Building should be designated as multiple fire zones with each area forming one or more software programmed zones. All wiring shall be done using 2 x 1.5 mm² twisted pair shielded PVC insulated copper cable while exposed and in PVC/MS Conduits in concealed in concrete.

28.2 **GLOSSARY OF TERMS**

28.2.1 **FIRE ALARM PANEL (FACP)** : This refers to the microprocessor-based panel that shall be connected to the various sensors/devices by means of 2 wire loops. The FACP shall be able to supervise individual detectors for proper performance as well as to give pinpoint location of Fire or Fault Alarm and initiate Alarms as well as facility for cutting off of AHU's and Electrical Power is also to be included. The panel shall also have the provision through volt-free contact to activate an Auto-Dialer to dial selected phone numbers in case of fire.

28.2.2 **LOOP** : A loop shall mean a 2-wire circuit connecting 198 Addressable Devices, which shall include 99 Sensors and 99 Modules. The loop card shall have built-in short circuit isolators to accommodate Class A wiring.

28.2.3 **ADDRESSABLE DEVICES**: This term indicates the complete group of addressable devices such as Sensors or Detectors, Manual Call Stations, Addressable Output / Input Modules etc.

28.2.4 **SENSORS OR DETECTORS**: The Sensors or Detectors shall be Analogue Addressable type. The chamber should be easily removable for the purpose of easy maintenance. The address programming shall be done through the decade switch in the Detector. The Detectors shall have a common base to allow easy interchange of various types of Detectors. Address setting by DIL Switch shall not be acceptable or through Hand Held Programmer.

28.2.5 **MANUAL CALL STATION** : The Manual Call Station shall be addressable type with Input Modules to define the address for each station. The function shall be similar to that of conventional Manual Call Point and should be resettable without replacing the glass.

28.2.6 **OUTPUT MODULE** : Output module shall mean Addressable points from the FACP with potential free contacts for tripping of AHUs, power supply etc. as required. Any module shall operate two relay outputs powered from the loop and preferably consuming single address on the loop. The system shall also be able to handle separate modules to interface the speakers of the Public Address System.

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- 28.2.7 **INPUT MODULE**: The input modules shall be of dual/single channel type. The dual channel module shall be selectable for Normally Open or Normally Close by a 2 bit DIL switch.
- 28.2.8 **SOUNDERS/HOOTERS** : Each sounder shall be of addressable type. The sounders shall derive power either from Loop itself. It shall be capable of being directly mounted on the wall/ceiling or along with the detector. The sounder shall have an output of at least 90db at 1 mtr. The sounder shall be programmed to activate in event of an alarm from a single detector/device or a group of detectors/ devices.
- 28.3 **SPECIFICATION.**
- 28.3.1 The design, supply and installation and testing of the entire fire alarm system shall conform to EN 54 / BS: 5839 or NFPA 71 and 72. The detectors shall conform to relevant codes for Fire Alarm Systems.
- 28.3.2 A general line diagram showing the circuit and spacing of detectors is to be enclosed. The quantity mentioned in the Price Schedule shall be quoted for. Unit rates shall apply in the event of any variance.
- 28.4 **FIRE ALARM SYSTEM.**
- 28.4.1 The Fire Alarm System shall conform to EN54, BS: 5839 or NFPA 71/72 in respect of design and installation, and it shall give Audio/Visual Alarm Signals when there is rise in temperature in case of Heat Detector or while measuring Smoke Density in case of Smoke Detector, while it exceeds the pre-set limit. The system shall give pinpoint location of fire with warning system and voice communication for commands and instruction if required.
- 28.4.2 The system shall have a microprocessor-based control and monitoring facility. The basic function of the system shall be able to achieve pinpoint location of alarm indication.
- 28.4.3 It shall be possible to program each loop with up to 99 Detectors & 99 Modules in a circuit.
- 28.4.4 Annunciation facility shall also be inbuilt into the FACP, the panel being able to initiate alarm signal for any particular zone.
- 28.4.5 The system shall be fully supervised for all fault conditions with distinctive alarm operated for fault and fire conditions. Test buttons and software features shall be provided to test the electronic circuits and Detector health.
- 28.4.6 The FACP shall be so programmed that when a particular Detector or group of detectors gives a fire signal the FACP should be able to trip an individual AHU automatically. In case of Fire in an area handled by an AHU the FACP shall be able to trigger a Relay that shall shut off the AHU through an additional contact provided in the AHU panel by the AC contractor.
- 28.4.7 The FACP shall have facility to connect addressable Input / Output Devices in the peripheral RS 485 bus. These may be 8 way input card, 4 way relay card, 4 way sounder card, passive/active repeater panels and mimic driver cards.
- 28.4.8 The system shall be based on an "Open Protocol" to ensure flexibility of using Sensors / Detectors of an alternate manufacturer, in case the user requires such an option at a later date.
- 28.5 **FIRE ALARM CONTROL PANEL (FACP).**
- 28.5.1 The Fire Alarm Control Panel shall be micro processor based fully Analogue Addressable, Analogue Control Unit which shall control all Analogue Addressable Detectors, Manual Call Stations and Switching Systems (for disconnecting AHU and power supply) connected to it.
- 28.5.2 All addressable units shall be connected to the FACP through the Loop Cards and shall be addressed through individual numbers. The FACP shall be able to obtain analogue value for all detectors in the circuit through a pulsed digitalized current data. The FACP shall be able to analyse all analogue inputs from all addressable units, and through its own software and ambient level screening the FACP shall be able to identify fire, possible fire or fault conditions. The unit supervision shall be dynamic and continuous.
- 28.5.3 The FACP shall itself have one loop card built in. The loop shall be able to address 99 addressable detectors & 99 devices. At least 99 FACP units may be networked to enhance system capacity as and when required. All the networked panels shall display all the events occurring anywhere in the system. Each FACP on the network shall effectively function as a repeater panel as well.
- 28.5.4 The FACP shall also give adequate warning signal whenever there is dust accumulation in detectors, and up to the point of its replacement it should be possible to change the level of ambient alarm calibration condition either by the use of software program operable by the owner or by resetting the detector.
- 28.5.5 Short / Open circuit units shall also be reported at the FACP In such cases, the system through the use of fault isolators shall be able to isolate that segment between the two fault isolators. The missing Detectors/Devices shall also be reported at the FACP with identification of the location.

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- 28.5.6 The FACP shall have the facility to set sensitivity of each smoke sensor remotely. It shall also be possible to set the sensitivity to a global high or global low based on night or daytime.
- 28.5.7 When an alarm condition is sensed at the FACP from a smoke or heat detector, a delay time/alarm verification period shall be started. If the sensor is still in alarm after the delay time expires, an alarm condition is reported. The delay time shall be adjustable from 0 to 990 sec's.
- 28.5.8 The FACP shall have the facility to perform walk test such that an operation can be periodically checked out for all initiating devices. As each device is placed into alarm the FACP shall print the condition and automatically reset the device. Audible devices shall be initiated, if required at a preprogrammed time. If a zone is inadvertently left in walk test mode, it shall automatically reset to normal after the idle time is exceeded. During the walk test the zones other than the programmed zones shall be under continuous supervision (normal mode). In case of any alarm initiated by detector/devices the walk test shall get terminated automatically.
- 28.5.9 Programming functions shall include alarm/trouble type assignment, point descriptor assignment, alarm message assignment, etc.
- 28.5.10 Programming may be carried out from the FACP keyboard or utilizing the approved PC setup software via laptop/desktop computer.
- 28.5.11 The FACP shall have a Liquid Crystal Display of Alphanumeric type to indicate immediately all conditions. The display should be high resolution, backlit 2 (lines) x 40 character. In case of testing of the system from the FACP the Display shall be able to give readouts of analogue value of all detectors being tested. The FACP shall also be able to carry out continuous self-monitoring when in normal condition.
- 28.5.12 The FACP shall have facility for in-built or external printer coupled to the FACP, which shall log all events with time. The printout shall clearly indicate the event - Fire/Pre Alarm/Fault etc. With the unit address and time.
- 28.5.13 The FACP shall also be able to discriminate between false alarms and fire conditions, as well as priority selection of alarm in case alarm activates in two or more remotely located units simultaneously. In such cases, the Manual Call stations shall have the highest priority.
- 28.5.14 The FACP also is able to actuate switches automatically in case of Fire condition that of AHU's and power supply or other systems such as Gas Extinguishing Systems.
- 28.5.15 In this respect the bidder is required to take note of clause relating to cutting off of AHU's given above. The bidder shall note that the Client shall provide no additional facilities for completion of this mechanism other than that specified in clause 73.4.6.
- 28.5.16. The System shall be fail safe and adequate safe guards should be under taken that in the event of a failure of a part of the System it shall not handicap the complete System. The Loop Cards shall be of Modular Construction.
- 28.5.16 The Bidder shall undertake the responsibility of the complete installation, commissioning, user trials, training and maintenance of the System as required. The Bidder shall take all responsibility for preparation and installation of System Software into the FACP. The Software shall be such so as to be easily operated by the Client's Personnel and secured against Software errors, ability to be upgraded so as to incorporate more features at a later date.
- 28.5.17 The FACP shall have its own Battery Backup of a minimum of 48 hours in normal condition and then half an hour in alarm condition. The backup time calculation shall be done as per IS 2189 standards. The Battery shall be 2*12V (24V) DC and of sealed lead acid rechargeable maintenance free type, housed inside the FACP.
- 28.5.18 It shall be able to withstand temperature variations from 00 centigrade to 550 centigrade. Further, Relative Humidity (non-condensing type) up to 95% shall not hamper its performance. The voltage rating shall be from 15V DC to 32V DC, though the voltage may be change depending upon the working voltages of a proprietary FACP.
- 28.5.19 The FACP shall be totally enclosed dust and vermin proof type made of minimum 16 gauge dust inhibited sheet with even baked finish. The FACP shall be of completely solid stage design.
- 28.5.20 The logic circuitry shall be based on high noise immunity solid state hardware employing modular construction. Logic cards shall be of epoxy fibber glass construction.
- 28.5.21 The FACP shall have any one of these approvals: EN 54:LPCB, UL and FM.
- 28.5.22 The system shall be designed such that it shall be possible to add atleast 20% of the Detectors for future expansion without extra cost on the panel.
- 28.5.23 The FACP shall be capable of being networked (future expansion) with other similar FACPs located at different part of the premises through a single RS485 bus.
- 28.5.24 The FACP shall have provision for interfacing with the Public Address System.
- 28.6 **FIRE ALARM REPEATER / ANNUNCIATOR PANEL.**

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- 28.6.1 The Alarm Repeater/Annunciator Panel shall display fire/fault messages simultaneously with the FACP. It shall be capable of interfacing with the FACP on a single RS 485 Bus. The panel shall be capable of operating on 24 V DC supply.
- 28.6.2 The panel shall have a 2 x 40 character backlit alphanumeric LCD display, which shall display date, time & description of alarm/trouble events that are displayed in the FACP with an inbuilt buzzer to indicate fault/fire alarm.
- 28.6.3 The panel shall be powered from the FACP.
- 28.6.4 It shall have control keys for Sound, Silence, Mute and to reset the FACP from the repeater station.
- 28.6.5 The repeater panel shall have the following LED's indications
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|--------------|------------|
| (a) Supply | (b) Fault |
| (c) Mute | (d) Silent |
| (e) Disabled | (f) Fire |
- 28.7 **ADDRESSABLE CONTROL MODULE.**
- 28.7.1 Addressable Control Module shall be provided to operate dry contacts for switching ON OFF pressurization fans, AHU' s etc. in case of fire etc.
- 28.7.2 It shall have a built in type identification to automatically identify this Device to the control panel.
- 28.7.3 It shall have internal circuitry & relay powered directly by two-wire loop.
- 28.7.4 It shall have a selectable inbuilt fault isolator
- 28.8 **ADDRESSABLE MONITOR MODULE.**
- 28.8.1 The monitor module shall provide an addressable input for N.O. or N.C. Contact devices such as manual stations, Water flow switches, sprinkler Supervisory devices, etc.
- 28.8.2 It shall provide a supervised initiating circuit. An open-circuit fault shall be Annunciated at the Fire Alarm panel (Subsequent alarm shall be reported.)
- 28.8.3 The device shall contain an LED, which blinks upon being scanned by the Fire alarm panel. Upon determination of an alarm condition of an alarm condition, the LED shall be latched on.
- 28.9 **LIGHTENING PROTECTION:** This shall be provided all as described in Schedule 'A' and as per MES Schedule. Any item for which specification is not given in Sch 'A', the same shall be followed from specifications given for the lump sum part in the beginning of the particular specifications, or if not there than from SSR.
29. **SOLAR WATER HEATING SYSTEM:** Solar water heating system with type 2 for warm regions with Solar flat plate collector conforming to IS :12933 (part-I) with amendment No 1 and IS : 12933 (part-2)/2003 suitable for inlet water with chlorine and fluorine content up to 300 ppm and supply hot water at the outlet.
- 29.1 The solar water heater system shall meet the requirement of heating of the water to maintain the temperature all through the winter season on average winter clear day and particularly for a clear day in December and January.
- 29.2 The solar water heating system shall give an output temperature of 60° C on year round average basis. The system will be thermos phonic type.
- 29.3 Solar water heating system comprising of solar flat plate collector's stand assembly stainless steel insulated hot water storage tank with heat exchanger and various other components solar flat plate collector component shall have:-
- | |
|---|
| (a) Solar flat plate collector cover plate made of toughened glass. |
| (b) Sheet for absorber made of copper. |
| (c) Absorber made of copper sheet and copper tubes. |
- 29.4 **SOLAR FLAT PLATE COLLECTOR SPECIFICATIONS:** Solar flat plate collectors shall have various components as under.
- 29.5 **COVER PLATE:** Cover plate shall be of toughened glass having thickness 4.0mm (min) conforming to section-1 of IS: 12933(Part-2)/2003 the Solar transmittance of the cover plate shall be minimum 85 percent at near normal incidence.
- 29.6 **COLLECTOR BOX:**Collector box shall be made of aluminium sections only type grade size workmanship and finish of the material to be used shall be as per section-2 of IS 12933 (Part-2)/2003. The minimum thickness of aluminium sections shall be as under:-
- | |
|--------------------------------------|
| (i) Channel section for sides 1.6mm. |
| (ii) Sheet for bottom 0.7mm. |

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(iii) Support for glass retaining 1.2mm.

(iv) Sheet for entire body 1.0mm.

29.7 **ABSORBER:** Absorber shall consist of riser header and sheet for absorber. The diameter of header shall be 25.4 ± 0.5 mm and thickness 0.71mm. The diameter of riser shall be 12.5 ± 0.5 mm and thickness 0.56mm and made of copper only. The distance between the risers from centre to centre shall be 120mm type grade size, workmanship of the material to be used shall be as per section -3 of IS: 12933 (Part-2) 2003. Riser and header assembly designed for working pressure up to 24.5 Kpa (2.5 kg/sqcm) shall be tested for leakage at a minimum hydraulic pressure of 490 K pa (5 kg/sqcm).

29.8 **SHEET FOR ABSORBER:** Sheet for absorber shall be made of copper only of thickness 0.28mm. Type grade size, workmanship and finish of, material to be used shall be as per sections -3 of IS 12933 (Part-2)/ 2003. A sample piece of the absorber having minimum area of 400 Sqcm shall be taken out from the oven and cooled at room temperature. The cooled sample shall be inspected visually for damages, if any. There shall not be any appearance of blistering/rupture/ peeling off the coated/ painted surface and of weakening of the bonding between absorber sheet and risers/ headers.

29.9 **COLLECTOR BOX INSULATION:** Insulation shall be provided at back and sides. Thermal resistance R of insulation material shall be minimum 0.96 Sqm degrees C/W for back insulation and minimum 0.48 sqm degree C/W for side insulation. This shall be derived after determining thermal conductivity (K) value at 100° C mean temperature in accordance with IS: 3346 Collector box insulation shall conform to sec. 4 of IS: 12933 (Part-2)/ 2003.

29.10 **GASKETS AND GROMMETS:** Gaskets and grommets shall conform to Sec 5 of IS: 12933 (Part-2)/ 2003 (EPDM withy inside/outside locking collar).

29.11 **TECHINICAL SPECIFICATIONS:**

Flat Plate Collector		
(i)	Collector Size	2033 x 1033 x 100mm Approx. 2.13 Sqm area
(ii)	Absorber area of the collector	>1.92 Sqm
(iii)	No of collector weight of the collector	One 38 Kg
(iv)	Water output heat carrier content	Copper based sheet
(v)	Absorber material	Copper based sheet
(vi)	Coating	Special Photon Blue coating sheet/Fins
(vii)	Construction of absorber	Full single sheet
(viii)	Header and Riser pipe material	Copper
(ix)	Header and Riser pipe size	25.4mm and 12.5mm respectively
(x)	Bonding : Raiser pipe to fins	Ultrasonic welding/ laser welding
(xi)	Bonding : Raiser pipe to Header	Simple brazing
(xii)	Absorbitivity of the collector	>95% Emmissivity -0.2.
(xiii)	Collector frame	Aluminium with pur polyester powder coating
(xiv)	Glass	4 mm toughened, low iron, transitivity $\geq 85\%$
(xv)	Back sheet	Aluminium riveted and sealed with sislcone selant with breather plug.
(xvi)	Glass Beading and sealing	EPDM with 35% rubber content with top aluminium retainer angle, with SS self tapping screws.
(xvii)	Grommets	EPDM with inside /outside locking collar
(xviii)	End connection	4mm thick brass flanged with EPDM gaskets
(xix)	Collector-Mounting structure	Mild steel with pure polyester powder coating
(xx)	Frame corners sealing	Sealed from inside with silicone sealant.

29.12 **SUPPORT STRUCTURE:** Rigid support are given for the collectors, and pi[ping (wherever necessary) using MS angle 40x 40 x 5mm or other sections as per site requirement. It will be suitably grouted all as per manufacturers design.

29.13. **CIVIL WORK:** Civil work of PCC in the ratio (1:2:4) type B-1 by using 20mm graded stone aggregate for grouting of the support structure for solar collector, tanks, piping shall be provided.

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All mild steel angle iron work/ supports will be provided with two coats of synthetic enamel paint over one coat of red oxide primer.

29.14 INSULATED HOT WATER STORAGE TANK:

(i)	Material	Stainless Steel 304
(ii)	Size of the tank	Capacity of tank, shall be as specified in respective item of sch 'A'
(iii)	Tank type	Horizontal
(iv)	Welding	TIG (Tungsten inert gas welding)/ linear welding and Resistance welding
(v)	Thermal insulating material	PUF (Poly urethane foam)
(vi)	Thickness of insulation	50mm
(vii)	Tank cladding	SS 430 Stainless Steel
(viii)	Tank design	Suitable for withstanding 1 kgf/ Sqcm (Atmospheric) pressure

29.15 The cold water tank is required to ensure continues feed water supply into the system at a suitable head. Position for placing of cod water tank shall be as per manufacturer's design. In case suitable head is not available, the height of cold water tank be raised at site as required and cost thereof is deemed to be included in the quoted rates and noting extra is admissible on this account.

29.16 **MATERIAL:** Insulated hot water storage tank shall be non pressure type and made of stainless steel grade (x04Cr19Ni9 or x07Cr18ni9 of IS 1570 (part 5)/1985. TIG welded.

29.17 **INSULATION:** Solar water heating system (SWHS) up to and including 500 LPD shall be Insulated with 50 mm CFC Free PUF insulation at 40 kg/metre cube of higher density PUF insulation could be pre extruded type fitted with FRP exterior cladding shall be with 22 SWG aluminium cladding.

29.18 **SYSTEM INTER CONNECTING PIPING:** GI pipes medium grade ISi marked (IS 1239) duly insulated with 9mm nitrile rubber with 26 SWG aluminium cladding. EPDM hose pipes can also be used for system up to and including 500 Ltrs per day.

29.19 Collector stand assembly shall be made of MS angle of size 40 x 40 x 5mm duly pretreated and stove enameled with black colour paint.

29.20 The capacity of makeup tank shall be 5 liters.

29.21 **TEMPERATURE GAUGE:** Dial type duly calibrated and suitable for temperature range from 0° C to 120° C.

29.22 STRAINER:

- (a) Type 'Y' Type
- (b) Material Cast iron
- (c) Purpose Filtration of suspended material

29.23 **CONTROL AND INSTRUMENTATION:** As per the system requirement for effective monitoring and trouble free operation of the system one No temperature gauge and one strainer in the cold water feed line are provided. Valves/Non return valves shall be provided for outlet and make up tank in the system.

29.24 General arrangement drawing shall clearly show all the parts of the system such as solar flat plate collector stand assembly. Stainless steel insulated hot water storage tank complete with stainless steel heat exchanger, sacrificial anode, required, internal and external piping, tank stand assembly, various valves, pressure gauges, temperature gauges and their fixing arrangements shall be got approved by PM before installation.

29.25 TESING & TAKEOVER OF EQUIPMENT:

- (a) The installation shall be taken after it has been commissioned and tested and the PM is satisfied that:-
 - (i) The system equipment's and accessories provided are as per contract specifications.
 - (ii) All water heating system, equipment's and accessories are mechanically sound and are of adequate structural strength and the system is in conformity with the specifications.
 - (iii) All pipes fittings etc are of specified make quality & design.
 - (iv) The contractor shall submit the instruction manuals pamphlets literature of the equipment's installed at site in triplicate.

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- (v) List of service outlets.
- (b) Testing of solar water heating system shall be carried out at the peak winter during Dec and Jan.

29.25 The contractor shall furnish complete and satisfactory type test reports for each size/type of solar flat plate collector as per contract specifications from any Govt. laboratory to the concerned Director (QA). Type test reports shall be complete with authenticated drawing giving complete details of the various component used in the solar flat plate collector. Type test reports shall include all the tests listed in IS: 12933 (Part-1) with amdt. No 1 (excluding test requirements as per clause 7.2.7 and 7.2.8 of Is) and IS: 12933 (Part-2)/ 2003 and also the tests included on various components of solar flat plate collector as per IS: 12933 (Par-2)/ 2003.

29.26 All civil work related to installation will done by the contractors.

29.27 **DETAILED SPECIFICATION PERTAINING TO PLUMBING**

Cold water plumbing from cold water tank to solar collector will be provided Emulated header will run along each service shaft with reducing diameter from top to bottom floor. A hot water supply will be given independent of geyser connection to third bath room and from second bath room another pipe to be merges into this with miser to ensure hot water in the bath room and also hot water for kitchen in officer Dus be catered in bath room to be connected solar heated water complemented by geyser in second bath room. Supply of individual Dus will be controlled by hot water restricting daily hot water supply of 75/ 50 ltr. Complete plumbing layout will be designed by contractor to ensure no air locks and water hammer and will get approved by P.M. (ref drawing Appx).

29.28 **INSULATION ON PIPE:** GI pipe of heater and service connection shall be insulated with nitrile rubber 9mm thick with 26 SWG aluminium cladding system upto 500 LPD. Alternatively nitriler rubber sleeve 4mm thick equivalent thermal conductivity may be provided.

29A. **ARBORICULTURE**

29A.1 **PROBABLE SOURCES OF MATERIALS**

(i) Contractor shall brought the soil/ manure materials from the sources approved by GE before the work started.

(ii) The tenderer shall ascertain the actual position/ exact location of source before submitting his tender and no additional payment shall be made on account of misunderstanding or its distance from site of work.

(iii) The tenderer shall amongst other things also ascertain all information such as royalties, taxes, duties and other charges etc. on the materials and no additional payment shall be made on account of the foregoing.

(iv) However, if due to any ban imposed by the State Govt Authority on obtaining the materials from the sources specified above and or specified materials is not available at the sources mentioned above these materials conforming to specifications as given in particular specification sll be procured from any other place/ source after getting the same approved from GE in writing and without any extra cost to Govt.

29B. **DISPOSAL OF SURPLUS SPOIL & RUBBISH ETC OBTAINED FROM DISMANTLING /DEMOLITION**

29B.1 All the surplus spoil, each, rubbish etc obtained from excavation/dismantling/ demolition shall be disposed off to outside Ministry of Defence land at any distance at Contractor's cost otherwise specifically not mentioned in Sch "A"/BOQ. Serviceable material if any obtained shall be deposited to MES store yard of Engineer-in-Charge.

30. **ARBORICULTURE /HORTICULTURE AND LANDSACPING**

30.1 The work of Arboriculture shall be started on the existing ground leveled and dressed to required formation levels and slopes. In case where unsuitable soil is met, it shall be either removed or replaced or it shall be covered over to a thickness decided by EIC with good earth. In the course of excavation or trenching during horticulture operations, cables etc. are met with shall not be dismantled without prior written permission of Engg- in Charge.

30.2. Trenching of soil is done in order to loosen the soil, and turn over and trenched the top layer containing weeds etc in the base and to bring up the lower layers of good earth to form a proper medium for grassing, pressing, hedging and shrubbery.

30.3. Trenching shall be done to the depth ordered by the Engineer.

30.4. The trenched ground shall, after rough dressing, be flooded with water for making small kiaries to enable the soil to settle down. Any local depression unevenness etc shall be made good by dressing and/ or with good soil.

30.5. Weeds or other vegetation which appear on the ground are then rooted and removed and disposed off. The surface when hard enough is fine dressed.

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30.6. The excavated soil shall be straight away dumped into the adjoining positions so that double handling otherwise involved in dumping the excavated stuff outside and in back filling in the trenches.

31. **MATERIALS**

31.1 **Grass:** Grass shall be of Cynodon Dactylon-Doob/Improved /hybrid strains of Bermuda grass/Zoyasia grasses as approved by GE. Grass shall be fresh, free from weed and vegetation as approved by Engg-in Charge before planting.

31.2 **Dump Manure:** It shall be well decayed, free from grits and any other unwanted materials. It shall be a mixture of cow dung and sheep dung, matured in pit for a period of 3 to 12 months as approved by GE. Nomenclature:

31.3 The names of all plants shall confirm to standardized botanical names.

31.4 **Manure:** - It shall be consisting of the following :-

Ser No	Items	Min Quantities of ingredients required for preparation of manure
(a)	Dump manure	0.0425 Cum
(b)	Neem Khali	1.33 Kg/cum
(c)	Bone meal	0.66 Kg/cum
(d)	D.A.P (16:42)	0.10 Kg/cum
(e)	BHC dust or any other authorize chemical	0.15 cum/permissible limit as manufacturer's instruction
(f)	Weedicide	0.0067 litre/cum

31.5 **Good Earth:** The soil shall be suitable for gardening , free from kankar, Moorum shingle, rocks, stones, brick bats, building rubbish, and any other foreign matter. It shall also be free from clods or lumps of sizes bigger than 75 mm in any direction and shall have Ph value ranging between 6 to 8.5. (Note: - Earth shall be obtained from quarries/ site as approved by the Engineer-in-Charge outside the defence land unsuitable soil found at site shall be removed and disposed of to a distance exceeding 250 metre but not exceeding 500 metre Complete all as specified & directed.)

32. **QUALITY AND GENERAL REQUIREMENTS OF PLANTS**

(a) Plants shall be typical of their species and varieties have normal growth habits, well developed branches, densely foliated with vigorous and fibrous root systems.

(b) Plants shall be free from defects and injuries. Bark shall be free from abrasion.

(c) Plants shall be freshly dug and nursery growth pots/bags. Plants shall have been grown under climatic conditions similar to those in locality of project to conditions of project location. Nursery grown plants shall have been at least once transplanted. Plants growing in natural ground prior to supply shall not be accepted.

(d) Each bundle of plants and all separate plants shall be properly identified by weather-proof level securely attached there to before delivery to project site.

(e) No plants shall be delivered to the project site, except for required samples, until inspections have been made in the field or at the nursery.

(f) Baled and Burlap plants must be removed with the root system as solids units in Balls of earth firmly wrapped with Burlap. The diameter and depth of the Balls of earth must be sufficient to encompass the fibrous and feeding root system necessary for the healthy development of the plant. No plant shall be used when the Ball of earth surrounding its roots have been badly cracked or broken prior to or during the process planting or after the equipment required in connection with its transplanting has been removed. The plant and ball shall remain intact as one unit during all operations.

(g) Container grown stock shall have been grown in container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in container.

(h) All plants shall be hardy under climatic conditions similar to those in the locality of the project.

(j) All trees, soon after planting shall be properly supported to ensure their safety against wind or other factor which may effect it adversely.

33. **SIZES OF PLANTS**

33.1 All plants shall be not less than 2.4m height/ which are minimum acceptable size, Plants shall be measured before pruning, with branches in normal position and healthy. The size of plant should be got approved from GE.

33.2 Plants shall be stable and shall stand without support after planting and minimum length as specified and shall be straight and symmetrical with a crown and having a persistent main stem. The size of the crown shall be good overall proportion to the height of the plant. The height of

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plant shall be measured from the top of root upto top of foliage and not the isolated branch/leaf main stem upto half the containers height.

- 33.3 Shrubs shall be well foliated with a crown typical of the species and variety shrub height dimension shall be average height of the top of all stems and not of the longest stem.
- 33.4 Ground cover plants shall be least one year old and shall be supplied in 8 inch earthen or other suitable posts/bags.
- 33.5 Creepers and vines shall have at least four runners and shall be supplied in 8 inch Earthen or other suitable pots. Creepers & vines in polythene bags are not acceptable.

34. SUPPLYING AND STACKING OF MATERIALS

- 34.1 **Dump Manure:-** It shall be transported in lorries to site of work. It shall be stacked of not less than 50 cm height and volume not less than 3 cum Length, breadth and depth of stacks shall be measured to a cm. The Volume of the stacks shall be reduced by 8% for looseness in stacking to arrive at the net quantity for payment.
- 34.2 **Good Earth:-** It shall be transported in lorries to site of work. It shall be stacked of not less than 50 cm height and volume not less than 3 cum. Length, breadth and depth of stacks shall be measured to a cm. The Volume of the stacks shall be reduced by 20% for looseness in stacking to arrive at the net quantity for payment.

35. MIXING GOOD EARTH WITH MANURE AND SPREADING

- 35.1 Good earth and manure shall be broken down to particles of sizes not exc 6 mm in any direction. These shall be mixed in specified proportions and stacked. This mix shall then be removed from stacks by head load and spread evenly over the surface to the thickness ordered by the EIC. It shall be spread with a twisting motion to avoid segregation and to ensure that spreading is uniform over the entire area.
- 35.2 The excavated soil from the top 60 cm depth of the bed stacked at the site shall be thoroughly mixed with sludge or manure in the proportion 8:1 by volume (8 parts of stacked volume of earth after reduced by 20% to 1 part of stacked volume of sludge or manure after reduction by 8%) or other proportion as described in the item. The mixed earth and manure shall be refilled over the trenched bed levelled neatly and profusely flooded so that the water reaches even the bottom most layers of the trenched depth of the bed. The surface after full subsidence shall again be refilled with the earth and manure mixture, watered and allowed to settle and finally fine dressed to the level 50 mm to 75 mm below the adjoining ground or as directed by the Engineer. Surplus earth if any, shall be disposed off as directed by the Engineer.
- 35.3 Brick bats and other foreign matter if met with during excavation or trenching shall be removed and stacked within initial load and lift, such material as is declared unserviceable by the Engineer shall be disposal by spreading and levelling at places ordered by him.

36. PLANTING OF GRASS: -

- 36.1 Initially the area shall be dug upto a depth of 15 cm and weeds and rank vegetation with roots removed there from by repeated forking. Clots of excavated earth shall then be broken up to the size not more than 75 mm in any direction. The trenched ground shall, after rough dressing, be flooded with water by making shall kiaries and after 10 days and within 15 days of flooding, weeds that re-germinate shall be uprooted carefully. The rubbish arising from the above operations shall be removed and disposed off as directed by EIC. Any local depression unevenness etc. shall be made good by dressing and/ or filling with good soil up to 10 cm below the formed ground level.
- 36.2 Weeds or other vegetation which appear on the ground are then uprooted and removed and disposed off. When the surface hard enough is fine dressed.
- 36.3 Top 10 cm thick trenched ground shall be filled with good soil mixed with manure as specified here above. 22.4 Grassing with Grass: The soil shall be suitably moistened and then the operation of planting grass shall be commenced. The grass shall be dibbled at 10 cm apart in any direction or other spacing as specified in Schedule 'A'. Dead grass and weeds shall not be planted. The contractor shall be responsible for watering and maintenance of levels and the lawns for 30 days or till the grass forms a thick lawn free from weeds and fit for moving whichever is later. Dead patches are replanted and weeds are removed.

37. PLANTING OF TREES:

- 37.1 The holes of circular shape min 400mm diameter in soil shall be excavated to a minimum depth of 500mm, unless otherwise described in the Schedule 'A' and the excavated soil broken to clods of sizes not exceeding 75 mm in any direction, shall be stacked outside the hole. Stones, brick bats, unsuitable earth and other rubbish, all roots and other undesirable growth met during excavation shall be separated out and unserviceable materials removed from the site. Useful materials if any stacked separately. Good earth in quantities as required to replace such discarded stuff shall be taken out of the supplied good earth mixed with required manure etc and filled.

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- 37.2 The tree hole shall be filled with manure uniformly mixed with the excavated soil after mixing manure has been broken down to powder (size of particle not to exceed 6 mm in any direction) in the specified proportion. The mixture shall be filled into the hole up to the level of adjoining ground and then profusely watered to enable the soil to subside. The refilled soil shall then be dressed evenly with its surface about 50 to 75 mm below the adjoining ground level or as directed by the EIC.
- 37.3 Immediately after plants pit is backfilled a shallow base slightly larger than pits shall be from with a ridge of soil to facilitate and contain watering. After planting cultivate the soil between the plant pit and rake smooth Spray the soil with water to settle.
38. **MAINTENANCE OF PLANTS/ SHRUBS/HERBS/GRASS ETC:-**
- 38.1 During the maintenance period any irregularities arising in ground levels due to watering or due to ramping by labour, or due to cattle traying thereon, shall be constantly made unto the proper levels with good earth. Constant watch shall be maintained to ensure that dead patches are replanted and weeds are removed.
- 38.2 The Contractor shall be responsible for re planting damaged ones, maintaining/protecting the plants/shrubs/herbs/grass etc. Planted under this contract for a period of 12 Months from the certified date of completion of Schedule "A" part-I. Rates quoted in Schedule "A" shall deem to include all.
- 38.3 Materials and labour required for regular wetting, watering, mulching the soil, fertilizing, punning/mowing, pesticides, T&P and other horticultural operation needed for proper growth of planted etc implanted under the Contract. Any causality in implanted plants/ herbs/ shrubs etc during maintenance period shall be made good by the Contractor at his own cost & expense to the entire satisfaction of EIC and nothing extra shall be admissible at any account.
- 38.4 As soon as the grass is approx. 3 cm high it shall be rolled with a light wooden roller in fine, dry weather and when it has grown to 5-8 cm above the ground, weeds must be removed and regular cutting with the scythe and rolling must begin. A top dressing of farm yard manure to the square yard or well decomposed well broken sludge manure shall be applied when the grass is sufficiently secure in the ground to bear the moving machine, the blade must be raised an inch above the normal for the grass could be cut so that it is from 4-5 cm in length, instead 3 cm necessary for manure grass.
- 38.5 Damaged or dying back of grass due to any account shall be made good by the contractor at his own expense.
- 38.6 Any Shrinkage below the specified levels during the contract period shall be rectified by the contractor at his own expense.
- 38.7 The contractor is to exercise care in use of moving machines to reduce to a minimum the hazards of flying stone and brickbats. All moving machines are to be stationed with safely guards.
- 38.8 Maintaining of the plantation/ landscape area will include weeding, rolling/mowing, replacement of dead plants, and watering, cultivating, control of insects, fungus and other diseases by means of spraying approved insecticide or fungicide, pruning, making of thalas, Manuring, applying fertilizer, side cutting, provision of seasonal flowers/plants in as directed and other horticulture operations necessary for proper growth and maintenance of the plants/trees so as to present a well kept and neat appearance at all times. However, potted plants for nursery area and semi-grown up trees shall be arranged as decided by Engineer-in-Charge.
- 38.9 Rolling : A mower with roller shall be used periodically, taking care that the lawn is too wet and sodden.
- 38.10 Edgings : These shall be kept neat and must be cut regularly with the edging shears.
- 38.11 Replacement of dead plants : Care must be taken to replace the damaged/dead plants with plants of equal height without any extra cost.
- 38.12 Watering : The lawn/plants/trees shall be watered with sprinklers or the contractor's flexible water pipe or as required, soaking the soil through to a depth of at least 20 cm.
- 38.13 Scope of work for maintenance of horticulture work: The quoted rates will be inclusive of cost of all materials like pesticides, manure/fertilizer etc. (except electricity), labour, tools, plants, equipment, transportation, taxes & levies etc. Water shall be made available from the places, earmarked within the defence area as per instruction of the Engr-in-Charge for horticulture works where the contractor has to make his own arrangement at his cost so that watering could be done for the entire area under scope of work.
- 38.14 Agency will execute the work as per specifications mentioned in these tender documents. However, where specification is not available in these tender documents or in SSR Part-I, work shall be executed as per sound engineering, arboriculture & landscaping practices and directions of GE.
- 38.15 Agency shall deploy adequate gardeners to maintain the site but at least three Nos gardeners and one supervisor for six days a week with 08 hours per day with necessary tools/equipments/

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materials in good working condition. The work to be executed as per the rotation of the staff and fare wages/labour regulation time being enforced and mentioned in IAFW-2249(General condition of contract) shall be followed.

- 38.16 If the contractor fails to arrange the sufficient quantities of materials/manpower/equipments required to maintain the work in good condition within 04 days of its notification from GE, than Govt reserves the right to get it arranged at contractor's risk and cost and will be charged with extra 20% on the actual expenditure incurred in house or outsource necessary materials/manpower/equipments in such circumstances. The decision of GE shall be final and binding on the contractor in respect of time allowed for rectification of defects and cost of rectification assessed. However, all complaints will be attended promptly and within the time limit specified by the GE.
- 38.17 The contractor is required to keep one standby Lawn mower (with roller) machine apart from two regular Lawn mowers runnable by single man, so that it can be utilized immediately in case of breakdown of regular Lawn mower (with roller) machine deployed for this work.

39. PRECAUTIONS

- 39.1 During the maintenance period any irregularities arising in ground levels due to watering or due to trampling by labour, or due to cattle straying thereon shall be constantly made up to proper levels with earth as available or brought from outside as necessary. Constant watch shall be maintained to ensure that dead patches are replanted and weeds are removed.
- 39.2 The rate shall include the cost of all labour and materials involved in all operations described above including supply of the requisite quantity of good earth from excavated soil of so needed properly maintaining the levels of the lawns.

40 GUARANTEE/SECURITY

- 40.1 **Any plant during currency of work / plantation found missing / dead / not true to name or size as specified or not in satisfactory growth shall be replaced immediately by contractor with a plant of approved size and shape.** All cost shall be born by the contractor on this account and nothing extra shall be admissible on this account.
- 40.2 All the plants and lawns shall be guaranteed by the contractor for a period of 24 months for work from certified date of completion of work.
- 40.3 The contractor shall furnish a guarantee bond on non-judicial stamp paper of appropriate value for well growth of the plants with remitting a amount of Rs 50,000/- (Rs Fifty thousand only) towards security deposit in favour of GE in the form of fixed deposit receipt of National bank/Scheduled bank or retaining the sum from the bill for the period of two years from the certified date of completion from certified date of completion of Phase I. This guarantee will stands against maintenance/defects liability period as prescribed during the period. Any defects observed by AGE/GE during maintenance / defects liability period, it is obligatory on the contractor to attend rectification of the defects, if he fails to do so, the same will be got executed/completed through other agency/agencies and sum against security deposit will be utilized for the purpose. i.e. the disposal of the guarantee amount shall be at the discretion of Accepting officer. The balance amount shall be returned to contractor after the maintenance/Defects Liability period.
- 40.4 Replacement : All replacement shall be plants of the same species, variety and size as specified in the BOQ.
- 40.5 The contractor shall employ a person having 10 years experience in the field of horticulture and a person with suitable experience of landscaping work. The contractors quoted rates shall be deemed included for the provisions. Condition 25 of IAFW-2249 shall be deemed amended accordingly.

41. DIESEL GENERATING SET:

The diesel Generating set required is to serve as a source of power. The set therefore shall be extremely reliable and shall be guaranteed to operate.

- 41.1 DG set shall operate continuously on full load (conforming to IS: 4722) and shall meet satisfactorily following operating conditions.
- (a) Self excited self-regulated excitation system along with fast response governor shall ensure that the set dependably comes to full speed and delivers rated output at 415 volts, 50 Hz within 15 seconds after the starting signal is given.
- (b) Under steady state conditions, the electronic voltage regulator shall keep the voltage constant within 0.5% of the open circuit voltage with full load at constant speed (with power factor carrying between 0.8 lag to unity). Further adjusting the set voltage upto 5% of O.C.V. shall be possible by the potentiometer for the purpose.
- (c) Under transient operating condition the time of return to within (3% of the steady state voltage when full load at 0.8 PF is suddenly applied shall be less than one second (assuming speed to be constant). Further the speed drop due to such loading shall be corrected to ensure 50HZ (1% within less than 3 seconds (Momentary fluctuation in frequency shall be less than (1HZ).

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Governing system shall ensure minimum speed fluctuation during load changes, Inertia constant of the rotating system shall aid the governing system.

(d) DG set shall meet the direct on line starting requirements of induction motors, Momentary voltage dip due to starting of the biggest motor connected shall be kept to minimum (less than 10%) when the set is clearly supplying other steady state loads. It is proposed to start all motors sequentially.

(e) Machine shall develop symmetrical balanced sine wave voltage. Irregularities in wave form shall not cause objectionable interference to other adjacent circuits. Telephonic harmonic factor (T.H.F.) as found by types tests shall be less than 5% (as per IS 4722).

(f) Over speed protection shall be act a safe permissible value of speed recommended for the set.

(g) All the sensor elements like temperature switches, pressure switches, etc shall be connected to protection circuits in a fail safe manner so that machine is not subjected to harmful effects of temperature, pressure etc due to mal functioning of the instruments.

412 ALTERNATOR

41.2.1 Alternator shall have following constructional features: -

41.2.2 Screen protected drip proof sheet steel enclosure conforming I.P. 23 degree of protection as per I.S 4691 (Terminal box shall conform to I.P 44. Generator set is intended for Diesel Engine driven.

41.2.3 Laminated low loss silicon steel stator core with copper winding in as specified by manufacturer' insulation firmly wedged in slots and brazed to with stand mechanical forces, high vibration impact stresses etc.

41.2.4 Laminated core salient with copper filed coils (Class 'F' insulation) firmly assembled on rotor, dynamically balanced over the entire operating speed range (including over speed due to primo mover) and provided with damping cage winding pole shoes, to operates with minimum vibrations.

41.2.5 Exciter and pilot exciter assembled integral with the main machine to provide self excited self regulated excitation system, with class "F" insulation.

41.2.6 Fast response electronic voltage regulator mounted on the machine.

41.2.7 Suitable terminal box with double compression type cable glands or terminating multiple rounds 3½ (225 Sqmm) PVC, armored aluminium power cable.

41.2.8 3 members protection CTs for protection CTs for protection of stator winding shall have suitable VA and ratio rating with 5A/1A, secondary current rating (Depending on the type of over current relay to be supplied) conforming to relevant IS code and CTs are to be mounted in Generator Control Panel.

41.3 TECHNICAL SPECIFICATION FOR DIESEL ENGINE AND ACCESSORIES

41.3.1 **General:** Suitable diesel engine turbo charged of direct injection type to drive the alternator shall be supplied with all standard accessories. While rating the diesel engine, the site conditions and climatologically data of the plant as required should be taken into consideration. The engine should be capable of delivering rated output continuously (24 hours operation) under the site conditions. Further, the engine shall be capable for satisfactorily providing an output of 10% in excess of the rated output at the same speed for one hour in any period of 12 hours consecutive running. The engine shall accept full load within 15 seconds from the receipt of signal to start.

41.3.2 The engine shall be provided with automatic governing system to control the engine speed within 1% of its rated speed under any condition of load upto full load rating (1500 Rpm) at full load.

41.3.3 FUEL OIL SYSTEM

(a)	The fuel oil tank of welded steel construction shall be supplied to store fuel required for 12 hours continuous run at rated output, it shall be provided with a sludge and sediment trap, level gauge calibrated in litres, filling in and cleaning band holes, drain cock, self supporting frame connection for supply of fuel oil to the engine fuel system and low level switch for alarming low fuel oil in the fuel tank. The tank shall be mounted above the engine fuel pump
(b)	Filter: -A simplex filter of suitable capacity to supply fuel oil at rated output
(c)	Hand operated portable fuel transfer pumps
(d)	Fuel injection and control system including fuel pump
(e)	Interconnecting pipe, valves and pipes fittings, pipe joints shall not be soldered and plastic tubing shall not be used

41.3.4 **COOLING SYSTEM:** The cooling system shall be designed to cool the hot parts of the engine for the safe operation of the equipment. It shall utilize ordinary industrial cooling water for the following system. It shall incorporate the following main equipment:-

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(a)	Radiator: The radiator shall be of sufficient capacity with fan, guard to the fan, and shall be engine mounted with a multiple fan belt driven from the engine. When half the belts are broken the remaining belts shall be capable of driving the fan.
(b)	An auxiliary pump driven by the engine for circulating the water in a closed circuit
(c)	Water filter/strainer
(d)	Thermostatic control for by passing the radiator during cold start
(e)	Interconnecting pipes, valves and fittings

41.3.5 **LUBRICATION SYSTEM:** -The lubrication system shall be self-contained with the following equipment: -

- (a) Sump to store sufficient oil for circulation.
- (b) Pump Suitable pump for forced lubrication.
- (c) Filter
- (d) Lubricating oil cooler.
- (e) Interconnecting pipes, valves and fittings.

41.3.6 **AIR INTAKE:** The air intake system shall ensure sufficient clean air to the engine. It shall incorporate the following items: -

- (a) Suction filter: - This shall be of dry type of supply clean air to the engine.
- (b) Turbo charger: - The engine shall also be provided with a turbo charger.

41.3.7 Exhaust the hot exhaust gases shall be let off with suitable exhaust systems. All the hot parts located at the working level shall be insulated. The exhaust system shall include:-

- (a) Exhaust manifold.
- (b) Noser: - The exhaust gases shall be let off through suitable to exhaust systems. A sufficient length of straight pipe shall be provided after the exhaust silencer to leave the gases at sufficient height above the engine and outside the room. Care shall be taken to prevent any condensate following into the engine.

41.3.8 **INSTRUMENTS:** The equipment shall be provided with necessary instruments to check the performance continuously. The following instruments shall be mounted on the machine and shall be fixed on a common instrumentation panel mounted directly on the engine:-

- (a) **TACHOMETER:** A suitable tachometer with sufficient dial diameter shall be located at a convenient place on the machine. It should also indicate the total number of hours the engine has run.
- (b) Cooling water temperature indicator.
- (c) Lubrication pressure indicator.

41.3.9 **PROTECTION SYSTEMS:-**The diesel generator shall be protected from the following abnormal conditions of operation:-

- (a) Over Speed
- (b) High cooling water temperature.
- (c) Low lubrication oil pressure.

41.3.10 **DIESEL ENGINE STARTER:** - Diesel engine shall be started with the help of stationary battery and starter motor of suitable voltage and ratings. The battery provided shall also cater for control power.

41.3.11 Battery station shall consist of maintenance free batteries (Complete with stand, floor insulators, cell supporting insulators, connectors etc) of adequate ampere hour capacity for supplying control power to starting power to engine starting motor. It shall be possible to start the engine three times successfully without appreciable drop DC Voltage. Batteries shall be of EXIDE, AMCO, AMARON, STANDARD, FURUKAWA.

41.3.12 Solid state annunciator shall be of following features, Test accept reset push button, two bubs per channel, lamp flashing dual tone audible annunciation window insertion shall be arranged in a logical manner to segregate engine faults, and alternator faults etc. Spare window shall be available Enunciator shall announce following minimum faults.

- (a) Sot fails to start.
- (b) Low DC voltage.
- (c) Low lubricant oil pressure.

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- (d) High cooling water temperature.
- (e) Circuit breaker tripped.
- (f) Fault in alternator.
- (g) Low fuel oil level.
- (h) Over speed trip.

41.4 MAKE OF ENGINE:-

Complete DG Sets shall be procured from the main manufacturers or makes or company or factory as mentioned in Appendix "B" here-in-after. However under-mentioned equipments/ components shall be procured from makes, manufacturers and companies indicated as under as well as authorized by the main makes/ manufacturers/ companies or factory manufacturing and assembling the DG Sets.

(a)	Contractors, Timers & HRC fuses	:	GEC, Alstom, Crompton, L&T, Siemens, Cutlar Hammer
(b)	Push buttons	:	L&T, Siemens, Cutlar Hammer
(c)	Selector switches	:	L&T, Siemens,
(d)	Over current & EF	:	GEC, Alstom, Easun Roy roll
(e)	Meters	:	BHEL, L&T AEI, ADIMP, AE
(f)	CTs	:	Voltas, AE, Jyoti, ABB, M/S AVK SEG,

41.5 BASIC DATA OF CONTRACTORS SUPPLIED ITEMS

41.5.1 **GENERAL:** The basic data of the important equipment are given below. Generally the contractor shall follow the basic data of the equipment given below. The basic data of the miscellaneous equipment shall be followed as per the relevant Indian Standards.

41.5.2 BASIC DATA OF ALTERNATOR

Rated capacity (Max continues	:	58.5 KVA at 0.8 PF
Rated Voltage	:	415V at full load
Frequency	:	50HZ \pm 1%
System	:	3 phase, 4 wiring, Solidly grounded
Excitation	:	Static , self excited
Protection (enclosure)	:	Screen protected drip roof
Mounting	:	On common base frame with diesel engine
Reference Standards	:	IS 4722, BS 2613 VDE 0530
Speed	:	1500 RPM
Installation	:	Indoor
Duty	:	Continuous
Class of Insulation Space heater	:	Class-F
Generator Voltage adjustment Self regulated (5% voltage regulation)	:	+ 0.5% on full load at 0.8 PF
Overload capacity	:	10% for one hour in every 12 hours operation
Transient voltage performance	:	Transient voltage shall not be more than 10 on application or removal of full load at 0.8 PF and the voltage recover nominal value within 0.5 seconds.

41.5.3 BASIC DATA FOR DIESEL ENGINE

Rating	:	To suit Generators rating specified
Duty	:	Output specified shall be on continuous basis (24 hours) operation per day under the site condition an output of 10% in excess of the rated output at the same speed for one hour in any period of 12 hours consecutive running
Reference B.S	:	649
RPM	:	1500
Cooling	:	Water cooling with pump, radiator.
Lubrication	:	Forced lubricated

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Fuel	:	High speed, diesel oil
Starting	:	Battery
Nature of loads	:	Lighting and induction motors
Cooling water temp	:	32° C

- 41.5.4 **DETAILS TO BE SUBMITTED** : Technical literature, pamphlets, brochures, catalogues relating to various equipment/components offered.
- 41.5.6 Following drawings shall be submitted to GE within 4 weeks from the date of acceptance of the tender: -
- Drawing indicating DG Set as per Sch 'A' & detailed Specification.
 - detailed dimensional drawing of AMF panels.
 - Bar chart giving various schedules to match the completion date of work.
- 41.5.7 Installation and maintenance manual for each and every equipment supplied. The manual in general shall cover but not restricted to the following, cover, title page, table of contents list of illustrations, list of drawings and tables, equipment description, storage installation, alignment maintenance, inactivation procedures, trouble shooting parts lists, special tools and instruments lists.
- 41.5.8 **INSTALLATION OF GENERATING SET**: The installation includes the cost of complete foundation as per manufacturer's instructions duly approved by GE including installation of accessories and civil works etc, Generating Set shall be installed in accordance with latest engineering practice. The contractor shall furnish detailed dimensioned drawings and specifications of foundation for the Generating Set. The drawings shall be got approved from the GE. Foundation and base plate shall be as per manufacturer design and specifications. The installation shall be made on the existing foundation with necessary alterations/modification as per drawing approved as indicated in Sch 'A'.
- 41.5.9 **EARTHING FOR GENERATING SET**: Earthing for generating set shall be done as per item indicated in Schedule 'A'.
- 41.6 **TESTING**
- 41.6.1 Manufacturer's test certificates purchase vouchers etc shall be furnished by the Contractor for all materials and components etc incorporated in the work.
- 41.6.2 Tools will be supplied by the contractor as per manufacturer list.
- 41.6.3 Initial fill of Lubricant oil upto and including testing is deemed to be included in the offer. However diesel oil only for testing purpose shall be supplied departmentally free of cost.
- 41.6.4 Minimum 5% payment will be retained by the GE for testing and commissioning of DG Set.
- 41.6.5 All Tech literature, operating manual etc of DG Set shall be supplied by contractor before payment.
- 41.6.6 Routine and type test certificates shall be submitted for approval on completion of the tests.
- 41.6.7 Manufacturer's test certificate shall be furnished by the supplier for all bought out materials, components etc.
- 41.6.8 Wherever such test certificate are not available, the item shall be got tested by the contractor at his own expenses at Government recognized laboratories mutually agreed upon.
- 41.6.9 All equipment and components shall be carefully examined to determine their conformance with this specification with respect to material and workmanship, finish, marking dimensions, arrangement, and to assess its conformance with other requirements stated or reasonably implied and not covered by specific tests.
- 41.6.10 Complete tests shall be made in the factory by the contractor to ensure that the performance and operating characteristics of all equipment are satisfactory and to determine whether or not the guarantee have been met.
- 41.6.11 For major equipment, certificates of type test carried out on identical design equipment shall be furnished.
- 41.6.12 Routine tests on all major equipment shall be carried as specified in the applicable standards listed in part D5 in presence of departmental representative.
- 41.6.13 After conclusion of all test procedures, the equipment shall be examined for signs of wear, cracks, distortion or incipient damage of any sort and any defects shall be corrected well before the installation delivered.
- 41.6.14 The equipment shall be carefully unloaded and unpacked on receipt. A thorough check should be made for external damages to equipment, its components and accessories. The equipment shall be installed only after ensuring everything is alright and fit to installation testing and commissioning.

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41.6.15 Pre commissioning test for DG SET shall be carried out by the IEM as detailed by Accepting Officer. Tenderers to note that all the necessary arrangements shall be made by the Contractor and cost thereof shall be borne by the contractor.

41.7 TESTING OF DG SET

41.7.1 A full load test shall be carried out for 12 hours and results recorded as per performance on the Performa as approved by GE. The tests shall be carried out by the Accepting Officer or his authorised representative in presence of contractor on completion of initial testing by Engineer-in-charge. However, decision of Accepting Officer on performance of DG Set shall be final and binding necessary load required for test shall be arranged by the contractor. Duration of testing shall be as indicated below: -

(a)	(i) ½ hour	No Load
	(ii) ½ hour	25% Load
(b)	2 hours	50% Load
(c)	3 hours	75% Load
(d)	5 hours	100% Load
(e)	1 hours	110% Load

Total results will be compared with the standard performance given by manufactures of the equipment.

41.7.2 **FUEL AND LUBRICANT:** Initial fill of lub oil and including testing shall be deemed to be included in the offer. The diesel required for testing of DG sets shall be supplied by the contractor and cost thereof shall deemed to be included in the unit rates quoted against respective items in Schedule 'A

41.7.3 **TAKING OVER:** If the load tests as described above do not show satisfactory result, the contractor shall at his own cost rectify/replace defective components or any part therefore as directed by the authorised representative of the Accepting Officer within 15 days. The installation shall be retested after rectification of defects. The installation shall finally be taken over after contractor has given satisfactory tests as certified by Accepting Officer or his authorised representative.

41.7.4 Four copies of test reports shall be prepared by Contractor signed both by contractor and Engineer-in Charge and shall be furnished by GE before issue of completion certificate.

41.8 **GUARANTEE/ WARRANTY:-** The contractor shall furnish guarantee in writing for 12 months from the date of taking over of installations after testing for DG sets and transformers installed under this contract.

42. DESIGN, SUPPLY, INSTALLATION TESTING AND COMMISSIONING OF LIFT

42.1. The Sch 'A'/ BOQ quoted rate includes the cost of designing, supply, installation, testing and commissioning of 8/13 Passenger lift, machine room less (MRL) type, suitable for G+4 floor as mentioned in BOQ item which includes lift car, counter weights, over speed governor with steel ropes, driver motor with brakes, lift electric control panel, landing doors, car doors, buffers, limit switches, sensors, guide shoes, compensation ropes, suspension steel ropes/ steel coated belt as applicable, wiring, any other item of work which is not mentioned here-in-before but required for satisfactory functioning of lifts etc. with any type of scaffolding work required during installation.

42.2 Contractor shall ensure that the design, supply, Installation, testing and commissioning of new machine room less type lifts shall be done by OEM/Manufacturer of lift as per specifications mentioned in Schedule 'A'/ BOQ for the new lift shaft/ lift well. The contractor shall have to submit complete design details, drawings, specifications to Deptt for approval by CWE.

43. LIFT SHAFT/LIFT WELL

43.1 The new machine room less lifts shall be installed in existing lift shaft/ lift well which includes necessary addition/ alterations to lift shaft/ lift well in overall quoted rates.

43.2 All landing openings in lift well enclosures shall be protected by doors which shall extend to the full height and width of the landing opening.

43.3 All the light points of lift shaft shall have control from location as recommended by OEM and as directed by Engineer-in-Charge. A socket outlet may also be provided at a suitable place for use by maintenance staff above the ground floor landing.

43.4. The lift pit shall be provided proper water proofing treatment so that the same remains dry.

44 **BUFFERS:** Buffers shall be provided at the bottom limit of travel for cars and counterweights. Buffers shall be energy dissipation type or energy accumulation type whichever is recommended by the Lift manufacturer.

45. **SCAFFOLDING:** The contractor shall make his own arrangement of scaffolding required for erection/ installation of the new lifts within overall quoted rates. The scaffolding shall be removed by the contractor after the completion of the work.

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46. DESIGN STANDARDS INTER CHANGEABILITY OF PARTS AND COMPLETION OF INSTALLATION

- 46.1 All materials, plant, equipment and the lift cars to be incorporated in the lift system, shall conform to the highest standard and latest practice in design & manufacture and shall be of robust construction liberally rated and capable of operating efficiently and economically under the stipulated service conditions.
- 46.2 The cost of all parts/ elements of installation, plant, equipment, apparatus and accessories, fittings and fixtures, electric works of every nature from the outgoing terminal of distribution boards, bolts etc, which may not have been mentioned in BOQ, Particular Specifications but which are required and recommended by OEM for running, efficient operation and performance of the lifts shall be deemed to be covered in the quoted rates of lifts. The contractor shall furnish the design data with technical specifications for each type of lifts for the approval by Deptt.

47. CONFORMITY WITH FIRE REGULATIONS

- 47.1 The installation shall be carried out in conformity with local fire regulation and rules there under wherever these are in force.
- 47.2 When the car rests on its fully compressed buffer, no part of the car or any equipment attached there to shall strike any part of the pit, lift shaft or any part of the equipment located therein.

48. MISCELLANUOUS WORK

- 48.1. The following shall also be deemed to be covered under the scope of the work for lifts to be done/ provided by the contractor:-
- (a) All miscellaneous works that may be required for the erection, testing and commissioning of the installations including two year's maintenance during defect liability period.
 - (b) Scaffolding as required during installation.
 - (c) Any building/ civil work required in the Lift Shaft/ lift well to fix brackets, support beams, guide rails etc and final grouting of various items, including making good to disturbed surfaces.
 - (d) Control, power wiring wk in conduit for machine drive, door drive, COP and LOP of various floor for control system and indicator wiring system etc. complete.
 - (e) Any temporary electric wiring and power connections required during installation shall be the contractor's responsibility who will ensure that it conforms to requirement and fulfills safety requirements.
 - (f) Necessary wiring for the alarm bell, intercom.
 - (g) All tools, tackles, equipments, appliances required for erection and testing etc.
 - (h) Any type of barricading, safety fence, safety tapes reqd to cover the lift shaft entrance to avoid any misshapening/ accidents etc.

49. VIBRATIONS

- 49.1. The contractor shall provide necessary adequate vibration reducing materials preferably rubber pads of proper density to effectively isolate the machine from supporting beams and floor slabs, reqd at site within BOQ quoted rates.

50. LIFT MACHINE

- 50.1 Lift machine shall conform to IS 14665 (Part 4 Sec 7).
- 50.2 Effective protection shall be provided for rotating parts which may be dangerous in particulars:
- (a) Keys and screws in the shafts and
 - (b) Projecting motor shaft

51. BRAKES

- 51.1 Brakes of the lift shall conform to IS 14665 (Part 4 Sec 7). Suitable Brake shall be provided in lift machine to prevent the rotation of the lift motor and thus preventing any drive/ motion to the lift car when there is no power supply to the lift motor.
- 51.2 The brake shall be capable of sustaining a static load equivalent to 125 percent of the rated load in the lift car, that is, it should be capable of preventing the lift car from movement with a load of 125 percent of the rated load with the lift car at rest.
- 51.3 The brake shall not be released under any circumstances unless electric power is applied to the lift motor. Any electric fault in the electric brake circuit shall not prevent the brake from being applied, when power supply to the lift motor is interrupted. A continuous flow of current is required to hold off the brake when lift is in normal use.
- 51.4 Provision shall be made for releasing the brake manually in case of emergency. As soon the hand pressure is released, brake should be applied immediately.

52. DRIVE UNIT

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- 52.1 The machine shall be gearless AC permanent magnet type (WVF/ VF type) with a single piece main shaft integral drive sheave and brake disc.
53. **MOTOR**
- 53.1 The operating device for lift and its controller shall conform to IS 14665(Part 4 Sec 9). The motor shall be with variable frequency drive type suitable for working on 415 Volts, 3 phase, 50 cycles, as recommended by OEM. Motor will be reversible type particularly designed for lift services with over load protection, single phase protection and protection against reversed phase. The motors shall be designed for lift duty, i.e. for repeated starts and stops.
54. **REVERSE PHASE PROTECTION & CORRECTION RELAY**
- 54.1. A reverse phase protection and correction relay shall be provided on the individual controller to protect the lift equipment against phase reversal, low voltage and phase failure. Relays shall have suitable contacts to withstand wearing due to frequent, make/break operation.
55. **SHEAVE AND SUPPORTING BEAMS**
- 55.1 Deflector and overhead sheaves with their steel supporting beams shall be furnished and provided as needed for obtaining the proper load of the steel ropes/belts to the car and counter weights. Sheaves and pulleys shall be of suitable material as mentioned in relevant IS code and as recommended by OEM.
- 55.2 Suitable spring/Coil buffers shall be provided for car and counter weights as required under IS 14665 (Part 4 Sec 1) shall be complied with.
56. **COUNTER WEIGHT**
- 56.1. The counter weight shall conform to S 14665(Part 4) Sec 3. The counter weight shall be of cast iron weights contained in structured frame and shall be equal to the weight of the elevator car plus 40% to 50% (approximately) of the rated load or as recommended by OEM. The lift shall be suitable counter balanced for smooth and economical operation. The factor of safety of steel frame members and the tie rods shall not be less than as per relevant IS code/ NBC norms. Suitable guide shoes shall be provided for structured steel frame capable of withstanding buffer impact.
57. **COUNTER WEIGHT GUARD RAILS AND GUIDE SHOES**
- 57.1 The tenderer shall furnish and install counter weight guard of required length at the bottom of the hoist way within overall rates quoted as recommended by OEM.
- 57.2 Lift, car and counter weight guides shall be of rigid steel. Machined Tee sections of appropriate size and weight in accordance with relevant IS code capable of withstanding all forces with due factor of safety tongued and grooved both on car and counter weight side shall be used. It shall be continuous throughout the length and shall be provided with steel bracket of such design and spacing so that the guides do not deflect more than as specified by OEM under normal condition. Guide shall be of such length that it shall not be possible for the counter weight shoes to run off the guides.
- 57.3 Sliding guide shoes shall be spring loaded and shall be rigid steel and shaped to fit the guide.
58. **AUTOMATIC TERMINAL STOPS**
- 58.1. The elevator shall be equipped with automatic stopping devices arranged to slow down the car and stop it at the landing/ terminal. Final limit switches should be provided in the hoistway which are operated by the car to stop the car and prevent to avoid overrun from normal travel limit by automatically cutting off the power and applying the brake.
59. **ELECTRIC WIRING**
- 59.1 All necessary insulated wiring and conduit or tubing together with necessary fittings, metal boxes, through and in lift shaft/ lift well will be provided. All electrical work in connection with installation of electric lifts shall be carried out in accordance with provision of IE rules and including all amendments thereafter and shall also comply with the provision of IS – 732 and code of practice for Electrical wiring and fittings in buildings.
- 59.2 All electrical wiring and apparatus besides conforming to the relevant Act/ Rules shall also conform to any regulations in force relating to fire protection of the building in which lift is installed.
- 59.3 All electric supply lines and apparatus in connection with lift installation shall be so installed, protected, worked and maintained that there shall be no danger to persons there from. All metal castings or metallic coverings containing or protecting any supply lines of apparatus shall be sufficiently earthed. No bare conductors shall be used in any lift as it may cause danger to persons.
- 59.4 All cables and other wiring in connection with installation shall be of suitable grade for the voltage at which these are intended to be worked and if metallic covering is used, it shall be efficiently earthed. Suitable caution notice shall be fixed near every motor or other apparatus in which electric supply is available/ being used.
- 59.5 Circuits which supply current to the motor shall not be included in any twin or multi core trailing cable used in connection with the control and safety devices. A trailing cable which incorporates

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conductors for the control circuits shall be separate and distinct from that which incorporates lighting and signalling.

59.6 All wiring shall be with copper conductor cables.

LIFT CAR AND CAR FRAME

60.1. The lift car of size with doors as mentioned in BOQ shall be provided as per OEM recommendations conforming to all safety norms as mandated by IS code, latest NBC norms, Govt rules. The car frame which support the car platform and room shall be made of structural steel girders properly braced and equipped with suitable guides and a car safety device. The load capacity of lift shall be marked in the lift car. A load plate giving the rated load of the lift shall be fitted in each lift car in a conspicuous position.

CAR & LANDING DOOR

61.1 Car door/ landing door and their operation shall conform to IS-14665(Part 4/Sec 6). Lift car door and landing door of size as mentioned in BOQ shall open in suitable direction to match with space available in lift well at site. All doors shall be of stainless steel and power operated. Horizontally sliding door shall conform to IS-14665 (part 4 Sec 6).

61.2 Power operated car doors on automatically operated lifts shall be so designed that their closing and opening is not likely to injure a person. The power operated car door shall be provided with suitable sensor which shall automatically initiate reopening of the door in the event of passenger being struck (or about to be struck) by the door while crossing the entrance during the closing movement.

LIFT SAFETY GEARS AND GOVERNORS

62.1. Safety gears and over speed governor shall conform to IS-14665 (Part 4 Sec 4) to be provided as per OEM recommendations.

EMERGENCY SAFETY DEVICES

63.1 Every lift suspended by belts/steel wire ropes shall be provided with one or more safety devices attached to the lift car frame and placed beneath the car. The safety devices shall be capable of stopping and sustaining the lift car with full rated load in the car at tripping speed. The safety gear shall operate to stop and sustain the lift car in the event of failure of the suspension belt/steel ropes or in the event of lift exceeding a predetermined maximum speed in the descending direction. Every safety gear shall operate positively and mechanically independent of any springs used in the construction. Design shall conform to IS-1860.

GUIDE

64.1. Car and counter weight guides shall be of rigid steel in all cases and shall comply with the requirement of code.

64.2. **SLACK ROPE SAFETY SWITCH** : This shall be fitted to the drive and automatically cut off supply if belt/steel rope becomes slack.

DOOR LOCKS

65.1. Electrical and mechanical door locks shall be provided. The landing door locks shall be such that the door cannot be opened unless the car has reached at that particular landing at which button has been pressed. It shall also not be possible to move the car unless the car door is securely locked in the closed position.

CONTROLLER UNIT

66.1. A controller of modern compact solid state design, adjoining printed circuit board shall be provided to control starting, stopping and speed of the elevator and also to automatically apply the brake if any of the safety devices operate or if power fails from any cause.

OPERATION WITH AN ATTENDANT

67.1. The regular car operating panel which includes car buttons, switches, etc for the collective automatic control, shall also include:-

(a) A two-way operation key-operated with switch marked to indicate ATT (attendant operation).

OVERLOAD WARNING

68.1. Overload warning feature with audio-visual indication (visual indication shall show over loaded) shall be available in the elevator car, so that when there is overload in the car the warning sign shall light up a flash indicating overloaded and buzzer shall operate during this period and the doors shall remain open until the overload is removed.

FIREMEN'S SWITCH

69.1. A toggle switch covered by a stainless steel cover suitable fireman switch as recommended by OEM/ local fire safety norms shall be provided on the ground/ designated floor for each elevator which shall permit a fireman to call the elevator to the ground/designated floor by cancelling all car

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and landing calls. The elevator shall then stop at the ground/ designed floor with the door open to permit the fireman to have exclusive use of the elevator without any interference from the landing calls.

70. AUTO/FAN “ON/OFF”

70.1. If the car is not used for a long predetermined time, the fan inside the car shall automatically be switched OFF.

71. TESTING OF INSTALLATION

71.1. The lift and other equipment will be subject to the following test. After completion, an inspection shall be carried out as stated in IS- 14665 (Part 5).

72. **AT SITE** : The final testing after installation of lifts shall be carried out by the IEM, HQ Chief Engineer Jalandhar Zone or any other officer detailed by Accepting Officer before it is put into normal service. The necessary test weights and instruments shall be provided by the lift manufacturer and the electric power at the declare voltage (and frequency) required for testing shall be supplied by the department. The OEM rep and contractor representative shall remain present during the inspection.

73. AUTOMATIC RESCUE DEVICES (ARD)/EMERGENCY RESCUE DEVICE (ERD)

73.1. The lift shall be fitted with A.R.D./ E.R.D. In the event of power failure/controller failure the elevator should move automatically to the nearest floor thereby rescuing passengers. A.R.D/ ERD should also work to rescue passenger in case of controller failure, phase failure and tripping of motor due to overload. A.R.D/ E.R.D should operate on dry maintenance free batteries. It should continuously monitor the normal power supply in the main elevator controller and should activate the rescue operation within 10- 15 seconds of power failure. A.R.D/ E.R.D. should keep lift remain parked till normal power supply is restored and the Elevator/ lift should automatically revert to normal operation mode. The cost of A.R.D/ E.R.D. unit with suitable maintenance free dry batteries should be deemed to be included in unit rate for lift quoted by the contractor under respective items of Schedule 'A' BOQ.

74. PREVENTIVE AND COMPREHENSIVE MAINTENANCE OF LIFTS DURING DEFECT LIABILITY PERIOD

74.1. After completion of work, Preventive and comprehensive maintenance for the lifts mentioned in BOQ and particular specifications/as recommended by OEM thereto shall be provided by the contractor without any additional cost to department for a period of 02 year after completion i.e during the defects liability period. Nothing extra shall be payable to contractor on this account.

75. TAKING OVER

75.1. Clearance certificate (s) of test and fitness as required by prevailing state and/or local bodies shall be obtained by the contractor at his own cost and produced to the GE before completion. If there is not any such policy exists in state, the lifts shall be inspected by third party appointed/ recommended by State Govt. The installation shall be taken over only if all the documents and tests are found to be satisfactory and a certificate to this effect is submitted to department by the contractor.

76. TRAINING DEPARTMENTAL PERSONNEL

76.1. Departmental personnel shall be trained during the final stage of erection of lifts & 10 days after commissioning of the lift to enable them to completely understand the mechanism and control of lift.

77. GUARANTEE

77.1. The tenderer shall submit complete details to suit overall specifications given in the tender and shall guarantee that materials and workmanship of the lift and connected equipment offered and installed by him under the contract are new/first class in every respect and he will make good at his own cost, any defects, damage which are not attributable to normal wear and tear or misuse and will be responsible for repairing/replacing any parts which are rendered defective within two year after the certified date of completion.

77.2. The contractor will produce test and inspection certificates for machine, motors, governors, controllers, motor generating sets, belts/steel ropes, buffers (as applicable), which are incorporated in the lifts, of having passed necessary tests as required as per IS – 14665 (Part 1 to 5) or relevant IS code. Lift manufacturer will also produce high voltage test certificates of di-electric strength of electric apparatus as required vide clause 11.2 of IS – 14665(Part 3/ Sec 1).

77.3. **PAINTING:** All exposed metal work (except aluminium or aluminium alloy or stainless steel) under this contract shall be properly painted with two coats of approved DUCO paint over a coat of primer and wooden portions shall be given necessary preservative treatment in hidden surfaces and two coats of varnish in exposed surfaces to produce a smooth glossy surface.

78. PREVENTIVE MAINTENANCE/ BREAKDOWN MAINTENANCE

PARTICULAR SPECIFICATIONS

- 78.1. Breakdown Maintenance during defect liability period: The contractor shall attend all complaints/break downs within 04 hours after receipt of message/ call from the GE/Engineer-in-Charge.
- 78.2. Preventive/ Schedule maintenance: The maintenance service shall mean regular examination of lifts installed as needed/ as recommended by OEM or as directed by the GE and shall include necessary adjustments greasing, oiling, repair and replacement of major and minor parts rendered defective due to any reasons with new genuine standard parts so as to keep the equipment in proper operation during defect liability period. GE will be the final authority to decide whether the defective parts are due to misuse or otherwise. It will be responsibility of the contractor to ensure that monthly, quarterly, half yearly and annual checks as recommended by OEM shall be carried out by lift company service Engineer as per schedule. The maintenance schedule book/other documents prescribed duly mentioning the date of tasks/ checks carried out shall be properly maintained properly by the contractor. The Register shall be maintained for each lift and the same shall be produced to GE.
79. **Lifts**
- 79.1 Lifts shall be provided all as per BOQ including notes thereon. The make/ manufacturer of lifts shall be approved by the Accepting Officer based on the minimum QR of OEMs failing which Rs 2,50,000/- will be recovered from contractor's dues for non fulfilment of minimum QR of OEMs. The lifts shall be tested by IEM after initial testing and commissioning by GE & test result shall be kept on record. The minimum QR of OEMs for 8/13 persons (544/884 kg), G+04 shall be as under:-

Srl No	Factors for consideration	Minimum QR
1	Type of plant	OEM having own modern plant with latest technology infrastructure having CNC Turrent punch machine, NC bending machine, shearing machine, lathe machine, drill machine, grinding machine, riveting machine, compressor, engraving machine using hot dip galvanizing, powder coating, manufacturing and testing of PBC processes.
2	Annual turnover	≥ 50 crore (Avg of last three years) as per audited financial report of last three years. OEMs having annual turnover less than Rs 50 crore but more than Rs 10 crore shall be considered for installation and maintenance of elevators for residential buildings upto six floors only.
3	Quality management system certificates	Current international and national certification/licenses of quality management system as amended.
4	BIS approval of product	Comply with BIS duly certified by designated lab (certifying agencies). The manufacturer shall comply with Gol DIPP, PPP-MII Order 2017 (as amended). The complete lift installation including its components, safety device, various types of controls etc, testing inspection, operation & maintenance shall conform to relevant codes (standard) of practice, guideline/safety rules/inspection codes, manuals, rules issued by BIS as amended.
5	Compliance of NBC 2016 as amended	Fire rating of car door and landing door shall be as per NBC-2016 as amended.
6	Nationwide marketing setup	The firm should have service centers with qualified technical personnel in at least 25 town/cities in India. Firms having setup in less than 25 town/cities but in at least 10 town/cities in four states shall be considered for installation and maintenance of elevators for residential building upto six floors only.
7	Execution of work/maintenance	The firm should have installed and maintained at least 50 elevators per year in last three years with central/state govt depts, PSUs, reputed private firms.
8	Past/performance/reputation	No case of non performance/ blacklisting by Govt Deptt/ PSU/ Reputed private firms in last five years.
9	Minimum experience in production	The firm should have experience in Design, manufacturing supply, installation and commissioning of minimum 10 years in the field of passenger/goods elevators. The firm should have domestic production capacity of not less than 50 lifts per annum (in last three years).

PARTICULAR SPECIFICATIONS

10	Product manufactured	Passenger lifts up to eight passenger, more than eight passengers, hospital lifts and goods lifts (tonnage) as required.
11	Quality control measures	A dedicated team of professionals with well-equipped R&D wing with at least one engineering graduate (mechanical related design with an experience of more than five years in the field of elevators) and at least three diploma engineers with experience of more than five years in the field of elevators, necessary design and simulation software for electrical and mechanical design and in-house training facility for installation and maintenance staff.
12	Inspection and measurement equipment (mechanical)	Testing tower shall be available with travel height not less than 12 mtr for requirement of lifts speed upto 1.5 mtr/sec
13	Inspection and measurement equipment (electrical)	(a) Motor insulation testing facility (b) Full function controller test bench. (c) Other measuring instruments for physical verification of various parameters as per requirement of BIS. (d) Functional testing of PCBs : Inspection and measurement equipment's are considered essential for manufacturing unit and should be available either at firms own premises or firms approved sub-vendors premises.
14	Availability of spares	The manufacturer shall be ensure availability of spares for the entire life of the life i.e 20 years.
15	Source of raw material	The source of raw material shall be in compliance to Gol, DIPP, PP-MII Order 2017 (as amended).
16	Down time to lift	The down time of installed lifts, which are being maintained by the manufacturer, shall not be more than eight hours (average) in case of minor fault and seven days (average) in case of major faults in last one year.

79.2 **GUARANTEE**:- The contractor shall furnish guarantee in writing for trouble free operation for a period of two years from the date of commissioning. Any defects discovered during this period shall be rectified free of charge.

80. **Rain Water Harvesting WORKS**: This shall be provided all as described in Schedule 'A' Part-XV & BOQ and as per MES Schedule. Any item for which specification is not given in Schedule 'A', the same shall be followed as specified here-in-before in these particular specifications.

81. **MISC ITEMS OF WORKS**:- This shall be provided all as described in BOQ including notes thereof, shown on relevant drawings, specifications and as per SSR. Any item for which specification is not given in Schedule 'A', the same shall be followed from specifications given in the particular specifications, or if not there then from SSR or relevant IS.

SIGNATURE OF CONTRACTOR

AAD (Contracts)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS

Appendix 'A'

LIST OF ISI CERTIFIED PRODUCTS TO BE USED IN WORKS

1. Concrete: Integral cement water proofing compounds (ISI-2645-1975) (First revision).
2. Joinery: Wooden flush door shutters, (solid core type), plywood Face panel (IS-2202 (Part-I)1983) (Fourth revision).
3. Builder's Hardware:-
 - (a) Steel butt hinges (IS-1341-1981) (Fourth revision with amendment No.1 to 3).
 - (b) Non ferrous metal butt hinges (IS-205-1978) (Third revision).
 - (c) Ferrous Tower Bolts (IS-204-1978-part-I), (Fourth revision).
 - (d) Non ferrous tower bolts (IS-204-1978 part-II) (fourth revision with amendment No.1).
 - (e) Door handles (IS-208-1979), (Third revision).
 - (f) Parliament hinges (IS-362-1982),(Fourth revision).
 - (g) Hydraulically regulated door closers (IS-3564-1986), (Third revision with amendment No.1)
 - (h) Continuous (Piano) Hinges (IS-3818-1986), (Second revision with amendment No.1)
 - (j) Non ferrous metal sliding door bolts (IS-2681-1979) (Second revision with amendment No. 1 and 2).
 - (k) Tee and strap hinges (IS-206-1981), (Third revision with amendment No.1).
 - (l) Mild steel sliding door bolts for use with padlocks (IS-281-1973) (second revision).
4. Steel & Iron Work
Steel doors, windows and ventilators (IS 1038-1983) (Third Revision)
5. Roof covering: Bitumen felts for water proofing & damp proofing (IS-1322-1982) (Third revision).
6. Ceiling and lining:-
 - (a) Plywood for General purposes (IS-373-1975) (second revision with amendment No. 1 to 3).
 - (b) Block boards (IS-1659-1979) (Second revision).
 - (c) Veneered particle board (IS-3097-1980), (First revision).
 - (d) Fibre hard board (IS-1658-1977) (second revision).
7. Flooring:-
 - (a) White Portland cement (IS-8042-1978), (First revision).
 - (b) Cement concrete flooring tiles (IS-1237-1980) (First revision)
8. Water supply, plumbing, drains and sanitary appliances
 - (a) Concrete pipes with or without reinforcement (IS-458-1971) (Second revision).
 - (b) Salt glazed stoneware pipes and fittings (IS-651-1980), (Fourth revision).
 - (c) Flushing cisterns for water closets (Valve less syphonic type) other than plastic (IS-774-1984) (Fourth revision).
 - (d) Cast copper alloy, screw down, bib taps and stop valves for water services (IS-781-1984), (Third revision).
 - (e) Mild steel tubes, tubular and other wrought steel fittings (IS-1239 part-II-1979), (Fourth revision) and mild steel tubular and other wrought steel fittings (IS-1239-Part-II-1982) (Third revision).
 - (f) Sand cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories (IS-1729-1979), (First revision).
 - (g) Ball valves (Horizontal plunger type) including floats for water supply purpose (IS-1703-1977) (Second revision).
 - (h) Cast iron manhole covers and frames (IS-1726-Part-I to VII-1974) (Second revision).
 - (k) Asbestos cement pressure pipes (IS-1592-1980) (Second revision).
 - (l) Automatic flushing cisterns for urinals (IS-2326-1987), (Second revision).
 - (m) Vitreous china, sanitary appliances
 - (ii) Wash down water closets (IS-2556 Part-II -1981) (Third revision).
 - (iii) Squatting pans (IS-2556-Part-III-1981) (Third revision).
 - (iv) Wash basins (IS-2556(Part-IV)-1972)-(Second revision).
 - (v) Laboratory sinks (IS-2556(Part-V)-1979), (Second revision).
 - (vi) Foot rests (IS-2556(Part-X)-1974), (Second revision).

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'A' (contd)****LIST OF ISI CERTIFIED PRODUCTS TO BE USED IN WORKS (CONTD)**

- (n) Plastic WC seats and covers (IS-2548 (Part-I & II)-1983) (Fourth revision).
- (o) Vertically cast iron pressure pipes for water, gas and sewage (IS-1537-1976)(First revision)
- (p) Pillar taps for water supply purposes (IS-1795-1982), (Second revision).
- (q) Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fitting and accessories) IS-3989-1984), (Second revision).
- (r) Centrifugally cast (spun) iron pressure pipes for water, gas and sewage (IS-1536-1976).
- (s) Rubber sealing rings for gas mains, water mains and sewers (IS-5382-1985), (Second revision).
- (t) Cast iron fittings for pressure pipes for water, gas and sewage (IS-1538-1976) part I to XXIII).
- (u) Low density polyethylene pipes for potable water supply (IS-3076-1985) (Second revision).
- (v) Sand cast iron spigot pipes (IS-1729 of 1979) (First revision).
- (w) Ductile iron pipe fittings (IS-9523)
- (x) Ductile iron pipe (IS- 8328-2000)
- (y) Galvanised iron pipe IS-1239(Part-I 1979 & Part-II 1982)
- (z) Sluice valve (IS- 14846 of 2000).
- (aa) GI Fittings(IS- 1879 Part I to X –1987)
- (bb) Thin walled GI pipe (IS-11722 of 1986).

9 ELECTRICAL WORKS

- (a) Ceiling Roses (second revision) (IS-371-1979).
- (b) Three pin plugs and socket outlets (Third revision) (IS-1293-1988).
- (c) Switch fuses (main and Switch) IEC:60898).
- (d) Rigid steel conduit (IS-9537-Part-II-1988) with amendment No.1 superseding (IS-1653-1972).
- (e) Plain rigid conduit of insulating material. (IS-9537(Part-III)-1983) (With amendment No.1) superseding (IS-1653-1972 & 2509-1973).
- (f) Polyethylene insulated cables for working voltages upto and including 1100 volts (IS-1596-1977), (Second revision).
- (g) LT XLPE cable (IS-7098/1/88)
- (h) Distribution boards(IS-8828 & IEC 898)
- (i) Pre-stressed concrete poles(IS-2713 Part I to III)
- (j) Steel tubular poles(IS-2713 -Part-I to III – 1980), (Second Revision)
- (k) Lightning Arresters (IS-3070- Part-I-1985).
- (l) RCBO(IS 12640 Pt-II of 1988)
- (m) MCB (IS-8828 of 1996).
- (n) RCCB (IS-12640 (Part-I) 2000).
- (o) House wiring (Copper wire) IS- 694 (Part-II).
- (p) Transformer (IS-1180:2014) Part-I

Note:- The items which are not included here in before shall be referred from SSR & website of the BSI.

(Signature of the Contractor)
Dated _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**APPENDIX 'B'****LIST OF MAKES/MANUFACTURERS OF EQUIPMENTS/MATERIALS/ PRODUCTS**

(i) The makes given in this Appendix shall be applicable to the extent required as per the Scope of this tender. The materials provided under this tender shall be of the approved brand/ manufacturer/ Makes given here under except in Schedule 'A' or Particular Specifications.

(ii) In case makes are specifically mentioned in Schedule 'A', then Makes specified in Schedule 'A' shall only be provided.

(iii) Makes specified in Particular Specifications Section –II shall be provided only when no makes are specified in Schedule 'A'.

(iv) In case where makes of items are not given in this Appendix/ or Schedule 'A' / or Particular Specifications, the items shall be of reputed make and bear ISI marking.

(v) Irrespective of makes, manufacture in tender documents, material(s) should not be procured from/of the makes, manufacturers, brands, models etc, if as on date, there is ban due to technical defaults or not operating/manufacturing for a long time or, non-existent etc. No claim whatsoever on this account shall be admissible to the contractor later on.

(vi) In order to decide the equivalency of cat part of different makes, models and manufacturers; cost, specifications, and parameters etc. shall be taken into consideration by the GE. In case of difference in the opinion of GE and Contractor, decision of the concerned CWE shall be final, conclusive and binding. No claim whatsoever on this account shall be admissible to the contractor later on.

Ser No	Product	GROUP OF PRODUCTS BASED ON MAKES/ BRANDS			Remarks
		GROUP 1	GROUP 2	GROUP 3	
1	2	3	4	5	6
<u>(A) INTERNAL & EXTERNAL ELECTRIFICATION</u>					
1.	Solar Water Heating System	INTERSOLAR, SSSPL <u>Additional Reputed Makes/Brands</u> TATA BP SOLAR, RACOLD		-	
2.	Solar PV Lighting System	INTERSOLAR, SSSPL, SURYA	RHINO, JILCO	-	
3.	Lift	OTIS, SCHINDER, KONE, TK ELEVATOR, MITSUBISHI ELECTRIC, JOHNSON LIFTS			
4.	LED Lights, Panels & Luminaries (Indoor)	RR ELECTRIC, CLAIR, KESELEC, TWINKLE LITE, ATC, FIEM, SSK, EVEREADY, POLYCAB, HAVELLS, C&S ELECTRIC, HALONIX, BENLO, HPL, SURYA, LUKER, ORIENT ELECTRIC <u>Additional Reputed Makes/Brands</u> PHILIPS, CROMPTON, BAJAJ, OSRAM	OPULUS, VINAY, IB LED, CIAZZ, FORTUNE ARRT, RHINO, JILCO, ASCO	ANCHOR, NEEV ENERGY, COMPACT, PAVAK, GOLDWYN LTD, ADHUNIK SWITCHGEAR, RASHMI, FINE SWITCHES	
5.	LED Light Fitting & Luminaries for Road and Street Lighting (Outdoor)	RR ELECTRIC, CLAIR, KESELEC, TWINKLE LITE, ATC, FIEM, SSK, EVEREADY, POLYCAB, HAVELLS, C&S ELECTRIC, HALONIX, BENLO, HPL, SURYA, LUKER, ORIENT ELECTRIC, <u>Additional Reputed Makes/Brands</u> PHILIPS, CROMPTON, BAJAJ, OSRAM	OPULUS, VINAY, IB LED, CIAZZ, FORTUNE ARRT, RHINO, JILCO	ANCHOR, NEEV ENERGY, COMPACT, PAVAK, ADHUNIK SWITCHGEAR, FINE SWITCHES	
6.	LED Lamps	CLAIR, EVEREADY, POLYCAB, HALONIX, BENLO, ORIENT ELECTRIC <u>Additional Reputed Makes/Brands</u> PHILIPS, CROMPTON, BAJAJ, OSRAM		COMPACT, PAVAK, RASHMI	
7.	BLANK				
8.	Tube Light/ Street Light Fittings & Accessories	POLYCAB, HAVELLS, C&S ELECTRIC, HALONIX, HPL, SURYA	-	ADHUNIK SWITCHGEAR	
9.	Flood Light Fittings	POLYCAB, HALONIX, SURYA	JILCO, ADHUNIK SWITCHGEAR,	COMPACT, PAVAK, LUZION	

PARTICULAR SPECIFICATIONS

Appendix 'B-1' (Contd...)

LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS

1	2	3	4	5	6
10.	Box Type Decorative Tube Light Fittings	POLYCAB, HAVELLS, C&S ELECTRIC, HALONIX, SURYA	-	-	
11.	CFL Lamp & Fittings	HAVELLS, C&S ELECTRIC, HALONIX, SURYA, HPL	ANCHOR, JILCO	-	
12.	Power Transformer 132/66/33/22 KV	ITE GURGAON, TRANSCON <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE, ALSTOM	-	-	
13.	Power Transformer (Non Sealed Type) upto 12.5 MVA of 33 KV	JAYBEE BTI, TRANSCON <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE, ALSTOM	-	-	
14.	Outdoor Type Oil Immersed Distribution Transformers 11 KV upto and Including 2500 KVA, 33 KV	KOTSONS, TRANSCON <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE, ALSTOM	-		
15.	Distribution Transformers 11 KV above 500 KVA capacity	ITE GURGAON, JAYBEE BTI, TRANSCON, POWERWARE <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE, ALSTOM	-	-	
16.	Distribution Transformers upto 500 KVA Capacity	ITE GURGAON, JAYBEE BTI, POWERWARE, TRANSCON, POWERWARE <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE, ALSTOM	-	-	
17.	Power & Distr Transformer upto 10 MVA & upto 33 KV	TRANSCON, KOTSONS <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, SCHNEIDER, CROMPTON GREAVES, ANDREW YULE	-	-	
18.	Dry Type Transformers upto 7.5 MVA/33 KV Class and Oil Type Transformers upto 20 MVA/66 KV Class	SUDHIR, TRANSCON	-	-	
19.	LV Switchboard	<u>Additional Reputed Makes/Brands</u> L&T, CROMPTON, HENSEL	-	-	
20.	LT Panels/ APFC Panels/ AC Control Panels/ Pump House Panels for SS having Capacity 1000 KVA and above	UNIVERSAL SWITCHGEAR, DVEPL, PSC, GM&G, ITE GURGAON, NEPTUNE, HENSEL, INDO ASIAN, STANDARD, HAVELLS, C&S ELECTRIC, BHANDARI, SHALABH, ADHUNIK SWITCHGEAR HPL, SEEPL <u>Additional Reputed Makes/Brands</u> ABB, L&T, SIEMENS	AARVE NOIDA, REW, GM, RST, HANSON, CONELEC SYSTEM, SMS PANELS & SWITCHGEAR, BCH, SEEPL, JAIMA ELECTRICALS, PRECISION SYSTEM CONTROL (PSC) POWERWARE	HPC, EAP, GEC, SSK, SUPERTECH, POWER CONTROL PVT LTD	
21.	LT Capacitor Bank	HAVELLS, C&S ELECTRIC	-	-	
22.	Fan (Ceiling, Exhaust, Table, Wall & Pedestal Fans)	RR ELECTRIC, POLYCAB, HAVELLS, ANCHOR, LUKER <u>Additional Reputed Makes/Brands</u> CROMPTON, BAJAJ, KHAITAN, USHA, ORIENT	HALONIX, VENUS, FINE SWITCHES, ASCO	-	
23.	Storage Water Heater GLS	RR ELECTRIC <u>Additional Reputed Makes/Brands</u> AO SMITH, USHA, CROMPTON, RAMCO, BAJAJ	-	-	
24.	PT Switch/ Socket/ Ceiling Rose/ Fan Regulator	SSK <u>Additional Reputed Makes/Brands</u> LEGRAND, CRABTREE, SCHNEIDER, PHILIPS, ANCHOR, BAJAJ, KINJAL	VINAY, POLYCAB	-	

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
25.	Modular Switch/ Socket/ Fan Regulator	SSK, GM&G, BENLO, INDO ASIAN, POLYCAB, HAVELLS, C&S ELECTRIC, HPL, ANCHOR <u>Additional Reputed Makes/Brands</u> LEGRAND, CRABTREE, SCHNEIDER, PHILIPS	-	ADHUNIK SWITCHGEAR, FINE SWITCHES	
26.	HT 132/66/33 KV & 11 KV XLPE Cables	CRYSTAL, CMI, DYNAMIC CABLES, GEMSCAB, RALLISON, KEI, POLYCAB, HAVELLS, GLOSTER, JMW KABEL <u>Additional Reputed Makes/Brands</u> CABLE CORPORATION OF INDIA, UNIVERSAL CABLE, ELEKTRON, PARAGON	RHINO, BCH, PLATIMA		
27.	LT Power & Control Cables, 1100 Volts, XLPE	JMW KABEL, CRYSTAL, CMI, RR KABEL, DYNAMIC CABLES, GEMSCAB, RALLISON, KEI, POLYCAB, HAVELLS, GLOSTER, ANCHOR, GRANDLAY, HPL, UNIVERSAL CABLE <u>Additional Reputed Makes/Brands</u> CABLE CORPORATION OF INDIA, ELEKTRON, PARAGON	VINAY, CRITINA CABLES, PARAFLEX, ALCON, RHINO, BCH, SCI, GRANDLAY, BMI CABLES, PLATIMA, PLAZA CABLES, VTL		
28.	PVC Wires & Cables 650/1100/ Volts	CRYSTAL, ULTRACAB, DYNAMIC CABLES, ATC, GEMSCAB, POLYCAB, GM&G, CMI, KEI, POLYCAB, STANDARD, HAVELLS, BENLO, GLOSTER, GRANDLAY, HPL, ANCHOR, RALLISON, SSK, JMW KABEL <u>Additional Reputed Makes/Brands</u> FINOLEX, ELEKTRON, PARAGON	VINAY, CRITINA CABLES, ASHIRWAD, CIAZZ PARAFLEX, ALCON, SHALABH, RHINO, BCH, PLATIMA, NEC (WIRE & CABLES), BATRA HENLEY, PLAZA CABLES, BMI CABLES	NATCAB, SCI, SSK	
29.	HT/LT XLPE Aerial Bunched Cables	CRYSTAL, JMW KABEL			
30.	LT/ HT Cable Joints Heat Shrinkable/ Cold Shrinkable/ Push On Type	COMPAQ, MS-SEAL, MSS <u>Additional Reputed Makes/Brands</u> M-SEAL, DENSON		-	
31.	Cable Junction Boxes, Circuit Breaker Boxes, DC Rated Junction Boxes	HENSEL, HPL, MEGAWIN 2025	-	HPC, ADHUNIK SWITCHGEAR, FINE SWITCHES, SUPERMAX	
32.	LT Air Circuit Breaker	YAMUNA DENSONS, INDO ASIAN, STANDARD, HAVELLS, C&S ELECTRIC, MEGAWIN 2025		ADHUNIK SWITCHGEAR	
33.	Composite & Relay Panel	YAMUNA DENSONS	REW, PRECISION SYSTEM CONTROL (PSC)	SUPERTECH POWER CONTROL (P) LTD	
34.	Composite Polymeric Insulator	YAMUNA DENSONS, JAIPURIA <u>Additional Reputed Makes/Brands</u> JAIPURIA, POWER-GRID, MG MATERIALS	-	-	
35.	Fibre Glass Reinforced Products 11 KV & 33 KV Cross Arms/ Top Hamper	YAMUNA DENSONS <u>Additional Reputed Makes/Brands</u> JAIPURIA	-	-	

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
36.	Cable Tray, Grating, Enclosure & Safety Ladder	YAMUNA, DENSONS	REW, GM		
37.	DG Sets	CROMPTON GREAVES <u>Additional Reputed Makes/Brands</u> CUMMINS, JAKSONS	SWADESHI WHISPOWER, GM	-	
38.	Rigid PVC Conduit Pipes	VPL <u>Additional Reputed Makes/Brands</u> KALINGA, PLAZA	JPC PIPES, PARAFLEX, KAMPLAST, PLAZA CABLES	ASIAN TUBES, POLYFIN	
39.	GI/ MS Conduit/ ERW Conduit Pipe	VPL <u>Additional Reputed Makes/Brands</u> AKG, BEC, BHARAT STEEL TUBES		-	
40.	Conductive Concrete Earthing	-	ELANCRETE, PRAGATI		
41.	ACSR Conductor	DYNAMIC CABLES <u>Additional Reputed Makes/Brands</u> ALIND, COYOTE, STERLITE POWER		-	
42.	Battery Charger, ACDB, DCDB, ELDB		BPS, POWER ONE	-	
43.	Medium Voltage SFC Gas Insulated RMU (Ring Main Unit) and Oil Insulated RMU of 12KV, 24KV & 36KV		LUCY, VOLTAMP		
44.	HT Switch Gear 33/66 KV, SF6 (outdoor)	MEGAWIN 2025, HARTEK		-	
45.	HT Switch Gear 11 KV, VCB (Indoor/ Outdoor) HT Ring Main Unit, SF6/ACUUM, 11KV/CT & PT	ITE GURGAON, MEGAWIN 2025, HARTEK		-	
46.	Package/ Unified Sub-Station	ITE GURGAON, MEGAWIN 2025, SUDHIR	AARVE NOIDA, VOLTAMP, MUSKAAN		
47.	MCCBS	STANDARD, INDO ASIAN, HAVELLS, C&S ELECTRIC, BENLO, HPL, ANCHOR	SHALABH, BCH, ADHUNIK SWITCHGEAR		
48.	MCB/ELCB/RCCB/RCBO/ Isolators/ MCB Distribution Board	CRYSTAL, SSK, POLYCAB, GM&G, INDO ASIAN, HAVELLS, C&S ELECTRIC, BENLO, HPL, ANCHOR	REW, AARVE NOIDA, GM, VINAY, SHALABH, BCH, PRECISION SYSTEM CONTROL (PSC)	FINE SWITCHES, ASCO, METALLO, SUPERTECH POWER CONT (P) LTD	
49.	Change Over Switches	MEGAWIN 2025, CRYSTAL, GM&G, INDO ASIAN, STANDARD, HAVELLS, C&S ELECTRIC, ANCHOR, HPL		ASCO, METALLO	
50.	Power Contactor	INDO ASIAN, HAVELLS, C&S ELECTRIC, HPL	-	-	
51.	Smart/ Tamper Proof Energy Meters (Digital Type)	NEPTUNE, HPL, ELMEASURE <u>Additional Reputed Makes/Brands</u> L&T, SECURE	-	-	MAGAN ATE CH ON NCNC BASIS
52.	Static Energy Meter	BENLO, ELMEASURE <u>Additional Reputed Makes/Brands</u> L&T, ABB, SECURE	-	-	
53.	Voltage Stabilizers upto 25 KVA	ITE GURGAON, VOLINA, SINETRAC, VINITEC, IEKO	PRAGATI, MUSKAAN, JAY BEE INDUSTRIES, JAIMA ELECTRICALS	-	

Contd...

PARTICULAR SPECIFICATIONS

Appendix 'B-1' (Contd...)

LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS

1	2	3	4	5	6
54.	Voltage Stabilizers Above 25 KVA (Servo Controlled)	ITE GURGAON, VOLINA, SINETRAC, VINITEC, IECO, POWERWARE	PRAGATI, MUSKAAN, JAY BEE INDUSTRIES, JAIMA ELECTRICALS	-	SPECTRO NON NCNC BASIS
55.	Sodium Hypochlorite Solution (Grade-I)	<u>Additional Reputed Makes/Brands</u> DECLIBAC, GRASIM	-		
56.	Street Light Timers	SINETRAC, INDO ASIAN, HAVELLS	-	-	
57.	Isolation Transformer	VOLINA, SINETRAC, VINITEC, IECO, ITE GURGAON	PRAGATI, POWER ONE	-	
58.	Single Phase Preventors/ Phase Sequence Corrector	SINETRAC, VOLINA	-	-	
59.	HT/ LT Steel Tubular Swaged Poles	SHIVAM METAL SHAPERS, SURYA, HPL	-		
60.	PCC Pole, Fencing Pole of 8 Feet Long & KERB Stone	SURYA, HPL		SANKHLA UDYOG, SSK, SHRI RAM FLY ASH BRICKS, INDERBIR, INDUSTRIES	
61.	Earth Inspection Housing (Earth Pit)	-	-	PARAMOUNT, IMPORT EXPORT CORP	
74.	1. Remote Terminal Units And Related SCADA/ asset Monitoring Software For (a) Water & Electric Supply Utility Services incl Automatic Remote Meter Reading/ Billing (b) HT & LT Substation, Solar Plants & Elec Assets such as Switch Gear, Transformer, Diesel Generators (c) HVAC, Security Systems, OT And Hospital Systems 2. Scada Application Programming Interface Software	MEGAWIN 2025, UNIVERSAL SWITCHGEAR	-	RIGHTWATTS	
75.	Oil Filled Distr Transformer upto 2500 KVA (Voltage Class Upto 33 KV Class)	-	VOLTAMP, JAYESH ELECTRICAL LTD	-	
76.	HT Panel	PSC, HARTEK			
77.	Bus Ducts/ Rising Main	-	-	EAP, SUPERTECH POWER CONTROL (P) LTD	
78.	Servo Controlled Stabilizer 1-500 KVA	-	POWER ONE, JAIMA ELECTRICALS	-	
79.	Solar cable	-	BONTON, PLATIMA, VTL	NEC (WIRE & CABLE)	
<u>(B) INTERNAL & EXTERNAL WATER SUPPLY</u>					
1.	GI Pipes/ MS Pipes	VPL <u>Additional Reputed Makes/Brands</u> JINDAL, TATA, OSWAL	-	PRAKASH (SURYA)	
2.	HDPE/UPVC/PPR Pipes	VPL, SFMC <u>Additional Reputed Makes/Brands</u> FINOLEX, SFMC, PRINCE, SUPREME	-	PRAKASH (SURYA)	

Contd...

PARTICULAR SPECIFICATIONS

Appendix 'B-1' (Contd...)

LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS

1	2	3	4	5	6
3.	Bronze Sluice Valve/ Non Return Valve/ Air Release Valve/ Pressure Reducing Valve/ Fire Hydrant Valve/ Spring Relief Valve/ Ball Valve/ Steam Valve/ Float Valve	PRAYAG, SHAKTI <u>Additional Reputed Makes/Brands</u> KIRLOSKAR, ZOLOTO, LEADER, L&T (AUDCO)	-	-	
4.	Float Valve	PRAYAG, SHAKTI <u>Additional Reputed Makes/Brands</u> AIRAEURO, AGROTECH, TELEFLO, TECHNO INTERNATIONAL	-	-	
5.	Gun Metal Gate Valve/ Globe Valve/ Horizontal & Vertical Check Valve	<u>Additional Reputed Makes/Brands</u> KIRLOSKAR, LEADER, L&T (AUDCO)	-	-	
6.	PPR/PVC Pipes and Fittings	KPT, VECTUS	-	-	
7.	DI Pipes	<u>Additional Reputed Makes/Brands</u> JINDAL, TATA	-	-	
8.	CI Pipes & Fittings	<u>Additional Reputed Makes/Brands</u> JINDAL, TATA METALIKS, TATA KUBOTA	-	-	
9.	GI Fittings	<u>Additional Reputed Makes/Brands</u> JINDAL, TATA, BST	-	-	
10.	Pump Sets-Mono Block	<u>Additional Reputed Makes/Brands</u> KIRLOSKAR, CROMPTON, KSB, JOHNSON & JOHNSON	-	-	
11.	Centrifugal Pumps	<u>Additional Reputed Makes/Brands</u> KIRLOSKAR, KSB, GRANDFOS, ITT	-	-	
12.	Submersible Pumps	<u>Additional Reputed Makes/Brands</u> KIRLOSKAR, BEACON, KSB, GRANDFOS, WASP, ITT	-	-	
13.	Non Clog Sewage Pumps	<u>Additional Reputed Makes/Brands</u> KIRLOSKAR, KSB, CROMPTON, JOHNSON & JOHNSON	-	-	
14.	Vertical Turbine Pump	<u>Additional Reputed Makes/Brands</u> KSB, KIRLOSKAR, BAJAJ ATLANTA, JOHNSON & JOHNSON	-	-	
15.	Dosing Pump/ Bleaching Dozer	<u>Additional Reputed Makes/Brands</u> ION EXCHANGE, MAIC INDIA, JESCO	-	-	
16.	Motor Starters	HPL <u>Additional Reputed Makes/Brands</u> L&T, BCH, SCHNEIDER, SIEMENS, ABB	-	-	
17.	Electric Motor	HPL <u>Additional Reputed Makes/Brands</u> BHARAT BIJLEE, KIRLOSKAR ELECTRIC, CROMPTON GREAVES, ABB, SIEMENS, GEC	-	-	
18.	Single Phase Preventor/ Phase Sequence Corrector	<u>Additional Reputed Makes/Brands</u> L&T, SIEMENS, LEGRAND, SCHNEIDER, ABB	-	-	
(C) AIR conditioning					
1.	Centrifugal blowers SISW & DIDW, LLD fans	<u>Additional reputed makes/brands</u> NICOTRA, AIRFLOW, GREENHECK, COMBIFREE, LLOYD	-	-	
2.	Scrubbers	-	VENTECH, SEEPL	-	
3.	FCU, AHU, Air washer	<u>Additional reputed makes/brands</u> BLUE STAR, VOLTAS CARRIER, LLOYDWAVES, HITECH	-	-	

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
4.	Window type/ Split type air conditioners (Note: Only 5 star BEE rating ACs shall be specified where annual, usage is > 1000hrs, 3 star for other places e.g. conference rooms)	<u>Additional reputed makes/brands</u> VOLTAS, LLYOD, LG, BLUE STAR, VIDEOCON, SAMSUNG, GODREJ, PANASONIC, HAIER	-	-	
5.	Water coolers	<u>Additional reputed makes/brands</u> VOLTAS, BLUESTAR, SHRIRAM, USHA, SIDHWAL	-	-	
6.	Refrigerator	<u>Additional reputed makes/brands</u> WHIRLPOOL, LG, SAMSUNG, VOLTAS, VIDEOCON, KELVINATOR	-	-	
7.	Deep freezer	<u>Additional reputed makes/brands</u> BLUE STAR, VOLTAS, SIDHWAL, CARRIER, FEDDERS	-	-	
8.	Cassette type AC	<u>Additional reputed makes/brands</u> BLUE STAR, LLYOD, VOLTAS, PANASONIC, TOSHIBA, LG	-	-	
9.	Pillar type AC	<u>Additional reputed makes/brands</u> LLYOD, LG, BLUE STAR, WHIRLPOOL, PANASONIC	-	-	
10.	Ductable AC	<u>Additional reputed makes/brands</u> LLYOD, VOLTAS, HITACHI, LG BLUE STAR	-	-	
11.	Air curtain	<u>Additional reputed makes/brands</u> CROMPTON GREAVES, ALMONARD, ROBUSTIX	-	-	
12.	Fire damper	<u>Additional reputed makes/brands</u> DYAN CRAFT, RAVISTAR, MAPRO, CARRY AIR, AIRFLOW, RUSKIN	-	-	
13.	Aluminium extruded, Aluminium grill/Diffuser	<u>Additional reputed makes/brands</u> DYNA CRAFT, RAVISTAR, MAPRO, SERVEX, GREEN HECK, BRIGHTFLOW	-	-	
14.	Desert coolers	<u>Additional reputed makes/brands</u> SYMPHONY, KHAITAN, KENSTAR, CROMPTON GREAVES, BAJAJ, OSRAM	-	-	
15.	Chillers/Chilling units	<u>Additional reputed makes/brands</u> CARRIER, VOLTAS, BLUESTAR, KIRLOSKAR	-	-	Climaveneta on NCNC Basis
16.	Cooling towers	<u>Additional reputed makes/brands</u> MIHIR, PAHARPUR, ADVANCE, DELTA	-	-	
17.	Fractional HP motors	<u>Additional reputed makes/brands</u> AUE, SIEMENS	-	-	
18.	Variable Frequency Drives (VFD)	<u>Additional reputed makes/brands</u> DANFOSS, HONEYWELL, ABB, AUTOMATION, SIMPHOENIX	-	-	
19.	Pot/ Y-Strainer	<u>Additional reputed makes/brands</u> EMERALD, RAPID COOL, LEADER	-	-	
20.	Pressure gauge/ Dial type thermometers	<u>Additional reputed makes/brands</u> FIEBIG, H. GURU, EMERALD, AUTO MAT LUB SYSTEM	-	-	
21.	Insulation (Fiber glass)	<u>Additional reputed makes/brands</u> LLOYD, SHRI FIRE PACK, IMPEX INSULATION, TRANS INSULATION	-	-	
22.	Insulation (Expanded polyethylene)	<u>Additional reputed makes/brands</u> TOSHIBA, STYRENE PACKAGING, CAPRICORN, ECOTHEM INSULATION	-	-	

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
23.	Insulation (Cross polyethylene foam)	Additional reputed makes/brands SUPREME, PARAMOUNT, AEROFLEX, TROCELLONE	-	-	
24.	Insulation (Nitrile rubber)	Additional reputed makes/brands KAIFLEX, KFLEX, VIDOFLEX, PARAMOUNT	-	-	
25.	TF Thermocol for pipe insulation	Additional reputed makes/brands PK PACKING, BIRDSSELL, PROPACK, STYRENE PACKAGING, RYCONSERVICES, KIWI THERMO PACK, SAHARA THERMO PACK	-	-	
26.	Controls (3 way valves)/ Thermostats	Additional reputed makes/brands ANERGY, SIEMENS, HONEYWELL	-	-	
27.	Extruded aluminium grills/ Diffusers/ Fire dampers	Additional reputed makes/brands DYNE CRAFT, MAPRO, SERVEX	-	-	
28.	Copper refrigerant piping	Additional reputed makes/brands DIAMOND, STAR	-	-	
29.	GI sheets for ducting	Additional reputed makes/brands SAIL, TATA, JINDAL	-	-	
30.	Actuator	Additional reputed makes/brands SIEMENS, ADVANCE, CASTLE, NIBCO, AIP	-	-	
31.	Strip heaters	Additional reputed makes/brands RAYCOLD, DASSPASS, AUE, HONEYBEE	-	-	
32.	Humidstat/ Thermostat	Additional reputed makes/brands DANFOSS, HONEYWELL, SIEMENS, JOHNSON, RAPIDCOOL	-	-	
33.	Air filter/ HEPA filter	Additional reputed makes/brands LLYOD, MIHIR, DANFOSS, INDFOSS	-	-	
34.	Factory built ducts	Additional reputed makes/brands FLEX, ROLASTAR, TECHNO AIR, CAMDUCT, ECODUCT	-	-	
35.	Flexible connector	Additional reputed makes/brands CORI ENGINEER, RESISTO FLEX, DUNLOP	-	-	
36.	Hot water generator	Additional reputed makes/brands THERMAX, INDCON 3M, RAPID CONTROL, ZENITH	-	-	
37.	Water treatment plant	Additional reputed makes/brands SCALE MASTER, SCALE GUARD, WELDONE, AQUAMECH, DELTA	-	-	
38.	Duct flange	Additional reputed makes/brands ZECO, ROLSTAR, ECODUCT	-	-	
39.	Expansion valve	Additional reputed makes/brands DANFOSS, INDFOSS, SPORLO, ALCO	-	-	
40.	Flow switch	Additional reputed makes/brands RAPID COOL, SIEMENS, BCH, L&T	-	-	
41.	Automatic air vent	Additional reputed makes/brands RAPID CONTROL, ANERGY	-	-	
42.	3-Way modulating valve	Additional reputed makes/brands HONEYWELL, SIEMENS, ANERGY, INDFOSS, DANFOSS, JOHNSON	-	-	
43.	Room thermostat/ AHU thermostat	Additional reputed makes/brands HONEYWELL, SIEMENS, DASPASS, ESCORTS, INDFOSS	-	-	
44.	HP/ LP cutouts/ Controls	Additional reputed makes/brands HONEYWELL, PENN, DANFOSS, INDFOSS	-	-	
45.	Air washers	Additional reputed makes/brands BREEZE AIR, NICOTRA, PECMA, AIREF, AIRLOW	-	-	
46.	Propeller fans	Additional reputed makes/brands ABB, KRUGER	-	-	
47.	Butterfly valve	Additional reputed makes/brands AUDCO, ADVANCE, DEEPAK	-	-	

Contd...

PARTICULAR SPECIFICATIONS

Appendix 'B-1' (Contd...)

LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS

1	2	3	4	5	6
(D) FIRE DETECTION, FIRE ALARM AND FIRE FIGHTING SYSTEM					
1.	Fire extinguisher all type	<u>Additional reputed makes/brands</u> MINIMAX, FIREX, NEWAGE, NITIN, CEASEFIRE	LIFEGUARD, JYOTI, ATASEE	-	
2.	Air hose/ Fire hose pipes & accessories	<u>Additional reputed makes/brands</u> NEWAGE, DUNLOP, COSMOS	LIFEGUARD, JYOTI	-	
3.	Fire hydrant/ Landing valves	<u>Additional reputed makes/brands</u> MINIMAX, FIREX, SAFEX	LIFEGUARD, ATASEE	-	
4.	Fire panel	<u>Additional reputed makes/brands</u> MATHER & PLATT, MINIMAX, SAFEX, AGNI, HONEY WELL, SYSTEM SENSOR, FIREX, NOTEFIRE	-	-	-
5.	Hooter/ Siren	<u>Additional reputed makes/brands</u> MINIMAX, MELTRON, AHUJA, PHILIPS, AGNI	-	-	
6.	Manual call bell point	<u>Additional reputed makes/brands</u> AGNI SURKSHA, MINIMAX, FIREX	-	-	
7.	Smoke/ Heat/ Ionisation detector, Addressable & Non addressable	<u>Additional reputed makes/brands</u> APPOLO, EDWARDS, HONEY WELL, SYSTEM SENSER	-	-	
8.	Water sprinkler head	<u>Additional reputed makes/brands</u> APPOLO, TYCO, CEASEFIRE, SAFEX, MINIMAX, STARTECH FIRE SYSTEM, ELECTRONIC CONTROLS, CEASEFIRE	-	-	
9.					
(E) B/R ITEMS					
1.	Pressed Steel Door Frames/ Chowkhats for Doors/ Cupboard and Window Frames	SHAKTI, MADHU INDUSTRIES, NCL SECCOLOR, SHIVAM METAL SHAPERS, ASHISH INDUSTRIES	PARSHOTAM STEEL IND (PSI), STEELMAN INDUSTRIES, CHANDNI INDUSTRIES	RATNAKAR STEEL WORKS, FRIENDS MANUFACTURI NG CO, JEW	
	Steel Windows/ Vents	SHAKTI, NCL SECCOLOR, MADHU INDUSTRIES, SHIVAM METAL SHAPERS, ASHISH INDUSTRIES	PARSHOTAM STEEL IND (PSI), STEELMAN INDUSTRIES, CHANDNI INDUSTRIES	SANMATI UDYOG, TEE PEE, RATNAKAR STEEL WORKS, FRIENDS MANUFACTURI NG CO, JEW	
2.	PVC Boards/ Door Frame/ Shutters	ACCUCEL, POLYLINE, ECOCELL, RAJSHRI PLASTIWOOD	-	BLACK COBA, ROOFFIT	
3.	UPVC Windows/ Doors/ Frames & Ventilators	YASHPOLY, ACCUCEL, APARNA VENESTER/ OKOTECH, MADHU INDUSTRIES, NCL VEKA, H2O SOLUTION, RAJSHRI PLASTIWOOD <u>Additional Reputed Makes/Brands</u> SCL CORA, FENESTA, ENCRAFT, SUPREME	GFT, ALUPLAST, CHANDNI INDUSTRIES	MARCOLINI, JEW	
4.	Anodised Aluminium Doors/ Windows/ Frames/ Partitions	AXSYS, ASHISH INDUSTRIES <u>Additional Reputed Makes/Brands</u> JINDAL, KALCO, ALPURE		GLOBAL, JEW	
5.	Galvanised Steel Sheets & Colour Coated Galvanized Steel Sheets	JSW, KAMDHENU <u>Additional Reputed Makes/Brands</u> TATA, JINDAL	-	-	
6.	Terrazzo Tiles/ PPC Tiles/ PPC Chequered Tiles		SITCO, MOHINDRA INDUSTRIES, SWASTIK ALW PJ (Bathinda)	-	

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PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
7.	Interlocking Tiles/ Exterior Tiles/ Paver Blocks		SITCO, POOJA CONCRETE, MOHINDRA INDUSTRIES, KB SPUN, SARAL IMPEX, RANA TILES CO, SHINO TILES, RN TILES & PAVERS, SWASTIK ALW PJ (Bathinda)	TULIP, GPT, MEGHA CONTRACTORS PVT LTD, HARIOM TILES & PAVERS, INDERBIR INDUSTRIES, SHRI RAM FLY ASH BRICKS, JUGRAJ TILE FACTORY	
8.	Roof Tiles, Kerb Stone	-	MOHINDRA INDUSTRIES, RN TILES & PAVERS, SWASTIK ALW PJ (Bathinda)	GPT, MEGHA CONTRACTORS PVT LTD, HARIOM TILES & PAVERS, NITCO, SHRI RAM FLY ASH BRICKS, INDERBIR INDUSTRIES	
9.	Glazed Ceramic/ Non- Skid Wall/ Floor Tiles	AGL, QUTONE, ORIENT BELL, SUNHEARRT CERAMIK, RAK CERAMICS, SOMANY <u>Additional Reputed Makes/Brands</u> NITCO, JOHNSON, VITERO TILES	VARMORA, ACE HARMONY		
10.	Vitrified Tiles (Normal/ Anti-Skid)	AGL, VITERO, QUTONE, CERA, ORIENT BELL, SUNHEARRT CERAMIK, RAK CERAMICS, VARMORA, SOMANY <u>Additional Reputed Makes/Brands</u> NITCO	-		
11.	High SRI Tiles	JOHNSON, ORIENT BELL, Pidilite, Panache, Ardex Endura, NITCO	AB Ceramic, Lune Tiles		
12.	HDPE & LLDPE Storage Water Tanks	PLASTO, VECTUS <u>Additional Reputed Makes/Brands</u> SINTEX, SUPREME	DIPLAST, DUTRON, SHEETAL	FRONTLINE SUPER, ORIENT, SPL	
13.	Stainless Steel Kitchen Sink With or Without Draining Board, Plate Rack	JAINKO, CERA, SHAKTI, PRAYAG, SPC, SILVER SHINE <u>Additional Reputed Makes/Brands</u> DIAMOND, NIRALI	DELPHIS, SHRI NAVVAR METALS LTD	-	
14.	Ball Valves (Horizontal Plunger Type)	-	PRIMA, JAINKO	-	
15.	Brass Valves	PRAYAG, ZOLOTO <u>Additional Reputed Makes/Brands</u> L&T VALVES, AMCO, VIP VALVES	-	-	
16.	Shower Roses Chromium Plated (Swivel Type)	Jaquar, Hindware, Roca, JAINKO, SHAKTI, SILVER SHINE <u>Additional Reputed Makes/Brands</u> VITERO, SOMANY, PRAYAG	-	-	
17.	CP Bathroom Fancy Fittings & Accessories/ CP Bath Fittings	JAQUAR, HINDWARE, KOHLER, CERA, SHAKTI, PRAYAG, PLAYER, AP ROYALE, BATHSENSE, SOMANY, SILVER SHINE <u>Additional Reputed Makes/Brands</u> VITERO	PARKOVIC, ESSEL, KI, CORONET, PRIMA, ESS ESS, GLOCERA JAINKO, SS GLOBAL	KPR, TROIKA, RN INDUSTRIES, CONTINENTAL	
18.	BIB Taps And Stop Valves (CP) Fancy Fittings	JAQUAR, HINDWARE, KOHLER, JAINKO, CERA, SHAKTI, PRAYAG	ESSEL, KI, PARKOVIC, CORONET, PRIMA, SS GLOBAL	KPR, KUNCHAL	
19.	PTMT/ PVC Fittings	-	PEARL, CONTINENTAL, JAINKO, SHEETAL	-	
20.	HDPE Pipes/ SNR Pipes (Water/Sewage)	PLASTO, SFMC <u>Additional Reputed Makes/Brands</u> SUPREME, UTKARSH, DURALINE	-	-	
21.	Cement Based Paints	ACRO PAINTS <u>Additional Reputed Makes/Brands</u> SNOWCEM, ASIAN, BERGER, DULUX <i>Note: VOC limits as per Appendix-'B-4'</i>			

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
22.	Decorative Paint (Ext & Int)	ACRO PAINTS, ASIAN, BERGER <u>Additional Reputed Makes/Brands</u> SNOWCEM, DULUX <i>Note: VOC limits as per</i> Appendix-'B-4'			
23.	High Built Texture & Wall Finishes (Ext & Int)	ACRO PAINTS <u>Additional Reputed Makes/Brands</u> ASIAN, BERGER, SNOWCEM, DULUX <i>Note: VOC limits as per</i> Appendix-'B-4'	-	-	
24.	High SRI Paint	Inian Insulation and engineering, Pidilite, Panache, Thermogreen, Vinayak, Lumin Coatings, Godavri, Lvannkanxt, Excel coating	Atarshield technologies		
25.	FRP Door Frame & Shutter	FIBERWAYS, SPC	JAYNA, ROOFFIT	-	
26.	PVC Wall Paneling/ PVC Ceiling & Partition	POLYLINE, ECOCELL, HR ENTERPRISES, RAJSHRI PLASTIWOOD <u>Additional Reputed Makes/Brands</u> DECOINN, SUNBEAM	GIZA, GYPTECH		
27.	HDF/ PVC Door Frame Shutter Moulded	POLYLINE, ECOCELL, HR ENTERPRISES <u>Additional Reputed Makes/Brands</u> ECHON, ALCAD, DECOINN	-	-	
28.	PVC Sheet Cladding	POLYLINE <u>Additional Reputed Makes/Brands</u> ALCAD, DECOINN	-		
29.	Acoustic Panels	-	HIMALYAN ACOUSTICS, GYPTECH		
30.	UPVC Ceiling & Panelling	YASHPOLY, ACCUCEL, HR ENTERPRISES			
31.	Pre Fab Panel Boards/ Wall Lining Ceiling Tiles	DEXUNE, AEROLITE, HI-STEEL, RAJSHRI PLASTIWOOD			
32.	False Ceiling Tiles/ Board (Gypsum Board/Pop / Mineral Fibre)/ Jointing & Finishing Material	DEXUNE, HI-STEEL, USG BORAL, RAJSHRI PLASTIWOOD <u>Additional Reputed Makes/Brands</u> GYPCORE, ARMSTRONG			
33.	False Ceiling/ Metal False Ceiling/ Metal Framing	DEXUNE, HI-STEEL, USG BORAL, RAJSHRI PLASTIWOOD <u>Additional Reputed Makes/Brands</u> GYPCORE, ARMSTRONG			
34.	Road Marking Paint, Water Based/ Thermoplastic	<u>Additional Reputed Makes/Brands</u> 3M, VERTEX			
35.	WPC Door Frames/ Panels/ Hybrid Sheet/ Flooring/ Jalli	-	-	ADO WOODS, ROOFFIT, BLACK COBA	
36.	Road Furniture & Reflective Sigh Boards (Road Studs, Solar Studs, Speed Breaker, Traffic Cone, Spring Post, Median Marker, Delineator, Safety Cones, Safety Convex Mirror, Q-Manager, Reflective Jackets, Lights Beton, Bollard, Road Barricades, Caution Tape Etc)	-	SHAKTI, SHEETAL		
37.	FRP Chajjas	-	JAYNA, ROOFFIT	-	
38.	CPVC Pipes & Fitting	PLASTO, PRAYAG, VECTUS <u>Additional Reputed Makes/Brands</u> SUPREME, FINOLEX, DUTTON	DUTRON, PRAKASH (SURYA)	-	
39.	PVC/ UPVC/ SWR Pipes & Fittings	PLASTO, PRAYAG <u>Additional Reputed Makes/Brands</u> SUPREME, FINOLEX, DUTTON	DUTRON, PRAKASH (SURYA)	-	

Contd...

PARTICULAR SPECIFICATIONS**Appendix 'B-1' (Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

1	2	3	4	5	6
40.	Sanitary Ware	CERA, PRAYAG, AP ROYALE, BATHSENSE, SOMANY, RAK CERAMICS <u>Additional Reputed Makes/Brands</u> HINDWARE, KOHLER	SS GLOBAL, GLOCERA		
41.	Pre Painted Galvalume Steel Sheet/ Galvalume Sheets	JSW, KAMDHENU <u>Additional Reputed Makes/Brands</u> TATA, JINDAL, DYNA ROOFING PVT LTD			
42.	Chain Link Fencing/ Barbed Wire/ Punched Tape Concertina Coil/ Razor Blade Tape Fencing	A-1 FENCE <u>Additional Reputed Makes/Brands</u> ARMSTRONG WIRES MAIMOM ROGER			
43.	Glass Reinforced Gypsum (GRG) Ceiling Tiles	DIAMOND CEILING <u>Additional Reputed Makes/Brands</u> GYPCORE, MARUTI GYPSUM, SHERA			
44.	Gypsum Boards/ Jointing & Finishing Material/ Partition & Ceiling Framing Work/ Plastering Material/ Gypsum Ceiling Tiles	GYPROC <u>Additional Reputed Makes/Brands</u> GYPCORE			
45.	Glass Wool Tile and Paneling	ECOPHON <u>Additional Reputed Makes/Brands</u> GYPCORE			
46.	AAC Blocks & Jointing Adhesive	-	MODCRETE, CLAVECON	-	
47.	ACP (Aluminium Composite Panel)	<u>Additional Reputed Makes/Brands</u> ALUCOBOND, EUROBOND	VIRGO, ALUTECH, ALUDECOR, ALEX PANEL		
48.	Marine Plywood & Plywood for Concrete Shuttering Works	-	ALLIANCE, GL PLY	-	
49.	PVC Flushing Cistern	SHAKTI, PRAYAG, RAK CERAMICS <u>Additional Reputed Makes/Brands</u> HINDWARE, PARRYWARE, SUPREME	PEARL, JAINKO	-	
50.	Toilet Seat Cover	PRAYAG, CERA, RAK CERAMICS <u>Additional Reputed Makes/Brands</u> PARRYWARE, CERA		-	
51.	PUF Panels	-	-	SYNERGY, TELECOMMUNICATI ONS, ROOFFIT	
52.	Pulley System, Wall Stands, Floor Stands & Accessories of Pully System	-	-	EASY DRY	
53.	Box Type Steel Windows	-	-	FRIENDS MANUFACTURING CO, LUXMI WELDING WORKS, JEW, TEE PEE	
54.	Wooden Panel Doors, Window & Frames, Flush Doors, Wiremesh Doors	-	SATISH KUMAR & CO, GL PLY		
55.	PCC Manhole & Drain Cover, Earth Pit, Cable Route Indicator	-	-	MEGHA CONTRACTORS PVT LTD, HARIOM TILES & PAVERS NITCO, INDERBIR INDUSTRIES	

Contd...

PARTICULAR SPECIFICATIONS

Appendix 'B-1' (Contd...)

LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS

1	2	3	4	5	6
56.	Prepainted Galvanised Colour/ Powder Coated Steel Windows, Doors, Partitions, Ventilators & Structural Glazing	-	CHANDANI INDUSTRIES, ELIXIR	-	
57.	Aluminium Extrusions (With Anodizing & Power Coating)	-	-	BHORUKA EXTRUSIONS	
58.	HDPE DWC Pipe	-	DUTRON, GEMINI PIPES	-	
59.	Fly Ash Bricks	Refer Appendix B- 3			
60.	Electric Cable Covers	-	-	INDERBIR INDUSTRIES, SHRI RAM FLY ASH BRICKS	
61.	Fire resistant paint	(i) Berger paint (ii) Jenson Nicholson (iii) Nerolac Paints (iv) Shalimar Paints (v) Asian Paints			
62.	Putty for glazing	(a) Atul Dyes and Chemicals Pvt Ltd (b) Anglo Dutch Paint, Colour & Varnish Works Pvt Ltd, 50 Najafgarh Road, Industrial Area, Delhi (c) Bhagson Paint Industries 16-A DEF Industrial Area, Najafgarh Road, New Delhi-16 (d) UK Paint Industries village Sultanpur Mehrauli, Gurgaon PO New Delhi-11003			
63.	APP membrane	(i) STP Ltd Gurgaon (ii) IWL India Ltd (iii) Chokesy Chemicals (iv) Bengal Biutmen (v) Texsa India Limited, Gurgaon. (vi) TIKI TAR DANOSA (INDIA) PVT LTD (vii) Torchtar Membranes & Bitumen Products Pvt Ltd. (viii) M/s Asian Paints Limited			

(F) INTERIOR FINISHES

1.	High SRI Paints	(a) Indian Insulation and Engineering Address: SCF 37, PHASE 9, MOHALI, PUNJAB Ph: 0172 5093735 / 09915080488 / 09878466444 Email: indianenggs@gmail.com (b) Pidilite Industries Ltd. Address: PIDILITE INDUSTRIES LIMITED Ramkrishna Mandir Road, P.O. Box No.17411 Andheri (East) Mumbai - 400059 Ph: 91-22-28357693, +91-9967005757, +91-22-28357859, +91-9004419044 Email: sumeet.trehan@pidilite.com (c) Lumin Coatings Address: 514, Sunny Trade Center, New Aatish Market, Mansarovar, Jaipur, Rajasthan - 302020 Ph: +91-9166506029, +91-9148261656 Email: jeevan@lumincoat.com (d) GODAVRI PAINTS PVT. LTD. Address: GODAVRI PAINTS PRIVATE LIMITED, MAHARASHTRA Ph: 9820147762, 9820118310 Email: anil@godavaripaints.com
2.	Interior/Exterior Paints	(a) Kansai Nerolac Paints Limited Ph: 9890680974 Email: mukulmarathe@nerolac.com (b) JSW Paint Private Limited Address: Jindal Mansion, 5A, Dr, G Deshmukh Marg, Mumbai – 400026 Ph: 7045289225 Email: ccpaints@jsw.in (c) Asian Paints Address: Asian Paints Limited, 6A & 6B, Shantinagar, Santacruz (East), Mumbai - 400 055, Maharashtra Ph: 022 - 6218 1000 Email: customercare@asianpaints.com (d) Berger Paints Website: https://www.bergerpaints.com/dealer-locator (e) Dulux Paints Address: AkzoNobel India Limited Magnum Towers, 9th Floor, Sector 58, Golf Course ext. road, Gurugram, Haryana 122011 Ph:1800-3000-4455

Contd...

PARTICULAR SPECIFICATIONS

		(f) British Paints Address: 19 D.D.A. Commercial Complex, Kailash Colony Extn, Zamrudpur, New Delhi – 110048 Ph: +91-11-2924-2394-96 Email: sales@britishpaints.in
3.	False Ceiling	(a) Saint-Gobain India Pvt. Ltd. Address: 5th level, Leela Business Park, Andheri-Kurla Road, Andheri East, Mumbai – 400 059 Ph: 022 – 40212121 Email: gyprocindia@saint-gobain.com (b) Visaka Industries Limited (Vnext) Address: Visaka Industries Limited, Visaka Towers, S.P Road, Secunderabad, Telangana- 500 003 Ph: 8886786398 Email: srinivas.dandu@visaka.in (c) Knauf India Pvt Ltd Address: S-217, Ground Floor, Panchsheel Park, New Delhi, South Delhi, Pin-110017 Ph: 9599816843 Email: nitika.datt@knauf.com (d) USG BORAL BUILDING PRODUCTS (INDIA) PRIVATE LIMITED Address: USG Boral Building Products India Pvt. Ltd, Unit No-610-13, 6th Floor, Vipul Trade Centre, Sector-48, Sohna-Gurgaon Road, Gurugram, Haryana 122001 Ph: 8551023311 Email: abhishek.khatti@usgboral.com
4.	Panelling (Fibre Boards)	(a) Everest Industries Limited Address: D- 206, Sector – 63, Noida, Uttar Pardesh – 201301 Ph: +91-9871589444 / 9971726725 Email: skhanduja@everestind.com (b) Visaka Industries Limited (Vnext) Address: Visaka Industries Limited, Visaka Towers, S.P Road, Secunderabad, Telangana- 500 003 Ph: 8886786398 Email: srinivas.dandu@visaka.in (c) Knauf India Pvt Ltd Address: S-217, Ground Floor, Panchsheel Park, New Delhi, South Delhi, Pin-110017 Ph: 9599816843 Email: nitika.datt@knauf.com (d) Merino Group Address: 2/14, W.H.S. 2nd Floor, Kirti Nagar, New Delhi – 110015 Ph: 011- 30515300 Email: merinopg@merinoindia.com
5.	Adhesives (Tile)	(a) SOMANY CERAMICS LIMITED Address: 2 Red Cross Place, West Bengal Ph: 9289222054 Email: sonu@somanyceramics.com (b) MarmoSolutions PvtLtd Address: 1/18, 2nd FLOOR, NEAR RICHI RICH, KIRTI NAGAR, NEW DELHI-110015 Ph: 011-40586081 Email: marmosolutionsindia@gmail.com (c) Magicrete Building Solutions Address: 101-102, Ritz Square, Near Narmad Library, Ghod Dod Road, Surat-395001 Gujarat – INDIA Ph: 8070408010 Email: info@magicrete.in
6.	Adhesive (Wodd/Ply/Furniture)	(a) Pidilite Industries Ltd. Address: Regent Chambers, Mumbai Ph: +91 98 9040 2605, +91 22 4229 7369 Email: sachin.gupte@pidilite.com
7.	Adhesive (Insulation/Duct)	(a) Pidilite Industries Ltd. Address: Regent Chambers, Mumbai Ph: +91 98 9040 2605, +91 22 4229 7369 Email: sachin.gupte@pidilite.com

PARTICULAR SPECIFICATIONS

(D) SANITARY FIXTURES		
1.	WC/Urinals	<p>(a) Hindware Address: 2 Red Cross Place, west Bengal Ph: 9996541037 Email: Kedar@hindware.com</p> <p>(b) Cera Sanitaryware Limited Address: 9 G.I.D.C, Industrial Estate Kadi - 382715 Dist.-Mahesana (North Gujarat) Ph: 8511115852 +91-2764-243000-242329 Email: byerpude@cera-india.com</p> <p>(c) Kohler India Corporation Private Limited Address: Kohler India Corporation Private Limited, 26A, Ring Road, Lajpat Nagar-IV, New Delhi-110024 Ph: 9160152131 Email: parvesh.kumar2@kohler.com</p>
2.	Plumbing Fixtures	<p>(a) JAQUAR & COMPANY PVT. LTD. Address: SP -53, RIICO INDUSTRIAL AREA, BHIWADI, DISTT. ALWAR (RAJASTHAN) PIN 301019 Ph: 09983323782 Email: bandhu@jaquar.com</p> <p>(b) Kohler India Corporation Private Limited Address: Kohler India Corporation Private Limited, 26A, Ring Road, Lajpat Nagar-IV, New Delhi-110024 Ph: 9160152131 Email: parvesh.kumar2@kohler.com</p> <p>(c) Hindware Ltd. Address: 2 Red Cross Place, west Bengal Ph: 9996541037 Email: Kedar@hindware.com</p> <p>(d) Cera Sanitaryware Limited Address: 9 G.I.D.C, Industrial Estate Kadi - 382715 Dist.-Mahesana (North Gujarat) Ph: 8511115852 +91-2764-243000-242329 Email: byerpude@cera-india.com</p>

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**Appendix 'B-2'****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

(A) Cement					
Ser No	Company Name	Address	Type of Cement	Valid upto	Remarks
1.	The Associated Cement Companies Ltd Brand: "ACC"	414-421, Splendor Forum (4 th Floor), 3, District Centre, Jasola, New Delhi – 110044, Ph : 011-46583600	All	-	
2.	Ultra Tech Cement Ltd Brand: "ULTRATECH"	'B' Wing, 2 nd Floor, Mahakali Caves Road, Andheri (East), Mumbai – 400093 Ph- 022-66917800	All	-	
3.	The India Cement	Dhun Building, 827, Anna Salai, Chennai – 600002	All	-	
4.	Dalmia Cement (Bharat) Ltd. Brand: "DALMIA INFRA PRO"	Dalmiapuram, Distt – Truchirappalli, Tamil Nadu – 621651	All	-	
5	Century Cements Brand: "CENTURY"	Industry House, 159 Church Gate Reclamation, Mumbai – 400020, Ph : 022 22023936	All	-	
6.	Saurashtra Cement Brand: "SAURASHTRA"	Gala No A-1, Ground Floor, Udhyog Sadan No 3 MIDC, Central Road, Andheri (East), Mumbai – 400093, Ph : 022 32955557/ 67 Mob : 9320290081	All	-	
7.	The Ramco Cements Ltd. (Formerly Madras Cement) Brand : "RAMCO"	Auras Corporate Centre, 98-A, Dr. Radhakrishnan Salai, Mylapore, Chennai – 600004, Ph- 044 28478666	All	-	
8.	Mangalam Cement Ltd Brand: "MANGALAM"	PO Adityanagar, Morak, Distt-Kota, Rajasthan – 326520 Ph : 9351468076	All	-	
9.	Birla Corporation Ltd Brand: "BIRLA"	Birla Building (3 rd & 4 th Floor) 9/1, R N Mukherjee Road, Kolkata – 700001, Ph : 033 30573700	All	-	
10.	Orient Cement Brand: "BIRLA-A1"	5-9-22/57/D, 2 nd and 3 rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad – 500063, Ph : 044 23688600	All	-	
11.	Nuvoco Vistas Corporation Ltd (Formerly Lafarge Cement) Brand : "NUVOCO"	Equinox Business Park, Tower-3, East Wing, 4 th Floor, LBS Marg, Kurla (West), Kurla Mumbai, Maharashtra-400070	All	-	
12.	Shree Cement Brand : "SHREE"	Bangur Nagar, Beawar, Distt-Ajmer, Rajasthan-305901 Ph-01462 228101-06	All	-	
13.	J K Cement Brand: "J K"	Kamla Tower Kanpur – 208001	All	-	
14.	J K Lakshmi Cement Ltd Brand: "J K LAKSHMI"	Jaykaypuram, Distt-Sirohi, Rajasthan- 307019, Ph : 02971 244409/10	All	-	
15.	Jaypee Rewa Cement Brand: "JAYPEE"	Jaypee Nagar, P.O. - Jaypee Nagar, Rewa – 486450 M.P.	All	-	
16.	Ambuja Cement Ltd Brand: "AMBUJA"	Kodinar, PO- Ambujanagar, Taluka- Kodinar, Distt-Junagadh, Gujarat – 362715, Ph : 02795 237000	All	-	

PARTICULAR SPECIFICATIONS**Appendix 'B-2'(Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

Ser No	Company Name	Address	Type of Cement	Valid Upto	Remarks
17.	M/s Sagar Cements Ltd Brand : "SAGAR"	<u>M/s Sagar Cements Ltd,</u> Plot No 111, Road No 10, Jubilee Hills, Hyderabad-500 033 Tele : +91-40-23351571, 2335672 Fax : +91-40-2335673 Email : info@sagarcements.in Web Site : www.sagarcements.in	OPC 43 OPC 53 PPC PSC	24 Aug 2025	
18.	M/s Chettinad Cement Corporation Ltd. Brand: "CHETTINAD CEMENT"	<u>M/s Chettinad Cement Corporation Ltd.</u> 4 th Floor Rani Seethai Hall Building, 603 Anna Salai Hall, Chennai – 600006 Tel No +91-44-28292727/42149955 Fax No +91-44-28291558 E-mail : shares@chettinadcement.com Website- www.chettinad.com	OPC 43 & PPC	13 May 2027	
19.	M/S My Home Industries Pvt Ltd Brand : "MAHA CEMENT"	<u>M/S My Home Industries Pvt Ltd</u> 9 th Floor, Block-3, My Home Hub, Madhapur, Hyderabad – 500081, Ph- 040-66929696, Fax- 040-66929797/98 Email : corp@myhomegroup.in Website : www.myhomeindustries.com	PSC	13 Oct 2027	
20.	M/S My Home Industries Pvt Ltd Brand : "MAHA CEMENT"	<u>M/S My Home Industries Pvt Ltd</u> 9 th Floor, Block-3, My Home Hub, Madhapur, Hyderabad – 500081, Ph- 040-66929696, Fax- 040-66929797/98 Email : corp@myhomegroup.in Website : www.myhomeindustries.com	OPC 53 & PPC	13 Oct 2027	

PARTICULAR SPECIFICATIONS**Appendix 'B-2'(Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

(B) TMT STEEL					
Ser No	Company Name	Address	Type of Steel	Valid upto	Remarks
1.	Rashtriya Ispat Nigam Limited (RINL) Brand: 'RINL'	Visakhapatnam Steel Plant, Visakhapatnam -530 031, India Tel (91 891) 518226, 518376. Fax : (91 891)518316 Email: cmdvsp@itpvis.ap.nic.in	All	-	
2.	Tata Iron & Steel Company (TISCO or Tata Steel) Brand: 'TATA'	Bombay House, 2, 4 Homi Modi Steel, Mumbai-400 001, Tel (91 22) 2049131, Fax : (91 22) 204 9522, 287 0840 Email: corpcomm@jsr.tatasteel.com (Br Office for North: Jeevan Tara Bldg, Patel Chowk, New Delhi)	All	-	
3.	Steel Authority of India Limited (SAIL) Brand: 'SAIL'	Central Marketing Organization Northern Region, 17th Floor, Scope Minar, Laxmi Nagar Distt Centre, Delhi-110 092	All	-	
4.	M/s Gallantt Metal Ltd, Gujrat Brand : 'GALLANTT TMX'	Ward 10BC, Plot No 123, Ground Floor, Gandhidham, Kutch, Gujarat – 370201 Tel : 02836-228164, Fax : 02836-235787, E-mail : gml@gallantt.com Website : www.gallantt.com	TMT Bars of Gde Fe 500 Fe 500D & CRS (Size 8-32 mm)	05 Jul 2025	
5.	M/s Rashmi Metaliks Limited, W.B Brand : 'RASHMI TMT'	<u>M/s RASHMI METALIKS LTD., W.B</u> Premlata Building, 39, Shakespeare Sarani, 6 th Floor, Kolkata – 700017 Tel : 033-22894255/56, Fax : 033-22894254 E-mail : mkt.domesticdip@rashmigroup.com Website : www.rashmigroup.com	TMT Bars of Gde Fe 500 (Size 8-32mm) Fe 500D & Fe 550D (Size 8-25mm)	23 Aug 2025	
6.	M/s Bajrang Power & Ispat Ltd, Raipur (CG) Brand: 'GOEL TMT'	<u>M/s Bajrang Power & Ispat Ltd, Raipur (CG)</u> Vill - Borjhara, Urla industrial Area, Raipur-493221 (CG) Tel- 0771- 4288019/ 29/ 39 Fax-0771-2323601/602, 4288123 Email-infobir@goelgroup.co.in commercial.bir@goelgroup.co.in	TMT Bars of Gde Fe 500, Fe 500D, Fe550D (Size: 8-32mm) Fe550D CRS (Size: 10-25mm)	08 Jan 2026	
7.	M/S Real Ispat & Power Ltd Brand: "G K TMT"	<u>M/S Real Ispat & Power Ltd</u> Vrindavan, near IDBI Bank, civil Lines Raipur-492001, C.G. Tel: +91 771 4224000 Fax No: +91 771 4224010 Email: real@realispat.com Website: www.realispat.com	TMT bars of Gde Fe-500D	09 Mar 2026	
8.	M/S Steel Exchange India Ltd (AP) Brand: "SIMHADRI TMT"	<u>M/S Steel Exchange India Ltd (AP)</u> D.No:1-65/K/60, Plot No. 60 Abhis Hiranya, 1 st Floor, Kavuri Hills Hyderabad, Telangana-500081 Tel : 040-23403725 Fax : 040-23413267 E-Mail – info@seil.co.in	TMT bars of Gde Fe-500D, Fe-500D HSCRM	29 Jan 2026	

PARTICULAR SPECIFICATIONS**Appendix 'B-2'(Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

Ser No	Company Name	Address	Type of Steel	Valid Upto	Remarks
9.	M/S Super Smelters Ltd Kolkata Brand: " SUPER SHAKTI "	<u>M/S Super Smelters Ltd, Kolkata</u> Premlata, 39, Shakespeare Sarani, 3 rd Floor, Kolkata-700017 Tel/Fax: +91 -33-2289-2734/36 Email: info@supershakti.com Website:www.supershakti.com	TMT bars of Gde Fe-500D & Fe-550 (Sizes 8mm to 32mm)	13 Feb 2026	
10.	M/S Shyam Steel Industries Ltd. (WB) Brand: " SHYAM "	<u>M/S Shyam Steel Industries Ltd. (WB)</u> Shyam Towers EN-32, Sector-V, Salt Lake, Kolkata –700091 Tel – 033-40074007, Fax – 033-40074010 Email: marketing@shyamsteel.com Website: www.shyamsteel.com	TMT bars of Gde Fe-500D & CRS	30 Jan 2026	
11.	M/S Jai Balaji industries Ltd Brand: " BALAJI SKAKTI "	<u>M/S Jai Balaji industries Ltd</u> 5 Bentinck street, 1 st floor, Kolkata-700001 Ph Tel – 033-22489808/2222488173 Fax – 033-2243002/22107893/22426263 E-Mail : info@jaibalajigroup.com	TMT bars of Gde Fe-500D & Fe-500D CRS (Sizes 8mm to 32mm)	09 Feb 2026	
12.	M/S MSP Steels and Power Ltd, chhattisgarh Brand: " MSP TMT 500D "	<u>M/S MSP Steels and Power Ltd, chhattisgarh</u> 16/s, Block-A, New Alipore, Kolkata 700053 Tel/: +91 -33-40057777/2398 2239 Mob - 7381028976 Email: contactus@mbspsteel.com Website:www.mbspsteel.com	TMT bars of Gde Fe-500D (Sizes 8mm to 32mm)	10 Mar 2026	
13.	M/S SPS Steel Rolling Mills Ltd. (WB) Brand: " ELEGANT TMT "	<u>M/S SPS Steel Rolling Mills Ltd. (WB)</u> <u>Regd Office</u> "Diamond Heritage" 16, strand Road, Room No H523 A, 5 th Floor, Kolkata –700001 <u>Regd Office</u> "Diamond Prestige" 41A, A.J.C Bose Road, 8 th Floor, Room No 801, Kolkata –700017 Mob -9831055568/9830281273 Email: info@spsgroup.co.in	TMT bars of Gde Fe-500D	15 May 2027	
14.	M/S Sugna Metals Limited Brand: " SUGNA TMT "	<u>M/S Sugna Metals Limited</u> Plot No. 76, Vemireddy Enclave, Road No. 12, banjara Hills, Hydrabad-500034 (Telaangana) Tele-040 27664502/27663527 Email: info@sugnatmt.com	TMT bars of Gde Fe-500D (Sizes 8mm to 32mm)	12 Sep 2026	
15.	M/S Syhyam Metalics and energy Ltd Brand: " SEL TIGER "	<u>M/S Syhyam Metalics and energy Ltd</u> Viswakarma Building , North west b 1 st 2 nd & 3 rd Floor, 86 C, Topsia Road, Kolkata-700046 (WB) Tel: +91 -33-40113000 Fax: +91 -33-22852212 Website:www.shyammetalics.com	TMT bars of Gde Fe-550D with (Sizes 8mm to 32mm)	12 Sep 2026	
16.	M/s Jindal Steel and Power Ltd. Haryana Brand : ' JINDAL PANTHAR '	<u>M/s Jindal Steel and Power Ltd. Haryana</u> OP Jindal Road Hissar, Haryana, Pin -125005 Tele – +91-1662-222471/84, Fax – +91-1662-222476 Website : www.jindalsteelpower.com	TMT bars of Gde Fe-500, Fe-500D & Fe-550, Fe-550D & CRS with (Sizes 8mm to 40mm)	05 Nov 2027	

PARTICULAR SPECIFICATIONS**Appendix 'B-2'(Contd...)****LIST OF MAKES/ MANUFACTURERS OF EQUIPMENTS/ MATERIALS/ PRODUCTS**

Ser No	Company Name	Address	Type of Steel	Valid Upto	Remarks
(C) <u>STRUCTURAL STEEL</u>					
1.	Rashtriya Ispat Nigam Limited (RINL) Brand : 'RINL'	Visakhapatnam Steel Plant Visakhapatnam – 530 031, India, Tel : (91 891) 518226, 518376, Fax : (91 891) 518316 Email : cmdvsp@itpvis.ap.nic.in	Structural Steel (Angle, Beam, Column, Channel, Plate etc.)		
2.	Steel Authority of India Limited (SAIL) Brand : 'SAIL'	Central Marketing Organization Northern Region, 17 th Floor, Scope Minar, Laxmi Nagar Distt. Centre, Delhi – 110092	-- do --		
3.	Tata Iron & Steel Company (TISCO, or Tata Steel) Brand : 'TATA'	Bombay House, 2, 4 Homi Modi Street Mumbai – 400 001, India, Tele : (91 22) 204 9131, Fax : (91 22) 204 9522, 287 0840 Email : corpcomm@jsr.tatasteel.com (Br office for North : Jeevan Tara Bldg, Patel Chowk, New Delhi)	-- do --		
4.	M/s Jindal Steel and Power Ltd. Brand : 'JINDAL'	Jindal Centre, Plot No 2, Sector – 32, Gurgaon – 122001, Haryana, Tele – 0124 661 2000, Fax – 0124 661 2125, Website : www.jindalsteelpower.com	-- do --		

Note:-

1. Validity of certain manufacturers in the above list might have not been renewed. The names thereof has not been deleted from the list presuming that validity of such manufacturers has been extended. The contractor can procure the material from such manufacturer(s) only in case their approval is valid as on bid submission end date.

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**Appendix 'B-3'****LIST OF FLY ASH BRICKS MANUFACTURERS**

Ser No	Name of Manufacturers	Production Capacity	Correspondence Address
1	M/s GEE ESS Enterprises Bathinda (Pb)	10000 bricks per day	# 16697H, St No – 7, Basant Vihar, Bathinda – 151001 (Pb)
2	Singla Industries	10000 bricks per day	M/s Singla Industries, C/o Singla Rice Mil, Bathinda Road, Rampura Phul 0 151 103 (Pb)
3	Paras Construction	20000 to 25000 bricks per day	Vill – Saidpura, G T Road, Tehsil and Distt – Fategarh Sahib – 140406 (Pb)
4	Sachin Builders & Construction	30000 bricks per day	Sachin Prakash, 11, Aggar Nagar, Ext Ferozepur Road, Ludhiana-141012 (Pb)
5	Ramji Concrete	35400 bricks per day	Vill- Jhanjher, Landran, Chunni Road, Tehsil – Kharar, Mohali (Pb)
6	M/s MGM Infra Development Solution Pvt Ltd	80000 bricks per day	Office 74, Ward o-74, Gurudwara Road, Kharar Distt Mohalli (Pb)
7	SS Enterprises	10000 bricks per day	324, New Golden Anenue, Amritsar-143001
8	Ramjee Enterprises	10000 bricks per day	Ramjee Concrete Pvt Ltd Village Hjaanghari, Mohalli-140307
9	Royal Bricks	12000 bricks per day	Royal Birkcs, Industrial Vill Bigapur, Maler Kotla Road, Khanna, Pb
10	M/s KB Spun Pipes (Make KB)		M/s KB Spun Pipes, Ind Area, Defence Road, Vill-Chacheli, PO-Sujanpur, Pin-145023
11	M/s Mohindra Industries		M/s Mohindra Industries, Jammu Jalandhar Bypass, Near Military Hospital, Pathankot-145001
12	PJ (Bathinda)		

Note:- All fly ash bricks and AAC blocks should contain more than 40% fly ash by volume.

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**Appendix 'B-4'****VOC LIMITS FOR INTERIOR PAINTS/COATINGS, ADHESIVES AND SEALANTS**

Srl No.	Paint Application	Type	VOC limits (grams of VOC per litre)
1.	Interior Coatings	Flat Non-Flat	<50 <150
2.	Exterior Coatings	Flat Non-Flat	<200 <100
3.	Anti-Corrosive	Gloss/Semi-gloss/Flat	<250
Srl No.	Sealant Application	Type	VOC limits (grams of VOC per litre)
1.	Architectural/roadways	--	250
2.	Single-Ply roof material installation/repair	--	450
3.	Others	--	420
4.	Sealant Primer Applications architectural non-porous	--	250
5.	Sealant Primer Applications architectural porous	--	775
6.	Other sealant Primer Applications architectural	--	750
Srl No.	Architectural Adhesive Application	Type	VOC limits (grams of VOC per litre)
1.	Wood Flooring	--	100
2.	Industrial/Rubber Flooring	--	60
3.	Ceramic Tile	--	65
4.	Structural Glazing	--	100
5.	Multi-Purpose Construction	--	70
6.	Sub-Floor	--	50
7.	Wall boards/Panel	--	50
8.	PVC Welding	--	285
9.	Adhesive Primer for Plastic	--	250
10.	Structural Wood Member	--	140
11.	Sub-specific use metal to metal	--	30
12.	Wood	--	30
13.	Fibre Glass	--	80
14.	Plastic foams/porous materials (except wood)	--	50

(SIGNATURE OF CONTRACTOR)
DATED _____AAD (CONTRACTS)
FOR ACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**Appendix 'C'****SOURCES OF MATERIAL**

Ser No	MATERIAL	LOCAL NAMES/ SOURCE OF MATERIALS
1	2	3
1	Sand for plastering/ pointing and mortar for masonry.	Contractor shall arrange for any resources available with them. However the material should conform to SSR/ IS specifications
2	Sand for plain concrete, and coarse sand for reinforced concrete	-ditto-
3	Sand for filling under floor.	-ditto-
4	Coarse aggregate for plain and reinforced concrete.	-ditto-
5	Aggregate for soling and WBM	-ditto-
6	Hard Core	-ditto-
7	Aggregate for premix	-ditto-
8	Bricks/ Brick tiles	-ditto-

NOTE:- The source of materials shall be as given in Column 3 above or in vicinity thereof. The tenderer shall ascertain the actual position/exact location of source before submitting his tender. The contractor shall be deemed to have ascertain the location/actual position of the source whether actually be ascertained the availability and its distance from the site of work or not and no claim shall be entertained on this account for any reasons whatsoever and all taxes and all levies and royalty etc. shall be borne by the contractor.

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd.....)
MATERIALS AND THEIR TESTS (Contd.....)

NOTES:-

1. The materials listed hereinafter shall be tested as per the frequency indicated therein. Tenderer is deemed to cater for the under mentioned provisions in his quoted lump sum.
2. It is mandatory for the Contractor to set up his own Site Lab for all contracts of Rs 1 Crore and above. However the contractor may be permitted to set up site lab for the works costing less than Rs 1 Crore at his option.
3. Out of the level 'A' tests carried out in Contractor's own Site Lab, a percentage/ selected checks as decided by the Accepting Officer, shall be got done independently in the MES (CE/ CWE/ GE)/ Govt approved lab, the expenditure for which shall be borne by the department. The contractor shall be responsible for tests to be carried out in site lab established by him and for that they shall employ a competent technical representative as approved by the GE.
4. Level of testing shown under Col 6 as 'A', 'B', 'C' are defined as under:-

- Level 'A' :
- (a) "Site Lab" means own site lab established by Contractor at the work site for such tests. This lab shall house all the facilities including T&P, machinery, equipment, manpower etc. required for conducting tests. This lab shall be operative for the entire duration of the contract till its completion. Tests shall be carried out in the presence of Engineer-in-Charge.
 - (b) Records shall be maintained at work site. The successful test results shall be recorded and signed jointly by the Contractor and Engineer-in-Charge.
 - (c) Within 15 days of placement of work order No. 1, Site Lab shall be established and this fact alongwith the particulars of the technical representative of the Contractor responsible for the Site Lab, shall be reported by the Contractor to GE in writing who will verify the facts and satisfy himself of the facilities provided and the particulars of the technical representative of the Contractor. Thereafter, GE shall issue a certificate to this effect in writing listing out equipment, particulars etc. of each material test. Only after issue of this certificate by GE, the tests shall be carried out and materials so approved shall be incorporated in the work.
 - (d) Manpower, material and infrastructure like electricity, water etc. required for conducting these tests shall be provided by the Contractor.
 - (e) Remedial measures, if any, required to achieve/ obtain desired results for each test shall be taken promptly by the Contractor.
 - (f) In case during any point of time, Contractor fails to adhere to the laid down frequency of the tests due to non availability of the required facilities in his site lab, the tests shall be carried out in MES (CE/CWE/GE) Laboratories, in which case the testing charges as stipulated therein' shall be levied. However, in case the testing facilities are not available in MES (CE/CWE/GE) laboratories, the tests shall required to be conducted in Engineering Colleges or any other Government approved test house and the actual charges as levied by these test houses/labs shall have to be paid by the contractor without any extra cost to the department. Whether the testing facilities exist in Contractor's Site Lab, MES (CE/CWE/GE) Laboratories or not shall be decided by the GE, whose decision shall be final and binding. All facilities for tests including conveyance/labour etc. shall also be borne by the contractor without any extra cost to the department. No extension of time shall be admissible on this account.
 - (g) However, in case GE in his opinion considers that Contractor is purposely not adhering to the laid down frequencies of the tests, he shall reserve the right to deduct penal recovery which shall be double the rates of tests indicated in Appendix 'D'. However, besides effecting penal recovery for non-compliance of contractual testing frequency, for adhering to quality control norms of testing, simultaneously GE will get tests done from MES (CE/ CWE/ GE) Lab as per laid down frequency and necessary testing charges shall be recovered from running bills. In case facilities are not available to conduct test in MES (CE/ CWE/ GE) Lab, then GE will get them tested from any other source and necessary testing charges paid by GE shall be debited to the running payments of the Contractor. GE's decision shall be final and binding on recoveries.
 - (h) No charges shall be recovered from the Contractor for tests carried out in his Site Lab.
 - (i) 'A' level tests for the works costing upto 100 lakhs: - The contractor may set up site laboratory at his own option for works costing up to 100 Lakhs. The other stipulations will be same as above. However in case the contractor has not set up the site lab and tests are carried out in MES (CE/ CWE/ GE) or any other lab approved / setup by GE, the recovery shall be made at rates applicable i.e. as given herein after.

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd.....)
MATERIALS AND THEIR TESTS (Contd.....)

Level 'B' & 'C' : The Test charges mentioned under column 7 of Appendix 'D' are the charges to be paid by the contractors in case the tests are conducted in MES (CE/ CWE/ GE) laboratories. Wherever it is convenient to get 'B' level tests done at Govt. approved test houses/Engg colleges the same can be done at the cost of the contractor and no separate recovery shall be made by the Deptt for such tests. However, the tests required to be conducted in Engineering Colleges or any other Government approved test houses and the actual charges as levied by these test houses/ labs irrespective of the rates indicated shall have to be paid by the contractor without any extra cost to the department. The rates of 'C' level tests have been given for the purpose of recovery if these tests are done in MES lab (if facility available) or these are not done and non testing of 'C' level tests is accepted by the Accepting officer. Whether the testing facilities exist in MES (CE/ CWE/ GE) laboratories or not shall be decided by the GE, whose decision shall be final and binding. All facilities for tests including conveyance/labour etc. shall also be borne by the contractor without any extra cost to the department.

5 The recoveries on account of testing charges wherever applicable shall be effected from the RAR payments due to the contractor payable after completion of the respective tests or wherever the tests is due whichever is earlier.

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd....)
MATERIALS AND THEIR TESTS (Contd....)

Srl No	Materials	Name of tests						
1	Bricks	3 (i) Compressive Strength. (ii) Water Absorption. (iii) Efflorescence	4 IS : 3495 (Part-II) -do- IS-3495 (Part-I)	5 As per IS : 5454 as given under :- Lot size Sample size Permissible No. of defective bricks. 1001 to 10000 5 0 10001 to 35000 10 0 35001 to 50000 15 1				8 Checks for visual and dimensional characteristics shall also be carried out as per IS : 5454
2	Coarse aggregate	(i) Sieve analysis (ii) Flakiness Index (iii) Estimation of deleterious materials (iv) Organic impurities (v) Moisture Contents (vi) Specific gravity	IS : 2386 (Part-I) -do- IS-2386 (Part-I) -do- -do- (Part-II) -do- (Part-II) -do- (Part-II)	-do- One test for every 100 Cum of aggregate or part thereof brought to site. One test per source of supply Regularly as required. One test per each source of supply	'A' 'A' 'C' 'A' 'B'	90/- 120/- 120/- 120/- 120/-		
3	Fine Aggregate	(i) Sieve Analysis (ii) Test for clay, silt and impurities (iii) Specific Gravity (iv) Moisture Contents (v) Test for organic impurities (i) Setting time	IS: 2386 (Par I) -do- (Part-I) -do- (Part-II) -do- (Part-II) -do- (Part-II)	One test for every 15 Cum of fine aggregate or part when brought to site -do- One for each source of supply Regularly as required subject to two tests/day when being used One test for each source of supply Once for each consignment or as and when required	'A' 'A' 'B' 'A' 'C'	180/- 90/- 180/- 180/- 180/-		
4	Cement	(i) Soundness (ii) Compressive strength (iv) Fineness (v) Consistency Test	IS: 4031 - 63 affirmed 1980 -do- -do- -do- -do-	Once for each consignment or as and when required -do- -do- -do- -do-	'B' 'B' 'B' 'C'	180/- 120/- 360/- 120/- 140/-		

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd.....)
MATERIALS AND THEIR TESTS (Contd.....)

1	2	3	4	5	6	7	8
5	Structural Concrete (M-15 Grade & above).	(i) Slump test or compaction factor test or Vee-Bee time	IS : 1199	The minimum frequency of sampling of concrete of each grade shall be as under:-	'A'	180/-	Random sampling shall be carried out to cover all mix units.
		(ii) Compressive Strength	Qty of Concrete in the work IS : 516	No. of Samples 1-5 cum 6-15 cum 16-30 cum 31-50 cum 51 cum & above	'A'	120/-	As per IS:456 2000 clause 14 for frequency of sampling
6	(a) PCC block for walling (Hollow block)	(i) Compressive strength (ii) Water absorption (iii) Density	IS : 2156-1984 (Appx 'B') -do- (Appx 'E') -do- (Appx 'A')	8 block out of 14 3 block out of 14 3 blocks out of 14	'A' 'B' 'B'	60/- 120/- 90/-	Sample: 14 blocks from consignment of 5000 blocks or part thereof.
	(b) PCC solid block for walling	(i) Compressive strength (ii) Water absorption (iii) Density	IS : 2185 -do- -do-	12 blocks out of 18 3 block out of 18 3 blocks out of 18	'A' 'B' 'B'	60/- 120/- 120/-	Sample: 18 blocks from consignment of every 1000 blocks or part thereof. These blocks to be checked for dimension and weight.
7	Cement Flooring tiles/ Terrazo tiles	(i) Water absorption (ii) Wet transverse strength (iii) Resistance to wear	IS : 1237 (Appx 'D') IS : 1237 (Appx 'E') IS : 1237 (Appx 'F')	6 tiles out of 18 6 tiles out of 18 6 tiles out of 18	'B' 'B' 'C'	180/- 144/- 540/-	Sample of 18 tiles from each source of supply selected at random.
8	Burnt clay roofing tiles (Hand made) as per IS:2690 (Part-II) Length : 150-250 mm Width : 100-200 mm Thickness :35-50 mm	(i) Water absorption (ii) Compressive strength	IS : 3495 (Part-II) -do- (Part-I)	6 tiles out of 12 6 tiles out of 12	'B' 'A'	216/- 180/-	12 tiles from each source of supply selected at random

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd.....)
MATERIALS AND THEIR TESTS (Contd.....)

1	2	3	4	5	6	7	8																	
9	Mangalore Pattern roofing tiles	(i) Water absorption	IS : 654 (Appx 'A')	6 tiles out of 32	'B'	180/-	32 tiles from each Consignment of 3000 tiles or part thereof, These tiles shall be checked for dimension and weight.																	
		(ii) Breaking Load	-do- (Appx 'C')	6 tiles out of 32	'B'	120/-																		
10	Timber	(i) Specific gravity and weight	IS:1708	Minimum 3 samples from a lot of 4 Cu.m or 250 pieces of seasoned timber	'B'	120/-																		
		(ii) Moisture content	-do-	-do-	'A'	120/-																		
11.	Water for construction purposes	(i) Test for Acidity	IS:456 and 3015	Once at the stage of approval of source of water.	'B'	240/-	Also refer clause 4.3 of IS-456 and its subsequent sub clauses regarding suitability of water																	
		(ii) Test for Alkalinity	-do-	-do-	'B'	240/-																		
		(iii) Test for solid contents	-do-	-do-	'C'	300/-																		
12	Welding of steel work	Visual inspection test	IS-822 clause 7.1	100% by visual inspection	Work site	360/-	Specialised tests their method & frequency to be decided on consideration of their importance by the Accepting Officer.																	
13	Timber panelled and glazed door/ window and shutters including factory made shutters.	(a) Dimensions, sizes, workmanship and finish.	IS: 1003 (Part-1)	Frequency of sampling for each lot shall be as under :-	'A'	180/-																		
				<table border="1"> <thead> <tr> <th>Lot Size</th> <th>Sample Size</th> </tr> </thead> <tbody> <tr> <td>26 to 50</td> <td>5</td> </tr> <tr> <td>51 to 100</td> <td>8</td> </tr> <tr> <td>101 to 150</td> <td>13</td> </tr> <tr> <td>151 to 300</td> <td>20</td> </tr> <tr> <td>301 to 500</td> <td>32</td> </tr> <tr> <td>501 to 1000</td> <td>50</td> </tr> <tr> <td>1001 and above</td> <td>80</td> </tr> </tbody> </table>	Lot Size	Sample Size	26 to 50	5	51 to 100	8	101 to 150	13	151 to 300	20	301 to 500	32	501 to 1000	50	1001 and above	80				
Lot Size	Sample Size																							
26 to 50	5																							
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101 to 150	13																							
151 to 300	20																							
301 to 500	32																							
501 to 1000	50																							
1001 and above	80																							
		(b) <u>Strength Test</u>	IS:1303																					
		(i) Slamming	-do-	From each lot 5% of the factory made shutters shall be tested for strength tests.																				
		(ii) Impact indentation	-do-																					
		(iii) Shock resistance	-do-																					

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS (Contd....)
MATERIALS AND THEIR TESTS (Contd....)

1	2	3	4	5	6	7	8
14	Plywood(IS:303)	(a) Moisture Content	IS:1734 (Part-I)	Six test pieces cut from each of the boards selected as per table I shall be subjected to tests.	'C'	240/-	Sampling shall be as per IS-7835 ables.
15	Wood Particle Board (Medium density) IS:3097-	(a) Density (b) Moisture content	IS:2360 (Part-III)	Three test specimens from each sample (size 150 mm x 75 mm).	'A'	60/-	Sampling shall be as per IS: 3487 with moisture metre.
		(c) Water absorption	-do-(Part-16)	-do- but sample size 300 mm x 300 mm	'A' & 'B'	60/-	
		(d) AAD(Contracts)jelling due to surface absorption	-do-(Part-17)	-do- but sample size 125 mm x 100 mm	'A'	60/-	
		(e) AAD(Contracts)jelling in Water	-do-	-do- but sample size 200 mm x 100 mm	'A'	60/-	
		(f) Modulus of rupture	-do-(Part-4)	Three test specimens as per IS:2380-77	'B'	90/-	
		(g) Screw withdrawal strength	-do-(Part-4)	-do- as per IS:2385	'C'	120/-	

LEGEND

A - SITE LAB

B MES (CE/CWE/GE) LAB

C - GOVT APPROVED TEST HOUSES/ENGG COLLEGES

(Signature of contractor)
Dated: _____

AAD(CONTRACTS)
For Accepting Officer

LIST OF TESTS AVAILABLE IN COMMAND TEST LAB**CEMENT**

Ser No	Test	Sampling
1	Consistency	1. Each sample for testing consists of a mixture of approx equal proportions, selected from atleast 12 different positions (12 different bags). The final sample should weigh atleast 5 Kg for each test and be brought in an air tight container. 2. Shall enclose copy of manufacturer's Test Certificate showing batch No and date.
2	Initial and final setting time	
3	Soundness	
4	Compressive strength	
5	Air permeability	

CONCRETE

6	Flakiness and elongation index	10 Kg	
7	Impact value test	4 Kg	
8	Crushing value test	12 Kg	
9	Abrasion value test	15-30 Kg according to aggregate size	
10	Sieve analysis of fine aggregate	3 Kg	
11	Sieve analysis of coarse aggregate	15 Kg	
12	Compressive strength of concrete cubes	Minimum 9 cubes per test	Sample cube must be dated
13	Flexure strength of concrete beam	Minimum 3 beams per test	-do-
14	Specific gravity of coarse aggregate	10 Kg	
15	Specific gravity of fine aggregate	1 Kg	
16	Free moisture of fine and coarse aggregate	3-4 Kg	Sample must be conveyed in an airtight container to maintain humidity.

BRICKS

17	Water Absorption	Total 50 bricks	Shall be selected at random from the complete lot to be tested.
18	Compressive strength		
19	Density		
20	Efflorescence		

SOIL

21	Dry sieve analysis	10 Kg	
22	Wet sieve analysis	10 Kg	
23	Liquid Limit Test	1 Kg	
24	Plastic Limit Test	1 Kg	
25	Shrinkage Limit Test	2 Kg	
26	Direct Shear Test	1 Kg	
27	Unconfined Compression Test (Remoulded)	1 Kg	
28	Moisture content	8 Kg	Sample must be conveyed in an airtight container to maintain humidity.
29	Dry density	8 Kg	
30	California Bearing Ratio Test	8 Kg	
31	Permeability Test	1 Kg	
32	Standard Penetration Test	In situ	
33	Moisture Content Using Speedy Moisture Meter	1 Kg	
34	Soil Cone Penetration Test	1 Kg	
35	Specific Gravity Test	1 Kg	

BITUMEN

36	Ductility Test	1 Kg	
37	Penetration Test	1 Kg	
38	Softening Point Test	2 Kg	
39	Flash and Fire Point	5 Kg	
40	Bitumen Extraction	5 Kg mix as per given design	
41	Specific Gravity of Core	In situ	
42	Flakiness and elongation index	10 Kg	
43	Viscosity	1 Kg	

Non Destructive Testing Facilities

1	Strength of concrete using digital test hammer	Available	
2	Quality of concrete using Ultra sonic Pulse Velocity meter	Available	
3	Deflection of flexible pavement under moving loads using Benkelman beam	Available	
4	Micro Cover Meter (Rebar locator, Sizing and Cover Measurement)	Being procured	

(SIGNATURE OF CONTRACTOR)
DATED _____AAD (CONTRACTS)
FOR ACCEPTING OFFICER

CEMENT SUPPLY/ ACCEPTANCE REGISTER

1. CA No. & Name of work.
2. Control No *
3. Name of Manufacturer/Brand Name/Gde of Cement (a) Manufacture _____ (b) Brand _____ (c) Grade _____
4. Qty of cement & lot No/Week No (in Bags): (a) Qty _____ (b) Lot No/ Week No. _____
5. Manufacturer's test Certificate No. _____
6. Randon Test Details (a) _____ Physical test report from _____ vide their letter No. _____
 (b) _____ (Name of approval Lab/ Engg College)
 Chemical test report from _____ vide their letter No. _____
 (Name of approval Lab/ Engg College)

Sl No	Details	Physical requirements (As per IS 4031)									Chemical requirements (As per IS-4032)									
		Specific surface area (M ² /Kg)	Soundness by Le chatelliar	Soundness by Auto Clave	Initial setting Time (Minutes)	Final setting time (Minutes)	Compressive Strengths(Mpa)			Temp during testing °C	Standard Consistency (%)	Lime saturation Ratio	Alumina Iron Ratio (Ratio)	Insoluble residue (%)	Magnesium m (%)	Sulphuric Anhydride (%)	Loss on ignition (%)	Alkalis (%)	Chlorides (%)	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	AS per relevant IS																			
2	As per manufacture's test certificate																			
3	As per random test certificate																			

Remarks with Signature

Accepted/ Rejected

Contractor

Junior Engineer

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/ Inspecting Officer/ CWE
 *To be allotted serially by GE consignment wise

(Signature of contractor)
 Dated: _____

AAD(CONTRACTS)
 For Accepting Officer

STEEL SUPPLY/ACCEPTANCE FORM

1. CA No. & Name of work.
2. Control No
3. Name of Manufacturer's TC No.
4. Manufacturer
5. Randon Test details (a) Physical test report from _____ vide their letter No. _____
 (Name of approv Lab/ Engg College)
 (b) Chemical test report from _____ vide their letter No. _____
 (Name of approval Lab/ Engg College)
6. Types of steel, Dia & Qty (a) type : TMT/CRS (b) Dia _____mm (c) Actual Wt _____ MT (d) Conversion Wt _____ MT

Sl No.	Particulars	Chemical Test								Mechanical Test					Remark
		Carbon %	Sulphur%	Phosphorus%	Manganese %	Silicon%	Corrosion resistant element	Wt per Metre	Stress (N/mm ²) 0.2% proof	Tensile strength (N/mm ²)	Elongation %	Bend test	Rebend Test		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	AS per IS 1786														
2	As per manufacturer's test certificate														
3	As per independent test														

Remarks with Signature

Accepted/ Rejected

Contractor _____ Junior Engineer _____ Engineer-in-Charge _____ Garrison Engineer _____

Remarks of BOO/ Inspecting Officer/ CWE

(Signature of contractor)
Dated: _____

AAD(CONTRACTS)
For Accepting Officer

Comparison chart of Epoxy Repairs & Water Proofing Treatment Products

Ser No.	Water Proofing equivalent products	Fosroc	BASF	Asian Paints	Sika	Pidilite/ Dr. Fixit	Berger
1.	Crystalline waterproof coatings	Brushbond TGP	Masterseal 501	Smart care Crystalline	Sika 101H	Krystalline	HS Wall Shield 2K
2.	Quick setting/leak plugging, patching mortar	Renderoc plug	Masterseal 505	Smart care Insta leakstop	Sika Monotop 108 Water Plug IN	Instant plug	HS Leak Stop
3.	Polymer modified cementitious coating	Brushbond	Masterseal 550	Damp Block 2K	Sika top Seal 107	Pidifin 2k	HS latex Shield 2K
4.	Flexible, polymer modified cementitious coating	Brushbond RFX	Masterseal 551	-	Sika top Seal 109HI	-	HS ShalCem EWP
5.	High Elastomeric Flexible, Polymer modified cementitious coating	Brushbond Ultraflex	Masterseal 555	Smart care Damp Block 2K	Sika top Seal Plus IN	Fastflex	HS ShalCem EWP 150
6.	Potable & hygiene waterproof coating for water retaining structures, RCC & Masonry structures.	Brushbond Aquadprotect Nito Cote EP 405	-	Smart care TriBlock/Food grade Epoxy Smart care Apocrep Food Grade Epoxy coating	Sika top 107 Seal Plus IN Sika Gard 67	-	HS Epilux 78HBTL- 1mm thick
7.	Pitch Free PU based Liquid applied single component elastomeric waterproofing membrane.	Nitoproof 600 PF	Masterseal 635	SmartCare PU Magnum	Sikalastic HLM 5000R	Flexi PU 270I	HS PU Elastoseal non-UV 1K
8.	Polyurethane based Liquid applied two component elastomeric waterproofing membrane.	Nitoproof 650 PU	Masterseal M860	-	-	Superseal 500	HS PU Elastoseal non-UV 2K
9.	One-component cold-applied water based modified polyurethane hybrid elastomeric waterproof membrane.	BRISHBOND ROOF GUARD PREMIUM	-	Asian Smart Care PU AQUA	Sikalastic 590 IN	New coat Select	HS PU Roofcoat
10.	Two-Component, Spray Applied Hybrid Polyurea	Polyurea WH200	Masterseal M800	SmartCare Ultron/Hyperton	Sikalastic 851	Superseal 450 PUH	HS Ultraseal MP 500
11.	APP modified bitumen. Torch on membrane	Proofex Torchseal	Masterpren2003 / 2004M	Smart care APP Membrane	Sika APP Membrane	Torchshield	HS Proshield
12.	Self adhesive, SBS membrane	Proofex Self Adhesive	Masterpeal 725 SA	Smart care SBS Membrane	Sikabitt5270	Samsshield	HS Proshield SBS
13.	Loosley laid TPO Membrane	Proofex ORG	Masterpern TPO	Smart care TPO Membrane	Sarnafil	-	HS TPO RF BG/SP
14.	Acrylic Elastomeric membrane	Brushbond Roofguard	-	Smart care Damp Proof	-	Dr. Fixit Roof Select	HS Roof Guard/ Damp Stop Elasto
15.	Swelling, high performance, bar for joints	Supercast SW20	Masterflex 910	Smart care Waterbar	Sika Swell	Dr. Waterbar	HA Waterbar
16.	Swelling, high performance, paste for joints	Supercast SWX	Masterflex 912	-	Sika Swell S2	-	HS Waterbar paste
17.	SBR based Bonding agent	Nitobond SBR	Masteremaco	Smart Care Repair Polymer SBR	Sika latex SBR Power	Super URP	HS Advanced Latex Plus
18.	Plasticised expanding grout admixture	Cebex 100	Masterflow 160A	Smart care Injection grout Additive	Sika Injection 130	-	HS Super Grout Admix
19.	Cementitious Tile Grout	Nitorile Grout	Mastertile 15	Smart care Tilegrout	-	Fevimate TG	HS Tile Grout

Comparison chart of Epoxy Repairs & Water Proofing Treatment Products

Ser No.	Water Proofing equivalent products	Fosroc	BASF	Asian Paints	Sika	Pidilite/ Dr. Fixit	Berger
20	Efflorescence Treatment	Nito Cote SN 522			Sika Gard 700 SN		
21	Grout	NitoFill WS 60 (PU Foam)			Injection 101 IN		
22	Epoxy Grout	NitoFill UR 63			Sika Dub 53 UF		
23	Crack Seal	Nitoseal PU 40			Sika Flex 127		
24	Flooring	Nitoflor LITHURIN(M)			Sika floor Curehard 24		
25	Rust Remover	Reebakiens RR		Smart Care Apcorep Rustrem	Rustoff 100		
26	Anti Corrosive Coating	Nitozinc Primer		Smart Care Apcorep Rustcoat RB	Ferrogard 950 IN		
27	Reinforcement bars anchoring	Lokfix E77			Anchorfix 3030		
28	Epoxy Bonding Agent	Nitobond EP		Smart Care Apcorep Multi-Purpose Epoxy Compound	Sikadur 32 LP IN		
29	Non Shrink Microconcrete	Renderoc RG		Smart Care Microconcrete	SikaCrete 145 IN		
30	Fiber Reinforced Repair Mortars	Renderoc SP40		Smart Care Repair Mortar	Sika Mono Top-122 F		
31	Carbon Wrapping	Nitowrap CWS 300 GSM		Smart Care Apcorep Ultrawrap CF	SikaWrap 300 C IN		
32	Grout	Conbextra EP 10		Smart Care Apcorep Injection Grout LV	Sikadur 55 LP IN		
33	Anti Carbonation Coating	Dekguard E2000		Smart Care Apcorep Anti Carbonation Coating	Sikagard 551 Elastic Primer		
34	Integral WP compound protection plaster	Conplast WL_Xtra		Smart Care Vitalia Neo	SikaPlastocrete Plus		
35	Exterior Coating	Dekguard WB 300		Smart Care Apcorep IPN Coating	Sikagard 550W IN		
36	Epoxy Primer for carbon wrap	Nitowrap 30 epoxy primer		Smart Care Apcorep Ultrawrap Primer	Sikadur 330 IN		
37	Impregnation resin for carbon wrap	Nitowrap 410		Smart Care Apcorep Ultrawrap Saturant	Sikadur 331 IN		

LIST OF DRAWINGS

Se r No	Drawing No	Sh No	Date		Particulars
			Original	Revised	
1	2	3	4	5	6
1.	CEJZ/LOD-1938/25	01/01	10.10.25	-	List of drawings and General notes.
<u>SITE PLAN</u>					
2.	CEJZ/S-313/2025	01/03	10.10.25	-	Site plan Showing Ext B/R Services.
3.	CEJZ/S-313/2025	02/03	10.10.25	-	Site plan Showing Ext E/M & Light Layout Services.
4.	CEJZ/S-313/2025	03/03	10.10.25	-	Site plan Showing Ext W/S Services.
<u>16 MAJOR MD ACCN (G+4)</u>					
5.	CEJZ/WD-1938/2025	01/14	10.10.25	-	Ground Floor Plan.
6.	CEJZ/WD-1938/2025	02/14	10.10.25	-	First Floor Plan.
7.	CEJZ/WD-1938/2025	03/14	10.10.25	-	Typical Floor Plan (For Second Floor to Fourth Floor).
8.	CEJZ/WD-1938/2025	04/14	10.10.25	-	Typical Detail Plan of One Unit (First Floor to Fourth Floor).
9.	CEJZ/WD-1938/2025	05/14	10.10.25	-	Roof plan (Mumty Plan), Front elevation & Details of Glazing.
10.	CEJZ/WD-1938/2025	06/14	10.10.25	-	Mumty Roof, Overhead Water tank roof plan & Details of Toilets.
11.	CEJZ/WD-1938/2025	07/14	10.10.25	-	Left and Right side Elevation.
12.	CEJZ/WD-1938/2025	08/14	10.10.25	-	Section at X-X, section at Y-Y and Details of Staircase.
13.	CEJZ/WD-1938/2025	09/14	10.10.25	-	Kitchen and Kitchenette Details.
14.	CEJZ/WD-1938/2025	10/14	10.10.25	-	Miscellaneous Details.
15.	CEJZ/WD-1938/2025	11/14	10.10.25	-	Miscellaneous Details.
16.	CEJZ/WD-1938/2025	12/14	10.10.25	-	Details of sanitary & water supply (For Kitchen, Kitchenette and Toilets).
17.	CEJZ/WD-1938/2025	13/14	10.10.25	-	Water distribution diagrams.
18.	CEJZ/WD-1938/2025	14/14	10.10.25	-	Water distribution diagrams (Fresh Water).
19.	CEJZ/EM-1938/2025	01/03	10.10.25	-	Internal Electrification Plan (Ground Floor) as per GRIHA/NBC 2016 Norms.
20.	CEJZ/EM-1938/2025	02/03	10.10.25	-	Internal Electrification Plan (Typical Floor) as per GRIHA/NBC 2016 Norms.
21.	CEJZ/EM-1938/2025	03/03	10.10.25	-	Internal Electrification Plan (Mumty Floor) as per GRIHA/NBC 2016 Norms.
22.	CEJZ/SOF-1938/2025	01/01	10.10.25	-	Schedule of Finishes.
23.	CEJZ/SD-1938/2025	01/11	10.10.25	-	Structural General Notes
24.	CEJZ/SD-1938/2025	02/11	10.10.25	-	Structural General Notes.
25.	CEJZ/SD-1938/2025	03/11	10.10.25	-	Structural General Notes & Typical Details.
26.	CEJZ/SD-1938/2025	04/11	10.10.25	-	Layout of RCC columns and Raft footing Sections
27.	CEJZ/SD-1938/2025	05/11	10.10.25	-	Layout of Columns and footing & Schedule of Footing
28.	CEJZ/SD-1938/2025	06/11	10.10.25	-	Layout & Schedule of Plinth beams.
29.	CEJZ/SD-1938/2025	07/11	10.10.25	-	Layout & schedule of Ground Floor lintel beams and typical floor lintel beams.

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31.	CEJZ/SD-1938/2025	09/11	10.10.25	-	Layout, schedule of roof beams & slabs.
32.	CEJZ/SD-1938/2025	10/11	10.10.25	-	Layout, schedule of roof, Mumty roof beams & slabs.
33.	CEJZ/SD-1938/2025	11/11	10.10.25	-	Layout, schedule of Water tank beams & slabs, Details of Staircase and Miscellaneous details.
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34.	CEJZ/TD-91/2025	01/02	13.03.25	-	Architectural norms notes for schedule of finishes & details.
35.	CEJZ/TD-91/2025	02/02	13.03.25	-	Architectural norms notes for schedule of finishes & details.
36.	CEJZ/TD-92/2025	01/01	13.03.25	-	Fixing details of sliding door (UPVC).
37.	CEJZ/TD-93/2025	01R/03	13.03.25	-	Details of WPC doors.
38.	CEJZ/TD-93/2025	02R/03	13.03.25	-	Details of WPC doors.
39.	CEJZ/TD-93/2025	03R/03	13.03.25	-	Details of WPC doors.
40.	CEJZ/TD-94/2025	01R/01	13.03.25	-	Details of Aluminium doors.
41.	CEJZ/TD-95/2025	01R/01	13.03.25	-	Details of Aluminium doors (Sliding).
42.	CEJZ/TD-96/2025	01R/03	13.03.25	-	Details of Aluminium window & ventilator.
43.	CEJZ/TD-96/2025	02R/03	13.03.25	-	Details of Aluminium window & ventilator.
44.	CEJZ/TD-96/2025	03R/03	13.03.25	-	Details of Aluminium window & ventilator.
45.	CEJZ/TD-97/2025	01R/01	13.03.25	-	Details of fire retardant doors.
46.	CEJZ/TD-99/2025	01/01	13.03.25	-	Details of ramp, plinth protection, RCC chajja, steps.
47.	CEJZ/TD-100/2025	01/01	13.03.25	-	Details of stack system for five storied.
48.	CEJZ/TD-101/2025	01/02	13.03.25	-	Miscellaneous Details.
49.	CEJZ/TD-101/2025	02R/02	13.03.25	-	Miscellaneous Details.
50.	CEJZ/TD-102/2025	01R/01	13.03.25	-	Details of RWP, splash stone.
51.	CEJZ/TD-103/2025	01R/01	13.03.25	-	Typical Details of SS railing & MS railing.
52.	CEJZ/TD-104/2025	01/01	13.03.25	-	Details of ground sump.
53.	CEJZ/TD-105/2025	01R/01	13.03.25	-	Details of local sunk, gully trap & inspection chamber (First Manhole).
54.	CEJZ/TD-106/2025	01/01	13.03.25	-	Details of Lightning conductor & method of earthing.
55.	CEJZ/TD-107/2025	01R/01	13.03.25	-	Details of cattle trap.
56.	CEJZ/TD-48/11	1/1	20.05.11	-	Format For Numbering of Buildings.
57.	CEJZ/TD-109/2025	1/1	30.06.25	-	Typical details of open and covered drain
58.	CEJZ/TD-110/2025	1/1	30.06.25	-	Details of bituminous roads for traffic upto 5.0 MSA, road in BC soil, PCC road and pavement with inter locking tiles
59.	CEJZ/TD-113/2025	01/01	30.06.2025	-	Telescopic Drawers in kitchen
60.	CEJZ/TD-114/2025	01/01	30.06.2025	-	Typical Details of Crumple joint
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64.	CEJZ/STD-06/2000	1/1	25.05.00	15.06.02	Typical details of joints in hard standing & apron.
65.	CEJZ/STD-216/06	1/8	31.3.06	24.4.06	Seismic Provisions- Seismic strengthening measures in masonry buildings.
66.	CEJZ/STD-216/06	2/8	31.3.06	24.4.06	Seismic Provisions- Seismic strengthening measures in masonry buildings.
67.	CEJZ/STD-216/06	3/8	31.3.06	24.4.06	Seismic Provisions- Seismic strengthening measures in masonry buildings.
68.	CEJZ/STD-216/06	4/8	31.3.06	24.4.06	Seismic Provisions- Seismic strengthening measures in masonry buildings.
69.	CEJZ/STD-216/06	5/8	31.3.06	-	Seismic Provisions- Seismic strengthening measures in masonry buildings.
70.	CEJZ/STD-216/06	6/8	31.3.06	03.08.06	Seismic Provisions- Ductile detailing of reinforced concrete structure.
71.	CEJZ/STD-216/06	7/8	31.3.06	03.08.06	Seismic Provisions- Ductile detailing of reinforced concrete structure.
72.	CEJZ/STD-216/06	8/8	31.3.06	-	Seismic Provisions- Seismic strengthening measures in masonry buildings.
73.	CEJZ/STD-305/11	1/5	20.05.11	-	Steel gate 5000 to 7500 wide: Elevation, plan of gate.
74.	CEJZ/STD-305/11	2/5	20.05.11	-	Steel gate 5000 to 7500 wide: Details at 'A' & 'B'.
75.	CEJZ/STD-305/11	3/5	20.05.11	-	Steel gate 5000 to 7500 wide: Details of box, pintel hinge & hole for locking.
76.	CEJZ/STD-305/11	4/5	20.05.11	-	Steel gate 5000 to 7500 wide: Isometric view of gate closer, plan showing fixing of fencing, details of stopper, Ty detail of PCC coping, details of wheel track.
77.	CEJZ/STD-305/11	5/5	20.05.11	-	Steel gate 5000 to 7500 wide: X-section of footing, RCC pillars, details at 'A', section at A-A.
78.	CEJZ/STD-412/22	1/1	04.11.22	-	Security wall 2.1M high; foundation plan, elevation, sections, details and schedules
79.	CEJZ/STD-422/24	1/34	30.05.24	-	Typical R.C.C details (Materials).
80.	CEJZ/STD-422/24	2/34	30.05.24	-	Typical R.C.C details (Materials).
81.	CEJZ/STD-422/24	3/34	30.05.24	-	Typical R.C.C details (Formwork).
82.	CEJZ/STD-422/24	4/34	30.05.24	-	Typical R.C.C details (Reinforcement).
83.	CEJZ/STD-422/24	5/34	30.05.24	-	Typical R.C.C details (Reinforcement).
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85.	CEJZ/STD-422/24	7/34	30.05.24	-	Typical R.C.C details (Typical corner and intersection details, Typical details of footing).
86.	CEJZ/STD-422/24	8/34	30.05.24	-	Typical R.C.C details (Detail of slab).

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89.	CEJZ/STD-422/24	11/34	30.05.24	-	Typical R.C.C details (Detail of beams).
90.	CEJZ/STD-422/24	12/34	30.05.24	-	Typical R.C.C details (Detail of beams).
91.	CEJZ/STD-422/24	13/34	30.05.24	-	Typical R.C.C details (Detail of roof projection).
92.	CEJZ/STD-422/24	14/34	30.05.24	-	Typical R.C.C details (Detail of beams).
93.	CEJZ/STD-422/24	15/34	30.05.24	-	Typical R.C.C details (Detailing of beams).
94.	CEJZ/STD-422/24	16/34	30.05.24	-	Typical R.C.C details (Detailing : columns).
95.	CEJZ/STD-422/24	17/34	30.05.24	-	Typical R.C.C details: (Column reinforcement).
96.	CEJZ/STD-422/24	18/34	30.05.24	-	Typical R.C.C details.
97.	CEJZ/STD-422/24	19/34	30.05.24	-	Typical R.C.C details (Detail of working bench and desert cooler slab).
98.	CEJZ/STD-422/24	20/34	30.05.24	-	Typical R.C.C details (Detail of spout).
99.	CEJZ/STD-422/24	21/34	30.05.24	-	Typical R.C.C details (Concreting).
100.	CEJZ/STD-422/24	22/34	30.05.24	-	Typical R.C.C details (Ready mix concrete).
101.	CEJZ/STD-422/24	23/34	30.05.24	-	Typical R.C.C details (Schedule of lintels).
102.	CEJZ/STD-422/24	24/34	30.05.24	-	Typical R.C.C details (Schedule of RCC lintels, sections of chajja and lintel).
103.	CEJZ/STD-422/24	25/34	30.05.24	-	Typical R.C.C details (Details of staircase).
104.	CEJZ/STD-422/24	26/34	30.05.24	-	Typical R.C.C details (Details of staircase).
105.	CEJZ/STD-422/24	27/34	30.05.24	-	Typical RCC details (Details of staircase).
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108.	CEJZ/STD-422/24	30/34	30.05.24	-	Typical RCC details (Construction joint and fixing detail of aluminium cover to separation joint).
109.	CEJZ/STD-422/24	31/34	30.05.24	-	Typical RCC details (Cross section of construction joints in building members).
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Notes:-

1. Drg No. CEJZ/S-313/2025 sh No 01/03 and 03/03 referred at Srl No. 2 to 4 of this list is not being uploaded. The tenderer may refer the same from this HQ or from the office of CWE/ GE during working hours on any working day.

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

Annexure-II**YARD STICK**

NAME OF BUILDING : 16 MAJOR MD ACCN (G+4) with GRIHA 3 Star rating SRL ITEM NO. 1 OF SCHEDULE 'A' PART-I.

Srl No	Stage of Works	%age	Remarks
1.	Stage - 1 : Upto Plinth Lvl Surface dressing, excavation, RCC footings including steel reinforcement, form work, RCC M-30, PCC (1:4:8) as in Foundation, Column, Plinth Beam, brick work below PB, RCC Wall, Reinforcement, Form work & RCC M-30 upto Plinth level, return filling in foundation, & filling under floor complete upto plinth level including ATT.	17.50	
2.	Stage - 2: Ground Floor to First Floor Column's, RCC Wall & Lintel RCC M-30 Concrete and Formwork for Column upto roof & Lintel Beams.	2.80	
3.	Stage - 3 : First floor Beams, Slabs, Facia & Staircase RCC M-30 in Floor beams & Slabs including reinforcement, form work, complete.	5.50	
4.	Stage - 4 : First Floor to Second Floor Column's & Lintel RCC M-30 Concrete and Formwork for Column upto roof & Lintel Beams	2.90	
5.	Stage - 5 : Second floor Beam, Slabs, Fascia & Staircase RCC M-30 in Floor beams & Slabs including reinforcement, form work, complete.	4.80	
6.	Stage - 6 : Second Floor to Third Floor Column's & Lintel RCC M-30 Concrete and Formwork for Column upto roof & Lintel Beams.	2.90	
7.	Stage - 7 : Third floor Beam, Slabs, Facia, Staircase & Parapet RCC M-30 in Floor beams & Slabs including reinforcement, form work, complete.	5.00	
8.	Stage - 8 : Third Floor to Fourth Floor Column's & Lintel RCC M-30 Concrete and Formwork for Column upto roof & Lintel Beams.	2.90	
9.	Stage - 9 : Fourth floor Beams, Slabs, Fascia & Staircase RCC M-30 in Floor beams & Slabs including reinforcement, form work, complete.	5.00	
10.	Stage - 10 : Fourth Floor to Mumty Floor Column's & Lintel RCC M-30 Concrete and Formwork for Column upto roof & Lintel Beams.	2.90	
11.	Stage - 11 : Roof Beam & Slab RCC M-30 in Roof beams & Slabs including reinforcement, form work, complete.	4.20	
12.	Stage - 12 : Mumty Floor to Overhead water tank Column's & Lintel RCC M-30 Concrete And Formwork For Column upto Slabs including reinforcement, form work, complete.	0.80	
13.	Stage - 13 : Mumty Roof Beam & Slab RCC M-30 in Roof beams & Slabs including reinforcement, form work.	0.50	
14.	Stage - 14 : Overhead Tank RCC M-30 Concrete And Formwork For Column upto water tank top slab, RCC walls, beams & Slabs including reinforcement, form work, complete.	0.80	
15.	Stage -15 : All floor Masonry Work & RCC Shelf Fly Ash & AAC Block Brick Masonry, RCC M-30 Concrete and Formwork for Shelves, etc.	6.40	
16.	Stage - 16 : All Floor Plastering 8mm ready-mix cement plaster to internal surface of walls , 5mm thick in CM (1:3) on Ceiling & 15mm thick ready-mix cement plaster to external surface of wall Cement etc.,	3.70	
17.	Stage - 17 : All Floor White/Colour washing, Distempering, Painting etc. Painting Work For Internal, External, Ceiling Newly Plastered Surfaces.	2.50	

Annexure-II (Contd.../-)

Srl No	Stage of Works	%age	Remarks
18	Stage - 18 : All Joinery Work, Builder hardware, Cupboard etc. Pressed steel door frames, WPC Door frames & shutters, FRP frames & shutter, Steel Doors, uPVC/aluminium Windows, cupboard, Kitchen cabinet& drawers and Builder hardware etc.	11.00	
19	Stage - 19 : All floor ATT, Plinth Protection, Steps, Flooring, dado & Skirting ATT Treatment below floors, Plinth Protection, PCC Flooring sub base to floors, HDPE sheet, Kota Stone, Non-skid Ceramic/vitrified Tiles Flooring including skirting to floor, Glazed Ceramic Tiles dado Filling under floor, granite on cills, platform , marble on steps complete.	10.00	
20	Stage - 20 : All Floor Plumbing, Drain Sanitary etc. Sanitary Items & Fixtures, plumbing etc complete.	1.20	
21	Stage - 21 : Roof treatment, Rain water pipes Roof treatment including roof tiling, treatment to wet area & Rain water pipes.	1.00	
22	Stage - 22 : Site clearance & Misc. Items Site clearance & invisible grill, misc. items.	5.70	
	Total	100.00	

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD (CONTRACTS)
FOR ACCEPTING OFFICER

GENERAL CONDITIONS OF CONTRACTS (IAFW-2249: PRINT-1989)

FOR

LUMP SUM CONTRACTS (IAFW-2159)

A copy of the MES GENERAL CONDITIONS OF CONTRACTS (IAFW-2249: Print-1989) with Errata and Amendments has been supplied to me/us and is in my/our possession. I/We have read and understood the Provisions contained in the aforesaid GENERAL CONDITIONS OF CONTRACTS before submission of this tender and I/We agree that I/We shall abide by the terms and conditions thereof.

It is hereby further agreed and declared by me/us, that the MES General Conditions of Contracts (IAFW-2249: Print - 1989) including Condition 70 thereof pertaining to settlement of disputes by Arbitration containing 33 pages (Serial page Nos. 192 to 224) with errata 1 to 20 and Amendment Nos.1 to 49 (Serial page Nos. 225 to 241) form part of these tender documents.

(SIGNATURE OF CONTRACTOR)
DATED _____

AAD(CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE OF MINIMUM FAIR WAGES

It is hereby agreed that the "Schedule of Minimum Fair Wages" (SMFW) as published vide Government of India Notification dated 10 Mar 92 (Revised upto date), form part of these tender documents.

My/Our signature hereunder amounts to my/our having read and understood the provisions contained therein and I/We agree that I/We shall abide by the same and that aforesaid documents form part of this tender.

NOTE:- "Schedule of Minimum Fair Wages" referred to above is available for reference, in any MES Office at Jalandhar Cantt"

(SIGNATURE OF CONTRACTOR)
DATED_____

AAD(CONTRACTS)
FOR ACCEPTING OFFICER

GRIHA RATING

FEASIBILITY REPORT

PROVN OF 16 X MAJOR MD ACCN I AT FEROZEPUR MIL STN

Prepared By

I-NAT
STUDIO

Project Brief

Name	Provn of 16 X Major Md Accn At Ferozpur Mil Stn (Tender-1)
Location	Ferozpur
Typology	Residential
Site Area	10405.03 sqm (as per CAD-drawings)
Built-Up Area	3541.1 sqm (as per CAD-drawings)
Occupancy	80
Rating Type	GRIHA
Minimum Target Rating	3 - Star

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Introduction to Green Buildings

What is a green building?

Green building is a resource-efficient method of construction that produces healthier buildings which have less impact on the environment and cost less to maintain. These buildings are sited, designed, built, renovated and operated to energy efficient guidelines, and they have a positive environmental, economic and social impact over their life cycle. Benefits of green building:

The benefits of green buildings can be grouped into three categories environmental, social and economic.

I. Environmental:

- Reduces wastage of water and energy
- Reduces carbon emissions
- Helps in mitigating global warming
- Conserves natural resources

II. Social:

- Increases productivity of occupants
- Increases inclusiveness of differently abled persons
- Enhances quality of life

III. Economical:

- Lower operational costs
- Savings in electricity and water bills
- Increases asset value

Cost of going green:

It is a common misconception that green buildings are costlier than conventional buildings. If designed and implemented well, green buildings cost the same as any other building. Even if there is any added cost incurred, the payback period is usually around 3-4 years, after which, the lower operational costs only result in savings.

About GRIHA:

GRIHA is the National Rating System for Green buildings in India; it reflects Indian ethos, culture and context, coupled with sensible modern approaches and developments in the domain of built-environment. Furthermore, it helps promote and implement, through its

robust and transparent processes, our country's energy and environmental norms, standards, policies and programs for achieving sustainability in its buildings and habitats.

India, in its "INDIA'S INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC): WORKING TOWARDS CLIMATE JUSTICE" document submitted to the UNFCCC (United Nations Framework Convention on Climate Change), ahead of the crucial climate meet at Paris in December 2015 (COP21), has highlighted GRIHA, as country's own green building rating system and a significant strategy in the National Mission of Enhanced Energy Efficiency to reduce emission intensity of its GDP (Gross Domestic Product). Thus, making GRIHA an integral part of our nation's mitigation strategy for combating global warming and climate change.

About GRIHA:

GRIHA is a rating system that was introduced to align with the changing sustainability norms and technological advancements. The main goal of GRIHA is to evaluate the environmental performance and impact of buildings and provide a framework for adopting sustainable practices in the construction and operation of various types of buildings and habitats.

Key features of GRIHA include:

- **Categorization:** GRIHA offers ratings for various building types, such as commercial, institutional, residential, and healthcare, among others.
- **Evaluation Criteria:** GRIHA evaluates buildings based on a set of criteria, including site selection and planning, sustainable building materials, energy efficiency, water conservation, waste management, and occupant comfort, among others.
- **Points System:** The rating is awarded based on a point system, where buildings are rated on a scale of one to five stars. Higher points indicate a more sustainable and green building.
- **Adaptability:** GRIHA provides flexibility to builders and developers, allowing them to choose the specific green building features that are most suitable for their projects.
- **Energy Performance Index (EPI):** GRIHA uses an Energy Performance Index to assess the building's energy efficiency and performance.
- **Regional Priority:** The rating system also takes into account regional climatic conditions and priorities, encouraging the adoption of appropriate sustainable practices based on the location of the building.
- **It's important to note that sustainability standards and rating systems may undergo updates and revisions periodically to keep up with evolving best practices and technologies.**

Rating Structure:

GRIHA criteria cover the following subjects along with the rating thresholds:



Point Checklist

SR. NO.	CRITERION	APPLICABLE POINTS	ACHIEVABLE POINTS	
			YES	NO
1	Site selection	1	-	1
2	Low-impact design	4	2	2
3	Design to mitigate UHIE	2	2	-
4	Site imperviousness factor	1	1	-
5	Air and water pollution control	1	1	-
6	Preserve and protect landscape during construction	4	4	-
7	Construction management practices	4	4	-
8	Energy efficiency	11	6	5
9	Renewable energy utilization	7	7	-
10	Low ODP materials	-	-	-
11	Achieving indoor comfort requirements (visual/thermal/acoustic)	6	4	2
12	Maintaining good IAQ	2	2	-
13	Use of low-VOC paints and other compounds in building interiors	2	2	-
14	Use of low-flow fixtures and systems	4	4	-
15	Reducing landscape water demand	4	4	-
16	Water quality	2	2	-
17	On-site water reuse	5	2	3
18	Rainwater recharge	2	-	2
19	Utilization of BIS recommended waste materials in building structure	6	6	-
20	Reduction in embodied energy of building structure	4	2	-
21	Use of low-environmental impact materials in building interiors	4	4	2
22	Avoided post-construction landfill	4	4	-
23	Treat organic waste on site	-	-	-
24	Labour safety and sanitation	1	1	-
25	Design for universal accessibility	2	2	-
26	Dedicated facilities for service staff	2	2	-
27	Increase in environmental awareness	1	1	-
28	Smart metering and monitoring	8	-	8
29	Operation, maintenance protocols	-	-	-
31	Innovation	4	4	-
	TOTAL	94 + 4 (Bonus)	73	25

Total Percentile

77.65%

SECTION-I

Site Planning

Site selection is a crucial step in construction, impacting project success and efficiency. It requires careful consideration of factors for long-term profitability and compliance with local rules.

The intent of the first criterion is to ensure that the site meets the relevant masterplan/local development plans and the project site is a brownfield site OR a redevelopment project OR there should be at least 5 amenities such as Grocery store, pharmacy, Bank/ATM, Park, Restaurant, Community Centre, School, Gym, Metro Station/Public transit stop.

Second criterion is Low-Impact design which comprises the use of environmentally friendly and sustainable practises that endeavour to reduce the negative effects of construction activities on the surrounding ecosystem, community, and natural resources. These tactics are becoming increasingly relevant in today's world, as the construction industry is a major cause of environmental degradation and resource depletion.

Third criterion is Design to mitigate Urban Heat Island Effect, as cities around the world are facing the problem of the urban heat island impact as urbanisation continues to rise. This phenomenon causes a number of environmental and health challenges, including higher energy use, air pollution, heat-related ailments, and decreased general liability.

Fourth criterion refers to the Site Imperviousness factor which comprises designing for site imperviousness factor is a critical aspect of construction and urban planning. The imperviousness factor refers to the percentage of a site's surface area covered by non-permeable materials such as concrete, asphalt, roofs, and other structures. As this factor increases, the ability of the land to absorb rainfall and natural water runoff decreases, leading to various environmental and infrastructure challenges.

Criterion Number	Criterion Name	Maximum Points
Criterion 1	Site Selection	1
Criterion 2	Low-Impact Design	4
Criterion 3	Design to mitigate UHIE	2
Criterion 4	Site Imperviousness Factor	1

Criterion 1

Site Selection

Maximum points: 1
Applicable points: 1

Appraisal Requirement:

1.1.1 : The site plan must be in conformity with the development plan/master plan/UDPFI guidelines (mandatory). This should comply with the provisions of eco-sensitive zone regulations, coastal zone regulations, heritage areas (identified in the master plan or issued separately as specific guidelines), water body zones (in such zones, no construction is permitted in the water-spread and buffer belt of a 30-meter minimum around the FTL), various hazard-prone area regulations, and others if the site falls under any such area – **Mandatory**

Current Status: The project team has submitted the CAD Drawings of the project.

Recommendations: The project team shall ensure to submit area statements, PWD approved sanction drawings, environmental clearance letter, the Fire NOC which are required to fulfil the mandatory requirement of the criterion.

1.1.2 : The project site is a brownfield site OR a redevelopment project OR there are at least 5 services (from the list given below) within the campus or within 500m walking distance from main entrance of the project – **1 point**

Services: Grocery store, pharmacy, Bank/ATM, Park, Restaurant, Community Centre, School, Gym, Metro Station/Public transit stop.

Current Status: As per the location of the project, there are fewer than five services and amenities within 500 meters of the main entrance of the site.

Recommendations: None

Current point status:

Total	Yes	No
1	0	1

Criterion 2

Low-impact design

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

2.1.1 : Strategies which enable the project to factor in ways in which the natural site features (topographical/microclimatic) can be protected and/or incorporated into the project design.

No. of Strategies Adopted	Points
2	1
3	2
4	4

Current Status: The following strategies can be attempted in the project:

- **Strategy 1:** The orientation and facades of the building are designed to reduce direct insolation gain through fenestrations on unfavourable orientations.
- **Strategy 2:** The massing of the building indicates a net reduction in direct insolation on the walls and roof compared to the GRIHA base case.

Calculation of Insolation Reduction Due to the Massing of the Proposed Building					
Sr. No.	Month	Proposed Case	Base Case	Difference	% Reduction
1	January	1087	1571	484	30.81%
2	February	1255	1790	535	29.89%
3	March	1529	2170	641	29.54%
4	April	1674	2321	647	27.88%
5	May	1763	2406	643	26.72%
6	June	1757	2389	632	26.45%
7	July	1687	2281	594	26.04%
8	August	1654	2249	595	26.46%
9	September	1583	2202	619	28.11%
10	October	1385	1975	590	29.87%
11	November	1168	1673	505	30.19%
12	December	1062	1546	484	31.31%
TOTAL		17604	24573	6969	28.36%

Figure 1: Calculation of Insolation Reduction due to Massing of the Proposed Building

- **Strategy 3:** Building design has been done in a manner to not obstruct the solar access to the neighbouring buildings.
- **Strategy 4:** As per the National Building Code (NBC) of India 2016, the minimum Window to Floor Area Ratio (WFR) for residential buildings in a composite climate zone (such as Gurgaon) is 12.5%. The project achieves a WFR of **19.5%**, as demonstrated in the calculation below, thus meeting the required compliance with the standard.

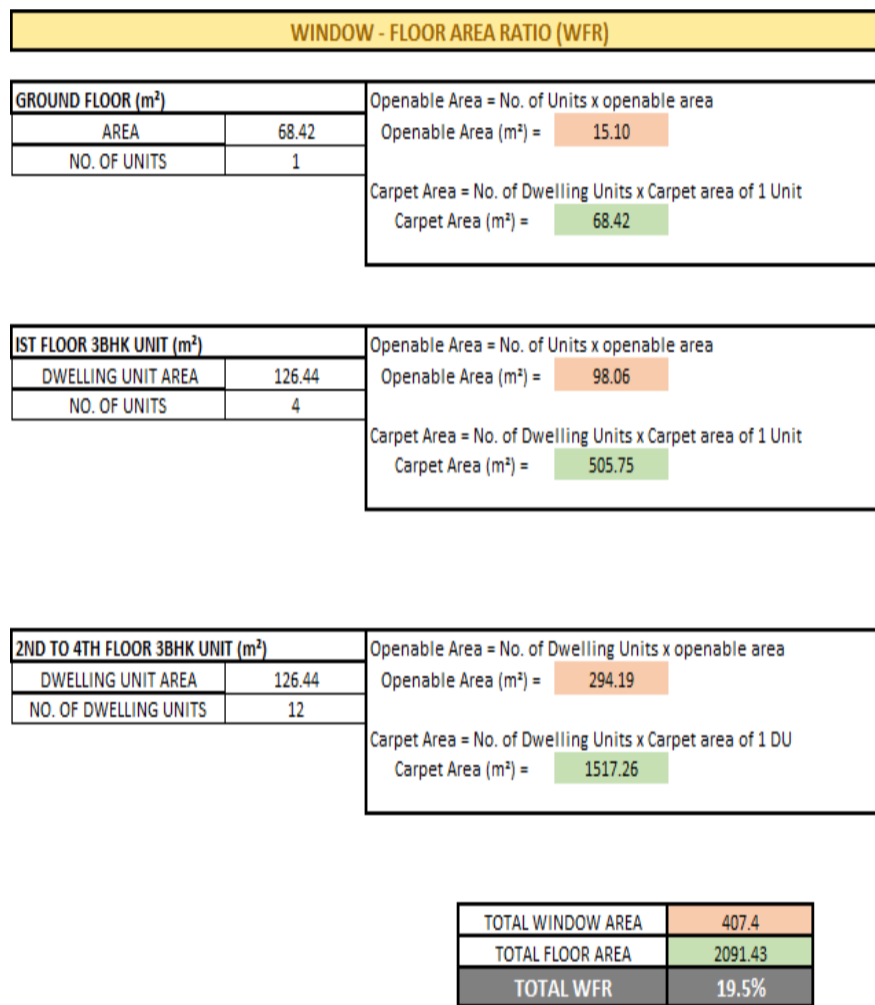


Figure 2: WFR Calculations

Recommendations: None

Current point status:

Total	Yes	No
4	2	2

Criterion 3

Design to mitigate UHIE

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

If the site surfaces visible to sky (including building roofs but not the landscape area) are either soft paved/covered with high SRI coating (SRI > 0.5)/shaded by trees/shaded by vegetated pergolas/shaded by solar panels or any combination of these strategies,

3.1.1 : More than 25% – 1 point

3.1.2 : More than 50% – 2 points

Current Status: As discussed with the project team, high SRI tiles shall be installed on the building's roof. However, detailed calculations to determine the actual reduction in UHIE will be conducted once the final design parameters are finalized.

Recommendations: For the project to achieve more than 50% reduction in UHIE, the project team should follow the recommendations given below:

- Plant native high foliage trees (neem, peepal, mango, banyan, shisham etc.) along both sides of the road and around building boundaries to increase shaded hard paved area.
- Use grass pavers for the pavements & parking areas.
- Use high SRI paint on roofs or roof shaded by solar panels wherever possible

CRITERION 3	
Site Area	10405.03
Landscape area (sq.m.)	4689.3
Net hard paved area	5715.73
Total area under :	
a. Total paved area shaded with trees (sq.m.)	1021.32
b. Grass paved area (sq.m.)	870.44
c. Paved area with SRI>0.5 (sq.m.)	0
d. Building roof area shaded by solar panels	300.00
e. Building roof area under High SRI finishes (sq.m.)	802.00
Total treated area (sq.m.)	2993.76
Percentage treated area (%)	52.4

Figure 3: UHIE Calculations

Current point status:

Total	Yes	No
2	2	0

Criterion 4

Site Imperviousness Factor

Maximum points: 1

Applicable points: 1

Appraisal Requirement:

4.1.1 : Net Imperviousness factor of site meets the NBC 2005 norms & the site is designed such that post-construction storm water discharge from the site is zero –**1 point**

Current Status: As per the drawings shared, a dedicated landscape area and cycle track has been planned. However, as the project is in its initial design stage, a detailed analysis could not be conducted.

Recommendation: To meet the requirement as per GRIHA, the project team should follow the recommendations listed below.

- Reduce paved surfaces by incorporating permeable paving, grass pavers, or porous concrete to enhance groundwater recharge.
- Increase softscape areas by increasing tree and shrubs areas, to reduce runoff and improve site permeability.
- Provide a rainwater storage tank to ensure that the post-construction storm water discharge from the site is zero.

Current point status:

Total	Yes	No
1	1	0

SECTION-II

Construction Management

This section focuses on the construction management, as construction management plays a critical role in the successful execution of construction projects. It involves planning, coordinating, and overseeing all aspects of a construction project from inception to completion. There are mainly four criteria in this section which mainly includes air and water pollution, preserve and protect landscape during construction, and Construction Management Practices.

First criterion of this section focuses on “Air and water pollution” as this is the major environmental concerns in the construction sector because of the different activities involved in developing infrastructure and structures. The building industry is critical to economic progress, but its environmental impact cannot be overlooked. Several aspects of construction contribute to air and water pollution, and understanding these challenges is necessary for effective mitigation techniques to be implemented.

Second criterion of this section on the “Preserve and protect landscape during construction” as preserving and protecting the landscape during construction is of utmost importance to maintain ecological balance, cultural heritage, and overall environmental health. Construction activities can have significant impacts on the natural surroundings, causing soil erosion, habitat destruction, and loss of biodiversity. Here are some key principles and practices that can help in preserving and protecting the landscape during construction.

Third criterion focus on “Construction Management Practices” as these are essential to the effective completion of building projects. They include a wide range of actions and strategies aimed at effectively planning, organising, and regulating all parts of a building project from start to finish. Construction management practises that are effective help to optimise resources, increase productivity, reduce hazards, and assure timely and cost-effective project delivery.

Criterion Number	Criterion Name	Maximum Points
Criterion 5	Air and Water Pollution	1
Criterion 6	Preserve and protect landscape during construction	4
Criterion 7	Construction Management Practices	4

Criterion 5

Air and water pollution control

Maximum points: 1

Applicable points: 1

Appraisal Requirement:

5.1.1 : Adopt at least 3 measures (from the list given with the first being mandatory) on site to curb air pollution during construction – **Mandatory**

- Provision of 3-meter-high barricading around the construction area - **Mandatory**
- Wheel washing facility at the vehicular entrance of the site
- Covering of fine aggregate and excavated earth on-site with plastic/geotextile sheets
- Water sprinkling on fine aggregate (sand) and excavated earth
- All diesel gensets on site to have proper chimneys with their outlet facing away from the site

Current Status: Construction has not yet started on the site. However, once the construction phase begins, the project team should implement at least three measures mentioned in the recommendations below.

Recommendations:

- It is mandatory to provide a 3m high permanent or temporary boundary around the construction site to control the air pollution.



Figure 4: A good example of 3-meter-high barricading using GI Sheets

- Wheel bath and aggregate bed should be provided on all vehicular entries/exits on site to reduce transfer of dirt and soil from the site.



Figure 5: A good example of a wheel washing facility at all entry and exit points of the site.

- All DG chimneys on site to be above stack height and facing away from the site. DG chimney stack height on site is should be above 2m and facing away from the site.



Figure 6: A good example of DG set with proper chimney stack height

- The fine aggregate material should be covered on site to control air pollution.



Figure 7: A good example of covered fine aggregates

- Water sprinkling to be done on excavated earth and fine aggregate to reduce air pollution.



Figure 8: A good example of water sprinkling of excavated earth during construction using STP treated water

5.1.2 : Develop and implement a spill prevention plan (to control effects of spill from hazardous materials like bitumen, diesel, etc.) on site – 1 point

Current Status: Construction on site has not yet started, hence we suggest the project team to follow the below recommendations.

Recommendations: The hazardous chemical drums should be kept on an impervious surface to prevent soil pollution in case of any spillage as seen in the example image below:



Figure 9: A good example of hazardous chemical drums stored on an impervious surface in an enclosed area on site.

Current point status:

Total	Yes	No
1	1	0

Criterion 6

Preserve and protect landscape during construction

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

6.1.1 : Ensure that no existing mature tree is cut on site OR transplant mature trees within the site and ensure they survive OR Plant 3 trees for every 1 tree cut of the same native/naturalized species OR any combination of these for all mature trees on site –

Mandatory

Current Status: As per the discussions with the site team, there are a few pre-existing trees on site. The project team has decided to preserve all pre-existing trees. However, a site survey plan to verify the location and number of pre-existing trees is required.

In case, any trees are being cut, a tree-cutting permission letter from the relevant state authority is required. In addition, the project team must plant three trees for every one tree cut.

Recommendations: The project team is advised to plant native species of trees to minimize landscape water demand and preserve the area's natural vegetation.

The preserved existing trees shall be properly barricaded on site to ensure their survival post construction.



Figure 10: Good examples of barricading existing trees on site.

6.1.2 : Increase total number of trees on site by 25% above the pre-construction phase OR Plant 4 trees for every 1 tree cut of the same native/naturalized species – **2 points**

Current Status: As discussed with the project team, the final landscape design parameters are yet to be finalized. The project team shall follow the recommendations below.

Recommendations: It is recommended that the project team increase the number of trees by 25% above the existing no. of trees and/or plant 4 trees for every 1 tree cut.

6.1.3 : Preserve top soil during construction, maintain its fertility (during construction phase) and use for landscape post-construction – **2 points**

Current Status: Construction on site has not yet started, hence we suggest the project team to follow strategies recommended below.

Recommendations:

- It is recommended that the project team preserve topsoil on-site during construction. The topsoil should be stacked to a maximum height of 400 mm and mulched to maintain its fertility.
- The preserved topsoil shall be reused for landscaping purposes in the project after construction is completed.
- The project team shall submit a soil fertility test report.



Figure 11: A good example of top soil preservation on a site.

Current point status:

Total	Yes	No
4	4	0

Criterion 7

Construction Management Practices

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

7.1.1 : Adopt staging practice during construction on site – **1 point**

Current Status: As construction is yet to start on site, the project team is recommended to follow the below mentioned strategies.

Recommendations: Staging of construction materials shall be done for the project and followed such that each construction material is stacked and stored at their designated place. The project team is advised to submit a site staging/ construction management plan and site photos indicating the same.

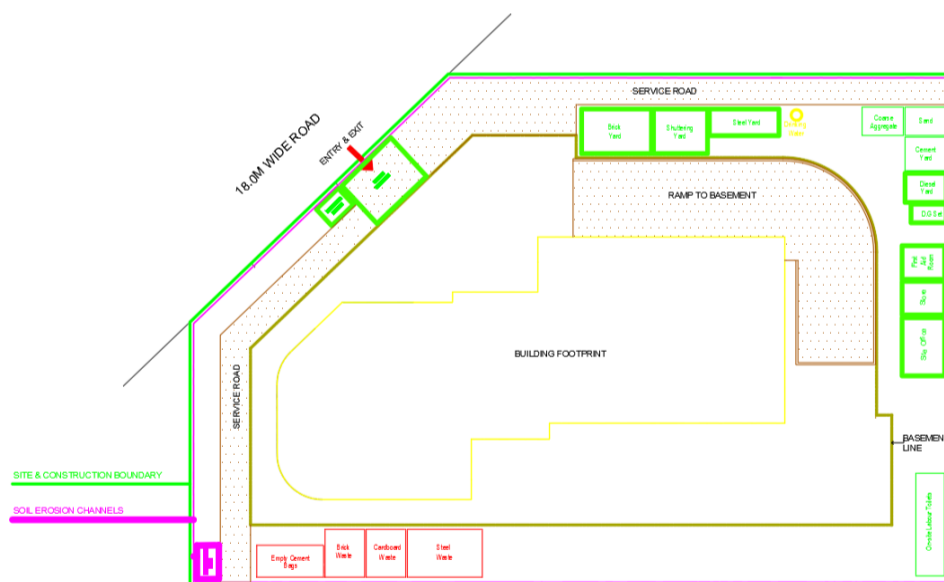


Figure 12: An example of a Construction Management Plan highlighting the location of construction materials.

7.1.2 : Adopt strategies to prevent/reduce movement of soil (not top soil) outside the site through adoption of various strategies (like soil erosion channels, sedimentation control etc.) – **1 point**

Current Status: Construction has not yet started on the site.

Recommendations: Soil erosion channels and sedimentation tanks should be constructed in order to manage the storm water discharge on site.

Good examples are provided below for the project team’s reference.



Figure 13: Soil erosion channel with gravel belt



Figure 14: Sedimentation tank connected via soil erosion channel

7.1.3 : Adopt strategies (at least 3 from the list below) to manage water during construction – 1 point

- Using gunny bags for curing and using ponding for curing
- Monitoring to avoid leaks and water wastage
- Use of additives to reduce water requirements during curing
- Use of treated waste water/captured storm water

Current Status: As the project is in its initial stages of design, the project team is recommended to follow the strategies recommended below.

Recommendations: The project team is advised to implement the below strategies to meet the GRIHA requirement:

- Use of hessian cloth and ponding technique for curing.
- Use of water reducing admixture – such as Conplast and FOSROC Auramix
- Use of treated STP water for sprinkling or dust suppression in the project – team is requested to share documentation proof of the same such as water tanker log book or challans.

7.1.4 : A construction waste management plan for segregation of construction waste, its safe storage and on-site/off-site recycling is developed and implemented in the project – 1 point

Current Status: Construction has not started on the site yet.

Recommendations: Construction waste management plan shall be made for the project such that all the waste materials are stored in their dedicated place as seen in the example below.

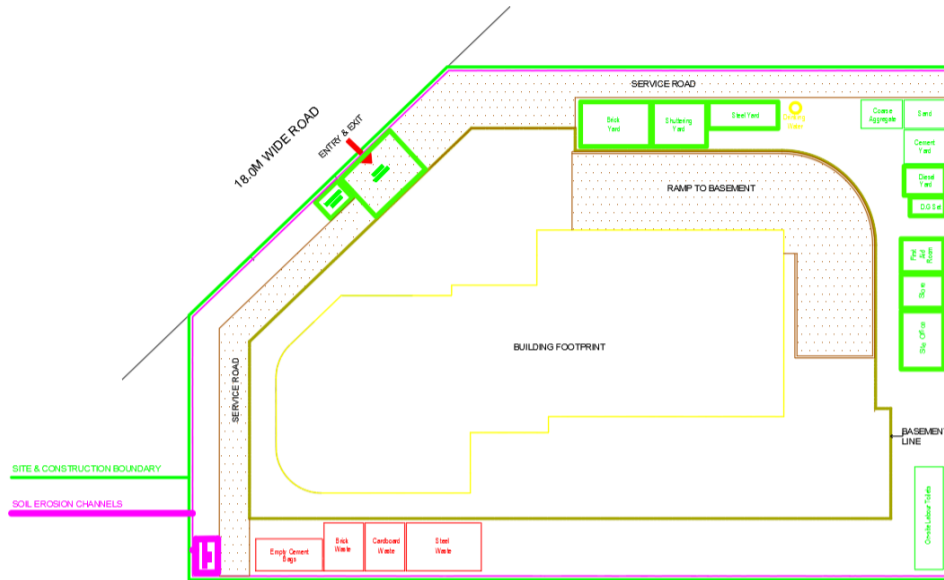


Figure 15: An example of a Construction Management Plan highlighting the location of construction waste materials.

Current point status:

Total	Yes	No
4	4	0

SECTION-III

Energy

As chlorofluorocarbons (CFCs) and hydro chlorofluorocarbons (HCFCs). Energy in buildings is a crucial aspect of modern architecture and construction. As the world faces environmental challenges and increasing energy demands, the need for sustainable and energy-efficient buildings becomes more pronounced. The concept of energy in buildings encompasses various factors, including energy consumption, conservation, renewable energy integration, and overall environmental impact.

First criterion of this section focuses on the energy efficiency in building design and construction is an important part of achieving sustainable development and lowering the environmental effect of human activities. Buildings take a lot of energy to heat, cool, light, and run various systems, making them one of the biggest contributors to greenhouse gas emissions and resource depletion. Improving energy efficiency in buildings is critical not only for addressing climate change, but also for lowering operational costs.

Second criterion of this section focuses on the “Renewable energy utilization” as the use of renewable energy in buildings is becoming an increasingly essential part of sustainable development and climate change mitigation. Buildings consume a lot of energy and release a lot of greenhouse gases, but they also have a lot of potential for incorporating renewable energy sources in order to reduce their environmental effect.

Third criterion encourages the use of Zero ODP materials, also known as zero ozone depletion potential materials, play a crucial role in promoting sustainable and environmentally-friendly practices in the construction industry, particularly in building insulation, HVAC (Heating, Ventilation, and Air Conditioning), and refrigeration systems and halon free fire extinguisher. These materials are designed to minimize or eliminate the emission of substances that contribute to ozone depletion.

Criterion Number	Criterion Name	Maximum Points
Criterion 8	Energy Efficiency	13
Criterion 9	Renewable Energy Utilisation	7
Criterion 10	Zero ODP Materials	0

Criterion 8

Energy efficiency

Maximum points: 13

Applicable points: 11

Appraisal Requirement:

8.1.1 : The project meets the mandatory requirements of ECBC & all fans must be BEE star rated - **Mandatory**

Current Status: The following details were specified in the documents provided by the project team:

- A 200 kVA oil type transformer has been proposed.

Reference: Ext Elect Supply DCS

- A DG Set with a capacity of 58.5 kVA has been proposed.

Reference: DG Set DCS

Recommendations: The project must mandatorily comply with ECBC requirements. To achieve compliance, the following measures must be implemented:

- Structural assembly specifications - use AAC blocks for the internal and external walls, and roof insulation, such as extruded polystyrene over deck insulation.
- Glass specifications – use of glass with the SHGC of less than 0.44 and VLT >40%.
- Air Conditioning Specifications - the proposed air conditioning system should have a COP of at least 3.0 for VRV or split ACs and a COP of 5.4 for chillers.
- Use min BEE 3-Star rated equipment such as ceiling fans, geysers, ACs and pumps.
- Use IE2 or IE3 rated motors in the project.
- Use of energy efficient LED light fixtures
- Use of an astronomical timer for the exterior lighting of the project.

8.1.2 : Peak heat gain through building envelope (for each AC building individually) should meet the GRIHA Building Envelope Peak Heat Gain Factor thresholds - **2 points**

Non-applicability: Appraisal 8.1.2 is applicable only for AC buildings (non-residential).

Current Status: The project team will be claiming non-applicability for this appraisal as it is a residential project.

Recommendations: None

8.1.3 : 100% of outdoor lighting fixtures (lamps + lamp housing) meet the luminous efficacy requirements of GRIHA – **1 point**

Current Status: As per the documents provided by the project team, external lights with a luminous efficacy of more than 100 lumens/watt have been proposed in the project.

Reference: Ext Elect Supply DCS

Recommendations: The project shall ensure that 100% of the outdoor lighting fixtures shall meet the luminous efficacy requirements (lamp + lamp housing) of GRIHA (at least 75lumens/watt).

8.1.4 & 8.1.5: Demonstrate (through simulations) that project EPI is below GRIHA benchmark. Points are awarded as per the table below:

Reduction from EPI benchmark	Points
1%	Mandatory
10%	2
20%	3
30%	5
40%	7
50%	10

Current Status: As per the information provided by the project team, the initial calculations show a **32.83%** reduction in EPI from the GRIHA benchmark.

Recommendations: The team is advised to adhere to the wall, roof, and glass specifications as recommended in appraisal 8.1.1 to achieve a higher EPI reduction from the GRIHA base case.

Current point status:

Total	Yes	No
11	6	5

Criterion 9

Renewable Energy Utilization

Maximum points: 7

Applicable points: 7

Appraisal Requirement:

9.1.1 : On-site/Off-site renewable energy system installation to offset a part of the annual energy consumption of internal artificial lighting and HVAC systems.

Daytime Commercial/ Institutional Buildings	Residential Buildings	24 X 7 occupied buildings	Points
2.5% (only On-site)	-	0.5% (only On-site)	Mandatory
5%	5%	1%	1
10%	10%	3%	2
15%	15%	5%	4
20%	20%	7%	5
25%	25%	10%	7

Current Status: As per the documents provided by the project team, there is no information available regarding the installation of a renewable energy system in the project. However, the initial calculations show that the project can avail all 7 points in this criterion by following the recommendations mentioned

Recommendations: It is recommended to install a solar PV system with a capacity of **30kWp** to earn all 7 points in this criterion.

Energy Offset Calculation	
Project EPI	70 kWh/m ² /year
32.83% reduction achieved	47.019 kWh/m ² /year
Built up area	3451.10 m ²
Energy consumption	162267.27 kWh
Solar Polycrystalline capacity	30 kWp
Energy consumption offset by renewable sources	27.73%

Figure 16: Renewable energy offset calculation

Current point status:

Total	Yes	No
7	7	0

Criterion 10

Low ODP materials – Mandatory

Maximum points: 0

Applicable points: 0

Appraisal Requirement:

10.1.1 All the insulation used in building should be CFCs and HCFCs free – **Mandatory**

Current Status: As the project is in its initial stages of design, the project team is recommended to follow the below strategies.

Recommendations: It is recommended to use CFCs and HCFCs free insulation such as Nitrile rubber to meet the GRIHA mandatory requirement.

The project team can select products from the GRIHA product catalogue or can consult with the green building consultants before selection.

10.1.2 All the refrigerant in the HVAC and refrigeration equipment should be CFCs free – **Mandatory**

Current Status: As the project is in its initial stages of design, the project team is recommended to follow the below strategies.

Recommendations: The refrigerant in the HVAC and refrigeration equipment should be CFCs free to meet the GRIHA requirement.

10.1.3 The fire suppression systems and fire extinguishers installed in the building are free of Halon – **Mandatory**

Current Status: As per the documents provided by the project team, the following types of extinguishers are proposed for the project:

- Foam Type
- Carbon Dioxide Type
- Powder Type

Reference: Fire Fight DCS

All the proposed extinguishers are halon-free and meet the GRIHA requirements.

Recommendations: None

Current point status:

Total	Yes	No
0	0	0

SECTION-IV

Occupant comfort and Well Being

Occupant comfort and well-being are critical characteristics of the built environment, comprising a variety of factors that have a direct impact on the physical, psychological, and emotional condition of people in a space. Whether in a residential, business, or institutional context, guaranteeing tenant comfort and well-being is critical for encouraging productivity, health, and overall pleasure. This section consists of the three criterions.

First criterion of this section focuses on Achieving indoor comfort requirements (visual/thermal/acoustic), Occupant comfort and well-being are critical characteristics of the built environment, comprising a variety of factors that have a direct impact on the physical, psychological, and emotional condition of people in a space. Whether in a residential, business, or institutional context, guaranteeing tenant comfort and well-being is critical for encouraging productivity, health, and overall pleasure.

Second Criterion of this section talks about the indoor air quality, achieving indoor comfort requirements, encompassing visual, thermal, and acoustic aspects, is essential for creating a conducive and pleasant environment for occupants. When designing and managing indoor spaces, it's crucial to consider these factors to enhance well-being, productivity, and overall satisfaction.

Third criterion of this section consists of use of low-VOC paints and other compounds in building interiors, low-VOC (volatile organic compound) paints and other chemicals have grown increasingly popular and vital in building interiors over the years due to their possible health and environmental benefits. VOCs are compounds that, at room temperature, easily evaporate into the air and contribute to air pollution and poor indoor air quality. Traditional paints and building materials frequently include high quantities of VOCs, which when inhaled can cause a variety of health concerns.

Criterion Number	Criterion Name	Maximum Points
Criterion 11	Achieving Indoor Comfort Requirements	6
Criterion 12	Maintaining Good IAQ	4
Criterion 13	Use of low-VOC paints and other compounds in building requirements	2

Criterion 11

Achieving indoor comfort requirements (visual/ thermal/ acoustic)

Maximum points: 6

Applicable points: 6

Appraisal Requirement:

11.1.1 : The WWR and SRR to not exceed 60% & 5% respectively and all the fenestrations must meet the SHGC requirement of ECBC-2007 - **Mandatory**

The project should meet adequate level of daylight (daylight factors) as per the below mentioned table:

Percentage of area getting daylight	Points
25%	Mandatory
50%	2 points
75%	4 points

Current Status: The initial calculations based on the floor plans provided by the project team show that the achieved WWR is less than 40%.

As per the initial assessment of the floor plans provided by the project team, over 43% of the living area meets GRIHA requirements for adequate daylighting.

Recommendations: None

11.1.2 : Artificial lighting design to fall within limits (lower and higher range limits) as recommended space/task specific lighting levels as per NBC and to meet a minimum uniformity ratio of 0.4 – **Mandatory**

Current Status: Since the project is in its initial design stage, the artificial lighting plan is yet to be prepared.

Recommendations: The project team shall ensure that all lighting fixtures are energy-efficient, and the artificial lighting design shall fall within the recommended limits (both lower and upper range limits) for space/task-specific lighting levels as per NBC/GRIHA, while also meeting a minimum uniformity ratio of 0.4.

11.1.3 : Demonstrate that project can achieve the thermal comfort requirements of NBC 2005 OR ASHRAE 55 OR requirement of the Indian Adaptive Comfort – **Mandatory**

Current Status: The project team should follow the strategies recommended below.

Recommendations: The project team shall ensure that the materials used in the building comply with the specifications mentioned in Appraisal 8.1.1.

11.1.4 : The indoor noise levels should be within the acceptable limits as specified in NBC 2005
- 2 points

Current Status: The project team should follow the strategies recommended below.

Recommendation: The project team shall ensure that indoor noise levels meet the acceptable limits as per NBC 2005. All DG sets should be equipped with acoustic enclosures to limit the noise they emit.

Current point status:

Total	Yes	No
6	4	2

Criterion 12

Maintaining good IAQ

Maximum points: 4

Applicable points: 2

Appraisal Requirement:

12.1.1 : Meet the minimum requirements of

- CPCB National Ambient Air Quality Standard (NAAQS) for quality of fresh air; and
- ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or an NBC-2005 for quantity of fresh air – **2 points**

The clause shall cover treatment of outdoor air for predominantly PM 10 and PM 2.5

Non-applicability: Appraisal 12.1.1 is not applicable for non-AC spaces/residential spaces with operable windows

Current Status: This point is non-applicable for this project as the project is a residential building with operable windows.

Recommendations: None

12.1.2 : Monitoring the CO₂, temperature and Relative Humidity (RH) at the occupied spaces or at AHUs for the air-conditioned spaces – **2 points**

Current Status: As the project is in its initial stages of design, the project team is recommended to follow the below strategies.

Recommendations: The project team shall install Indoor Air Quality (IAQ) monitors to track CO₂ levels, PM_{2.5}, PM₁₀, TVOC levels, as well as temperature and relative humidity in regularly occupied spaces.

Current point status:

Total	Yes	No
2	2	0

Criterion 13

Use of low-VOC paints and other compounds in building interiors

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

13.1.1 : Ensure that all interior paints are low-VOC *(as mentioned in the GRIHA manual) and lead-free – **1 point**

Current Status: No details have been provided regarding the interior paints.

Recommendations: The project shall use interior paints that are low-VOC and lead free.

Paint applications	VOC limits (grams of VOC per litre)	
Interior coatings	Flat	<50
	Non-flat	<150
Exterior coatings	Flat	<200
	Non-flat	<100
Anti corrosive	Gloss/ semi gloss/ flat	<250

Table 1: Limits for low-VOC content in interior paints.

13.1.2 : Ensure that all adhesives and sealants used shall be low-VOC *& that interior composite wood-products do not use urea-formaldehyde as a bonding resin –**1 point**

Current Status: No details have been provided regarding this.

Recommendations: All adhesives and sealants shall have low VOC content, and interior composite wood products should be free of urea formaldehyde.

Sealant Application	VOC Content limit (grams of VOC per litre)
Architectural/roadways	250
Single-ply roof material installation/repair	450
Others	420
Sealant Primer applications architectural non-porous	250
Sealant Primer applications architectural porous	775
Other sealant primer applications architectural	750

Table 2: Limits for low-VOC content in sealants used in interior applications

Architectural adhesive application	VOC content limit (g of VOC/litre)
Wood Flooring	100
Industrial/rubber flooring	60
Ceramic tile	65
Structural glazing	100
Multi-purpose construction	70
Sub-floor	50
Wall boards/panel	50
PVC welding	285
Adhesive primer for plastic	250
Structural wood member	140
Sub-specific use metal to metal	30
Wood	30
Fibre glass	80
Plastic foams/porous materials (except wood)	50

Table 3: Limits for low-VOC content in adhesives used in interiors.

Current point status:

Total	Yes	No
2	2	0

Section-V

WATER

Water consumption in buildings is an important part of sustainable design and resource management. Efficient water use improves the environment while also lowering utility bills and increasing overall water availability in the long run. This section comprises of five criteria.

First criterion of this section focuses on the use of low flow fixtures and systems as these are essential in sustainable building design and water conservation efforts, as they reduce water consumption without compromising functionality or user experience. These fixtures optimize water usage without compromising functionality.

Second criterion of this section refers to reduce landscape water demand it is an important part of environmentally responsible urban planning and sustainable architecture. As water scarcity and climate change become more important worldwide challenges, optimising water usage in landscaping is critical to conserving this precious resource and minimising its impact on the ecosystem.

Third criterion of this section talks about the water quality in treated sewage as it is important part of environmental and public health protection. As human populations continue to grow and urbanise, the need for freshwater rises, inevitably resulting in wastewater creation. Sewage treatment is crucial for preventing water contamination and maintaining the ecological equilibrium.

Fourth criterion focuses on the on-site water reuse, also known as Water recycling is a sustainable management approach that treats and reuses water on-site, reducing freshwater resource strain and pollution, allowing for non-potable applications and reducing pollution.

Fifth criterion focuses on Rainwater recharge on-site involves capturing and directing rainwater to be stored and naturally filtered on-site, conserving water, mitigating storm water runoff, and replenishing groundwater resources.

Criterion Number	Criterion Name	Maximum Points
Criterion 14	Use of low-flow fixtures and systems	4
Criterion 15	Reducing Landscape Water Demand	4
Criterion 16	Water Quality	2
Criterion 17	On-Site Water Reuse	5
Criterion 18	Rainwater Recharge	2

Criterion 14

Use of low-flow fixtures and systems

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

14.1.1 : Reduce water demand from the GRIHA base case through selection of low-flow fixtures. The points are awarded as per the table below:

Reduction in Water Demand	Points
30%	Mandatory
50%	2
70%	4

Non-applicability: All faucets, which are installed in spaces with water head heights less than 5m/17feet, in a gravity fed systems (without pressure reduction) are exempt from calculations in this criterion.

Current Status: The project team shall follow the strategies recommended below.

Recommendations: The project team shall incorporate the below strategies;

- Use of low-flush toilets, dual-flush adaptors, and low-flow flush valves.
- STP-treated water should be used for flushing and landscape irrigation.
- Aerators can be added to taps.
- The project team can achieve the desired reduction in water demand by using plumbing fixtures that have been mentioned below.

Fixture	Recommended Flow Rates (lpm/lpf)
Water Closets	3/6
Kitchen Faucets	4
Lavatory Faucets	4
Showers	6

Table 4: Recommended flow rates to reduce water demand by 50%

Fixture	Recommended Flow Rates (lpm/lpf)
Water Closets	2/4
Kitchen Faucets	2
Lavatory Faucets	2
Showers	4

Table 5: Recommended flow rates to reduce water demand by 70%

Residential				
Design case for				
Building occupancy		Male	40	
		Female	40	
		Total	80	
Working days			365	
	Fixtures	Flow rates (lpf/lpm)	No. of uses	Water Consumption (l)
1	Water Closets (solids)	6	1	480
2	Kitchen Faucets	4	3	960
3	Water Closets (liquid)	3	5	1200
4	Shower	6	5	2400
5	Lavatory faucets	4	3	960
Daily water consumption (l)				6000.00
Annual water consumption (l)				2190000
Base case				
Building occupancy		80		
Working days			365	
	Fixtures	Flow rates (lpf/lpm)	No. of uses *	Water Consumption (l)
1	Water Closets (solids)	9	1	720
2	Kitchen Faucets	10	3	2400
3	Water Closets (liquid)	9	5	3600
4	Shower	10	5	4000
5	Lavatory faucets	10	3	2400
Daily water consumption (l)				13120
Annual water consumption (l)				4788800
Water use reduction (%) =	54.27	[Annual water demand (Base case) - Annual water demand (design case) / Annual water demand (Base case)] *100		

Figure 17: Calculations showing Water use reduction by following recommendations of Table 4

Residential				
Building occupancy			Male	40
			Female	40
			Total	80
Working days			365	
	Fixtures	Flow rates (lpm/lpf)	No. of uses	Water Consumption (l)
1	Water Closets (solids)	4	1	320
2	Kitchen Faucets	2	3	480
3	Water Closets (liquid)	2	5	800
4	Shower	4	5	1600
5	Lavatory faucets	2	3	480
Daily water consumption (l)				3680.00
Annual water consumption (l)				1343200

Base case				
Building occupancy			80	
Working days			365	
	Fixtures	Flow rates (lpm/lpf)	No. of uses *	Water Consumption (l)
1	Water Closets (solids)	9	1	720
2	Kitchen Faucets	10	3	2400
3	Water Closets (liquid)	9	5	3600
4	Shower	10	5	4000
5	Lavatory faucets	10	3	2400
Daily water consumption (l)				13120
Annual water consumption (l)				4788800

Water use reduction (%) =	71.95	$[(\text{Annual water demand (Base case)} - \text{Annual water demand (design case)}) / \text{Annual water demand (Base case)}] * 100$
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Figure 18: Calculations showing Water use reduction by following recommendations of Table 5

Current point status:

Total	Yes	No
4	2	2

Criterion 15

Reducing landscape water demand

Maximum points: 4
Applicable points: 4

Appraisal Requirement:

15.1.1 : Reduce landscape water demand from the GRIHA base case. The points are awarded as per the table below:

Reduction in Water Demand	Points
30%	1
40%	2
50%	4

Current Status: As seen from the drawings provided by the project team a landscape area has been proposed.

Recommendations: To gain points, the project team shall follow the recommendations given below:

- Sprinkler irrigation should be provided for lawns, and drip irrigation should be used for trees and shrubs to reduce landscape water demand.
- The team shall plant native species of trees and shrubs in order to reduce landscape water demand.
- Plant a greater number of high-foliage trees and shrubs.

Design case monthly water requirement		
S.No.	Month	Total water requirement
1	January	66,387
2	February	75,010
3	March	238,086
4	April	167,910
5	May	180,338
6	June	187,557
7	July	175,411
8	August	359,734
9	September	212,539
10	October	32,515
11	November	15,033
12	December	13,339
Total Annual Water requirement		1,723,858

Base case monthly water requirement		
S.No.	Month	Total water requirement
1	January	144,527
2	February	163,301
3	March	518,328
4	April	365,549
5	May	392,607
6	June	408,322
7	July	381,879
8	August	783,163
9	September	462,710
10	October	70,787
11	November	32,729
12	December	29,039
Total Annual Water requirement		3,752,941

Water use reduction (%) =	54.07	[Annual Irrigation water requirement (Base case - design case) / Base case]*100
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Figure 19: Calculations Showing Landscape Water Requirement for Design Case

Current point status:

Total	Yes	No
4	4	0

Criterion 16

Water Quality

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

16.1.1 : Water used for various purposes like drinking, irrigation etc. shall conform to the BIS standards - **Mandatory**

Current Status: As per the documents provided, the project team states that the groundwater table at the project location is high hence rainwater harvesting is not required.

Reference: Ext Water Supply DCS

Recommendations: It is recommended that the project team ensure all water used for drinking, irrigation, and other purposes complies with Bureau of Indian Standards (BIS) specifications. The project team shall ensure regular quality assessments for drinking water and STP outlet water are conducted through NABL-certified laboratories, with the test reports submitted during the final certification process.

16.1.2 : The STP installed on site meets the CPCB norms – **2 points**

Non-applicability: If the total waste water generated on site is less than 10kLD, then the project is exempt from appraisal 16.1.2 and 17.1.1.

Current Status: As the project is in its initial stages of design, the project team is recommended to follow the below strategies.

Recommendations: The project team should ensure that the Sewage Treatment Plant (STP) installed on-site complies with CPCB norms. The treated water can be reused for flushing and landscaping purposes, while the solid waste can be converted into compost or manure for use in the landscape areas.

Current point status:

Total	Yes	No
2	2	0

Criterion 18

Rainwater Recharge

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

18.1.1 : Recharge of surplus rainwater into aquifer (through appropriate filtration measures) – **2 points**

Current Status: As per the documents provided, the project team states that the groundwater table at the project location is high; therefore, rainwater harvesting is not required.

Reference: BDPG5-6 40

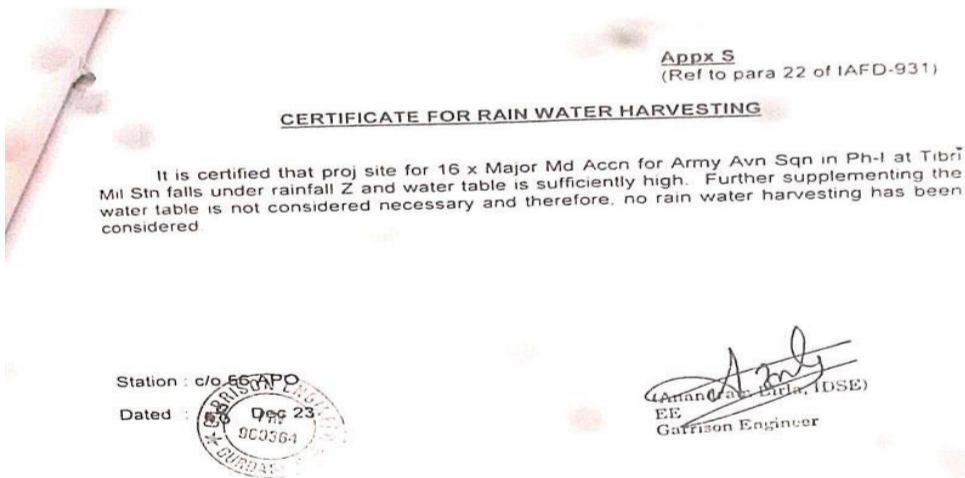


Figure 21: Reference BDPG5-6 40

Recommendations: To claim non-applicability for Criterion 18, the project team must conduct pre- and post-monsoon groundwater tests as per CGWB norms for the site. The test results should confirm that groundwater recharge measures are not required under CGWB regulations.

Current point status:

Total	Yes	No
2	0	2

Section-VI

Sustainable Buildings Materials

This section contains three criteria mainly focusing on the use of the sustainable building materials, it plays an essential role in the construction industry's efforts to lessen its environmental effect and encourage more environmentally friendly practises. These materials are intended to be resource and energy-efficient, as well as environmentally responsible, throughout their entire life cycle, from extraction or creation to disposal or recycling.

First criterion of this section focuses on the Utilization of BIS recommended waste materials in building structure, it recommends using waste materials in building structures for sustainable, environmentally friendly solutions, reducing waste generation, reducing natural resources, and lowering the construction industry's carbon footprint.

Second criterion of this section focuses on the Reduction in embodied energy of building structure, building structure embodied energy reduction is an essential aspect of sustainable architecture and construction. The entire energy consumed throughout the extraction, processing, manufacture, transportation, and assembly of building materials and components is referred to as embodied energy. It has a substantial impact on the total environmental impact and carbon footprint of a building.

Third criterion of this section focuses on the Use of low-environmental impact materials in building interiors, the materials used in building interiors may possess a big impact on environmental sustainability. We can reduce negative consequences such as resource depletion, greenhouse gas emissions, and waste generation by choosing low-impact materials.

Criterion Number	Criterion Name	Maximum Points
Criterion 19	Utilisation of BIS recommended waste materials in buildings	6
Criterion 20	Reduction in embodied energy of building structure	4
Criterion 21	Use of low-environmental impact materials in building interiors	4

Criterion 19

Utilization of BIS recommended waste materials in building structure.

Maximum points: 6

Applicable points: 6

Appraisal Requirement:

19.1.1 Minimum 15% replacement of Ordinary Portland Cement with fly ash* by weight of cement used in structural concrete – **1 point**

If replacement is more than 25% - **2 points**

Current Status: Construction has not been started as of yet. The project team shall follow the recommendations mentioned below.

Recommendations: It is recommended that the project team replace 25% of OPC with fly ash by weight used in structural concrete to earn 2 points.

19.1.2 Minimum 40% composition of building blocks/bricks by fly ash* by volume, for 100% load bearing and non-load bearing masonry walls – **2 points**

Current Status: Construction has not been started as of yet. The project team shall follow the recommendations mentioned below.

Recommendations: It is recommended that the project team ensure that AAC blocks/bricks used in the project contain at least 40% fly ash by volume.

19.1.3 Certify minimum 15% replacement of Ordinary Portland cement with fly ash* in plaster/masonry mortar – **1 point**

If replacement is more than 25% - **2 points**

Current Status: Construction has not been started as of yet. The project team shall follow the recommendations mentioned below.

Recommendations: It is recommended that the project team replace 25% of OPC with fly ash by weight in plaster/masonry mortar to earn 2 points.

Current point status:

Total	Yes	No
6	6	0

Criterion 20

Reduce embodied energy

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

20.1.1 : Reduction in combined embodied energy of load-bearing structure and masonry walls by at

Reduction in Embodied Energy	Points
10%	1
20%	2
30%	4

Current Status: Construction has not started on the site yet. The project team shall ensure to follow the strategies recommended below.

Recommendations: The project team should ensure the following:

- Use AAC blocks in all the external and internal walls of the project.
- Use mechanical couplers for reinforcement lapping

Current point status:

Total	Yes	No
4	2	2

Criterion 21

Use of low-environmental impact materials in building interiors

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

21.1.1 : All materials (calculated by surface area) used for building interiors* meets the GRIHA criterion low-impact material requirements

Reduction in Surface Area as Low Impact Material	Points
25%	1
50%	2
75%	4

Following materials will be accepted as low-environmental impact:

- Stones from India
- Composite wood-based products
- FSC Chain of Custody certified products
- Manufactured products with at least 5% recycled content
- Products with EPD (cradle to gate) analyzed and published as per ISO 14025 / ISO 21930
- Products with water footprint (cradle to gate) analyzed and published as per ISO 14046

**False ceilings/internal partitions/paneling/in-built furniture/flooring/internal door & window panels & frames*

Current Status: As per the documents provided by the project team following materials have been proposed in the project:

Flooring:

- Vitrified Tiles
- Ceramic Tiles

Dado/Skirting:

- Vitrified Tiles
- Ceramic Tiles

Joinery (Doors/Windows):

- Second Class Hardwood Door Frames

- Factory Made Paneled Door Shutters
- First Class Hardwood Window Frames

However, information regarding the low energy parameter of the products is not available.

Recommendations: It is recommended that the project team ensure the use of at least 75% of all interior furnishing materials with low environmental impact. The project team should submit technical specifications for the interior finishes, including the percentage of recycled content in the selected materials.

The project team shall ensure that proposed doors are PF bonded and provide tech sheets of the same. In addition, the project team shall ensure that the proposed tiles contain at least 5% recycled content.

The team can select the products from the GRIHA product catalogue or consult the Green Building consultant of the project before selection.

Current point status

Total	Yes	No
4	4	0

Section-VII

Solid Waste Management

This section consists of two criteria, building solid waste management is essential for ensuring environmental sustainability and public health. With increased urbanisation and population density, managing solid waste in buildings becomes increasingly more important in order to minimise pollution, conserve resources, and maintain a healthy living environment. Waste reduction, recycling, correct disposal, and resource recovery are all part of effective waste management techniques in buildings.

First criterion of this section talks about the post-construction landfill, it is a crucial aspect of sustainable building practices and environmental responsibility. It refers to the efforts made to minimize or eliminate the amount of waste sent to landfills after a building has been constructed and occupied.

The second criteria of this section focus on the treat organic waste on site, organic waste treatment on-site is an environmentally friendly and sustainable practise that has gained traction in recent years. Organic waste includes any biodegradable substance that can decay naturally, such as food scraps, yard trimmings, agricultural residues, and sewage sludge.

Criterion Number	Criterion Name	Maximum Points
Criterion 22	Avoided Post-Construction Landfill	4
Criterion 23	Treat Organic Waste on Site	2

Criterion 22

Avoided post-construction landfill

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

22.1.1 : Provide infrastructure (multi-colored dustbins/different garbage chutes) to building occupants to ensure segregation of waste at source.

Current Status: As the project is its initial design stages, no details regarding the waste segregation have been provided.

Recommendations:

The project team shall follow a multi-step waste management plan:

- Step 1 – Waste segregation at source (multi-colored dustbins)
- Step 2 – Site level waste segregation – dry waste and wet waste bins
- Step 3 – Inorganic waste (Paper, Plastic, Glass and Medical Waste bins) to be segregated and sent for recycling or incineration as required.

22.1.2 : Provide dedicated, segregated and hygienic storage spaces in the project site to store different wastes before treatment /recycling

Current Status: There is no information regarding this available.

Recommendations: The project team shall provide a dedicated, segregated and hygienic storage space on site to store different waste before treatment/recycling.

22.1.3 : Provide contractual tie-ups with waste recyclers for the safe recycling for recyclable wastes like metal, paper, plastic, glass, etc.

Current Status: As the project is still in its initial stages, the contractual tie-ups have not yet been finalized.

Recommendations: Post -occupancy, the project team shall establish contractual agreements with certified waste recyclers to ensure the safe and responsible recycling of materials such as paper, metal, plastic, glass, and medical waste.

Current point status:

Total	Yes	No
4	4	0

Criterion 23

Treat organic waste on site

Maximum points: 2
Applicable points: 0

Appraisal Requirement:

23.1.1 Implement strategies to treat all organic (kitchen and landscape) waste on-site and to convert it into a resource (manure, biogas etc.) - **2 points**

Non-Applicability: If the total waste generation on site is less than 100kg/day, then the project is exempt from this criterion.

Current Status: As per the initial calculations, the project generates less than **100 kg/day** of organic waste; hence, the project team will seek non-applicability for this criterion.

Recommendations: None

Residential Refuse		
CALCULATIONS FOR ORGANIC WASTE MANAGEMENT (REQUIRED)	KG/capita/DAY	Source
WASTE GENERATION NORMS {0.6kg/capita/day}	0.6	as per NBC
OCCUPANCY	80	
ORGANIC WASTE GENERATED (kg/Day) - 40% OF TOTAL WASTE GENERATED	19.20	as per NBC

LANDSCAPE WASTE GENERATED		
Considerdering the higher value of leaf litter quantity	132	gm/sqm/year
Total organic waste generated from landscape (kg/year)	396.66	kg/year
Landscape waste generated (kg per day)	1.1	kg/day

Total organic waste generated from the building (kg/day)	20.29
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Figure 22: Organic Waste Generated in the Project

Current point status:

Total	Yes	No
0	0	0

Section-VIII

Socio-Economic Strategies

Socio-economic strategies on construction sites balance economic growth, social welfare, and environmental sustainability, ensuring positive impacts on communities and workforce. This section consists of four criteria.

First criterion focuses on the labour safety and sanitation as these are vital aspects of maintaining a healthy and productive work environment. They encompass a range of practices and regulations aimed at safeguarding the well-being of workers, preventing accidents, and promoting overall hygiene in workplaces.

Second criterion of this section talks about the Design for the universal accessibility, it is a concept promoting inclusivity and independence for all, regardless of age, skills, or impairments. It benefits seniors, children, and those with temporary injuries, ensuring no one is excluded or faces difficulties.

Third criterion of this section talks about the dedicated facilities for the service staff, buildings with dedicated facilities for service staff play a vital part in improving the overall efficiency, productivity, and well-being of the building's workforce. Janitors, maintenance people, security guards, concierges, and other key service providers who maintain the building's seamless operation and upkeep are examples of service staff. Dedicated facilities for these service personnel not only indicate a commitment to their comfort and safety, but also improves the level of services they can provide.

Fourth criterion of this section focuses on to increase in environmental awareness, this shift in approach can be associated to an increasing awareness of the significant environmental impact of buildings, including their contribution to greenhouse gas emissions, energy consumption, water usage, and trash generation. As a result, architects, engineers, developers, and customers have been collaborating to include sustainable practises into building design, construction, and operation.

Criterion Number	Criterion Name	Maximum Points
Criterion 24	Labour Safety and Sanitation	1
Criterion 25	Design for Universal Accessibility	2
Criterion 26	Dedicated Facility for Service Staff	2
Criterion 27	Increase in Environmental Awareness	1

Criterion 24

Labour safety and sanitation

Maximum points: 1

Applicable points: 1

Appraisal Requirement:

24.1.1 : Ensure compliance with the NBC (2005) safety norms for providing the necessary safety equipment and measures for construction workers – **Mandatory**

Current Status: As the project is still in its initial stages of design, the project team must follow the recommendations mentioned below during the construction phase.

Recommendations: The project team must mandatorily provide the following:

- Construction workers are to be provided with adequate safety equipment such as safety helmets and shoes.
- First aid facilities are to be provided on the site.
- Safety nets are to be provided near accident prone areas on site.
- Safety signage to be displayed on site, preferably in multiple languages.
- Temporary handrails and barricades are provided at accident prone areas such as the staircases and building edges.

Few good practice examples are provided below:

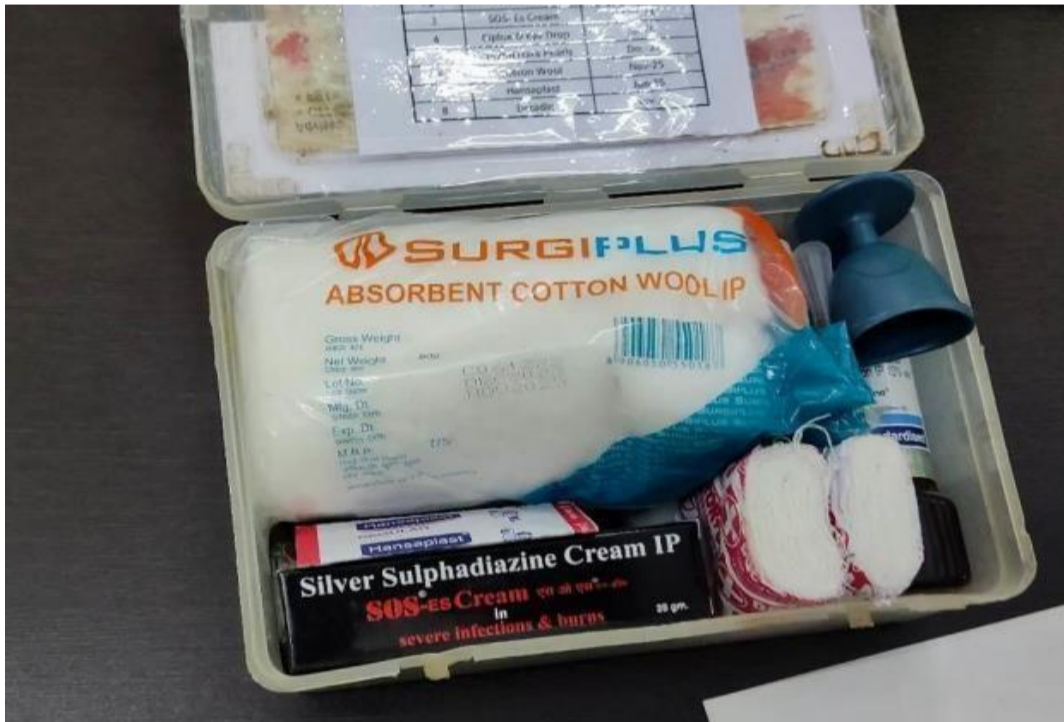


Figure 23: A good Example of First Aid kit provided on site for labour health and safety

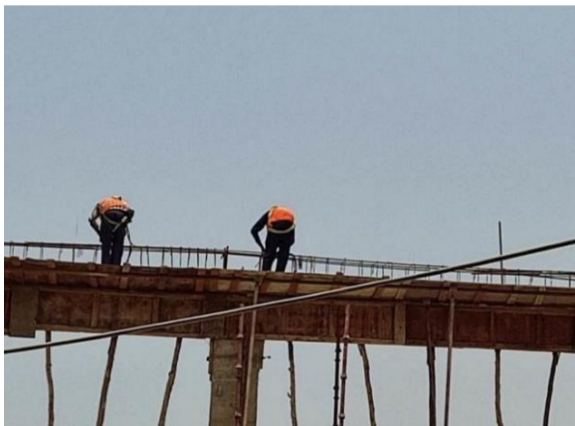


Figure 24: Few good Example of Construction workers wearing adequate safety equipment.



Figure 25: A good Example of Safety nets and barricading to be provided on site.



Figure 26: A good Example of Safety signage displayed on site.

24.1.2 : Ensure provisions for drinking water, hygienic working & living conditions and sanitation facilities shall be provided for the workers – **Mandatory**

Current Status: As the project is still in its initial stages of design, the following recommendations should be followed by the project team during the construction stage.

Recommendations: Construction workers are to be provided with safe drinking water, healthy and hygienic working & living conditions and sanitation facilities.

24.1.3 : Provide a crèche facility for children of construction workers – **1 point**

Non-applicability: If no families are allowed to work and live at construction sites, then appraisal 24.3 is not applicable.

Current Status: Construction has not yet started on the site. In case any families are working on-site the project team should follow the recommendations mentioned below.

Recommendations: The project team shall provide a crèche facility on site for the children of the workers if families are allowed to work on site.

Current point status:

Total	Yes	No
1	1	0

Criterion 25

Design for Universal Accessibility

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

25.1.1 : Compliance with National Building Code norms on Requirements for Planning of Public Buildings Meant for Use of Physically Challenged - 2 points

Current Status: As seen in the building plans, accessible toilets have been proposed; however, ramps have not been included in the project. It is recommended that the project team follow the below mentioned strategies.

Reference: 16 MAJ. QTR (16-01-2025).dwg

Recommendations:

The project is to be designed to accommodate differently-abled users, with the following design strategies proposed in accordance with the National Building Code (NBC).

- Ramps shall be provided at the ground floor level of the building with properly designed railings on both sides.
- Differently-abled parking spots shall be provided near the building entrance. The parking of the differently-abled should be properly demarcated and painted with appropriate signage.
- Uniform floor levels to ensure smooth movement across common and exterior spaces.
- Lifts should feature audio assistance and Braille, ensuring inclusivity for all users.

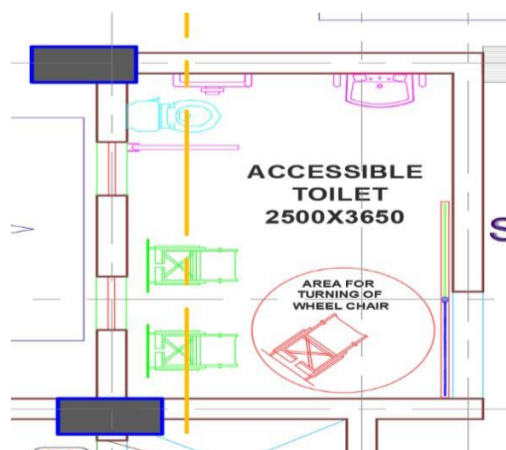


Figure 27: Accessible Toilet Provided in the project.

Current point status:

Total	Yes	No
2	2	0

Criterion 26

Dedicated facilities for service staff

Maximum points: 2

Applicable points: 2

Appraisal Requirement:

26.1.1 : Provide dedicated resting rooms for the service staff on site – **1 point**

Current Status: As seen from the drawings shared by the project team, dedicated resting areas have been proposed for the service staff.

Recommendations: None

26.1.2 : Provide toilets for the service staff on site – **1 point**

Guidance for estimation		
Assume total service staff population to be about 5% of total fixed building occupancy. If staff works in shifts, count the position only once.		
Fixtures	Male	Female
WCs	1 per 25	1 per 15
Washbasins	1 per 25	1 for 25
Urinals	Nil up to 6 1 for 7 – 20 2 for 21 – 45 3 for 46 – 70 4 for 71 – 100 Add 3% over 101 – 200 Add 2.5% over 200	

Current Status: As seen from the drawings shared by the project team, dedicated toilets have been proposed for the service staff.

Recommendations: None

Current point status:

Total	Yes	No
2	2	0

Criterion 27

Increase in environmental awareness

Maximum points: 1

Applicable points: 1

Appraisal Requirement:

27.1.1: Adopt measures to create environmental awareness – **1 point**

Current Status: As the project is still in its initial stages of design, the following recommendations are to be followed.

Recommendations: It is recommended that the project team provide dedicated display boards to be placed in common areas, such as lifts and entrance lobbies, for displaying posters about environmental awareness and sustainability.

Current point status:

Total	Yes	No
1	1	0

Section-IX

Performance Monitoring and Validation

Performance monitoring and validation are essential for optimising building operations, maintaining energy efficiency, and improving occupant comfort. As the world grows more aware of environmental sustainability and energy conservation, these processes have grown in relevance in building management. This section consists of four criteria.

First criterion consists of Smart metering and monitoring, it is essential for optimising building operations, maintaining energy efficiency, and improving occupant comfort. As the world develops more aware of environmental sustainability and energy conservation, these processes have grown in relevance in building management.

Second criterion of this section talks about the operation, maintenance and protocols, O&M standards are critical for assuring the effective and efficient operation of buildings, whether they are residential, commercial, industrial, or institutional. These protocols include a collection of principles, procedures, and routines meant to preserve the building's integrity, safety, and lifespan while optimising performance and lowering operational costs. Properly implemented O&M processes can result in increased energy efficiency, decreased downtime, and increased occupant comfort.

The third criterion in this part discusses the Performance Assessment for Final Rating and provides the option to review some of the criteria.

Fourth criterion of this section focus to the Innovation, which promote to implement some new innovation strategies for the project.

Criterion Number	Criterion Name	Maximum Points
Criterion 28	Smart Metering and Monitoring	8
Criterion 29	Operation, Maintenance Protocols	0
Criterion 30	Performance Assessment for Final Rating	0
Criterion 31	Innovation	4

Criterion 28

Smart metering and monitoring

Maximum points: 8

Applicable points: 8

Appraisal Requirement:

28.1.1 : Comply with the following basic metering requirements of GRIHA - **Mandatory**

Energy	Water
<ul style="list-style-type: none"> •Utility grid •On-site renewable energy system •Diesel Gen-Set 	<ul style="list-style-type: none"> •Municipal Supply •Bore well (if applicable) •Treated water outlet from STP •Captured rainwater (if applicable)

Current Status: The project shall ensure to install the basic metering for the locations mentioned in the above table to meet the mandatory requirements.

Recommendations: None

28.1.2 : Comply with the following extended metering requirements of GRIHA- **2 Points**

Extended Metering Required	
Electrical	Water
<ul style="list-style-type: none"> •AHUs •Indoor and Outdoor Lighting •Lifts and common areas 	<ul style="list-style-type: none"> •Irrigation •STP/WTP/ETP

Current Status: As the project is still in its initial design stages, no information on this is available.

Recommendations: In order to earn points in this criterion, the project team shall ensure the implementation of extended metering at all the above-mentioned locations.

28.1.3 : Installation of one-way communicable smart metering and monitoring system capable of tracking energy and water consumption through a web-hosted portal and also capable of the following, – **3 points**

- Hourly data reporting in near-real-time (no more than 15minutes delay)
- Energy mix breakdown and consumption patterns
- Water consumption patterns from various sources
- Ability to set energy & water consumption targets, alarms and pricing
- Ability to compare historical trends and benchmark data
- Real time monitoring with the user interface which operates even on mobile devices

Current Status: As the project is still in its initial design stages, no information on this is available.

Recommendations: None

28.1.4 : Connect to GRIHA Online Benchmarking platform (linked to smart metering) to allow for two-way communication on the following – **3 points**

- Monthly energy consumption (with fuel mix) and water consumption (with source split) with GRIHA IT platform.
- Receive, average energy and water consumption (normalized for building typologies, location and area) for display to building occupants to assess building energy and water efficiency.

Current Status: As the project is still in its initial design stages, no information on this is available.

Recommendations: None

Current point status:

Total	Yes	No
8	0	8

Criterion 29

Operation & Maintenance Protocols –Mandatory

Maximum points: 0

Applicable points: 0

Appraisal Requirement:

29.1.1 : Provision for a core facility/service group responsible for the O&M of the building’s systems after the installation as per GRIHA requirements. Inclusion of a specific clause in the contract document of the supplier of the system for providing training to the core facility/ service group responsible for the O&M of the building systems after installation, on the operating instructions/dos and don’ts/ maintenance requirements for the specific system, as per GRIHA requirements. Development of a fully documented O&M manual/ CD/ Multimedia /information brochure enlisting the best practices for O&M of the building’s systems as per GRIHA requirements – **Mandatory**

O&M protocol should be submitted for-

- HVAC plant- AHU, Cooling tower, Chillers and pumps, VRF
- Electrical- Transformer, DG, HT & LT panels
- Energy Systems- Solar PV, windmill, bio gasifier, etc.
- STP and/or WTP

Current Status: As the project is still in its initial design stages, no information on this is available.

Recommendations: The project shall ensure that a dedicated team is provided post occupancy for the operation and maintenance of all electro mechanical equipment and systems.

Current point status:

Total	Yes	No
0	0	0

Innovation (Bonus Points)

Maximum points: 4

Applicable points: 4

Appraisal Requirement:

Promote the adoption and implementation of innovative strategies in improving the sustainability of the project.

31.1.1 : 1 point per Innovation strategy up to a maximum of 4.

Examples of innovation:

- A GRIHA-certified professional (Trainer or Evaluator) is involved in the project from beginning to end)
- First Mover: Implementation of technology for the first time in the country.
- E-waste recycling
- STP technologies that do not use chemicals
- Net-Zero Energy/Water

Current Status: As the project is still in its initial design stages, innovation strategies have not been finalised yet.

Recommendations: To earn points, the project team shall ensure the implementation of the following strategies:

- GRIHA CP
- Use of green cleaning chemicals
- Provision for EV-charging
- Use of Astral or supreme PVC for plumbing purpose or can use paver blocks containing recycled aggregates.
- Use of paver blocks made from construction and demolition waste such as recycled aggregates.
- Provide EPD documents for the furniture to be installed in the project, highlighting its environmental impact.

Current point status:

Total	Yes	No
4	4	0

END- OF- REPORT
